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LOCALIZING THE MEDIA, LOCATING OURSELVES:
A CRITICAL COMPARATIVE ANALYSIS OF SOCIO-SPATIAL SORTING IN
LOCATIVE MEDIA PLATFORMS (GOOGLE AND FLICKR 2009-2011)

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A thesis submitted in partial fulfillment of the
requirements of the University of Westminster
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This dissertation is lovingly dedicated to my mother, Marta Cecilia. Without her unconditional support throughout my life this dissertation would not have been written. Gracias madre, te lo debo todo.

Abstract

In this thesis I explore media geocoding (i.e., geotagging or georeferencing), the process of inscribing the media with geographic information. A process that enables distinct forms of producing, storing, and distributing information based on location. Historically, geographic information technologies have served a biopolitical function producing knowledge of populations. In their current guise as locative media platforms, these systems build rich databases of places facilitated by user-generated geocoded media. These geoindexes render places, and users of these services, this thesis argues, subject to novel forms of computational modelling and economic capture. Thus, the possibility of tying information, people and objects to location sets the conditions to the emergence of new communicative practices as well as new forms of governmentality (management of populations). This project is an attempt to develop an understanding of the socio-economic forces and media regimes structuring contemporary forms of location-aware communication, by carrying out a comparative analysis of two of the main current location-enabled platforms: Google and Flickr. Drawing from the medium-specific approach to media analysis characteristic of the subfield of Software Studies, together with the methodological apparatus of Cultural Analytics (data mining and visualization methods), the thesis focuses on examining how social space is coded and computed in these systems. In particular, it looks at the databases' underlying ontologies supporting the platforms' geocoding capabilities and their respective algorithmic logics. In the final analysis the thesis argues that the way social space is translated in the form of POIs (Points of Interest) and business-biased categorizations, as well as the geodemographical ordering underpinning the way it is computed, are pivotal if we were to understand what kind of socio-spatial relations are actualized in these systems, and what modalities of governing urban mobility are enabled.

List of Contents

Abstract	
List of contents	
List of figures	
List of tables	
Acknowledgements	
Declaration	
Chapter 1. Introduction.....	1
Chapter 2. Elements for a critical approach to locative media	
2.1 Politics of information.....	11
2.2 Media and materiality.....	19
2.3 Social production, or the social factory.....	23
2.4 Participatory culture and the audience commodity.....	33
Chapter 3. Problematizing the 'locative'	
3.1 The spatial turn: re-locating communication.....	41
3.2 Locative media and the emergence of the geoweb.....	44
3.3 Media geography.....	53
3.4 Governmentality and geography.....	57
3.5 Critical GIS.....	61
Chapter 4. Methodology	
4.1 Methodological framework.....	63
4.2 Case studies introduction.....	67
4.3 Case Study 1: Google.....	68
4.4 Case Study 2: Flickr.....	72

4.4.1 Phase 1: Qualitative Analysis.....	73
4.4.2 Phase 2: Quantitative Analysis.....	75
4.4.2.1. Data.....	75
4.4.2.2. Other data.....	79
4.4.2.3. Data Analysis.....	80
Chapter 5. Places databases and the indexation of the world –	
The case of Google’s local platform	
5.1. Introducing the case study.....	82
5.2 Location platforms as geodemographic systems.....	85
5.3 The economics of geolocation.....	95
5.4 The surplus value of user-contributed local/location data.....	98
5.5 Location-based platforms’ spatial rationality.....	109
Chapter 6. The annotated city and the politics of visibility –	
The case of geotagged media in Flickr	
6.1. Introducing the case study.....	115
6.2 The generalized annotation of the world.....	119
6.3 An algorithmic sense of place.....	131
6.4 Spatial-visual regime.....	143
6.5 The affective engineering of the city.....	154
6.6 Geotagged Hackney: mapping the biopolitical city.....	159
Chapter 7. Discussion: Geocoding and the production of	
governable places	
7.1 The order of places: The world as a database.....	176
7.2 Geodemographics and the rationalization of social space.....	187
7.3 The cluster: a diagram of locative networking.....	193
7.4 Towards an environmentality critique of locative media.....	203
7.5 The securitization of mobility.....	212
Chapter 8. Conclusion.....	223

Annexes

Annex 1: Flickr Places API Methods.....	234
Annex 2: Hackney - Most Popular Tags per Neighbourhood.....	235
Annex 3: Dataset Summary.....	237
Annex 4: Dataset Statistics.....	238
Annex 5: Spatial Patterns Statistics Summary.....	242
References.....	243

List of Figures

Figure 4.1: Data mining methodology diagram.....	77
Figure 5.1: Google Local layout 2005.....	84
Figure 5.2: Google Places layout 2011.....	84
Figure 5.3: Google's Local listings sources.....	86
Figure 5.4: Google Places – Sentiment analysis of a restaurant.....	91
Figure 5.5: PlaceGraph of the Museum of Fine Arts, Boston.....	93
Figure 5.6: Place page of a point of interest – Victoria Park, London.....	99
Figure 5.7: Google's patent illustration of a geolocation module performing a location correction process.....	111
Figure 5.8: Google Places dashboard analytics.....	112
Figure 6.1: Geofence privacy feature.....	120
Figure 6.2: Flickr's all time most popular tags.....	122
Figure 6.3: Flickr Geotagging Groups – Content analysis.....	126
Figure 6.4: World Distribution of Flickr's Geotagged Content.....	139
Figure 6.5: Distribution of Geotagged Photos in London Comparison: Raw data Vs Filtered by Attention Metadata.....	141
Figure 6.6: Yahoo's WOID place ontology example for Stratford-upon-Avon.....	144
Figure 6.7: Distribution of Geocoded media objects in London Comparison: Flickr Vs Foursquare.....	148
Figure 6.8: Bing Maps' integration of Flickr's geotagged media. Overlaying of a historical photo of Pike Place Market (Seattle, US onto Bing Maps' Streetside imagery).....	150

Figure 6.9: Historiogram: Distribution of objects.....	152
Figure 6.10: Spatial point patterns: Locals (red) vs Tourists (black).....	153
Figure 6.11: Flickr Place Page layout.....	160
Figure 6.12: Map of Hackney's neighbourhoods boundaries according to user-generated geotagged content.....	162
Figure 6.13: Hackney - Aggregated Data Vs Hackney Group.....	164
Figure 6.14: Spatio-temporal distribution of Flickr's geotagged photos in Hackney (2007-2010).....	167
Figure 6.15: Spatial point patterns: Locals vs Tourists comparison (Hackney detail).....	168
Figure 6.16: Map of cultural and creative industries in Hackney (2005).....	169
Figure 6.17: Map of Hackney Geotagged content – Hotspots (Hackney Wick Detail).	169
Figure 6.18: Map of Hackney Geotagged content – Hotspots (Hackney District Detail).....	170
Figure 6.19: London2012 Group - Popular Tags.....	172
Figure 6.20: Distribution of Tags: Gentrification Vs Regeneration.....	173
Figure 6.21: Map of London Property Hotspots 2008-2012.....	175
Figure 7.1: Geodemographic profiling model: London and New York clustering segmentations based on Foursquare's data.....	191
Figure 7.2: Nearest Neighbor Classification Diagram.....	195
Figure 7.3: Nearest Neighbor Network Topology.....	198

List of Tables

Table 1: Thematic Mapping Groups by Category – Examples.....127

Table 2: Places APIs technical specifications.....181

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DECLARATION

I declare that all the material contained in this thesis is my own work.

Chapter 1

Introduction

My own interest in geolocation stems from a fascination with the possibilities opened up by the availability to the general public of GIS capabilities over the Internet. With the social adoption of geolocation technologies such as satellite navigation devices or online mapping services, the map seemed to me to be rising as an alternative metaphor for how we organize and access information, especially as the mobile phone has grown as a platform to access the Internet, and the new generation of smartphones are all map-based and have in-built GPS systems. So I conducted research for my Masters dissertation on online maps as interactive media interfaces and their use in the context of online news as a means of presenting information to audiences.

In view of that, when I began this research project my main aim was to offer insight into how media annotated (or tagged) with geographic information (i.e., geocoded media) and its display on mapping interfaces shapes contemporary communication, and what was the implied politics of knowledge embedded in this media practice. This thesis started then as an exploration of the practice of media geocoding, however, I would soon realised that the significance of location to contemporary communication is far greater than just the access of information through mapping interfaces. Location is becoming prominent for our communications at various levels. At a protological level, location is even claimed to constitute a data subsystem (O'Reilly, 2010), an organizing principle for information in its own right. Gordon and de Souza e Silva have further argued that 'the new organizational logic of the web is based on physical location' (2011, 7). Location governs information in various ways. Today, Geo IP can determine a visitor's geographical location and deliver locally targeted content, or even

set access privileges to information accordingly (Kjar, 2011). In a similar way location can be used to enforce national copyright laws. Conversely, location data is also used to locate ourselves: from serving as a means of self-presentation, belonging and peer valorization (sharing location) to consumer segmentation (marketing). In this sense—as the title of this dissertation suggests—I adhere to Greg Elmer claim that ‘the locative’ enacts a double logic of finding and being found that has become inherent to digital networked media (2010).

This realization changed my formulation of the problem and opened up new research avenues. The problem of location-based indexation of the media in relation to broader questions of control (both of information and users) became central. In order to follow this line of research the understanding of the technological underpinnings of locative media was a necessary condition to examine different mediations of space and (local) knowledge. Some readers might regard this approach as a fetishization of the technical that forecloses the social and the political. I claim the contrary. As Eugene Thacker remarks, the technical aspects matter, and matter politically for "the question 'how does it work?' is also the question 'whom does it work for?'" (Galloway, 2004, xii).

This material approach to media widens the research lens to include the examination of the specific techno-economical frames of geocoded media. Drawing from Mackenzie's elaboration of the concept of transduction as 'a way of thinking about technologies processually' (Mackenzie, 2003 cited in Galloway, 2010, 29), Anne Galloway proposes an approach to the study of locative media which shifts the 'focus from networked objects or spaces to diverse procedures or performances in which social, spatial, and technological assemblages or associations take shape'. An approach capable of accounting for the 'shifting socio-technical arrangements' in which locative media is implicated (Galloway, 2010, 30). This research project is set out, accordingly, to explore how location is articulated into different technical, economic and cultural assemblages.

Past years have seen the rapid rise of the so-called geoweb fuelled mainly by the proliferation and social adoption of mapping and location-based services. Today media objects are commonly geocoded and mapped. Geocoding information has become part of the webmasters' protocol of best practices of search engine optimization, while our location-enabled devices (the majority of smartphones) automatically geocode our media products. These estimate figures from 2011 are indicative of the current prominence of geocoded objects populating the media ecology of the city: half a million geotagged places in Wikipedia, ten million annotations in WikiMapia, eight hundred million GPS contributed to OpenStreetMap, ten million Google placemarks, two hundred million geotagged photos in Flickr, and half a billion Foursquare check-ins (Graham and Zook, 2011). The seamless integration of geocoding into our everyday communications may make location a default protocol setting of communication, and soon a taken for granted dimension of communication retreated into the background of our daily life media practices—our 'technological unconscious' so to speak (Thrift, 2004).

Indeed, Sean Cubitt considers that the media episteme of the early 21st century is essentially spatial, and it is composed of three core technologies: geographic information systems (GIS), spreadsheets, and databases. The underlying operating principle of this media system, Cubitt argues, is the spatialization of time: 'identify[ing] points rather than continua' whilst 'excluding both semantic reference and temporal change' (2009). The social adoption of location-based services, coinciding with Google's launch of its mapping service Google Maps in 2005 and the steady penetration of location-enabled mobile devices, has intensified this tendency towards the spatialization of the media. Whilst the figures of geocoded media cited above seem to suggest the formation of an overcoded world as the immaterial layers of media annotation continue to stratify onto physical space.

This thesis considers that as location and the nearby environment become central for our communications, governing information and visualizing populations in new ways, a critical engagement with location technology is

urgent. That is to say, there is a need to interrogate the modes of power involved in this technological organization of communication.

To pursue this approach, we shall start by placing the technologies enabling location-aware media in the perspective of their military and commercial development history. As other core technologies composing the infrastructures of our current communications systems (e.g. the Internet), the Global Positioning System (GPS) originated as a military technology in the post-Second World War context of militarism and globalization. As such, 'GPS provide[d] a global perspective, both essential to a US military hegemony and consistent with the needs of a US-born global capitalism' (Wilson, 2012, in press). GPS remained of exclusive use of the military until 2000 when the US President Bill Clinton opened the system to commercial and civilian use. Then followed a period where social experimentation with location technology, mainly from within the media arts and activism, prevailed over commercial ventures. Three main developments would contribute to the final commercial embracing of location through the offer of location-based services (LBS), and the subsequent widening social adoption: 1) the integration of the Internet and location technology (i.e. the geoweb) epitomized in Google's launch of its GIS platforms Google Maps and Google Earth in 2005. This development made location services accessible and popular while enticed entrepreneurs and venture capitalists to capitalize on potential business opportunities. 2) The raise of mobile communication. By the end of the first decade of the 2000's the mobile phone developed into a networked media platform powered by the parallel development of associated wireless network infrastructures. The move to mobile communication grounded the Internet so to speak - allegedly a space of transnational networks -, prioritizing the local by connecting people to their physical surroundings while on the move. As a matter of fact, the most popular software applications on mobile phones are maps and the weather (comScore, May 7th 2012). Mobile phones' location affordances triggered a second wave of LBS. And lastly, these developments are inscribed into 3) the more general change in computation toward location-based mobile

computing (i.e. ubiquitous or pervasive computing). This shift marked a transition in our media ecology from the desktop to environmental or context dependent forms of media (e.g. mixed reality).

Whereas first location-based services operated basically on abstract location data (e.g. GPS geographic coordinates, Wi-Fi and cell tower data), current location-based services translate that data into human-readable information such as places names—a process known as reverse geocoding. This way, geocoded media objects are converted into a form of rich metadata about places. Insofar as geocoding establishes an indexical relationship between media and a location, geocoded media constitutes therefore at the same time an annotation of the place it is linked to. Thus, locative media represents a form of spatial annotation, that is to say, a form of inscribing or ‘writing down’ space. This spatial indexing of media, the possibility of tying information, people and objects to a specific location, sets therefore the conditions to the emergence not only of new communicative practices (e.g. location sharing) but also, and critically, new forms of governmentality.

Having set this context, the main research question guiding this research is: in the ongoing situation of social adoption of location-aware communication and the subsequent explosion in the production of location data, how is geocoded media articulated into different technical, economic and cultural assemblages? And how these different articulations produce or reproduce power relations?

There is still scarce critical research on commercial locative media (Zook and Graham, 2007a; Munster, 2008; Parks, 2009). And while there is a growing body of research within media geography focusing on mapping geocoded media to examine how places are represented online (Graham and Zook, 2007b, 2010; Graham, 2011; Zook et al., 2011), to the best of my knowledge there is no extensive and theory-informed research on the technicity of media geocoding as such. This project is therefore essentially exploratory. To that end, it chooses a case study methodological strategy in order to map out different locative forms of mediation and problematics. Selection criteria for

the case studies considers platforms that shed light on different cultural, social and political dimensions of media geocoding while covering different types of location services. The first case study centres on Google—the main player in mapping and local search—looking at how its local platform harnesses local/location data for search and advertising. This case revolves then mainly around issues of local information indexation and consumption, and more broadly the economic dimension of local/location data. The second case study is devoted to user production of geocoded media on Flickr, looking at its community of 'geotaggers' and repository of geotagged photos. It brings to the fore the more cultural and social aspects focusing on geotagging and location sharing. Though data from location sharing platform Foursquare is also embedded in the case study for comparative purposes.

I should clarify that my objective is not to provide a detailed account of locative media. The research scope comprises only commercial locative media forms corresponding to the post-2005 era, abovementioned, and restricts what is a much wider array of location-based services to geotagging, local search, and location sharing. Moreover, I would also like to clarify that this study does not address the problem as to how users interact with location-based systems or how they experience the mediation of space and place and the effects of such mediation on them. Rather, it questions how code/software might mediate those effects (Kitchin, 2011, 950). In this sense, the study does not consider users in the complexity of their singularities and everyday media practices. Though this is an important research avenue, such phenomenological direction is beyond the scope of this research. This research does not address locative media in its representational or semiotic dimension either. That is, how it represents places either through the interface or media content (annotations). My concern is rather to examine modes of representation at the back-end ontological level of data models and formal logics, that is to say, looking at how social space is modelled and computed. Finally, one of the most relevant and most commonly discussed subjects in regards to location data is privacy. Although this dissertation considers practices of surveillance, they are framed as marketing practices,

economic surveillance as it were, and assessed in relation to the population taken as a whole (i.e. a mass subject) rather than to their implications for the private life of individuals.

Given this purpose, the examination of the case studies is deployed in three basic levels: a) an operational level: looking at how the platforms under scrutiny work to articulate users and third parties' information based on specific algorithmic logics in order to produce knowledge of places; b) a cultural level: looking at the way that locative platforms act on social and cultural practices; and c) a political economy level: looking at the way media geocoding is congealed into specific economic configurations.

To answer the research question, this project incorporates Latour's actor-network theory as a methodological frame to think about locative media platforms as techno-socio-cultural assemblages. My major methodological influence, however, comes from the field of 'software studies' as well as the methods of 'cultural analytics', i.e., the use of data mining methods and information visualization for the exploratory analysis of patterns in large sets of cultural data (Manovich, 2007). I draw particular inspiration from the scholarly work of Friedrich Kittler, Matthew Fuller, Lev Manovich, Adrian Mackenzie, David Berry, Wendy Chun, and Alex Galloway—to name only some of the most influential scholars working within this paradigm for media analysis. A 'software studies' approach to media turns to the material specificity of our technical systems seeking to illuminate cultural and social phenomena. Accordingly, I adopt this perspective 'to make visible the dynamics, structures, regimes and drives' (Fuller, 2003, 32) at work on the chosen platforms. 'Software studies' framework serves as a means to scrutinize the technical layer of these systems in order to make legible some of the cultural and political logics that underpin current forms of location-aware communication. As such, the research line of enquiry is informed by the question: how social space is 'captured within code in terms of algorithmic potential and formal data descriptions' (Dodge et al, 2009, 1285). This dissertation particularly builds on the insights of four key geographers

that have laid the theoretical foundations for a program of research on the imbrications of code/software and space: Nigel Thrift, Stephen Graham, Martin Dodge and Rob Kitchin. Moreover, the theoretical framework is also grounded in autonomist Marxist political economy in order to analyze the always problematic articulation between media cultures and proprietary systems. Lastly, this research inscribes itself within the larger problem of biopolitics and governmentality inaugurated in the work of Michel Foucault. In this light, it interrogates how programs of government and discursive regimes inform the shaping of these socio-technical systems. I fuse therefore the medium specific approach of 'software studies', the analytical tools of autonomist Marxist political economy, and Foucauldian governmentality analysis in order to examine locative media in relation to practices of visibility, mobility, and control.

In the final analysis this thesis argues that the geocoding of the media and its assemblage into geoindexes renders social space subject to novel forms of governance. When the formal logics embedded in locative systems are put to work to sort and orientate us in the physical world new power compositions are cultivated, which might potentially impact our relation to the urban environment and the composition of social space as such. That is, the way we see the city and experience urban life.

My argument proceeds as follows. In chapter two I elaborate on some analytical tools for a critical assessment of locative media. First I discuss a politics of information approach, framing the analysis of power relations in terms of information flows dynamics, protocols of communication, and network power laws. Next I argue for the pertinence of a material understanding of communication and culture. I then shift the focus to explore digital culture from the perspective of value production. In this section I draw from autonomist Marxist theory to lay down the elements for a critique of the political economy of locative media. I engage with debates on the role of communication, affect, and attention in the production of value in information capitalism.

Chapter three main aim is to locate 'the locative', so to speak, as a problematic site of intersection among various fields and subfields: human geography, media geography, cartography, GIS science, computer sciences, media studies and the arts. The first section discusses the resurgence of the interest in the spatial dimension of communication, manifested today in the prominence of themes of space, mobility and the city in recent media studies scholarship. Next I address the emergence of the geoweb (i.e. location-enabled web) in the broader perspective of locative media's history. Then I discuss how the geodisciplines have problematized this technological and social shift in GIS, addressing issues of user-generated production of spatial data and knowledge politics. The following subsections introduce media geocoding and one central problem framing this dissertation, namely how code shapes spatiality. Lastly the chapter engages with the encounter between Foucault's governmentality analytics and questions of coding space, population, and (geo)surveillance.

Chapter four outlines the research strategy. Initially, it discusses the assumptions underlying the methodological approach, and then it proceeds to present the case studies and their respective methodology designs.

Chapter five comprises the first case study: Google's local platform 'Places'. The case study shows how Google appropriates user-generated local/location information through different mechanisms in order to commoditize the online presence of places. To develop this analysis I first start by examining the basic components of the platform and describing the technical processes whereby Google ensembles the database of places underpinning its local search service. Then I discuss Google's mode of processing local data to conclude that the way its 'PlaceRank' algorithm sorts places, that is, its ordering logic, should be understood as geodemographical. In the second half of the chapter I move to develop a political economy of local search. Firstly, I consider how Google articulates location within its business model. Then I go on to identify the different modes of capture of local data and users' labour as the main sites of value

production in its 'database economy'. I end with an account of the locative advertising and marketing services through which Google capitalizes on its database of places.

Chapter six presents the analysis of geotagging in Flickr. The first part of the case study addresses user production of geotagged content. By looking at Flickr's community of 'geotaggers' I map out different cultures of use and explore the types of (local/locational) knowledge they produce. Next, by considering Flickr's 'Interestingness' algorithm, the study investigates how algorithmic regimes function as a vector of asymmetrical visibilization in the way the city is mediated through the platform. Then the attention shifts from the algorithm to the examination of the databases supporting the platform's geocoding capabilities. The study ends by exploring potential articulations between spatial annotation and broader circuits of affect, culture, and capital in urban spaces.

In the final chapter I discuss and further explore the case studies' findings. It comprises two basic lines of discussion. The first one traces the genealogy of the geocoded world to its origins in the eighteenth and nineteenth century America with the advent of the technology of address. Highlighting how geocoding actually precedes GIS and GPS technologies. The aim is to understand how space came to be rendered inscribable and under which specific power/knowledge configurations. The second line of discussion centers on the way social space is categorized, encoded and computed in location-based services to argue that the form of this configuration is pivotal to understand what kind of socio-spatial relations are enabled in these systems. Subsequently, I formulate a diagram of locative networking in order to elaborate the thesis that contemporary location-based services are underpinned by a geodemographic ontology. Finally, and drawing from Foucault's work, I propose an environmentality critique of locative media as a means for thinking through its different mechanisms of government.

Chapter 2

Elements for a critical approach to locative media

'Software challenges us to understand new forms of technological politics and new practices of political invention, legibility and intervention that we are only beginning to comprehend as political at all' Thrift and French (2002).

2.1 Politics of information

The Internet seems to embody a fundamental paradox. Despite the fact that its network architecture raises promises of democratization and egalitarian exchange of information, as it continues to grow we are witnessing, on the contrary, how few companies and services are concentrating the most users and dominating an ever-greater share of the traffic. According to a research report, Internet traffic is less proportionally distributed today than it was five years ago (Arbor Networks, 2009). There is a manifest trend in Internet growth towards concentration of traffic in an increasingly smaller set of companies. "Out of the 40,000 routed end sites in the Internet, 30 large companies—'hyper giants' like Limelight, Facebook, Google, Microsoft and YouTube—now generate and consume a disproportionate 30% of all Internet traffic" (Arbor Networks, 2009) (see also: Alexa.com rankings of top sites). The freely democratic model of communication commonly attributed to the Web has been contested by research in network science. Research in network science has revealed that the Web is fundamentally asymmetrical (scale free) rather than an equally distributed, with few nodes amalgamating the most connections (20% of nodes have 80% of links) (Barabási, 2002). This asymmetrical network topology is the result of most people linking to few and more robust and established nodes in the network; a process Barabási calls 'preferential attachment' (2002). Network effects reproduce therefore

power relations insofar as a vector of centralization is reintroduced via these power laws, fostering concentration and formation of information monopolies. The same power law distribution functions at the micro level of users within networks. For instance, approximately only 5% of Twitter users have more than 100 followers, and the top 10% of users accounts for over 90% of all tweets (Heil and Piskorski, 2009). These network laws have been observed since the first MUDs, BBSes, and online communities, to the current so-called Web 2.0. Even regardless market forces, the very act of choosing among different information sources creates necessarily a power law distribution and as a consequence forms of centralization (Shirky, 2003). Network analysis' insight is that despite being a decentralized many-to-many and one-to-many information system, there is an embedded hierarchical architecture in the Internet that operates under democratic principles.

Google has extensively praised that 'democracy on the web works'. An ideal embodied in how its PageRank algorithm organizes information based on links as indicators of votes. Google states in its webpage: 'Google PageRank relies on the uniquely democratic nature of the web by using its vast link structure as an indicator of an individual page's value'. Along with other apologetic discourses of democratization that flourish in many accounts of the Web, these ideals are often based on a fundamental misconception: the belief that connectivity immediately implies collectivity, i.e. more communication access would foster consequently more diverse and democratic social formations. As Thacker claims, 'while connectivity may be a prerequisite for collectivity, the reverse does not apply' (2004). That is to say, connecting to the Web and being able to participate do not necessarily lead to richer communicative exchanges and forms of democratic participation. In Jodi Dean's view, in fact, 'communicativity hinders communication' (2005, 59), and the abundance of messages produced is not necessarily an indicator of democratic potential. What is at stake in networked communications, Dean goes on to argue, is rather a 'fantasy of participation' induced when the very act of contributing (e.g. posting a comment on a blog or uploading a video on Youtube) carries with it the belief

that the message will be received and elicit a response accordingly, foreclosing, to borrow from Lacan, the aforementioned topological framing in which the contribution is embedded (Dean, 2005, 60). From Dean's standpoint, messages that rarely elicit any response become mere contributions to the flow of data, losing as a consequence their communication value: 'The use value of a message is less important than its exchange value, its contribution to a larger pool, flow or circulation of content' (Dean, 2005, 59). For network communication is framed by asymmetrical systems where many voices can speak but few are heard, most contributions are essentially then, to put it in Bernard Stiegler words, 'ghost communication'. Thus, an informational milieu dominated by few hubs, in which communication is mostly self-referential (Boyd, 2005), sets the conditions for cultural production in network cultures.

Any attempt of analyzing the politics of information - Richard Rogers claims - has to acknowledge therefore the fact that on the Web any source of information is competing to be the leading source, and hence dominate the most traffic (2004). This is a struggle for prominence, but most importantly for inclusion. With so many sources competing for users' limited attention the possibility of establishing communication could be easily reduced to be ranked on top by search engines—the so-called 'battle for ranking' (Introna and Nissenbaum, 2000). According to eMarketer figures (2010) 95-96% of search engine referrals come from page one of the results. A limitation even more critical as empirical research has shown that users trust and are heavily influenced by these rankings (Pan et al., 2007). Despite the open architecture of the Web guarantees that any resource can be accessed from any node in the network (retrievability), this condition does not translate into equal visibility for every resource. While retrievability online is absolute, visibility is relative (Hindman, 2003, 4). The fact that search engines channel the largest share of Web traffic, and that they filter and rank it mainly based on the amount of inbound links a given web resource has (e.g Google's PageRank ranking algorithm), contribute to the concentration of information in heavily-linked sources. This power law of information whereby the most

heavily linked sources dominate networks represents therefore a new form of exclusion. Moreover, it foregrounds the fact that technical architectures underpinning digital networked media and their embedded logics are at the core of communication power today.

Hence, the politics of access, inclusion/exclusion from the flows of information and communication, are central to power struggles in the information order (Lash, 2002, 4; Scholz and Hartzog, 2007). A case in point is the current policy debate on net neutrality. If regulators fail to guarantee the neutrality of the Internet architecture, platform operators could become content gatekeepers capable of discriminating access to the network, either by slowing down traffic or even blocking it. Of keen interest too are the practices of web governmentality currently being put in place by governments and corporations demanding ISPs or Internet companies to regulate access to information. For instance, Microsoft, Yahoo and Google have complied with Chinese government's injunction to self-censoring. Also noteworthy is the widespread practices of automatic discrimination of flows. Graham has pointed out that 'computer algorithms are being used [...] to allocate different levels of service to different users on an increasingly automated basis' (2004, 325). Not to mention radical forms of exclusion from the networks of communication as such, the so-called digital divide. In this regard, Tongia and Wilson (2007) empirical analysis on network exclusion has shown that the costs of exclusion increases faster than the value of inclusion. 'The depth of exclusion's costs—the researchers argue—will begin to spread back into the wider society' (Tongia and Wilson, 2007, 22). Put in Lash's words, 'social class becomes a question of access to the platforms' of communication (2002, 25).

Analyzing power relations in terms of information flows brings out a rich set of discussions. Flows of information, Lash contends, have gained hegemony in distributed networks as the institutions of the disciplinary society have been de-territorialized. Nevertheless, such de-territorializations do not necessarily presuppose new degrees of freedom, but also imply new re-

territorializations ('networks and actor-networks') that eventually become the standards and platforms imposing regulative regimes on information flows (Lash, 2002, 205-206). This is precisely what Alexander Galloway refers to as 'protocological control' (2004).

Galloway extends Deleuze's analysis of control to ask how power is configured in networked forms of organization. Drawing on Deleuze (1991), Galloway argues that the key to understand what the French philosopher calls the control societies lie today on information technologies and computers (2004, 4). His basic argument is that although distributed networks seemingly decentralized power, the mechanisms of control remain concealed in code. Distributed networks of information would exercise then novel forms of control that operate primarily at a non-human level. Galloway encompasses such forms of control under the concept protocol:

protocols are all the conventional rules and standards that govern relationships within networks [...] if networks are the structures that connect people, then protocols are the rules that make sure the connections actually work (Galloway and Thacker, 2003, 8).

Galloway goes on to argue that communication on the Internet is encapsulated within a set of different layers of technical protocols (e.g. TCP/IP, the Web, etc.) that, while constituting the very mechanisms of control, they are at the same time the condition of possibility for communication as such. For an example of how protocol regulate information and format communication, let's consider Twitter's architectural change in its reply system (May 2009). Twitter considered 'undesirable' that users could see the messages users belonging to their network send in reply to users out the network. By doing so the platform reframes sociality by not allowing people to follow conversations taking place at the fringes of their respective networks anymore. The architecture of the reply system in Twitter determines then community formation and ultimately reformats sociability. With protocols of communication, Castells argues, 'power is exercised not by exclusion from

the networks, but by the imposition of the rules of inclusion' (Castells, 2009, 43).

Nonetheless, Langlois *et al.* (2009) put into question the applicability of Galloway's model in the context of the current Web 2.0, which is characterized for a proliferation of protocols. Arguably, the actual evolution of the Web carries with it a new architecture of protocols that cannot be fully grasped by only focusing on the 'informational dynamic of single protocols' (Langlois *et al.*, 2009). In Galloway's view, TCP/IP protocol would encapsulate all protocols in a hierarchical and rather unproblematic articulation. In contrast, new Web architectures (i.e. Web 2.0) comprise a much more complex interplay of protocols that sometimes even compete among them (XHTML, XML, JavaScript, AJAX, PHP, databases, API's, etc.) (Langlois *et al.*, 2009). Thus an encompassing approach to protocol falls short to explain the complexity and multiplicity of the protocological assemblages at stage. In a similar vein, Castells suggests that this proliferation of protocols of communication, in what he terms 'mass-self communication', may have even diminished protocols as a source of network power, since, compared to standardized forms of mass communication, the messages can be formatted in more forms (2009, 418).

Langlois *et al.* argues therefore for a platform-based approach to protocol that takes into account the myriad of technocultural articulations at play shaping communication in Web 2.0 architectures:

conceptualizing Web 2.0 spaces as platforms helps highlight the need to examine the modularity of Web 2.0 spaces in order to see how they arise as sites of articulations between a diverse range of processes and actors (2009).

Nevertheless, neither the Web can be encapsulated in the analysis of a single nesting protocol (Galloway, 2004), nor it can be assumed an scenario of multiple technical architectures. The current evolution trend of the Web shows a turn towards consolidation of a reduced set of protocols. According to industry research, whereas Internet applications used to communicate

across 'a panoply of application specific protocols and communication stacks', 'today, the majority of Internet application traffic has migrated to an increasingly small number of web and video protocols [...]' (Arbor Networks, 2009). These findings also showed a decline of peer-to-peer networks traffic over the past two years (Arbor Networks, 2009), often regarded as the non-hierarchic alternative platform for cultural production (P2P sharing culture) (Uricchio, 2004) and political contestation (P2P activism) (Waltz, 2005).

By focusing the locus of control exclusively on the technicity of protocols, we might overlook the fact that they are to a certain extent socially negotiated, even in a democratic and transparent way for the most part (e.g. W3C). Accordingly, there is also a social dimension to protocol that should be interrogated by looking at 'the motivations, finances, and structure of the human agents that create them' (Halpin, 2008). There are even cultural biases at play in protocols' production and implementation that need to be examined in order to understand their particular configurations. In this light, Langlois *et al.* open up the analysis of protocol to legal, economic, social and cultural processes: 'it becomes central, in turn, to figure out not only the articulation of protocols with other protocols, but also the articulation of protocol with other technocultural dynamics' (2009).

Here, I would like to draw attention to another form of protocol, metadata, a key protocol at play in information politics today. Metadata - data about data - is a descriptive protocol for information that is gaining great importance under the ongoing evolution of the Web (semantic web) in which data is being enriched with metadata. Behind Tim Berners-Lee's proposition of a semantic Web lies an attempt to standardize the logical encodings of information, which on the one hand would make information easy to discriminate, monitor, and manage by machines; while, on other hand, guaranteeing the possibility of different forms of access to data. So, in a context of media mobility, characterized for the circulation of media between people, devices, and the Web (Manovich, 2008), metadata plays a necessary role as data identification that guarantees the possibility of such circulation. In this sense

metadata is not just mere description of data, but ultimately it is also a mechanism to control the access to data. Metadata implies, thus, new implicit power relations. To a certain extent the question of metadata is also the question of governance to access to information.

Any political account of metadata must also address the intersection between the mobility of media objects and the anchoring of such mobility in property relations. Traditionally, the industry has developed identification codes in order to enforce control over copyright and regulate the circulation of its products, e.g. ISBNs for books, ISSNs for periodicals, ISWC for music, etc. (Dodge and Kitchin, 2004). Hence the appearance of digital networks of distribution that facilitate non-regulated flows of information among users (e.g. P2P networks) has placed metadata - as identification code for informational goods, and ultimately as a mechanism to enforce law over them - at the centre of property wars. For instance, Internet music suppliers (e.g. iTunes, Napster, Yahoo Music) encode music with metadata-based DRM (Digital Rights Management) to prevent users to share information regaining control over data flows, and enforce ownership. This is precisely what Larry Lessig points to when he claims that code has the force of law:

In real space recognize how laws regulate - through constitutions, statues, and other legal codes. In cyberspace we must understand how code regulates - how the software and hardware that make cyberspace what it is regulate cyberspace as it is (Lessig, 1999, 6).

Another important aspect to take into consideration is the power/knowledge relations at play in the Web 2.0 informational regime. Social media technologies are contributing to the massification of metadata by enabling users to categorize data using tags. This way indexing is not centralized anymore in the hands of expert programmers and automatic systems (top-down ontologies) (Weinberger, 2007). Public participation on metadata production constitutes then a socially driven way of classifying information (i.e. social ontology or folksonomy). Hence, if knowledge is linked to systems

of power that produces it, and to effects of power that it induces, following Foucault, what are user-contributed metadata politics of knowledge and power effects? Metadata production, in the form of bottom-up annotation and indexation of information, could represent a shift from the industrial mode of production (unidirectional — from producers to consumers) to a model founded in collective production (multidirectional) (Stiegler *et al.*, 2009). However, Stiegler warns, this could also lead to a scenario of what he terms 'automatic voluntary servitude', whereby capitalism manages to absorb the cognitive surplus generated by these bottom-up forms of knowledge production. This way, Stiegler locates the question of metadata at the core of the political economy of information.

2.2 Media and materiality

Another line of thought to be considered is how protocols affect the production of new forms of cultural signification. This enquiry necessitates a material understanding of culture that overcomes the traditions dualism in the social sciences and humanities between culture and technology (Debray, 2000; Leroi-Gourhan, 1988; Stiegler, 1998; Kittler, 1990, 1999). From the perspective of the French anthropologist Leroi-Gourhan, there is a transductive relationship between culture and technology, that is, a relation in which both terms are constituted by the relation (1988). In this sense, roughly put, culture is what technology makes possible. In a similar manner, Lash argues that such dualism could only be conceived within a culture of representation that places the subject in a dualistic relation with the cultural object. Conversely, the subject is in the world with things (Lash, 2002, 156). Information technologies do not simply mediate culture, they constitute it. Further, Adrian Mackenzie proposes that information technologies such as multimedia devices, operating systems, search engines, algorithms, protocols, etc. have become 'cultural-objects' 'by virtue of the density of the mediations and relationality that run through them and texture them' (2009, 74).

Appropriately Langlois proposes that cultural analysis of the Web not only has to acknowledge how it is shaped by social processes, but crucially they have to assess also the cultural possibilities that are embedded in the articulation of different technical layers:

Web standards should not only be analyzed as transmission devices, but also as representational devices. In order to operate this shift, it is also important to consider technical standards and computer processes not only in terms of the control and limits they express, but also in regard to the cultural environments they create (Langlois 2005, 577).

Tiziana Terranova goes a step further in this material understanding arguing for an informational dimension to contemporary culture. On Terranova's view culture unfolds in a complex milieu of information flows, and takes as a consequence informational attributes:

If there is an informational quality to contemporary culture, then it might be not so much because we exchange more information than before, or even because we buy, sell or copy informational commodities, but because cultural processes are taking on the attributes of information - they are increasingly grasped and conceived in terms of their informational dynamics (Terranova, 2004, 7).

In this view, what is at stake is not a preponderance of information as production of symbols as such, but rather its circulation (Lash, 2002, 176). Google may be a clear example of this logic. Whereas previous media empires (e.g. News Corp) relied on the control of content, the Internet's giant is relatively indifferent to it. Instead, Google is pure mediation of information flows. Its business relies not on content production but on connecting users with the content they are interested in. 'They [Google] aim to control, and hence profit from, relations between information—any information' (Lovink, 2008). Google accumulates then value monitoring these relationships, which it exploits through its advertisement system (Adsense and Adword). In this way informational dynamics are increasingly gaining priority over the

formation of meanings (Terranova, 2004). The key political question seems not to be just about meaning anymore, but instead about the production of relations between information and users.

The Web as a metamedium—a medium for the structuring of information—actually foregrounds form over content (Evens, 2009). For instance, XML and XML-based languages (RSS, XHTML, Atom, etc.), a widely used protocol to describe and interchange data over the Internet, represents a way of formalizing content as a feature of structure. Here, I would like to draw attention again to Galloway's account of protocols. Galloway points out that although protocols encapsulate and distribute content, they remain indifferent to it. Protocols manage data no meaning. Though it is a matter of debate whether machines could interpret the semantic web, built on well-defined data, meaningfully.

In media and cultural studies the political dimension of culture is usually presented in terms of a struggle over meanings. Particularly noteworthy is Castells' account of communication power (2009). In Castells' view power is the capacity of programming the global networks of communication to shape the human mind through the construction of meaning. Where counterpower would imply resisting such programming and reprogramming networks to defend alternative discourses (Castells, 2009). Despite the fact that Castells acknowledges that the material characteristics of the medium format the message and determine its possibilities of distribution, his communication theory of power is strongly focused on representation in terms of meaning construction and reception between senders and receivers. Ultimately, Castells claims, 'discourses frame the options of what networks can or cannot do' (2009, 53).

On the other hand, another set of authors call for a shift from a focus on the register of meaning to the register of operability (Lash, 2002; Terranova, 2004; Mackenzie, 2005; Langlois, 2008). That is, to interrogate the technical conditions within which meaning can exist. Most research on information networks continues to be centred on issues of representation, identity,

consumption, collectivity, democracy, etc.; whereas the material understanding of information architectures is still overlooked for the most part. By downplaying the technological, Mackenzie points out, it is harder to see how certain domains of technical practice become significant within the political (2005, 382). In 'Code and Other Laws of Cyberspace' Lessig (1999) brings to the fore the technological in order to look into the political. In his view the very architecture of the networks enables certain forms of culture and further imply a social order; and any change in this architecture could transform culture and society.

A media-technological framework draws also the attention to the political dimension of code/software (Grusin, 2000; Fuller, 2003, 2008; Chun, 2004; Elmer et al, 2007; Langlois *et al.* 2009). Langlois *et al.* proposes that politics at this level should interrogate 'how actors have literally encoded the Web for their political purposes' (2009). Such political approach would function at various other levels though. Some accounts centres on the intersection of code and proprietary relations in capitalist economies exploring questions of ownership (Lessig, 2004; Berry, 2008a). Other approaches centre on software interfaces and its political substrate. Wendy Chun, for instance, argues that software, at the user-interface level, operates as ideology (2004). Drawing from Althusser's notion of ideology as 'the imaginary relationship of individuals to their real conditions of existence' (Althusser cited in Chun 2004, 43), Chun contends that 'software [interfaces] offer us an imaginary relationship to our hardware: they do not represent transistors but rather desktops and recycling bins'. To Chun, then, ideology appears embedded in software (the interface) as visual knowledge, shaping, as Fuller puts it, 'modalities of experience—sensoriums through which the world is made and known' (2003, 63). In the end, she goes on to argue, 'software produces users' as such (Chun, 2004, 43).

To Galloway, nonetheless, Chun's analogy ideology/software falls short. Drawing on Kittler (1995), Galloway points out that in Chun's account software is understood only as a symbolic machine language despite the fact

that 'software is both language and machine' (2006, 327), foreclosing as a result its non-linguistic dimension. Following Kittler, Galloway underlines that 'software is merely a human-friendly category extracted from what is always an operation of hardware' (1995). Then, Galloway foregrounds that unlike natural languages code is different in that it is an executable language. That is to say, code has a different performative power than natural languages because it actually makes things happen in the machine. Software does something. Therefore, Galloway proposes to extend the analysis to the functional nature of software as 'ideology turned machinic': 'what is crucial in software is the translation of ideological force into data structures and symbolic logic' (2006, 325). In this vein Lash argues that power today is largely post-hegemonic because it operates not from the outside (discourse), but instead up close in the algorithms of the socio-technical systems that shape our culture and society at large (Lash, 2007). With code what is at stake, according to Lash, is the emergence of a new type of rules structuring human societies, namely 'generative' or algorithmic rules: "'generative' rules are, as it were, virtuals that generate a whole variety of actuals" (2007, 71).

In conclusion, this project's framework will draw from these material accounts of media in order to understand the communication and cultural regimes of locative media. It will elaborate a critical approach to media geocoding by examining 1) code/software: '[...] how communicative processes are invented, produced, regulated and controlled through power relations present in code' (Mackenzie, 2006, 38); and 2) the platforms that articulate and modulate information flows, users' labour and subjectivities.

2.3 Social production, or the social factory

In the previous section I started looking at the power relations shaping information flows in order to delineate a cultural politics critique of networks, protocols, and information dynamics. In this section I want to explore in the literature another entry point of analysis by looking at the productive

dimension of information production. The aim is to understand media geocoding from the perspective of value production, i.e. a political economic approach. I am interested in examining the economic relations that might shape this media practice. In order to do so I will delineate next the theoretical framework for a critique of the political economy of locative media, drawing mainly from Autonomist-Marxist theory.

From this theoretical perspective economic value in post-fordist societies is more a result of social relations rather than an objective measure *per se* (as Marx formulated it in his labour theory of value). The post-autonomists have put forward the idea that the new form that capitalism has taken (i.e. 'cognitive capitalism', 'knowledge capitalism', 'immaterial capitalism', 'information capitalism', etc.) represents a passage from an economy based on material production and the accumulation of fixed capital to an economy mainly based on the production of knowledge and information, a form of capital difficult to measure. As Maurizio Lazzarato puts it, we have to change therefore the principles of valuation if we are to understand the value of value in contemporary capitalism (2004).

The post-autonomist perspective proposes then a new set of analytical concepts that challenges, or better supplements, the Marxian theory of value and opens up new venues to understand contemporary capitalism and by extension media production.

In 2008, in the aftermath of Burma cyclone disaster, 40 volunteers managed to map 120000 km of the affected territory in just four days (Katragadda, 2009). Geographers have coined the terms VGI (volunteered geographical information) or neogeography to describe the social and technological processes through which geospatial information is being produced by non-professional cartographers (see: Elwood, 2008; Goodchild, 2007a, 2007b; Coleman et al., 2009). Burma amateur geographers used a Google mapping application called Google Map Maker, which allow users to edit its basemap. Google openly encourages these contributions: 'with Google Map Maker, you can become a citizen cartographer and help improve the quality of maps and

local information in your region. You are invited to map the world with us!' (Google Map Maker Website, December, 2008). According to a Google spokesperson (Feb 2009), users contributions to Google mapping platform are about 10,000 additions or corrections per hour.

At stake in this example is a form of social organization that Yochai Benkler has called 'social production' (2006). According to Benkler, this form of social organization is not only highly efficient—as the work of the Burma amateur geographers illustrated, but it constitutes a new form of production of value that is not motivated by market interests since people choose to participate and contribute freely. Benkler's proposition is based on the assumption that free reproducibility and circulation of information necessarily foster a gift ethos (participatory culture) in a non-competitive milieu ('information is non rival'). This is a truly virtuous circle of production. Benkler argues, therefore, for a 'networked information economy' based on social production that is either parallel to or outside market relations, but never intertwined: 'what we are seeing now is the emergence of more effective collective action practices that are decentralized but do not rely on either the price system or a managerial structure for coordination' (Benkler, 2006, 63).

Benkler argues then for a fundamental shift from industrial production to a participatory peer-to-peer and commons-based model of cultural and knowledge of production. Alex Bruns has described this shift as 'produsage' (2008), highlighting the blurring of the traditional economic separation between producers and consumers. Both Benkler and Bruns coincide in some of their case studies: Free and Open-Source Software (FOSS), Wikipedia, and citizen journalism.

In the context of the geoweb there are also peer-to-peer and commons-based examples that are worth mentioning: Wikimapia (a wiki-based platform that allow anyone to annotate places), and OpenStreetMap (a public-domain crowdsourced street map of the world). Back to our example, people chose by and large to use Google's platform to produce a map for Burma despite the availability of non-proprietary-non-profit options. As it is the case with

other social media, social production takes place mainly in proprietary profit-oriented platforms:

The 20 most accessed web 2.0 platforms accounted for 13.24% of the global average daily page views. 12.73% of these 13.24% were page views on profit-oriented platforms, which means that 96.15% of all views of the top 20 web 2.0/3.0 platforms were conducted on profit-oriented sites. These data show that web 2.0/3.0 is a strongly commodified space, there seems to be only a tiny minority of non-profit platforms (Fuchs, 2009, 95).

Google has managed to integrate its mapping tools with its other services, including its search engine. This has given Google a *defacto* monopoly over maps and location data, a move similar to what Microsoft did it in the past in the browser market incorporating Internet Explorer to its operating system Microsoft Windows. Leading as a consequence to what in economics theory is known as a monopsony, i.e. a form of market where one buyer faces many sellers. So, for example, if someone wants a video to be widely distributed, he/she is persuaded to choose YouTube despite the existence of many more video sharing platforms. Hence, if one wants to look for or share location information, Google's mapping platforms present as the default option.

Furthermore, following David Berry's critique of Benkler's work, the weakness of the social production argument is that it is based on a dualism between on the one hand industrial-proprietary production, and on the other hand network-commons-based-peer-to-peer production, failing thus to acknowledge "the extent to which, if (networks) are indeed so wealth-generating, they will be co-opted into mainstream 'industrial' ways of production" (2008b, 369). Actually, the gift economy has been indeed widely incorporated in the Web 2.0 model of free platforms and free content. In this respect, Castells has called the attention to this enclosure of the commons of free communication as one of the arrows of contemporary capital 'commodification of freedom' (2009, 421).

Regardless of the social, cultural and public value that social production indeed represents, Benkler's model is not grounded in the economy

production of value. The so-called participatory economy overlooks the relation of social production to capital. It does not take into account how social production, the commons, and the value it generates is recaptured and exploited by property regimes.

The transformations of contemporary capitalism have brought about not only changes in forms of production but also a change in the 'nature of labouring processes' (Hardt, 1999). The autonomist critique of capitalism brings to the fore the question of labour, which according to Terranova has been relegated in media studies for the most part compared with questions of ownership (political economy) and consumption (cultural studies and audience studies) (2000, 34). In this respect the autonomists offer a set of concepts useful to understand value production in informational capitalism.

While the traditional economic categories of the political economy fall short to account for the conflation of production and consumption ('produsage' or 'prosumption') in the digital economy, Maurizio Lazzarato concept of immaterial labour provides a rich framework to understand this transformation of labour, and redefine new productive practices we do not commonly recognize as labour. With the concept of immaterial labour, Lazzarato traces a transformation from the rigid division of mental and material labour of the industrial economy to a 'communicational model' of work that demands more and more management, creativity, and communication skills from workers. Within such conditions, Lazzarato argues, workers are required to 'become subjects of communication' in order to get incorporated into the new forms of production that turn communication and culture into capital (1996). In this sense, immaterial labour refers to the practices that produce the 'informational and cultural content of the commodity' (Lazzarato, 1996). That is to say, 'labour that creates immaterial products, such as knowledge, information, communication, a relationship, or an emotional response' (Hardt and Negri, 2004, 108).

It should be noted that this form of labour power is not limited to highly skilled workers, nor it is equivalent to paid work. Hence, the communicative

practices associated with online participation: tagging, commenting, linking, posting, remixing, ranking, forwarding, reviewing, sharing, favouriting, 'friending', 'tweeting', 'liking', and so on, represent, on the this view, labour. At stake in what Benkler calls social production is also new forms of value-generating free labour (Terranova, 2000):

These types of cultural and technical labor are not produced by capitalism in any direct, cause-and-effect fashion; that is, they have not developed simply as an answer to the economic needs of capital. However, they have developed in relation to the expansion of the cultural industries and are part of a process of economic experimentation with the creation of monetary value out of knowledge/culture/affect (Terranova, 2000, 38).

On Terranova's view, immaterial labour is immanent to the capitalist cultural economy rather than an appropriation of any authentic culture outside capital: 'incorporation is not about capital descending on authentic culture but a more immanent process of channelling collective labour [...] into monetary flows and its structuration within capitalist business practices' (2000, 38-39). Hence social media production does not widely occur then on a parallel non-market driven realm—as Benkler would have it; 'conversely, the context of social life online is always entrenched in market relationships, no matter if users are motivated by profit' (Scholz, 2008). Immaterial labour then emerges as a key concept to understand how digital culture is inscribed within the circuits of capital.

Of keen interest then is what drives people to participate, and most importantly, to engage in forms of free labour. Cote and Pybus in a study of immaterial labour in MySpace 'emphasize the role of affect as the binding, dynamic force which both animates those subjectivities and provides coherence to the networked relations' (2007). In a similar vein, Clay Shirky regards affect ('love' in his vocabulary) as the main driving force in user participation. To Shirky, users tend to share and contribute in social media platforms because it ultimately builds up their social capital (2008, 193). Hardt underlines also the productive aspects of affect in contemporary

capitalism. In his view the creation and manipulation of affect is directly productive: 'what affective labor produces are social networks, forms of community, biopower' (Hardt, 1999). The economic harnessing of collective circuits of affectivity and communication has become, from this perspective, central to models of value production in the current informational economy, which is particularly the case of the so-called Web 2.0 models.

Frankfurt school derived accounts of media as ideology production are insufficient in this context:

Immaterial production helps us to see how the postmodern emphasis on signification completely underestimated the power of this other mode of communicating, which is not so much about constructing the world through shared meanings, as about an excess of the world in relation to signification [...] (Terranova, 2004, 31).

Following Marx's thesis on the general intellect in the Grundrisse, the autonomists argue that economic value is today predominantly produced out of collective knowledge and social relations. This is the so-called social factory thesis, according to which value no longer resides in the individual entities represented by the worker and his/her working time, but in social cooperation at large. The principles of value production change accordingly. As Lazzarato claims, drawing from Tarde's economic psychology, accumulation of social desire and collective imitation become vectors of valorization. And innovation—represented today in the widespread of the 'creative attitude' to all spheres of labour—is placed at the centre of the economy. Contemporary forms of social filtering provide an illustration of production of surplus value in the context of informational capitalism. From recommendation systems (e.g. Amazon, Last.fm, Digg), forms of social browsing of content (e.g. Delicious, Flickr, Twitter), or search engines (e.g. Google's PageRank algorithm) the independent activities of users are harnessed by algorithms and platforms functioning as mechanisms to extract value from social relations, social desire and collective imitation.

In regards to locative media platforms, immaterial labour assumes the primary form of social production of collective symbolic capital about places. Of keen importance is the current incorporation of geocoding capabilities in more and more social media platforms, making this extension even more pervasive as it is becoming automatized and a default setting of media production. Flickr, Blogger, YouTube, Twitter, and Facebook for example, allow user-generated content to be associated with location. It is also worth to mention the recent emergence of social location platforms (e.g. Foursquare, Gowalla and MyTown) that are stirring the production of user-generated geocoded media content. This generalized embracing of location by the major Internet players has opened up possibilities for profit generation—as it will be explore in-depth in the case studies.

Inasmuch as value production is social (participation/cooperation), communicative (symbolic interaction), and affective (fosters affective engagement), the nature of value in such socio-technical systems becomes very diffuse. Yet the immaterial surplus value extracted from users' production is evident from the market value of some Internet media companies. For example, Facebook stock market valuation is estimated in \$70bn (June 2012), and Google is \$182bn (June 2012). Youtube was acquired by Google in \$1.6bn, MySpace by NewsCorp in \$583m, and Last.fm by CBS in \$280m. So, how is this diffuse value actually measured? Metcalfe's law, according to which the value of a network increases in proportion to the square of connections, is often quoted as a sort of law of value in the tech industry. However, this kind of measure contrasts with the common incapacity of Internet corporations to translate this network value into profits. Metcalfe's law is a depolitized technical view on value that masks the fact that social media companies are valued in financial markets considering not only the amount of users accumulated but most importantly the worth of those users in terms of their potential value to advertisers or other clients. That is to say, on the ability to extract surplus value from them. Although more factors also play out in these valuations: revenue, growth rate, market position, brand value, etc. Even so, the common

disproportionate differences between market valuations and actual profits are symptomatic of how value is significantly realized also as financial rents, i.e. speculation over future economic performance. What market valuation standards fail to grasp, nevertheless, is that ultimately what build up audience numbers, and the personal profiles corporate social media profits from, is social desire for communication. In this sense, following Lazzarato (2006), valorization has to be identified first and foremost with the production of communication, affect and attention. That is to say, social relations is the basic material where value is extracted.

Marx's insight that the increase in the production of commodities results in the diminishing of their exchange value does not hold in the digital economy. Though the multiplication and acceleration of information undermine the value of every single act of communication, it produces nevertheless social relations. And sociality itself is where value actually resides, to the extent that social media platforms do not depend on owning the information they host. The limited and valuable resource is not information as such. What we face is a shift 'from a paradigm of material scarcity to one of immaterial abundance' (Toscano, 2007) in which a new form of scarcity is reintroduced via the limited resource of users' time. In oversaturated information milieus users attention span tends to decrease. The no-rivalry of information has not led us to a non-market production system as Benkler (2006) claims; on the contrary, the digital realm resembles today a market characterized by fierce competition over people's attention.

Thus the notion of the attention economy is central to understand how media platforms produce value under conditions of information saturation. In this respect, what makes a platform valuable depends highly on its capacity to capture the flows of attention that generates attention capital, in order to transform this accumulation of collective desire, to draw from Tarde, into advertisement rates and subsequently into financial rents. Therefore, the economic logic goes, as social media networks continue growing and

attracting more Internet users, so advertising spending is expected to grow as these networks become more valuable.

Matteo Pasquinelli foregrounds the excess and accumulation of energy ('electricity, data, information, communication, knowledge, imagery, money, labour, desire' (2008, 54)) in sociotechnical systems as the key to understand the digital economy. Building upon Michel Serres theory of the parasite (see: Serres, 1980), Pasquinelli argues that the economy underlying social production is essentially parasitical. Against binary accounts of the digital economy in which the exchange of energy among peers is assumed to be symmetrical and cooperative (Benkler, 2006), a parasitic ternary model, Pasquinelli claims, re-introduces asymmetry. Accordingly, any exchange of energy between peers is never equal but always implies a third party (i.e. the parasite) that steals and captures energy from that exchange. In this light, social media platforms could be thought of in a parasitic dimension, as the third element (material network infrastructure) that captures and re-allocates the surplus produced by users communications (immaterial labour).

Pasquinelli (2009) goes on to argue that the parasitic form of extraction of surplus value in the digital regime is rent not profit (the mechanism characteristic of productive capitalism). Following David Harvey, this mechanism takes place when 'social actors control some special quality resource, commodity or location which, in relation to a certain kind of activity, enables them to extract monopoly rents from those desiring to use it' (Harvey, 2002). This is precisely the mechanism of valorisation in corporate social media, which extracts rents (mainly through advertising) from the use of the networks of communication. The general formula of Web 2.0 models prescribes building a monopoly through the enclosing of user-generated media and then finding out how to capitalize on it (e.g. Facebook monopoly over social contacts, YouTube monopoly over video, Twitter monopoly over status updates, and so on). In this sense, Vercellone points out, rent extracts 'value from a position of exteriority in respect to production' (2010, 96) via

'privatization of the social conditions of production' and the commons (2010, 94), i.e., communication and sociality.

There are certainly other key elements to understand the political economy of locative media besides the capture of surplus value from user production. Of keen interest too is looking at how location data is impacting the generation of economic value in different markets. The local/mobile search market is one of those markets impacted by geolocation technologies. Simply put, because while one is on the move the most relevant information is contextual information, and location is key providing context to communication. Other markets to be considered are travel and tourism, and real estate as an underlying component. It is crucial therefore to stress that media geocoding is not only about new possibilities for communication and cultural production, but also involves forms of capitalization on these practices. What are the techniques of capture of surplus value in different modalities of location-based services? What are the respective business models? Any account on geocoding as a communicative practice will fall short if the analysis of its embedding within social relations of production is foreclosed. One of the aims of this project therefore is to interrogate the political economic dimension of the ongoing annotation of the world.

2.4 Participatory culture and the audience commodity

How does capitalization on users and the immaterial labour they produce take place? There are various business models in the digital economy, ranging from paying for services and content, to mixed free and pay services business ('freemium'), and free advertising supported. Even so, the latter is the standard dominant Web 2.0 business model, which consists basically in providing free platforms and services to attract users and sell advertising to third parties. But what differentiates this 'free content for advertising' model from other mass media models (e.g. free ad-supported TV) is the economic importance given to profiles. Although mass media employ also audience

demographics measures, social media have made rich individual profiles become a more profitable form of information (Elmer, 2004).

From a critical media studies perspective, in media advertising models audiences are the commodities being sold to advertisers and marketers. This is the 'audience commodity' thesis (Smythe, 2006) according to which 'the price that corporations pay for advertising spots on particular programs is determined by the size and social composition of the audience it attracts' (Murdock and Golding, 2005, 65). This model implies a conception of audiences as discrete and easily quantifiable units, and formulates them essentially as a market product.

Joseph Turow has traced the history of this relationship between marketing and media to show how it has been shaping the construction of audiences and, by extension, media content and culture itself. Turow demonstrates how there has been an historical willingness of American audiences to allow media corporations to collect their personal data in exchange for benefits. This tacit consensus, Turow argues, has resulted in the emergence of a 'culture-production system in which surveillance marketing is deeply embedded' (2005,112-113). Considering the audience figures of the top social media companies, without a doubt, most users willingly share their data with these platforms in exchange for their advertising-oriented services. Indeed, young generations have not lived in a media culture free from advertising. Hence for many, not only marketers, this is a fair trade-off. However, users at large are less aware of the amount and kind of personal data that these companies commonly collect, which they share and trade with third-party domains for commercial purposes (Krishnamurthy and Wills, 2009a). For instance, tracking companies can associate one single social media account, and its content, with the traces of activities and interests a given user has already left in the Web to build a richer and potentially more profitable personal profile. It is also important to note that the main tracking companies, i.e. third-party advertising servers, (e.g. doubleclick.net, advertising.com, 2mdn.net, googlesyndication.com, googleanalytics.com,

yieldmanager, adrevolver, etc.) are all owned by the big Internet players (Microsoft, Google, Yahoo, AOL) (Krishnamurthy and Wills, 2008; 2009b), which account for the greatest share of information flows online. Arguably, as Turow remarks, we are under a 'surveillance-driven culture production' in the digital age (2005, 113). In the view of this one of the most urgent questions that a cultural politics of digital media platforms should address is how profiling and personalization are articulating new regimes of cultural consumption.

Social media epitomizes 'surveillance-driven culture production'. These media platforms encourage and reward participation and contribution while, at the same time, punish those who choose not to share personal data (e.g. services restriction). As Elmer well put it, 'ultimately, what both requesting and requiring personal information highlight is the centrality of producing, updating, and deploying consumer profiles' (2004, 5). To put it bluntly, collecting users' personal information is the very condition of participation (Zimmer, 2008). Personal data and profiling are critical if we take into consideration the dominant forms of advertising online. Behavioural advertising relies entirely on the identification of patterns of Internet usage in order to transform this data into consumer segmentations to serve targeted ads. This pervasive extension of profiling brings out important issues beyond the obvious privacy concerns. In his research on niche economics, Turow spotlights the potential consequences of user profiling in terms of exclusion. In short, he claims that once segmented into consumer categories we are susceptible to experience forms of 'marketing discrimination', which occurs as 'marketers increasingly use computer technologies to generate ever-more-carefully defined customer categories (or niches) that tag consumers as desirable or undesirable for their business' (2006, 1).

The concept of audience commodity, nevertheless, has its limitations as it regards audiences as mere discrete and passive commodities to sell. The audience commodity thesis considers the value users produce as consumers of commodities, but it does not account for the surplus value at play when

users/audiences engage in collective network formations and participative cultural production (i.e. immaterial labour), therefore failing to explain other forms of value production present in social media economic regimes.

Based on audiences research on fandom cultures, Henry Jenkins addresses this cultural shift in the relationship between audiences and cultural production within the context of what he calls convergence culture:

How audiences are imagined is crucial to the organization of media industries, which rely on such mental models to shape their interface with their public. Convergence culture brings with it a re-conceptualization of the audience - how it is comprised, how it is courted, what it wants, and how to generate value from it. Increasingly, audiences are valued not simply based on what they consume but also on what they produce. The audience is no longer the end point along an industrial chain [...] (Jenkins, 2008).

According to Jenkins the great 'emotional capital' audiences are investing in cultural products, coupled with a media systems that allows users to connect and produce content with other users, has brought about changes in the relationship between media industries and the so-called participatory audiences. In Jenkin's view (2006), a new cultural frame in which audiences contest proprietary rights over cultural products (production and distribution) presents a situation of neither submission (i.e. the political economy account) nor of resistance (i.e. the cultural studies account), but rather of negotiation.

In their role of cultural producers participatory audiences provide new avenues for profit generation. Jenkins argues that, through what he calls 'affective economics', one of the strategies of media industries and advertisers is to 'blur the line between entertainment content and brand messages' (2006, 20) to exploit the affect fans attach to cultural products (i.e. affective labour) in order to sell commodities. Participatory culture, thus, is incorporated into the circuit of capital.

Participatory culture has also been subsumed to capital through a logic of enclosure whereby community formations and user-generated content (i.e.

the common) is kept captive in these platforms for profit generation (so-called 'walled-gardens'). Unlike open decentralised peer-to-peer network architectures, in commercial social media confinement is incorporated in the platform design via a centrally controlled network architecture (Kleiner and Wyrick, 2007). This network topology guarantees the accumulation of the social and cultural capital produced by users in gated databases. Platforms hold the rights to keep users content and social graph even if one chooses to withdraw. To leave a platform without the subsequent expropriation of our data have been made virtually impossible. Facebook, for example, even keeps the rights over deceased members accounts. In 2009 Facebook blocked and took legal action against an art project called 'Web 2.0 Suicide Machine'. The project consisted of a software application that asks users for permission to access their accounts in different social media platforms in order to delete all personal data. The 'Web 2.0 Suicide Machine' case made clear that Facebook is not only the owner of users data but also its exclusive manager, as it does not let its users grant access to their data to applications that are not previously approved. Thus, in spite of the fact that it may be perfectly rational for users to seek security and stability in these digital enclosures, at stake is an important political issue. That is, the right to take our data with us whenever we decide to leave a platform (data portability).

From a Marxist perspective users are alienated therefore from the product of their production in corporate social media platforms. However there is a form of expropriation, communication is virtually an infinite resource, so users are not left empty-handed as such. The question is then whether this expropriation equates to exploitation. Tiziana Terranova suggests that in social media platforms users '[...] are not working only because capital wants them to; they are acting out a desire for affective and cultural production' (2000, 36). In other words, the marriage between productivity and desire seems to foreclose exploitation as such. In fact, users' participation in social platforms far from being experienced as exploitation is on the contrary rewarded with social capital (e.g., attention, prestige, affect, etc.). In this vein, Castells claims that Internet use, and specifically what he calls mass self-

communication, entails indeed a potential for autonomy. The higher the level of Internet usage, the higher the levels of autonomy (not only communicative autonomy but also sociopolitical, professional, personal, etc.) (Castells, 2009). Processes of alienation in social media platforms are then far more complex, Langlois *et al.* suggest, since they take place through a 'technico-legal system' whereby the platform is allowed to keep track and record users data, while it is also granted rights over it (2009). This poses the question whether such consented agreement should be regarded as a form of exploitation. To paraphrase Scholz, being exploited is one thing, not knowing the mechanisms by which user-generated content and users' attention is monetized is another (Scholz and Hartzog 2007). Following Scholz, it would be more precise to talk of expropriation rather than exploitation, for to participate in social media, as stated previously, we have to hand over the control of our data. To move forward the overarching argument of exploitation Scholz proposes then a separation between voluntary and involuntary forms of participation. To return to the example with which we began this reflection, while mapping and annotating places are voluntary forms of participation, the corporate mining and insertion of this content into economic circuits may not be.

Another line of thought to be considered is how these forms of capitalizing on user production are articulated in the process of production of subjectivity:

If production today is directly the production of a social relation, then the 'raw material' of immaterial labor is subjectivity and the 'ideological' environment in which this subjectivity lives and reproduces. The production of subjectivity ceases to be only an instrument of social control (for the reproduction of mercantile relationships) and becomes directly productive, because the goal of our postindustrial society is to construct the consumer/communicator—and to construct it as 'active' (Lazzarato, 1996).

This mandate to become subjects of communication is embodied in the very affordances of social media platforms: e.g. add new friends, join groups, rate media, comment on 'friends' communications, manifest what one likes, share

content, make reviews, and so on and so forth. And it is precisely through this set of communicative practices that users, in Stiegler's terms, individuate themselves (psychic individuation), (co)individuate in relation to others (collective individuation) and to the platform itself (technical individuation). Echoing this point, Langlois et al. foreground the importance of this machinic dimension of subjectivation to the way we should frame users and agency in the context of media platforms:

[...] The concept of the platform can enrich our understanding of subjectivation as it brings in a technocultural dimension that helps us to acknowledge that the user cannot be equated with a human actor - it is actually a site of articulation between the technocultural dynamics present through the platform and human actors. In turn, the hybridity of the user points out how processes of subjectivation on Web 2.0 worlds are both highly personalized and standardized. That is, the representation of ourselves takes place through a platform's universal algorithmic logic (Langlois et al., 2009).

Langlois et al. go further to argue that platforms set up the very conditions of possibility under which users can negotiate identity, form communities, and produce content. If social media platforms represent an exteriorization of users' subjectivity (Stiegler, 1998), as they provide 'augmented cultural knowledge, affect and desire', alienation as such disappears (Langlois et al. 2009). The authors even claim that there would be no more a contradiction between advertising and subjectivity enrichment, as the former is presented to the user as another form of recommendation, another form of cultural capital. In fact, marketing research has made evident this link between advertising and subjectivity enrichment in social media: 40% of US social media users 'friend' brands on Facebook, while 25% follow brands on Twitter. And '76% of users welcome advertising on social media' (FEED, 2009). Another industry survey shown that although the majority of users 'friending' brands are mostly motivated by special offers and sales, many users, interestingly the most active ones in terms of social connections, are interested in deeper engagement with brands (Marketing Sherpa and Survey

Sampling, 2010). That is, some users relate to brands as a form of cultural capital.

In sum, capital accumulation processes persist in the digital regime under new forms. In the digital media economy value is more and more subjective and cultural. It does not need to take the objective character of the commodity for it is directly extracted from the common (affect, attention, communication, social relations, etc.) through economic rents. Though rent is not a directly exploitative mechanism, perhaps, as Hardt and Negri propose, we should reformulate the relation between labour (i.e. user production) and value in such a way as to think of 'exploitation as *the expropriation of the common*' (Hardt and Negri cited in Casarino, 2008, 15, original emphasis).

Chapter 3

Problematizing the 'locative'

3.1 The spatial turn: re-locating communication

In media studies space came to be 'declared death'. The idea of time-space compression resulting from contemporary acceleration of communications (Virilio, 1995), and the sense of loss of territorial boundaries brought about by the logic of globalization (Hardt and Negri, 2000; Scholte, 2003), led to a 'spatial blindness' in media scholarship. As Morley and Robins remark, contemporary theory has been concerned with the disorientating experience of global space, and fundamental to this concern is the impact of global-image space (1995, 38). Global space is regarded as a space of transnational networks and information flows (Castells, 2000), a truly decentred space in which frontiers and boundaries are disappearing (Morley and Robins, 1995, 115). Furthermore, the dislocated identities associated with this spatial scenario, and its subsequent derealisation process was enthusiastically hailed (Baudrillard, 1988). All these accounts can be grasped under the umbrella hypothesis of the 'end of geography' (Smith, 1997) or 'the death or distance' (Negroponte, 1995). This argument, at the same time, can be read under the light of the ideology of 'globalism' and its teleological ideal of abstract universalism (Morley and Robins, 1995, 39).

In this line of thought, Meyrowitz claims, digital media has reconfigured the ways in which information is transmitted and received, and as a consequence, it has also reshaped the relationship between physical place and social place:

Although oral and print cultures differ greatly, the bond between physical and social place was common to both of them. Print, like all new media, changed the patterns of information flow to and from places. As a result, it also changed the relative status and power of

those in different places. Changes in media in the past have always affected the relationship among places. They have affected the information that people bring to places and the information that people have in given places. But the relationship between place and social situation was still quite strong. Electronic media go one step further: They lead to nearly total dissociation of physical place and social 'place.' When we communicate through telephone, radio, television, or computer, where we are physically no longer determines where and who we are socially (Meyrowitz, 1985, 115).

In Meyrowitz's view, place is not longer a fundamental category of communication since digital media has undermined its importance as a determinant of communications. In the digital environment communication is no longer limited by where the actors are—the argument goes. "Through electronic media of communication, social performers now 'go' where they would not or could not travel, and audiences are now 'present' at distant events" (Meyrowitz, 1985, 118).

In this vein, early accounts of the Internet commonly categorized it as a placeless space (cyberspace) (Castells, 1996). Nevertheless, a new generation of Internet researchers have argued for a reformulation of this conception. To Richard Rogers (2008) we reached the 'symbolic end of cyberspace' when a French court in 2000 ordered the search engine Yahoo! to block the access to Nazi memorabilia auctions to users located in France (see: Goldsmith and Wu, 2006). From that moment on the Web became grounded and location-aware thanks to the implementation of IP-to-geo (address location) technology. This way language, advertising and even content was tailored according to users geographical location. Navigating cyberspace became an experience of replacement (Rogers, 2008).

In another line of argument, some scholarship has perpetuated a form of dualism that separates the spaces produced by media from real space, referring to the former as a merely conceptual structure. This point of view fails to address, though, space as it is lived in the spaces of communication, in both its material and conceptual dimension. In our media situation, Couldry

and McCarthy point out, place and its mediation tend to become indistinguishable: 'as electronic media increasingly saturate everyday places with images of other places and other (imagined or real) orders of place, it is ever more difficult to tell a story of social space without also telling a story of media, and vice versa' (2004,1). At stake here is the problem of how media produces spatiality. Couldry and McCarthy propose the concept of 'mediaspace' to conceptualize mediated space:

Mediaspace defines the artefactual existence of media forms within social space, the links that media objects forge between spaces, and the (no less real) cultural vision of a physical space transcend by technology and emergent virtual pathways of communication (Couldry and Carthy, 2004, 2).

Couldry and Carthy advance here the idea of a spatial theory of communication that would incorporate geography in media studies. This reevaluation of spatiality within communication has become to be known as the spatial turn in cultural and media studies (Falkheimer and Jansson, 2006). Basically, this is an approach to media analysis that presents itself as a solution to the traditional hiatus between media and space. Lefebvre called this hiatus the 'spatial violence' of media, whereby the media tends to separate representation from its material organization (1991, 289). Within this framework space is not longer left aside as a dead dimension for communication. This is indeed a necessary reframing of communication for with the social explosion of mobile technology the questions of space and place are reintroduced as central to media studies. Appropriately, Falkheimer and Jansson even call for an interdisciplinary sub-field of communication geography, which would devote to the exploration of 'how communication produces space and how space produces communication' (2006).

3.2 Locative media and the emergence of the geoweb

The object of study of this research project, nevertheless, could be more precisely framed within the umbrella term locative media, as it implies a direct technical association of digital media with location. That is, 'on a technical level, locative media harnesses the capacity of geo-technologies for the site-specific capture, tagging and display of content' (Hamilton, 2009, 394). This link location and media will be explored throughout this project at three levels: 1) the annotation of the media with location references, 2) the spatial indexing of media, and 3) location-driven media.

Historically, the origins of locative media can be traced back to net art movement at the turn of the twentieth first century. It was originated essentially as a critical reaction to the 'decorporialized, screen-based experience' net art offered. In contrast, locative media claimed 'the world beyond the gallery or the computer screen as its territory' (Tuters and Varnelis, 2006, 357). Locative media would comprehend 'artwork that utilizes media that can express an index of spatial relationships' (Albert cited in Galloway and Ward, 2005, 3). Projects such as Amsterdam Real Time, Urban Tapestries, Yellow Arrow and Milk are perhaps the most representative. These projects, and locative media broadly speaking, could be classify under two basic types: 1) annotative: 'media technologies that allow its users to tag (and consequently filter) the world' and 2) phenomenological: media that traces the action of a subject in the world (Tuters and Varnelis, 2006).

Many of those early locative media projects were strongly politically informed (Dieter, 2007). Some authors conceive the reappropriation of technologies commonly used for surveillance and social control (GIS, GPS) as forms of empowerment entailing potential for political activism (Saldmond, 2010). In this vein, Tarkka calls for tactical uses of locative media with the "capacity to create new 'pervasive imaginaries' and to resist the totalizing tendencies and closures of ubicomp spaces" (2005, 3).

It is also important to highlight the prominence of gaming in these first stages of social experimentation with locative media (from 2001 to 2004). In this respect Drakopoulou writes

The context of play [...] reveals very successfully the possibilities of location-based technologies in recontextualising location to represent the city in a user-authored annotative environment, and to create a context for social interaction in a locality (2010, 66).

It is also worth mentioning geocaching, a media practice involving the sharing of location information through the use of GPS in a game setting (see: Willis, 2010). Interestingly, this context of play has been incorporated within the architectures of some recent location-based services (social location platforms), which present themselves as games in which users are encouraged to share their locations and annotate places in order to get rewards. Thus, what emerged as a form of cultural innovation within the arts and activism has become an increasingly adopted media practice with the consolidation of a location-enabled Web (Gordon, 2007).

Before the Internet era the process of creating digital maps and accessing spatial data was basically restricted to experts. Even with the advent of the Internet, digital mapping remained for a long time a one-to-many system where users were remained mere consumers of data (Graham 2009; Hudson-Smith et al, 2009). Despite their interactive features, the first successful Internet-based mapping platforms (e.g. UK Multimap.com and US Mapquest) still consisted of expertly spatial data and did not allow users to either modify or add anything to the map, not to mention social interaction capabilities. Reviewing the historical development of the geoweb, Haklay et al. (2009) point out that up until 2005 geographical information over the Internet remained still very limited for a series of factors: 1) the cost of developing mapping applications were still high in terms of complexity and scarcity of developers; 2) licensing costs of geodata (background maps); and 3) limitations of bandwidth to deliver this information. Yet, the technical foundations of the geoweb were already under construction thanks to the

implementation of standards promulgated by the Open Geospatial Consortium (GML [Geography Markup Language], WMS [Web Map Services] and WFS [Web Feature Services]) within different projects in the military, government, and academic sectors (Macconchie, 2008, 18). However a further series of developments were necessary to provoke a profound change in the way we deal with geographic information, including: 1) higher Internet connection capacity; 2) the increase of computing processing power relative to price; 3) new Internet protocols (XML, Simple Object Access, etc.); and 4) the social adoption of GPS and especially participatory technologies (Haklay et al, 2009, 2018). In this process of making the Web location-enabled, other researches also highlight the importance of technologies such as geocoding, high-quality graphics, and the development of shared semantics for location concepts (Goodchild, 2007; Wilde and Kofahl, 2008).

The confluence of all this factors triggered the participation of non-expert users in web mapping and the subsequent explosion of user-generated location data. But it was perhaps the launch of Google Maps in 2005 the event that would better represent the emergence of a new socio-technical system for the production of location information. Interestingly enough, Google Maps was not built on the set of technologies and standards developed by the Open Geospatial Consortium, instead it uses much simpler technologies: API, KML, and GeoRSS. As a consequence, Macconchie points out, a separation was established between the geoweb of Internet users and the geoweb of corporate and government organizations (interested in closely controlling and maintaining the value of their data) (2008, 19).

Through APIs (Application Programming Interface), Google Maps and other GIS platforms provided users and developers with spatial data (maps, satellite imagery, street photograph, etc.) and the means to tap into it, mash-up content, and produce their own maps. This media form became known precisely as mash-up, i.e. the combination of different data layers with a basemap. According to the mashup directory Programmable Web, as of

August 2010 there are approximately 5000 mashups out of which 46% are mapping mashups. The blossoming of a mashup culture and the social adoption of geobrowsers and their integration within mobile devices, were factors contributing to the establishment of the map as another interface for all kinds of information. A media transformation reflected on Google's discourse. According to Google's Product Manager for Google Maps and Earth the company is moving from Google Maps as a separated service to a full integration of geolocation: 'Google on maps'. In the words of its spokesman, 'Google Maps is evolving from a driving directions and business search tool, to a comprehensive representation of all the world's information on a map' (Join Lior Ron, 'Where 2.0 conference, 2008').

Gordon (2007) rightly points out, nevertheless, that there is hardly any newness to maps as a metaphor to organize information in digital culture. He goes on to argue that the 'metaphor of mapping has long been central to the popular articulation of the Internet, although its meaning has changed: 'the map has shifted from a means of controlling networks to a means of controlling life immersed in networks' (2007, 886). In this sense, Verhulst highlights the urgency of research that seeks to understand 'how reality is being linked, framed, and mediated' through the mapping interface (2008, 192). The integration of location data and the Web extends in fact beyond the map interface. For instance, location is already integral to Web search technologies, directly impacting our practices of knowledge discovery (see: Tezuka et al, 2006).

In the literature there are various attempts to define this socio-technical system, namely the geoweb. Scharl (2007) understands it as a new platform for content production and distribution based on geocoded knowledge repositories. Haklay et al. characterize it as 'the merging of geographic (location- based) information with the abstract information that currently dominates the Internet' (2008, 2012). Along the same lines, the industry has defined it as 'the ability to locally/globally integrate and share geospatial information via the Internet' (GeoWeb Conference, 2008).

Other researchers have centred the focus on the social practices the geoweb has unleashed in terms of production of spatial data and location-based media. Goodchild has termed this phenomenon 'volunteered geographic information' (VGI), claiming that it constitutes 'a special case of the more general Web phenomenon of user-generated content' (2007a, see also: 2007b). Another name that has been given to this phenomenon is 'neogeography' (Turner, 2006; Graham 2009; Haklay et al. 2008). This term refers basically to the appropriation of the practices of geography within a social media setting (Web 2.0): 'neogeography is about sharing location information with friends and visitors, helping shape context, and conveying understanding through knowledge of place' (Turner, 2006). And unlike the scientific epistemology of physical geography, "neogeography tends toward the intuitive, expressive, personal, absurd, and/or artistic [...] idiosyncratic applications of 'real' geographic techniques" (Szott, 2006). Other group of researchers highlights the changes taking place in cartographic practices as consequence of the social availability of GIS software. 'Map hacking' (Erle et al., 2005), 'GIS 2.0' (McHaffie, 2008), 'wikification' of GIS (Sui, 2008), and 'Maps 2.0 FOSS cartography' (Crampton, 2009), are some of the terms used to described them.

All this panoply of names does not simply reflect the 'amateurization' process many disciplines have undergone under the so-called Web 2.0 paradigm (Keen, 2007), but also reflect deeper epistemological debates taking place within the geodisciplines. In Elwood's words, 'the geoweb is [...] altering the sociopolitical construction of spatial data, the knowledge politics associated with geographic information technologies and our embodied and social relations to these technologies and data" (2010, 354).

Although the geoweb's infrastructural layer (satellites, protocols, spatial databases, basemaps, geolocation technologies, etc.) is of keen interest to this research project, those layers will be mainly considered for analysis in their role of enablers of the content layer of geolocated media. This layer is technically enabled thanks to geotagging or geocoding, a process whereby

geospatial context is assigned to media objects through the embedding of location metadata. Where metadata is 'structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource' (NISO, National Information Standards Organization). This way, location metadata (or geotags) is commonly expressed either as latitude-longitude coordinates, post codes, street addresses, or place names, and using different protocols (KML, KMZ, GML, GeoRSS, RDF, JPEG, Machine Tags, etc.).

To some geographers, geotagging, however, does not bring in anything new as an explanatory term since for decades the term geocoding has been used in GIS to associate information with location (Haklay et al., 2008, 2022). Even though both terms refer to georeferencing, and beyond being simply a category of the Web 2.0 parlance, there are fundamental differences that justify the use of the term geotagging when referring to certain aspects of this practice. Whereas geocoding may be associated with rigid classification vocabularies and technically complex standards controlled by experts and authorities, geotagging, on the other hand - similar to social tagging (see: Weinberger, 2005) - is characteristically amateur, sometimes even adopting idiosyncratic vocabularies (e.g. 'Frisco' instead of San Francisco, or vernacular place names instead of latitude-longitude coordinates). Geotagging is basically participatory insofar as it makes adding location metadata to information technologically accessible for non-expert users. Simply put, geotagging represents a form of 'people-powered metadata' (Smith, 2008)¹. In what follows I will use both terms interchangeably, privileging the more established term geocoding but changing to geotagging when the argument requires emphasizing its social production dimension.

Geolocation is becoming increasingly important in the actual information ecosystem. According to a research on spatial data in the Web 2.0, it is

¹ Considering this participatory quality, interestingly, geotagging has been conceptualized by some authors as a new form of graffiti (digital graffiti) (see: MacDowall, 2008): 'whereas the industrial city was marked by graffiti tags, the information city is marked by [...] XML-driven tags' (Rice, 2008, 383). New media artists have also drawn parallels with graffiti, praising geotagging expressive potential for the creation of narratives upon the very urban fabric (Hemment, 2006).

estimated that in the UK as much of 80% of the information collected is georeferenced (National Geospatial Data Framework) (JISC, 2008, 2). Particularly, geolocation is becoming critical in information search and retrieval. A study of geographic search queries showed the prominent role of geography in users search requests (Gan et al., 2008). These findings are backed by Google's figures according to which 'one out of five searches [...] are related to location' (Google Blog, 2010). This is not a new technological trend by any means. Already a decade ago Microsoft researchers were working on prototypes to exploit 'the geographical location information of web sites so that web search engines can rank resources in a geographically sensitive fashion' (Buyukkokten et al., 1999). Today technology analysts go as far to claim that geolocation (the geoweb) is already one of the main data subsystems composing the architecture of the so-called 'Internet operating system', along with the search and the 'social graph' subsystems (Turner and Forrest 2008, 1).

There is a set of research studies assessing the indexical dimension of location metadata. One study on tag-geotag correlation in social networks discovered a strong correlation between (textual) tagged and geotagged information (Lee et al. 2008a, 2008b). The researchers found that since tag similarity and geographical distribution are correlated, geolocation constitutes therefore a good index to find relevant information. Another study on users' tagging behaviour on Flickr showed that location is prominently used as a way to organize information. The results revealed that location is tagged most frequent (28%) vis-à-vis other categories: artifacts or objects (16%), people or groups (13%), actions or events (9%), and time (7%), other (27%) (Sigurbjörnsson and Van Zwol, 2008).

Other studies focusing on geotagged photos remark the potential benefits of using location metadata for sharing, discovering and browsing content (Torniai et al. 2007). Commentators have also underlined the benefits of geocoding and geosemantics to manage the increasing excess of visual information on the Web (Thielmann, 2010).

In regards to the politics of knowledge, Scharl (2007) claims that as a new generation of location-aware devices automatically geocode our media products we should expect new forms of knowledge to emerge out of the more unstructured user-generated location data—but rich in terms of people’s experiences, socio-spatial interactions, and local knowledge (Edwardes and Purves, 2008)—that expert GIS have failed to integrate. In addition, Elwood (2008a) points out how the new forms of knowledge production at play in VGI nurture social and political practices. For instance, Miller (2006) analyzed how people used Google’s mapping platforms in the aftermath of Hurricane Katrina. The researcher described how communities made use of Google maps to report citizen’s needs and effectively identify and organize assistance.

Considerable work has been undertaken exploring the motivations of participation and the formation of communities in geographic information systems. Early literature on community participation in GIS highlights the importance of socially grounded motivations for participation in the production of location data (Elwood, 2008a). Researchers documented community engagement with GIS and found that participation empowered communities when this practice was integrated into local decision making (e.g. urban planning, crime prevention, environmental management, etc.) (Craig et al, 2002). Interestingly, researchers investigating tagging behaviour in tagging systems reached similar conclusions (Ames and Naaman, 2007; Sigurbjörnsson and Van Zwol, 2008; Erickson, 2009). Their findings show that users do not simply tagged content for organization and self-retrieval purposes, but the most common motivation is in fact social and communicative (i.e. adding context for friends, family, and the public).

There exists also research on assessing the potential of mapping platforms for community formation. Goodman and Moed (2006) observation of map mashups sites suggests that mash-up’s inherent informational dynamics, that is, the mixing of streams of content in an always changeable interface, are at odds with the ‘needs for stability, persistence, and control of online self-

presentation', conditions necessary for community building. In a related study, Munster (2008) analysed community formation and sociability in Google Earth. The author foregrounds the fact that Google Earth's representation of a human deserted world brings with it a solitary experience for its users. 'Google Earth therefore produces a world and its peoples as a database of individual users initiating and retrieving their individual inquiries bereft of sociality' (Munster, 2008, 400). As a result, Munster contends, geobrowsers entail a tendency toward 'self-enclosure' (2008, 400). Another study centred on Google Map Maker, a platform that allows its members to edit Google's base map. In this case Google directly governs its community through a membership policy that enforces a strict set of practices on users. This way policy subjects participants 'to a procedural discourse that governs community decision making', rendering participants thus in a 'liminal space of semi-inclusion' (Boulton, 2010, 1).

A final set of accounts relate to issues of quality of user-contributed location data. This body of research foregrounds the problem of data veracity and validity—of critical importance for geographers and cartographers. Hence, Flanagan and Metzger (2008) call for a re-theorization of these notions in the context of user-contributed location data. The researchers point out that whereas people are easily aware of the subjective nature of most user-contributed content (e.g. blogs), this complicates in the case of geographical data since this is a type of information widely thought as factual. Goodchild (2007a), on the other hand, finds problematic the 'belief in the essential goodness of users', calling the attention to the potential threat that spam, and other malicious interventions pose to the conformation of the geoweb. Case in point, after an initial period of social adoption of blogs, the blog ecosystem underwent a situation in which by 2006 between 3,000 and 7,000 spam blogs were created each day (Sifry, 2007). In this respect the present project will extend the analysis of location data production to include the other side of user-generated contribution, namely the information management techniques used by different parties attempting to intervene these systems in the service

of their particular interests: geospam, fake reviews, local search SEO tactics, etc.

3.3 Media geography

Parallel to the development of a spatial turn in media studies, geography has also undergone a communicational turn (see: Adams, 2009). This turn has been categorized as a new branch within human geography, namely media geography. The new discipline encompasses a wider set of sub-disciplines that have proliferated in the intersection of media and geography: 'art geography', 'literary geography', 'music geography', 'psychogeography', 'film geography', 'television geography', 'telegeography', 'cybergeography', 'Internet geography', and 'Wi-Fi geography' (Thielmann, 2010, 5). In Thielmann's assessment, media geography should be understood in the light of the fact that

[...] the appearance of new media applications has always initially resulted in 'individual media ontologies', which have then been extended to 'general media ontologies' through the synopsis of several media and the formation of an independent mediality (Thielmann, 2010, 4).

The collection *Geographies of Media and Communication* is the first attempt to map the field of media geography. To briefly summarize the book's proposition in a few lines, four intersections of media and geography are outlined: 'media in spaces', 'spaces in media', 'places in media', and 'media in places'. Each of which constitutes at the same time different avenues of research. One research axis addresses the problematization of spatiality either in its abstract dimension (space) or its social dimension (place or social space). On another axis we find the issues of coding/representation and spatial practices/organization. Taking as a reference this four-quadrant diagram the present project interrogates the intersection between the social dimension of spatiality (Massey, 1994; Adams, 2009) and the ways places are coded, i.e. the social practices and organizations of place that specific spatial encodings entails.

A crucial issue to media geography, and to human geography at large, is the reevaluation of the significance of place in the context of the rise of geographic information systems and location-enabled networking, and the subsequent spread of mapping and geotagging practices (Thielmann, 2010, 6). In this respect Dodge and Kitchin call for the necessity of a new ontogenetic understanding of space. That is, thinking of space not as a static and fixed entity but as always 'coming into being through transductive processes', in which code (software) plays more and more a central role (2005, 174). To Dodge and Kitchin code modulates material space by 'altering the conditions through which space is continually beckoned into being' (2005, 178). Echoing this point, Thrift and French point out that the increasing embedding of space with code is bringing about a fundamental reorganization of different everyday environments (2002, 329). A process that, Thrift and French argue, remains ignored and taken for granted (2002). The authors go on to argue that what they term the 'automatic production of space' is enabling a technical extension of human spaces that changes the very way in which they are constructed.

The literature also includes accounts regarding the impacts of the imbrications of code and space on our experiences of the city. Anne Galloway (2004)—against the grain of common totalizing accounts of ubiquitous computing—develops a critique of the everyday life approach to ubiquitous computing, focusing on these technologies as everyday practices in urban environments. Other accounts shift the attention from spatial practices to the politics of code (Graham, 2005; Zook and Graham, 2007; Crang and Graham, 2007). For instance, Graham stresses the ways in which code mediates to shape 'social and geographical inequalities within and between places' (2005, 564). He coins the term 'software-sorting' to account for this mediation:

The term software-sorting captures the crucial and often ignored role of code in directly, automatically and continuously allocating social or geographical access to all sorts of critical goods, services, life chances or mobility opportunities to certain social groups or geographical areas, often at the direct expense of others (Graham, 2005, 564).

Furthermore, the ongoing extensive overcoding of places, Crang and Graham argue, is technologically enabling new forms of urban visibility that render the city a transparent text for technocratic control (2007).

Another important reference is Dodge's, Kitchin's and Zook's (2009) issue of *Environment and Planning A* bringing together works at the intersection of geography and software studies. Of keen relevance to expose the particular ways how code produces spatiality is Mackenzie's (2009) analysis of the algorithmic processes involved in wireless signals processing that enable the real-time and ever changing spaces of mobile communication. In the same vein, Tarkka (2005) draws attention to the importance of examining the information infrastructures underlying locative media. And, particularly central for this project, the necessity to scrutinize "the 'invisible work' of categories, classifications and data structures", which has been largely overlooked by communication researchers as it tends to 'disappear into the uncontested background of practices' (Tarkka, 2005, 14).

Other direction in the literature addresses how geocoded media as presented in geobrowsers legitimate power relations, i.e. reveal and reinforce inequality and social divides. Crutcher and Zook (2009) analyzed geocoded media ('placemarks') produced by the Google Earth Community in the aftermath of New Orleans' hurricane Katrina disaster in 2005. The visualization of the distribution of user-generated geotagged media revealed that the more affluent and whiter neighbourhoods were largely more annotated than the poorer Afro-American ones. Social divides, and particularly racial divides, were recreated in the platform. The researchers concluded that inasmuch as locative media platforms make explicit the connection between the online and offline worlds we might expect them to reflect the social divisions characteristic of the latter (Crutcher and Zook, 2009, 524).

Also noteworthy is a research strand looking at the potential of user-generated geotagged content to produce or make visible local knowledge. As

Goodchild puts it, VGI potential lies ‘in what it can tell about local activities in various geographic locations that go unnoticed by the world’s media, and about life at a local level’ (Goodchild, 2007 cited in Crutcher and Zook, 2009, 533). So far results have shown the high degree of local content in user-generated content repositories. For example, over 45% of Flickr content is regarded as local by its users (Hecht and Gergle, 2010). These preliminary findings indicate that geocoded media can be critical to determining what is known about places. And even more critical, they suggest that people (and places) who do not contribute spatial annotations could become underrepresented and hence overshadowed in these systems (Crutcher and Zook, 2009).

In their study of Google Maps Zook and Graham (2007) continue tracing the mechanisms of exclusion at play in locative media. The authors found that search engine rankings are significantly affecting what places are visible online. To the authors Google extends the ordering logic of its algorithm to sort the physical world, this way potentially rendering invisible (or less visible) those places without a strong (if any) online presence. The key finding of this study is to have shown how physical spaces become susceptible of being affected by the apparent placelessness of flows of information and communication. In the same vein, platforms prioritization of some representations of place over others—a problem that this dissertation will address—may have economic, cultural and political consequences that we are just starting to comprehend (Graham, 2009, 8). Consequently, Graham calls for developing politically informed analysis of code problematizing how ‘software-sorting’ is being put to work as way to ‘separate privileged and marginalized groups and places’ (2005, 562).

The present research project will draw from Zook and Graham initial attempt to investigate how software shapes ‘the perceptions of the places that it maps’ (2007, 447) and how people interact with them. Although it will extend the analysis to include other factors, namely economical, that are complicating the way places are being indexed and represented online.

3.4 Governmentality and geography

Another key literature informing this research project comprises Michel Foucault's conceptualization of biopolitics and governmentality (1991, 2007, 2008), as well as the derived work of some governmentality scholars. In order to avoid an oversimplification of Foucault's philosophical investigations on governmentality (this will be developed in chapter 7), allow me to mention here just one key aspect framing this research project. The analysis of governmentality - 'the conduct of conducts' in Foucault's simplified definition - covers a wide range of different forms of government and practices, to the extent that it has been criticized for been a vague concept in its meaning and limits, and even its explanatory scope have been put into question. However, governmentality will be elaborated in this dissertation in one precise dimension so to illuminate how the urban environments enacted in locative media platforms enable the regulation of spatial conducts.

Even though Foucault acknowledged the importance of space in projects of government, and particularly the importance of the territory for the management of populations, these themes were not conceptualized in great detail in Foucault's work compared with what he did for disciplinary spaces (prison, hospital, school, etc.) (Huxley, 2008, 1644-1645). Aiming to develop Foucault's thesis on space and power, thus, research has emerged within geography addressing the spatial aspects of governmentality. Rose-Redwood (2006a, 2006b), in an historical account of house numbering, advances what could be considered a genealogy of the geocoded world. The core contribution of this research is showing how the numerical address system (i.e. geocoding houses) was used to produce an abstract space that served as a form of segmenting urban populations. To Rose-Redwood, "the practice of geo-coding [...] provided the geographic foundation which linked governmental knowledges (both statistical and cartographic) with the governed population by constructing a 'geo-coded landscape'" (2006a, 470). Following Foucault, Rose-Redwood articulates a key insight informing this

research project: 'technologies of government construct fields of visibility that render governmental rationalities operable' (2006a, 475). Another related work in this vein examined the role of the US Census at the end of the nineteenth century as a biopolitical technology that allowed for the first time the mapping of an entire population across a vast territory, this way rendering it visible and measurable (statistics) for social control (Hannah, 2000). Equally important is Osborne's and Rose's historical account of how governmental projects find expression in different diagrammings of cities, that is to say, 'the different ways in which government has been territorialised in an urban form' (1999, 737). In this line of thought this project will adopt the concept of 'spatial rationalities'. Huxley proposes this concept to account for the ways in which the environment can function as 'operative rationales' of government with the aim of shaping spatial behaviours and subjectivities (2006, 783).

In the governmentality literature there are also attempts to integrate Foucault's analytic framework into the theorization of population geography (Legg, 2005). Such integration brings to the fore a fundamental line of inquiry for this project: how media geocoding might be put to work in the service of regulating the population on a territory. There exists empirical work in the computer sciences that has visualized population mobility using user-generated location data. Girardin et al (2008a, 2008b) mapped the flows and concentrations of tourists in the cities of Rome and Florence using Flickr's geotagged photos. The resulting modelling of tourists' mobilities showed how geotagged repositories represent 'high-level human behaviour' information that could inform governmental projects (e.g. urban planning, local government, tourism business, marketing, etc). Bedö (2010) goes further to argue that the spatio-temporal patterns of urban mobility that geocoded information reveals not only serve as visualization of population flows, but also, when publicly accessed through interactive maps and platforms, they could 'rewrite the rules of urban self-organization by introducing feedback between organizational levels' (from street level to neighbourhood and city levels) reshaping, as a result, the very patterns of urban life. Thus, once such

'tracking' and feedback simulation of urban places becomes routine, Graham suggests, the social politics of places and the geographies of urban inequality will be mediated by 'online geodemographic software' (2005, 571). In this respect, Burrows et al. (2005) have further suggested that the increasing public availability of geodemographic data online may encourage people to sort themselves out, and critically, according to social class (Burrows and Gane, 2006). This research project will trace precisely some of the arrangements this mediation is taking under the guise of contemporary location-based services.

One major issue that arises in geography accounts of location data is surveillance. Obermeyer (2007) remarks that, indeed, the discussion of (geo)surveillance has a long tradition among geographers dating back to the beginning of the 90's. Concerns revolve mainly around the implications of a growing social conformity with spatial data monitoring in the name of security. Obermeyer argues that what she terms our 'volunteered geoslavery' is a Faustian trade-off for safety and security that exploits 'the most basic human drives' (2007, 1). This issue is particularly relevant today considering the current trend towards more location data sharing (e.g. Foursquare, Google Latitude, Twitter geotagged messages, etc.). Nevertheless, the motivations for sharing location data have changed to become rather communicative and affective. A shift that will be further explored in subsequent chapters of this thesis. It is also worth noting that in the Foucauldian informed geography literature surveillance has been mainly conceptualized under the disciplinary model of the Panopticon (Dobson and Fisher 2006, cited in Obermeyer, 2007). The growing field of surveillance studies, in this respect, is developing new frameworks to account for this phenomenon in the context of contemporary post-industrial society (Lyon, 2002b). Precisely, Michalis Lianos criticizes how the Foucauldian disciplinary model has been projected onto the present without much nuance, misleading, as a consequence, further understandings of contemporary forms of social control (2003, 412). Instead, Lianos proposes a theory of

social control based on what he terms as 'automatic socio-technical environments':

These are technology-based contexts of interaction that regulate, organize or monitor human behavior by integrating it into a pre-arranged environment, built upon a conception of 'normality' or 'regularity' that all subjects are expected to reproduce (Lianos and Douglas, 2000, 264).

Hence, following Lianos, sociality takes place within automatic socio-technical environments according to operational standards that at the same time legitimate them because they are presented to the user as part of the service. 'This makes it often impossible to distinguish between control and service' Lianos and Douglas conclude (2000, 271). From this standpoint, therefore, control becomes 'unintended control', a consequence of a planned managerial activity within particular managed environments (Lianos, 2003, 415). Lianos links then control to a process of institutionalization of sociality whereby institutions (public and private) mediate most aspects of human activity (2000, 272). Hence, if control is a necessary condition of participation in the socio-technical environments where sociality resides today, then any analysis of locative media as a mere surveillance apparatus falls short if it reduces the way it organizes and modifies socio-spatial relations only to its negative dimension as constraint and subjection. Therefore, instead of framing locative media platforms as mere surveillance technologies, they will be understood in the light of what Foucault terms 'apparatuses of security' (2007).

Yet there are important contributions to the study of the relationship between GIS and surveillance worth mentioning. Crampton (2008) identifies a politics of fear driving the production of spatial knowledge of populations by governmental bodies (e.g. thematic statistical maps such as crime maps). He points out how governmental discourses frame the environment and the population in terms of risk in order to justify, through the instrumentalization of fear of these risks, the deployment of surveillance techniques (e.g.

geoprofiling and data-mining) (2008, 283). Let me just mention another two contributions along the same lines. Monmonier's work, *Spying with Maps: Surveillance Technologies and the Future of Privacy* (2002). And finally, Friedland's and Sommer's (2010) account of locational privacy and the perils of the public availability of geocoded data for potential real-world attacks.

3.5 Critical GIS

As a final note it is important to briefly summarize the key debates in critical GIS studies since they constitute a point of reference for any critical media studies account of geocoded media. It is worth remarking that critical GIS took form as a subdiscipline at the intersection of geographic information science (GIS) and geographical social theory, drawing from the critical theory tradition in the social sciences (Sheppard, 2005). A first set of debates in critical GIS research has revolved around the knowledge politics associated to the production of geodata: who produces geodata, who owns it, and the debate over commodification (Crampton, 1995). Including also critiques on the positivistic character of GIS knowledge (Prosen, 2005). These accounts highlight the socially constructed nature of GIS, and how GIS knowledge is shaped by particular institutional contexts.

Another set of debates centres on the sociopolitical dimension of geodata, setting the discussion in terms of social inclusion/exclusion. These debates look mainly at the consequences of under-representation of certain social groups and places in GIS for this condition creates (or reinforces) divides (e.g. exclusion of certain groups needs from policy decision processes) (Elwood, 2008b). Elwood also underscores the existence of social divides operating at the level of data standards (knowledge exclusion) (Elwood, 2008b, 179), as well as at the level of copyright and privacy laws (the chance to access and share of location data) (Elwood, 2010, 351). In a related sense, Sheppard (2005) argues that the uneven access to GIS and location

data also facilitates practices of 'surveillance, social engineering, opinion formation, and warfare' carried out by the information privileged.

Other accounts extend the scope of these discussions. The feminist critique of GIS change the focus of the debate to the impact these technologies have on producing gendered identities, as well as how they are experienced in everyday life practices (McLafferty, 2005). Within cartography the critique of GIS assumes the form of a politics of map mapping. That is to say, an examination of how maps inscribe power and naturalize domination structures (Harley, 1989; Crampton 2005, 2008). In this regard is worth mentioning Lisa Parks' (2009) critique of Google Earth's visual representation of the humanitarian crisis in Darfur. As well as Gravois (2010) account of the geopolitical disputes over Google mapping platforms' political representation of national territories. One final issue of concern in critical cartography studies is the political potential of developing practices of counter-mapping in order to resist power asymmetries through the promotion of alternative worldviews (knowledges) (Crampton, 2008).

In sum, what is notable in this multi-disciplinary scholarship around 'the locative' is that communication and media studies accounts on the geoweb are still scarce. The work I have reviewed here emerges for the most part from the geodisciplines and the computer sciences. Moreover, its scope is still narrow since it revolves heavily around the moment of knowledge production and the subsequent knowledge politics the explosion of volunteered geographic information poses to these disciplines. Lastly, the emergent body of research exploring the intersection of locative media and spatiality is notable for its lack of political economy depth. The main literature gap that remains unaddressed is how different locative media configurations might serve to harness social space as a productive force. In this respect some questions still need to be addressed: how location-enabled platforms extract value out of geocoded media? And how geocoded media is articulated within broader productive circuits? There is therefore potential for more critically informed accounts of locative media.

Chapter 4

Methodology

4.1 Methodological framework

The methodological grounding of the analysis draws on the fundamental standpoint proposed by Bruno Latour's sociology of associations, namely Actor-Network Theory (ANT). Against the dualism underlying the dominant theoretical traditions in the social sciences that separates technology and society, which entails often an essentialised notion of 'the social', ANT introduces a relational conceptualization of this relationship in which technological actors (or actants) have the same ontological status as human actors. The social from this perspective is composed of associations between human and non-human actants assembled in heterogeneous networks (actor-networks): 'social does not designate a thing among other things [...] but a type of connection between things that are not themselves social' (Latour, 2005, 5). As Nick Couldry puts it, ANT does not deny any social dimension as such, but rather its aim is to avoid a social deterministic position whereby technology is seen as a mere 'receptacle for social processes' (Latour, 1993, 55 cited in Couldry):

[...] To avoid the twin pitfalls of sociologism and technologism. We are never faced with objects or social relations, we are faced with chains which are associations of humans [...] and non-humans [...] No one has ever seen a social relation by itself [...] nor a technical relation (Latour, 1991, 110 cited in Couldry, 2004).

In this way, ANT redefines sociology as the 'tracing of associations' (Latour, 2005, 5) among a multiplicity of actors regardless of their ontological pedigree. ANT framework provides then a sound point of departure since it recognizes the complexity of the socio-technical assemblages at study here.

Thus, from an ANT standpoint, software-based media platforms should be examined as shifting socio-technical networks constituted by multiple human and non-human actors: companies, programmers, software, users, developers, media objects, advertisers, etc.

Actor-network usefulness also lays on the specificity that the inductive tracing of localized actor-networks provides for the analysis of case studies. Moreover, it constitutes a particularly suitable framework for the study of locative media:

[ANT] permits the sketching of locative media as a kind of manifestation of what Bruno Latour means by the “Internet of Things” [...]: by geotagging objects instead of people and having these objects tell us their stories, locative media create an awareness of the genealogy of actants and agencies (Thielmann, 2010, 11-12).

Nonetheless, one of the main critiques of ANT as analytical framework remains its explicit avoidance of the question of power (at least as a social explanation) (Latour, 2005, 85-86), of key importance for this research project. Consequently, ANT is complemented here by incorporating more analytical tools. In this regard, the present project will draw from a variety of material analyses of communication that traces precisely the power-relationships embedded in socio-technical ensembles. These materialistic accounts look at the characteristics of media in order to examine the ways in which they shape communication and by extension culture and sociability. In this vein, for instance, the works of Lessig (1999) and Galloway (2004) represent a fundamental cornerstone for any analysis on how code and protocols regulate and shape socio-technical networks, reintroducing thus a methodological outlook that incorporates power relations at the level of the material.

Following this line of research, this project wants to extend the analytical scope beyond semiotic models of communication to include also the very materialities that make communication possible. This approach brings us to the figure of Friedrich Kittler (1999) who inaugurates a technology-based

thinking of media that brings to the fore analysis focused on medium storage, calculation and transmission. In this line of thought what the medium makes possible in terms of information transmission is key to understanding its potential cultural impacts and social shaping. Kittler's work undertakes a critique of Foucauldian discourse analysis that in his view overlooks the role media technologies and their material characteristics play in the production, storing, and circulation of discourses. To Kittler 'technologically possible manipulations determine what in fact can become a discourse' (1990, 232). In this sense, precisely, ANT distributes agency to include technical objects as they set limits (and at the same time potentialities) to human agency. Kittler proposes then the concept of 'discourse network' as a way to articulate Foucault's discourse analysis with media technologies. According to him, 'discourse networks' are 'networks of technologies and institutions that allow a given culture to select, store and process relevant data' (1990, 369). Following Kittler, discourse networks refers to systems for inscribing and transmitting culture that would determine what is transmitted as culture by selecting just an array of inscriptions among all possible ones—in this sense systems of notation is perhaps a more precise translation from the German *aufschreibesysteme* than discourse network itself. For instance, think of how the medial affordances of our publication software (e.g. databases, XML, RSS, blogs, APPs, etc.) and the institutions coupled with them (e.g. Google, Apple, Amazon, etc.) have an impact on the type of culture we produce and consume. Discourse network analytical framework opens up therefore the cultural politics of technology since it interrogates the techno-cultural assumptions embedded in socio-technical systems.

In a similar manner, software studies framework is of keen importance in order to assess the articulation of code/software² with cultural and social phenomena (see: Manovich, 2002, 2008; Kirschenbaum, 2003; Fuller, 2003,

² Berry (2011c) introduces a useful analytical distinction between code and software, understanding the former as textual source code and the latter as basically commercial and proprietary applications which entail situated cultural processes and social relations. Hence, methodologically-wise, 'code implies a close reading of technical systems and software implies a form of distant reading' (Berry, 2011c, 32).

2008; Chun, 2005; Mackenzie, 2006; Columbia, 2009, Berry, 2011a). Software studies calls for a critical examination of those economic, cultural and political values embedded in code/software, which have been for the most part overlooked in media studies with its focus on questions of content and audience reception and use of media. According to Fuller, software studies explores the conjunctions between computation and culture in such a way that the former is not 'epistemically subordinated' by the latter (2008, 5). Software is addressed therefore as an actant, both understood as a technical object and a social object:

Rather than focus purely on the technical, [software studies] fuses the technical with the philosophical to raise questions about what software is, how it comes to be, its technicity, how it does work in the world, how the world does work on it, why it makes a difference to everyday life, the ethics of its work, and its supporting discourses (Kitchin and Dodge, 2011, 246).

The primordial insights of software studies are articulated by Langlois et al. (2009) within a broader elaboration of a platform-focused methodology. The researchers call for methodologies that go beyond a focus on single protocols (Galloway, 2004; Garrido and Halavais, 2003; Rogers and Noortje, 2005; Schneider and Foot, 2005; Elmer, 2006), or code (since it is always executed in situated web environments), to develop an approach able to account for more complicated media assemblages in which different protocols are encapsulated in the form of platforms:

A platform-based methodology facilitates a process of making visible the ways in which protocols are articulated so as to channel information in specific ways and thus enact specific economic, legal, and cultural dynamics. In other words, a methodology that would witness the unfolding of the production of worlds via commercial Web 2.0 platforms would be of considerable benefit in terms of identifying specific sites of stabilization (Langlois et al., 2009).

A platform-based methodology comprises also what Richard Rogers calls the medium-specific nature of Internet native digital methods. According to

Rogers, it is the very dynamics of the medium (platform), how it stores, calculates and transmits information, which indicates how to approach its study: 'How may one learn from how online devices (e.g. engines and recommendation systems) make use of the objects, and how may such uses be repurposed for social and cultural research?' (2009, 1).

This approach connects with debates about the proliferation of transactional data and the consequences for traditional sociological empirical research (Savage and Burrows, 2007). In the age of pervasive communication (Lash, 2002) and database culture (Manovich, 2000) the methodological repertoires of empirical sociology and the humanities at large need to be rethought. From a historic account of social research methods, Savage and Burrows call into question the usefulness of sample survey and in-depth interviews within our current context of social media (providing nuanced representations of specific populations) and data-intensive communications (providing massive amounts of transactional data) (2007, 891). Hence engaging with the data sources now available to the social scientist pose a challenge for methodological innovation and implementation of 'natively digital' methods.

4.2 Case studies introduction

In order to understand how geocoded media is articulated within different technical, economic and cultural networks, and how these different articulations reproduce power relations, this project will adopt a research strategy based on case studies (Hartley, 2004). Though, as Stake clarifies, a '[c]ase study is not a methodological choice but a choice of what is to be studied. By whatever methods, we choose to study the case' (2000, 435).

Broadly, the case studies explore the interaction points between geocoded media and urban places. While the first case study examines the mechanisms through which the online representation of places (i.e. local/location information) is appropriated by commercial platforms in order to generate economic value, the second case study moves the focus to how

location-enabled platforms encode and produce social space and consequently shape urban mobilities and subjectivities.

This project implements a methodological approach based on a mixed methods research design adopting both quantitative and qualitative methods (Hewson, 2007), and deploying them in two parallel phases whose results are then combined at the level of data interpretation. The main strength of a mixed methods strategy is that in allowing different tools and modes of research inquiry (induction, deduction, and abduction) (Onwuegbuzie and Leech, 2006) it makes possible more comprehensive descriptions and understandings of the case studies, consequently providing better means of legitimating results.

4.3 Case Study 1: Google

This case study examines Google's database of local and location information: Google Places. The selection criteria for Google Places as the object of study is twofold: Firstly, Google is the market leader in online mapping services and a big player in mobile/local search and advertising. And secondly, due to this monopolistic position, Google plays a leading role in shaping how places are represented online. To the best of my knowledge, there is not theoretically informed published research on Google's local database as such, though there is related literature focusing on other Google's location services (Jones, 2007; Zook and Graham, 2007a, 2007b; Munster, 2008; Parks, 2009).

According to Google, 'a Place Page is a webpage for every place in the world, organizing all the relevant information about it' (Google Blog, 2009). With Places Google assembles algorithmically generated listings out of data available for, from, and about places. Accordingly, this case concentrates particularly on the analysis of what type of information is selected to build the database of places, and how that information is filtered, ordered and ranked.

This comprises looking at the algorithms at play in the indexation of places as well as the question of how the company capitalizes on this geoindex.

There are important methodological limitations when it comes to the investigation of code/software in social media, nonetheless. The algorithms underlying these platforms are commercial secrets; hence, their workings have been deliberately black-boxed. There is no access to the source code that would enable a direct reading into the platforms' underlying mechanisms. Considering this 'problematic mode of existence of code', as Adrian Mackenzie puts it (2003), the strategy implemented consisted of examining the inner workings of the black box through the information provided in the algorithms' patent documentation. This approach was complemented with analysis of records of interviews and texts (blog posts) produced by Google's programmers and other employees. There are limitations to this methodological approach, however. The descriptions of the technologies provided in the patents can sometimes be rather general or intentionally obscures how the technology is actually implemented in order to protect what are valuable corporate properties. It should be noted also that the design of algorithms as it is presented in a patent does not correspond necessarily with their actual implementation. More critically, the design concepts might never concretized, and develop instead into different forms.

Furthermore, algorithms are variable, mutable, always subject to modifications to adjust to changing information ecologies and media practices, some of them are indeed programmed to learn and change their functioning accordingly (machine learning algorithms). To illustrate, Google's algorithm PageRank original design as described in its patent documentation included just two variables as ranking criteria (number and quality of incoming links) whereas its current implementation has been claimed to process more that 200 ranking variables (Levy, 2010).

So it is uncertain whether a particular function in the algorithm as described in a patent may be at work on what the final user experiences. As a matter of fact, the user experience is likely to entail a far more complex and distributed

operation involving different algorithmic processes. Even so, code/software still necessitates to be interrogated if we are to understand computational media. With these caveats in mind, I adopt an ontological perspective of software that looks at algorithms as sets of abstract relations and formal operations (sorting, comparing, searching, encoding, decoding, etc.). I trace their respective principles of organization and operational logics, i.e. their diagrammatic models³, in order to interrogate what cultural and social orders might be embedded in those models. In this diagrammatic approach, the complexity of the actual functioning of the technology is simplified by abstracting a model for analysis.

Drawing from the ANT methodological approach, the research traces the associations of the different actors (users, local businesses, developers, third party content providers, advertisers, and software) in order to map out their articulation in the platform. Inasmuch as interviews with such an array of actors surpass the limitations of this research project, the different actors associations and interactions are traced through documents, namely blog posts archives and textual discussions from forums.

The first step studies how Google has integrated local/location information and local businesses historically by tracing the platform evolution from Google Local, Google Maps, Local Business Center, and Google Real Estate to Google Places. In order to trace this evolution, an analysis of Google's blogs (Official Google Blog, Google Lat-Long Blog, and Google Geo Developers Blog dedicated to the developer community) is carried out. These information sources constitute an archive of the different changes to the interface, new services and upgrades introduced to Google's local/location platform. Another aspect traced is the platform's business model evolution, from ad-free services to its articulation within the whole Google's advertising ecosystem. The case study examines how through specific legal and technical processes the platform has managed to capitalize on user-

³ 'Deleuze elaborates the concept of 'diagram' from Foucault's understanding of the panoptic mechanism. The diagram –Deleuze argues- is an 'abstract formula' [...] 'that is to say a functioning, abstracted from any obstacle [...] or friction [and which] must be detached from any specific use' [...] The diagram 'is a map, a cartography [...] an abstract machine.'" (Deleuze, 1988, 34).

generated media content (both from users and local business owners). For this purpose, terms of service documentation and APIs documentation are scrutinized in order to identify the different strategies through which local/location information has been captured within Google's commercial network.

It is out of the scope of this case study to investigate the communicational practices of individual users. Instead, the case study examines a narrower conception of the user taken in its collective materialization as population. Here, conceptualized in a Foucauldian sense, 'the population is a flexible articulation of individualizing and collectivizing tendencies' (Galloway and Thacker, 2007, 72). The population is taken not only as a mass body (particularly as flows of bodies in the city), but also as a mass subject through the notion of 'the public' (see: Foucault, 2007; Lazzarato, n.a.). In this sense the analysis will consider users as aggregated data: opinions (reviews, comments, ratings, etc.), media objects (user-generated geocoded media), and behavioural data.

Local business owners constitute another personification of the user, understood in a double dimension both as content producers and as main advertisers on the platform. The research interrogates thus the ways in which small local businesses are incorporated within Google's economic regime (advertising network), and under which governmental rationality. For this purpose the analysis conducts a revision of Google Places policy, Google Places Help Forum, and Google Places forums for businesses.

In June 2010, when I finished the data collection process, Google Places API had not yet been released; nevertheless, documentation for the future API was already available. The documentation was clear as to the limits imposed for the use of the API for non-commercial purposes. In order to have access to the API, the documentation reads, the user 'must provide a valid AdSense publisher id'. In addition, the 'API must only issue queries in response to end user actions', and data could not be permanently stored (except references and IDs). These limitations of access do not permit the implementation of

quantitative methods (e.g. data mining and data visualization) that are, on the other hand, central to our next case study.

4.4 Case Study 2: Flickr

The second case study examines the photo-sharing platform Flickr, focusing particularly on its repository of geotagged media. Significant research within computer sciences has been done using the Flickr platform to investigate location metadata. This project builds on the findings of previous research that have shown the potential of this platform to extract knowledge about places, understand users' communication behaviour and affective attitudes in relation to places (Kennedy et al 2007; Kennedy and Naaman 2008; Rattenbury et al 2007; Rattenbury and Naaman, 2009; Ahern et al., 2007; Girardin et al. 2007, 2008a, 2008b). The main aim is to investigate how the platform articulates the production of geocoded media within its technical frame in order to produce representations of places, and how this articulation may complicate social space.

Compared to other platforms that enable geotagging, the importance of Flickr to understand this form of spatial annotation is that it links geolocation with a social tagging system and other forms of social metadata (comments, favourites, groups) (Skågeby, 2009) that permit further description of the media, consequently providing richer representations of those places that media are linked to. Moreover, Flickr's database of geotagged content, accessible through a public API, is the largest on the Internet exceeding the hundred millions, constituting thus a valuable cultural repository about places for the social researcher.

The analysis of Flickr centres on geocoded media produced for London (UK), with particular attention paid to the London Borough of Hackney. London is the second most photographed city in the world on Flickr after New York (Crandall et al, 2009). The selection criteria for this area of London considered the complex layers of urban stratification that conflate there: 1) an

ethnically diverse population; 2) a significant concentration of creative industries and creative labour; and 3) a changing urban fabric mainly as a consequence of the large scale regeneration processes the area has been experiencing in the last years as this borough hosts the London 2012 Olympics games. These different social, economic, and cultural conditions render Hackney a rich case study to explore the range of potential connections between media and the political economies of cities. In this sense, to some extent, the case study tries to respond to Richard Roger's call for research that is able to use the Internet as a source that informs cultural, economical, political processes taking place offline, and make grounded claims about society at large ('online groundedness') (2009, 4). Building on the assumption that Flickr constitutes a rich source of data about society and culture, it is within the scope of this project to evaluate also to what extent user-generated spatial annotations mirror (or even shed new light on) the socio-economical processes shaping this London borough.

4.4.1 Phase 1: Qualitative Analysis

This phase is mainly descriptive and seeks to understand what kind of representations of places is produced in the platform. The first component of the platform analyzed was 'groups', in particular those revolving around the practice of geotagging. Previous ethnographic studies have already investigated the motivations of individual users to geotag content (Ames and Naaman, 2007; Erikson, 2009). The case study focuses instead on the cultures of use in forms of collective practices of spatial annotation. That is to say, it interrogates what are the types of cultural and communicational practices that are enabled by geotagging within the affordances of the platform. The sampling process was carried out by means of Flickr's search functionality. Groups were filtered using 'geotagging' as a search keyword. The selection criteria included groups that either set geotagging as a rule of participation and/or explicitly encourage its members to geotag the content uploaded to the group. The final sample includes 389 Flickr groups. Although

there is a small proportion of the sample that correspond to non-English speaking groups, the use of the keyword 'geotagging' in the sampling process might have magnified the English bias characteristic of the platform's demographics, composed, according to the only available demographic data on Flickr—though already out of date, primary of male young Americans and Europeans, mostly students or creative industries workers (Meyer et al., 2005; Cox et al., 2008). Even so, inasmuch as the term 'geotagging' emerged within Flickr's community it has seen widespread adoption as part of Flickr's vocabulary, extending, consequently, its use across languages.

The resulting groups are scrutinized using content analysis to map out the main themes. The method evaluates: 1) 'participation': for this purpose the sample was sorted into four categories: a) 'personal' (for single member groups), b) 'small' (2-10 members), c) 'medium' (10-100 members), and d) 'large' (more than 100 members); and 2) 'typology': the sample was sorted into three categories with their respective subcategories: a) 'geographic' ('world', 'continent', 'country', 'region', 'city', and 'locality'), b) 'thematic' ('travel', 'art/culture', 'architecture', 'nature', 'community', 'politics/journalism', 'educational', 'history', 'gaming', and 'other'), and c) 'technical' which includes groups dedicated to geotagging technical issues, hardware (GPS/Cameras) and software.

Following the medium-specificity strategy (Rogers, 2009), the analysis moves then to another feature of the platform: the tagging system. Tagging systems enable forms of collective distributed cognition (Steels, 2006), as such, tags are assumed in this research to provide valuable insight on users' descriptions and attitudes towards places. And insofar as Flickr just displays the most frequent tags associated to particular places (the 'all time popular tags' feature), it is expected that this feature functions as a collective filter for the most representative tags for any given place. The Places API allows the retrieval of up to 100 tags for a place query. However, since the city level is the finer level of granularity one can extract tags from, the API imposes a limit to the access to tags at the level of neighbourhoods. Tags were

manually collected therefore sifting through individual Place pages for neighbourhoods, though access was in this case restricted to just up to 20 tags for every neighbourhood belonging to Hackney. Tags were then examined sorting them into two categories: 1) 'place tags', which refer to place names, and 2) 'narrative tags', which refer to tags providing a story-context, or displaying attitude expression or implicit cultural significance (Zollers, 2007).

The last set of qualitative data scrutinized included the following documentation: patents, the API and Flickr's terms of service, as well as published interviews with Flickr's founders and developers, Flickr groups' forums and Flickr's staff blog entries.

4.4.2 Phase 2: Quantitative Analysis

4.4.2.1. Data

A data mining approach was implemented to explore Flickr's database of geocoded media. More precisely, the aim was to analyze patterns in media descriptions (metadata). Increasingly, social researchers are calling for the necessity of a data-driven social sciences able to deal with and interrogate the huge amount of data that our informational saturated media environment produces (Lazer, 2009). A computational turn within the humanities and social sciences is already evident in the emergence of new methodological frameworks such as cultural analytics and digital humanities (Manovich, 2008; Berry, 2011a) that apply computer-based methods to interrogate social and cultural data. Broadly, this emergent paradigm stresses the identification of patterns in datasets over traditional research methods that favour hermeneutical interpretation. Though traditional methods are not rendered unnecessary in these methodologies.

The main assumption of data mining as a method is that, even though it won't test any hypothesis, it is still useful for exploratory purposes since by

rendering visible relations in data it offers perspective on the phenomenon under study (see: Rieder and Röhle, 2010). In data mining analysis is not necessary to formulate a departing hypothesis to test; though, it is fundamental to define a set of variables to be interrogated (Little and Schucking, 2008, 425). Thus, in this case study this tool was set to gather data that may provide insight both on the distribution of geoannotations and how the platform makes them visible.

This phase of data collection, as well as subsequent phases of data processing and analysis, was conducted in collaboration with colleagues in computer sciences and geography. Dr Gaurav Gupta help was critical in the process of extracting and preparing the data for analysis, while Jonathan Cano offered his orientation on the analysis types and GIS tools needed in order to explore the data.

Following the platform-focused methodology, Flickr API was used as a data-gathering tool that under determined specifications allows the researcher to explore the platform beyond the level of the user interface to the level of the database (fig. 4.1). This way the API permits access to structured data. Flickr database of publicly available photos for London was mined then for geotagged items. A set of variables was retrieved from the geotagged photos' metadata, returned in the form of XML. The following metadata was extracted in the sampling process: 'photo ID', 'search stream', 'user' (obfuscated ID), 'date uploaded time stamp', 'place ID', 'WOID' (Where On Earth Identifier), 'latitude', 'longitude', 'photo accuracy', 'tags', 'comments', 'favourites'.

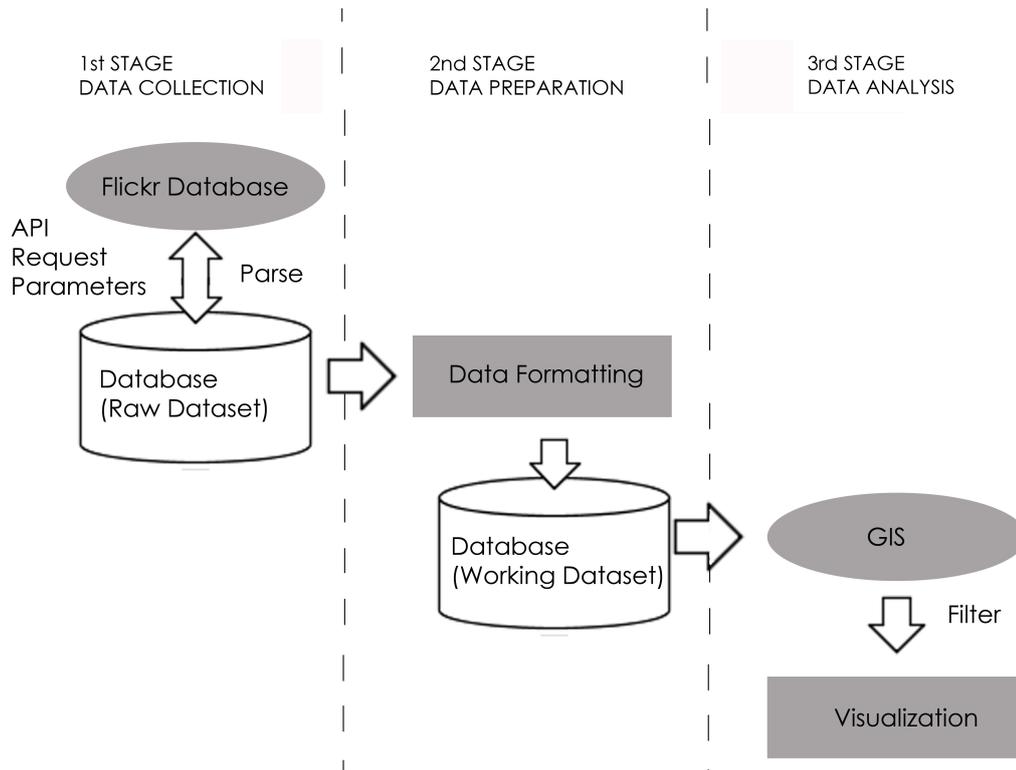


Fig. 4.1 Data mining methodology diagram

A problem the implementation of this method faced was the restriction that the Flickr API imposes for data retrieving. The API limits the intensity of server calls, which will keep returning the same data if more than 4096 records match a query, making it difficult and time consuming to gather a big sample of data. The crawling strategy implemented to overcome this obstacle consisted on filtering the data in other directions by adjusting date and uploaded times.

The data collection was performed during the summer 2010. The final sample comprises 94310 geotagged photos taken in London by 6671 users in one-year time (between August 2009 and July 2010). Even though the total amount of geotagged photos for London is unknown, related studies used approximately similar samples. For instance, Girardin and Blat (2007)

took a sample of 90967 geotagged photos for their study of geocoded content for Barcelona.

Other datasets were also gathered using different API call methods. One of them comprises all geotagged content corresponding to Hackney from the period August 2007 to August 2010. Complemented by another dataset comprising the entire Hackney Group's set of photos from the same period. A final pair of sets under analysis comprehended datasets of Flickr's geotagged objects from London as sorted into data generated by locals and data generated by visitors. Eric Fisher kindly provided the algorithm used in the sample. Basically, the algorithm works tracking the presence of a given user in the city over time. The definition of local was determined identifying a run of geotagged objects without a gap of more than 30 days that extends over a period of more than 30 days. If that time-gap is exceeded the user was considered a visitor. Those records that were not clearly identified either as corresponding to locals or visitors were not considered in the final analysis.

As other researchers have pointed out, one of the problematic aspects of user-generated geotagged content is its geographical accuracy and quality (Mummidi and Krumm, 2008). However, Hollenstein (2008) argues that due to the critical mass of items and participating users in locative media platforms the quality of the content still holds relevant spatial knowledge despite a potential degree of geolocation inaccuracy. Even though this consideration can be applied to London, since it is one of the most densely geotagged cities, this might not be the case for most places in the world as geotagged data is unevenly spatially concentrated rendering most places therefore underrepresented.

Another methodological limitation includes potential sample biases. To the demographic bias aforementioned we can add that the sample may be also biased in terms of users' technical skills. Even though geotagging is a function easily accessible through Flickr's user interface, the sample may

over-represent a particular technological-savvy group with skills such as using GPS or a wider set of techniques to geotag photos.

A final consideration involves ethical concerns of user-privacy protection. In this regard it is important to clarify that the data collected in the data mining process corresponds to public records in which location have been explicitly disclosed by users. Moreover, it is also worth noting that the API automatically anonymizes users' identity, therefore, the sample collected is composed of obfuscated user identifiers instead of users names or nicknames.

4.4.2.2. Other data

Data extracted from social location network Foursquare (as of April 2012 the main repository of location data in the form of check-ins) is incorporated in the research strategy to draw connections across different datasets for exploratory purposes. I worked with a dataset of Foursquare's geocoded objects for London collected via the platform's API and made publicly available by Anil Bawa-Cavia from the Centre for Advanced Spatial Analysis (University College of London). Fortunately, the data was collected about the same period in which the Flickr samples were taken (July 2010), which helps to validate comparisons, although the exact dates for every register in the dataset are unknown since the data does not contain timestamps. This dataset comprises a sample of 156529 check-ins corresponding to 7091 places in London. It is also important to point out the limitations of this dataset. The aforementioned bias of demographics composition may also apply to Foursquare's sample. A Forrester survey in 2011 (US population only) identified that just 5% of online adults use this type of location applications, most of them corresponding to affluent, male, early technology adopters. Besides, since Foursquare is mainly used as a mobile application the data is likely to be skewed towards a technological-savvy population subgroup owning 3G mobile phones.

4.4.2.3. Data Analysis

We used MySQL (database) to store and query data, and gvSIG (GIS) and OpenStreetMap (maps) to access, filter, cluster, and visualize the data stored in the database. All these tools are free and open source software.

Once collected, the datasets were organized into a relational database in order to render the data readable by the GIS software. In this phase of data preparation records with incomplete data or corrupted data were identified and removed (data cleaning). As a result of this process the following final working datasets of geocoded objects were produced: 92729 registers for London, 11770 registers for Hackney, and 2871 registers for Hackney Group.

With the final datasets imported into the GIS software the data was ready to be analyzed and displayed in the form of geovisualizations. The main aim of visualization is to make visible patterns and relations in the data (Manovich, 2010). Hence, dot maps were produced in order to identify visually the overall spatial patterns for each dataset. However, since it is difficult to precisely determine the degree of spatial clustering (or dispersion) of each spatial pattern through visual inspection, spatial statistics were conducted for this purpose (average nearest neighbor method).

Another geovisualization method implemented was hotspot mapping. 'Heat' maps show the spatial distribution of media objects based on the spatial relationship of their respective locations (kernel density analysis) helping identifying thus spatial concentrations of high values (hotspots). To allow comparisons between different datasets, a common measurement scale was set based on a method called 'equal interval'. This method of classification divides the total amount of points (representing geocoded objects) into equal-sized ranges. Five intervals were set represented by colour scale values ranging from blue for low values to red for high values. The GIS software automatically determines where those divisions are for each dataset. This method allows relative cross-comparisons between datasets as it permits to see the clustering values on one map relative to those values on another.

Visualization was mainly used to reveal patterns of spatial distribution of media objects and make inferences or formulate tentative hypotheses based on the overlapping of both media space and urban space. As Welser et al. point out, computational social science approaches have proved to be insightful as to 'how populations, groups and other super-individual-level units vary across time and social space', but those insights are "likely to be more valuable when they can also provide a scaffold upon which further, 'thicker' descriptions and explorations of meaning are possible" (2008, 128). Considering this, secondary sources were used for further description a deeper insight into the data, including official administrative records and policy documents from the publicly available archives of Hackney as well as other research data. These data provided the grounds for more in-depth conceptualization about the factors shaping the resulting spatial distributions.

Chapter 5

Places databases and the indexation of the world - the case of Google's local platform

'To control the future mechanisms of orientation will be to control the global imaginary' Stiegler (2003).

5.1. Introducing the case study

In a 1999 paper J.C. Spohrer, an IBM researcher, presented the concept of a WorldBoard. In that paper Spohrer suggested the possibility of building a 'global infrastructure to associate information with places' that would allow anyone to 'post and read messages associated with any place' [...] 'on a planetary scale and as a natural part of everyday life' (Spohrer, 1999, 602-604). Parallel with the development of locative media within the arts over the last half-decade, the WorldBoard idea would begin to take shape with the launch of commercial mapping services, above all Google's location platforms in 2005, and their subsequent broad adoption. This case study centres on Google's embodiment of the WorldBoard idea, particularly on Google's location platform Places, although the analysis is complemented with and extended to other location-based services and location-enabled platforms.

Google Places is the current avatar of what has been since 2004 Google's business directory and local search service. In 2004 Google first integrated its local business listings service with mapping and called it Google Local, which offered a basic service providing 'neighborhood business listings, maps and directions'⁴ (fig 5.1). In 2006 local search was incorporated in Google Maps and renamed Local Business Centre. Finally, in 2010 Google Maps' Local Business Centre was rebranded as Google Places. Google

⁴ Google History: <http://www.google.com/about/corporate/company/history.html>

Places was previously known therefore as Google Local, then Google Maps and Local Business Center⁵. Regardless its form and brand name, what is of interest in this case study is how Google assembles its database of places and integrates it within its services and respective business model⁶.

According to Google 'a Place Page is a web page for every place in the world, organizing all the world's information for that place' (Google LatLong Blog, September 2009). In the API documentation Google defines a place as 'an establishment, a geographic location, or prominent point of interest'⁷. The basic layout of a place page includes: information about the place (address, telephone, opening hours, website, etc.), events, photos uploaded by the owner, geotagged user-generated content, related places, mapping tools, Web citations, personalized recommendations, a reviews section, and as with any other Google service, advertising (fig. 5.2). In this light a place page is a truly 'virtual palimpsest of place' (Graham, 2010). The core component of place pages is, nevertheless, the reviews section that feeds its recommendation system of places, which include at the same time different components: ratings, 'reviews from around the web', 'reviews by Google users', and 'what people are saying'. All in all, Google Places should be considered in a media genealogy that spans from the city and business directory of the eighteenth and nineteenth centuries and the telephone directory of businesses (yellow pages) of the twentieth century, to the current online business directories and review websites.

⁵ Google. *Google History*. Available at: <http://www.google.com/about/corporate/company/history.html>

⁶ In the course of this research project Google local platform changed its interface design and added new functionalities. This case study is based on the form the platform had between April 2010 and June 2010. On May 30, 2012 Google launched Google+ Local, integrating in this change its local and social platforms. As a consequence Google Places ceased to exist under this name. Interestingly enough, this change reflected a current communication trend towards the integration between mobile, local and social media.

⁷ Google Maps API Web Services. Available from: <http://code.google.com/apis/maps/documentation/places/>

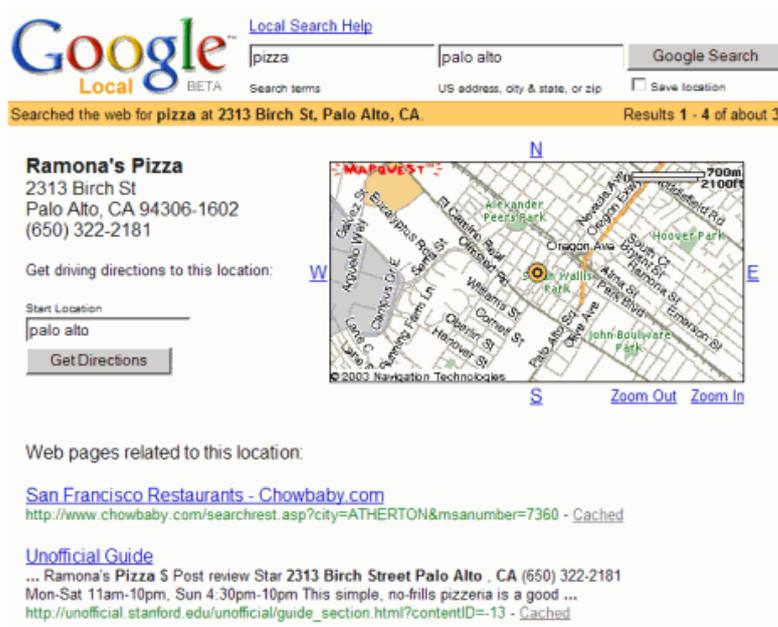


Fig. 5.1 Google Local layout 2005



Fig 5.2 Google Places layout 2011

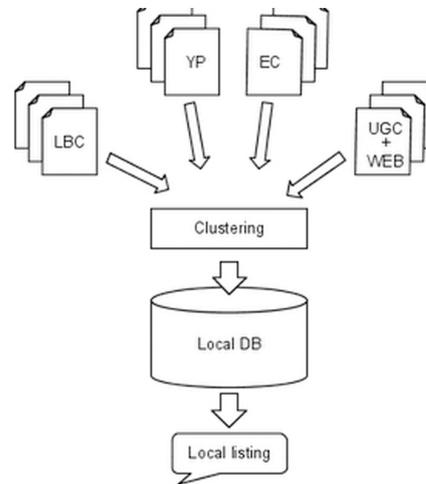
At the macro level Places is a places database (locations or Points of Interest database) incorporated into Google's myriad of services - primarily Google Maps and Google Earth - as a nested content layer for searching for nearby locations based on what a given user is looking for (find the place that meets user's needs) rather than simply providing navigating directions. In other words, it is the places database that underlies Google's local search technology. In its basic workings the Places API takes location data in the form of geographical coordinates as input and return a list of named locations. This is a database particularly critical for mobile search where users need both information targeted to their specific location (e.g. nearby cafes) and search for content specific to a location (e.g. best cafes in Soho).

This study will examine Google's approach to location through its platform Places, and its respective actor-network, in order to analyze some of the modes of governance at work in locative media. Particularly it looks at how through technical and commercial mechanisms user-generated local/location information is appropriated by Google in order to generate value, and how this economic capture may potentially shape the mobility of populations in the city.

5.2 Location platforms as geodemographic systems

The rise of mobile location-based services is making critical the availability of comprehensive and rich place databases into which developers can build their applications. In fact all the main current social media players have incorporated geolocation already, turning their respective platforms into location-enabled services (e.g. Twitter released its geotagging API in August 2009 (Twitter Blog, 2009), and Facebook its Places API in August 2010 (The Facebook blog, 2010)). The collection of data to build these places databases takes different strategies, however. To illustrate, Facebook Places harnesses its social graph to collect local/location data, Foursquare uses a crowd-sourced approach that relies on game dynamics, and Google Places

deploys a mixed strategy using controlled data (e.g. Streetview, Maps, Local Business Center), listing providers licensed data, online directories, and user-generated data (Google Blog, 2009) (fig. 5.3).



LBC: Local Business Center. Information submitted and verified as individual listings appears with the label *Provided by business owner*. Also, some feeds are submitted through the LBC.

YP: Yellow Pages. This describes information we get from public directories created and licensed from 3rd parties. In some areas, we provide attribution at the bottom of a list of results (e.g., business listings distributed by YellowPages.ca™).

EC: Enhanced Content, which can include reviews, photos, business hours, payment methods, and other details. This is provided to us via feeds from other websites. If this information is coming from a published web page, a link will be provided.

UGC + WEB: User Generated Content & other websites. Both these sources are either submitted to Google directly or crawled, just like other websearch results. If the content is hosted on a website, we'll provide a link. Otherwise, you'll see a *Provided by Google users* label that shows it was

Fig. 5.3 Google's Local listings sources. Source: Google Blog (2009) 'Local listings: Where do they come from?'

More specifically, in the case of Google, a place page is an assemblage of local/location data produced out of Google's own databases and dispersed data on the web. A patent application describes the method whereby the places database is algorithmically generated. Google's web crawling look for unique business/address/phone groups in order to create data clustering modules into which all data about a place is finally collected and stored in a database for querying (local search). The data undergoes first a structuring

process consisting of the following steps: data acquisition, data extraction, data parsing, and data normalization:

Structured and/or unstructured data about enterprises are acquired from one or more sources such as commercial data providers, enterprise web sites, and/or directory web sites. Strings are extracted from the unstructured data. The strings contain key, value pairs describing facts about the enterprises. The extracted strings are parsed to normalize the keys and values and place them in a machine-understandable structured representation. Some keys and/or values cannot be normalized. The facts are clustered with the enterprise to which they pertain. Normalized facts from different sources are compared and confidence levels and/or weights are assigned to the facts. These confidence levels and weights are used to select the facts that are displayed on a page for the enterprise in a directory (Google Inc., 2010b).

Additionally, Google has championed a set of protocols, mainly hCard for representing places online and hReview for reviews (both open standards), as a way of disciplining webmasters on how to code local/location data in order to make it 'Google friendly' and hence expand its geindex:

In organizing the world's information geographically, Google looks for the best sources of information about any place. But to find those pages that mention the business, Google must understand your reference to the particular business without the convenience of the Web's uniform and unambiguous system of hyperlinks. Your addition of structured markup simply helps to resolve ambiguities by clarifying that 1) you are in fact referencing a business (e.g. you mean 'Shalimar' the restaurant rather than 'Shalimar' the city), and 2) you're referencing a very specific location (e.g. the Shalimar in Sunnyvale rather than the Shalimar in San Francisco). When annotating reviews, you also clarify which text corresponds to the review of the particular business (Google).⁸

The key political question remains, nevertheless, how does Google structure its geindex to make information searchable by place? Patent applications dating as far back as to 2004 (Google Inc., 2010c) already shows the importance that Google has given to location as indexation criteria for

⁸ <http://maps.google.com/help/maps/richsnippetslocal/>

information. This is, however, today even more important as the search engine now displays local information to users even when the queries have not explicit geographical terms. In this case Google determines implicit local intent using other signals including GPS data, geo IP, search history or language of the query (Google Inc., 2011b). Furthermore, Google has merged its previously distinct local and general search results ('Place Search') increasing as a consequence the visibility of information that could only be reached before through its local services. Built into its standard search service Google positions thus the places database as a pillar of its search technology: 'with Place Search, we're dynamically connecting hundreds of millions of websites with more than 50 million real-world locations'—Google's product manager explains (Google Blog, 2010).

Google's criterion for ranking places is not strictly geographical as such. A given place is ranked considering not only the 'distance from the geographic identifier in the search term' but mainly through the calculation of its non-cartographic attributes, namely, its online presence (or PageRank score) (see: Zook and Graham, 2007b). Google's local algorithm PlaceRank patent reads as follows:

Place rank is computed based on the weighted contributions of various non-cartographic meta attributes about a geospatial entity. Rather than directly measuring a characteristic of a physical place [...] these attributes reflect traits of abstractions or representations associated with the geospatial entity (Google Inc, 2011a).

Among those non-cartographic attributes one stands out from the algorithm's patent documentation: georeferences. In local search georeferences are the equivalent of the inbound links that search engines use to calculate a website popularity. They refer specifically to citations or mentions of a place tied to a particular locale, or as it is stated in another Google's patent, they are

documents that are associated with a location' [...] 'A document may include, for example, an e-mail, a web site, a business listing, a file, a combination of files, one or more files with embedded links to other

files, a news group posting, a blog, a web advertisement, etc. (Google Inc., 2004).

This is how georeferences influence place ranking:

When multiple entities are clustered in a relatively small geographical region, this signifies that authors of the entities have indicated a geographical region of elevated interest. From this it can be assumed that an entity with an elevated density of neighboring entities has a greater value than would otherwise be the case. This is implemented in an embodiment of the ranking system described herein by adding or otherwise providing a rank bonus based on the number of other entities within a defined area that includes an entity's location (Google Inc, 2011a).

Georeferences function then as the alleged one link equals one vote of the PageRank system. This way, as Google Places offers a ranking bonus based on the flow of check-ins to a given place, the number of check-ins represents the spatial equivalent of a clickstream, and therefore a measurement of attention value in real-time as it will be discussed further below.

Another important ranking factor to consider not only in place ranking but also in Google's search technology at large is personalization⁹:

A rankings premium may be assigned to geospatial entities based on the user's interest or preferences. User data collected at a client may be stored in the memory of the entity ranking module and used by the ranking engine to generate entity rankings that are personal to the user (Google Inc, 2011a).

Google may extract location clues mainly from users' search history (Google LatLong Blog, 2010a), as well as previous reviews, ratings and recommendations of places made by the user and his/her respective social network that feed Google Places' in-built recommendation system (Google LatLong Blog, 2011).

⁹ Since December 2009 Google extended personalization to all its search technologies (Google Blog, 2009b).

There are, furthermore, more variables determining local search that are not included in the PlaceRank patent but are nevertheless prominent in the orderings of places. Particularly, and along with georeferences, of great importance is the volume of documents with reviews of the place on the Web as well as their specific quality¹⁰. This factor is described in the patent ‘Scoring local search results based on location prominence’:

The number of information documents that mention a business associated with a document may be used as a factor in determining the location prominence score for the document. An information document may refer to a document that provides important information about a business, such as the address, telephone number, and/or hours of operation of the business, reviews and/or atmosphere of the business, whether the business accepts credit cards, etc. (Google Inc., 2010d).

The quality of reviews is algorithmically measured using what is called sentiment, that is, opinions or affective states that signal the attitude of users towards a given place (Google LatLong Blog, 2009; see also: Liu, 2010). Sentiment analysis in fact lays the base of a platform that aggregates disperse data about places and deliver it in the form of reviews. Google’s sentiment analysis technology basically looks for different attributes of a particular place that could be rated by users (location, service, food, experience, value, ambience, etc) in order to aggregate opinion expression about them. In order to do so the algorithm breaks down phrases to sort words according to lexicons to understand their meanings in context, then subjects them to quantificational procedures to determine the strength of the sentiment expressed, and finally assembles review summaries expressing the sentiment for the different attributes (Google Inc., 2008) (Fig. 5.4).

¹⁰ It has also been pointed as a main factor in the Local Search Ranking Factors 2011, an annual survey of local search specialists (Mihm, 2011).



Fig.5.4 Google Places – Sentiment analysis of a restaurant.

It can be argued that an affective dimension is indeed already built-in in the platform via an algorithm capable of measuring affectivity. Through this process of 'grammatization of affects' (Stiegler, 2010, 33) the sentiment algorithm captures then the 'affective labour' (Hardt, 1999) produced in these communication exchanges: beliefs, desires, feelings, opinions towards places, using the resulting data to refine and improve local search and place recommendations: '[...] Sentiment classification can also assist web searchers seeking information about an entity by summarizing the sentiment for the entity' (Google Inc, 2007).

Drawing on Foucault, the regulation of the population becomes in this way the management of the public. According to Foucault 'the public (...) is the population seen under the aspect of its opinions, ways of doing things, forms of behaviour, customs, fears, prejudices, and requirements' (2007, 105). In this light, the public in Google's platform amounts to the aggregate behaviour of individual users. It is a statistical trend in the population, never static but in continuous variation (Lazzarato, 2006, 74). At stake in the platform's use of sentiment analysis is a form of 'environmental power' that works as a modulation of the relationship between the user and his/her environment through 'affective calculation' and the modulation of affectivity in order to shape our perception of places (Massumi, 2009; see also: Grusin, 2010).

In Google the ordering of spatial entities is not as much based on geographical distance as it is on the collective symbolic capital of social spaces as accumulated and sorted by Google's algorithms. In this process

Google imposes its 'PageRank epistemology' onto the world. That is, it sorts spatial entities according to the measurement of media-driven attention (attention capital): the quantity (e.g. number of georeferences) and quality (e.g. sentiment of reviews, authority, ratings, etc.) of the online media presence of places. Accordingly, the manner in which Google organizes space should be understood as essentially geodemographical in as much as at play is the sorting of places according to its social dimension, namely the cultural capital and collective desire attached to them.

Arguably Google's location platform shares the core components of geodemographic systems: 1) A GIS technology: for instance, Google possesses a comprehensive set of mapping technologies. 2) A database on consumer identity behaviour: Google collects not only demographic data but also behavioural data to determine the location patterns of users (Google Inc., 2009b). 3) Use of cluster analysis to produce segmentation classifications: even though such classifications are not visible for the user it could be hypothesized that they are black-boxed in the algorithms. An empirical research on personalization in Google search results found that the search engine indeed matches people to segmented groups (Feuz, Fuller and Stalder, 2011). Such segmentations would be in operation then in the form of recommender systems, sorting places in a similar way such systems sort for instance cultural goods (e.g. Amazon, Netflix, Last.fm) or social contacts (e.g. Facebook's SocialGraph):

Our system automatically compares the places you've rated against the places rated by other Google Places users, and identifies people whose taste overlap — meaning you both tend to like and dislike the same places. Now, you can see all the places that people who are 'like-minded' with you enjoy, since there's a very good chance you're going to love them too (Google Places, May 24, 2011).

Even though Google Places does not provide a rich description of its places recommender system, looking at other location platforms could shed light on

In as much as traditional geodemographics has proved successful in targeting populations for marketing and political campaigns, these new socio-technical configurations raise questions in regards to the geodemographic modeling of the information that reach us, that is, the 'software-sorting' (Graham, 2005) of the information we get depending on our socio-spatial profiles. As Lyon highlights, '[codes] are invisible doors that permit access to, or exclude from participation in a myriad of events, experiences and processes [...] thus directly and indirectly affecting the choices and chances of data subjects' (2003, 13).

Google is advancing mobile search towards this direction under what they term contextual discovery. In an interview Vanessa Mayer (Techcrunch, 2010), the Vice President of Location and Local Services at Google, explains how location may be used to push information to people: When we are on the mobile phone, she explains, context is 'where you are in the physical world'. This way 'we can figure out where the next most useful information is'. In an embodiment of a techno-geographical milieu invested with agency, contextual discovery, Mayer remarks, takes 'users location as a piece of context for finding what (users) want without them actually searching for anything'. This is 'Google results without the search', Mayer concludes. We may not be in that world yet, but forms of content geotargeting are already in fully operative thanks to the default personalization of search results. As Feuz, Fuller and Stalder point out, 'personalised search promise[s] an 'augmented reality' in which machine intelligence interprets the user's individual relationship to reality and then selects what's good for each' (2011).

Market research sponsored by Google has shown how mobile searches are characterized by an immediate need. That is to say, users tend to take action immediately (or within few hours) after performing a mobile search query. Google claims that 9 out of 10 mobile search users take some action, with over half leading to an act of consumption (Google Mobile Ads Blog, 2011). Considering this action-oriented behavioural pattern, geodemographic

segmentation represents a commodity inasmuch as it facilitates the exploitation of people's spatial propensities to engage in the consumption of particular goods and services. Location targeting value for local commerce lies thus in its potential capacity to convert data traffic into foot traffic to local retailers. In this light, contextual search would put in place what Nigel Thrift calls 'the engineering of propensity' (2009): 'Google's overriding goal in local advertising, Vanessa Mayer continues, is to anticipate what people might want—a nearby restaurant, theatre, or mechanic depending on their location, search history and other data—before they actually know it.'

5.3 The economics of geolocation

'The Web is now the world [...] The new direction for the Web, its collision course with the physical world, opens enormous new possibilities for business [...]' (Tim O'Reilly).

As the trend towards location-enabled smartphones adoption continues (International Data Corporation, 2011; Strategy Analytics, 2011), along with mobile network technology development (3G and 4G), we are witnessing the exponential growth of the mobile web and the parallel emergence of a new search market¹³. Coupled with these technological trends there is a social trend worth noting: mobile users' demand for real-time local information. In the US, the social trend in mobile usage indicates that nearly half of all users search in mobile platforms for "information that is practical and in real time" (47%), including mainly weather updates (42%) and local business information (37%) (PEW, 2011). Local search is closely linked with mobile search mainly because while one is on the move the most relevant information is contextual information, and -along with time, weather, and demographics data- geolocation provides context to communication. Former Google's CEO Eric Schmidt pointed to the centrality of local/location data in mobile search remarking that 'one in three queries from smartphones is

¹³ Google claims 1 billion mobile gross revenue (Google Investor Relations, 2010b).

about where I am', that is, they are related to the user's local environment. Microsoft, Google's main search competitor, estimates that 'local intent' (implicit place-related queries) represents even slightly above half of all mobile queries (Search Engine Land, 2010). Location data is not only central in mobile search, the company has also been involved in other markets closely connected to location: real estate search and the travel search market. These usage trends show both the preeminence of location in the mobile media experience and the extent to which people use mobile devices to navigate the physical world.

Currently Google has an even more dominant market share in mobile search than it does in desktop search. As of April 2011 Google had a market share of roughly 98 percent in mobile search, according to StatCounter. The available market research data suggests that the main opportunity for Google to capitalize this market lies in location advertising. Market research company BIA/Kesley reported that location targeted mobile advertising represents 51% of overall US mobile advertising spending and predicts it will account for 69% of US mobile advertising by 2014 (BIA/Kesley, 2010). Search ads and location ads (paid-for positioning on maps and augmented reality apps) in particular are expected to deliver the highest revenue (Gartner Inc., 2011). Accordingly, as a Google executive has been reported to claim, the company is directing its mobile strategy precisely to location-based services, particularly to local advertising and location-aware offers (coupons) (Mobile Marketer, 2010). This comes at no surprise though as Google's economy relies almost exclusively on advertising revenue (96.7% in 2010) (Google Investor Relations, 2010a), and the company's success has depended precisely upon innovation on advertising technology. More broadly, this market opportunity also comprises most location-based services. Research data from US audiences suggests that most people rely already on the Internet to seek for local information (47%), compared to print newspapers (29%), word of mouth (22%), local TV (8%) and local radio (5%) (PEW, 2011). What is at stake with the rise of these new services is a competition for a piece of the local advertising market, whose sales channels

spans from newspapers, radio, yellow pages, and city directories to online search. A market competition that could collapse the already weakened local news and hyper-local media business models as advertising budgets redistribute among more market players.

As early as 2004, patent applications already showed how Google was willing to give marketers the option of targeting users by 'geographic location' (Google Inc., 2005). In practice geolocation technology renders users easier to segment and target for marketers—as will be explained below, and part of mobile advertising value resides precisely in this efficacy:

What interests us a lot is not just more queries via mobile— Mike Steib, Google Director of emergent platforms explains—but we know who you are and where you are [...] If you go to Google on your handset, we ask would you like to share your location for more relevant results, here's what's nearby now [...] If you search for something and the result is nearby, the click-through rates (CTR) are astronomically higher (Mobile Marketer, 2010).

Some available metrics may also point to the value that location-targeting has for Google. The cost pay by marketers and publisher to search engines (cost per click) is higher in mobile search than on desktop search (Efficient Frontier, 2011). If the advertising replies (CTR) are effectively higher at the local level, as the Google's executive suggests, an ad targeted at a country level would be worth less than one more accurately targeted at the city, neighbourhood or even street level. Local players would be therefore more likely to raise the bids paid for ads competing for these valuable clicks, generating as a result more profits for Google's advertising system. For that reason, owning the database of places (local/location data) constitutes a crucial economic asset in as much as mapping and profiling the locations from which users are searching, updating their status or checking-in is necessary to target ads more effectively at the more profitable local level. Nonetheless it still remains to be seen whether the so far 'rather hesitant adoption of mobile advertising' due to the conflicting interests of the groups involved (telcos, handset manufacturers, content providers) (see: Rowan and

Sinclair, 2009), as well as users' current wariness toward location services will continue to pose limits to such business potential. A research commissioned by Microsoft (2011) carried out in the US, UK, Japan, Canada and Germany found that despite the perceived usefulness of location-based services is relatively high, users are still very concerned about potential issues such as unauthorized location sharing, personal information theft, loss of privacy and security threats.

5.4 The surplus value of user-contributed local/location data

Google's power must be understood first and foremost from the perspective of value production (Pasquinelli, 2009). In this light, the company has broadly two strategies of value production at play in its location platform: either directly enticing publishers and merchants to advertise as delineated above, or more indirectly channelling users' production to enrich its place database. The latter is unfolded at various levels according to different users' categories: business owners, developers, and users at large. Therefore, to understand value production on Google Places it is necessary to examine how the platform articulates the different categories of actors.

At a large scale, with its algorithmic-generated place pages Google collects all the information available about places on the web along with the local knowledge implicit in users' spatial annotations (reviews, geotagged media, user-generated maps, etc.). In the specific case of non-commercial places for which descriptions of places are scarce mainly because user reviews are rather absent, the platform aggregates information mainly from Wikipedia's repository of user-generated content under Creative Commons licensing (fig. 5.6).

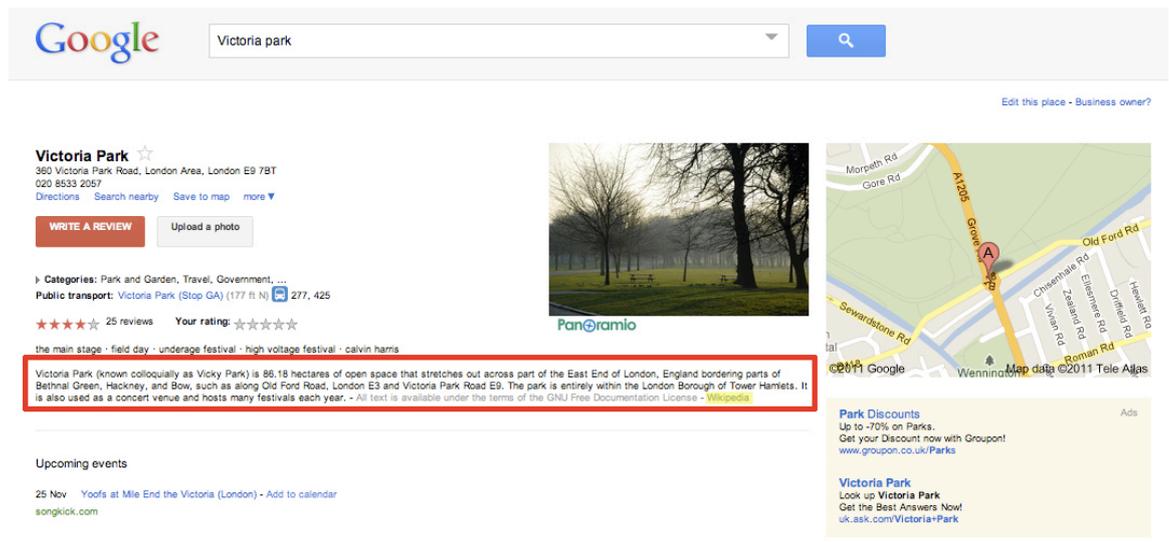


Fig. 5.6 Place page of a point of interest – Victoria Park, London.

All in all Google aggregates the ‘collective symbolic capital’ (Harvey, 2002) of places (cultural commons) in its database. This is how the company frames users production within its mission of mapping the world:

Our goal is to create the world's most comprehensive virtual atlas -- the best, most complete map of the earth. This is no easy task, and we know we can't accomplish it without the help of our users, because nobody knows a neighborhood better than the folks who live in it (Google Blog, 2008).

In order to achieve this goal Google has been gradually enabling its platforms to better capture user-contributed location data. On June 2007 it allowed users to add reviews to its business listings (Google Lat Long Blog, 2007a). Later on that year it started indexing user-contributed spatial annotations and showing the results in Maps (Google Lat Long Blog, 2007b). MyMaps and Map Maker services followed allowing users to contribute

mapping data. In 2008 the option of adding new places was incorporated (Google Lat Long Blog, 2008a). Subsequently, rating places (2008) (Google Lat Long Blog, 2008b), editing place pages information (2010) (Google Lat Long Blog, 2010b) and uploading photos directly to them (2011) (Google Lat Long Blog, 2010c) are made available to the public to help building the index of places.

Broadly, Google Places captures user-contributed metadata about the world to create place profiles and repack it basically in the form of reviews. As of December 2010 the company registered an average of one million place ratings per month (BIA/Kelsey ILM West conference, 2011). The weight of reviews in the platform lies in their specific influence over offline economic behaviour. A research on the impact of user-generated reviews on offline consumption (ComScore, 2007) showed that one out of every four Internet users read reviews online before buying offline. Besides, findings pointed to users' willingness to pay more for a better-rated product or service. Put in terms of Gabriel Tarde's economic psychology, 'there is no economic relationship between men that is not first accompanied by an exchange of words, whether verbal, written, printed, telegraphed, or telephoned' (Tarde cited in Latour and Lépinay, 2010, 49). Consequently, social knowledge, turned into reviews, becomes economically productive. The economic value of reviews and analysis of sentiment data has also been highlighted by recent studies as a way of measuring consumer feedback on market performance of firms in order to support financial valuations and predict stock market performance (see: Tironialli and Tellis 2011).

By the same token, due to the importance of reviews to local commerce, Google has been particularly fierce trying to position its Places platform in the local search market. As of 2011 Google has been battling intensively with market rivals, mainly Yelp and Tripadvisor, over reviews. This battle has a long history. From 2005 to 2007 Google licensed reviews for its local search service from its main competitor Yelp. Later on in 2009 the media reported that the latter declined an acquisition offer from the former. Then in 2010

when Places was launched Google started aggregating third-party reviews in its platform and displaying fragments of content from them, including Yelp's, without legal permission. In an antitrust hearing in the U.S. Senate entitled 'The Power of Google: Serving Consumers or Threatening Competition?', Yelp's CEO alleged in his testimony that Google was using its dominant position in the search market to force review services to contribute their content to Google Places. Google, Yelp claims, accepted to remove third-party reviews just on the condition of agreeing on been removed from Google's web index entirely. A solution that comes at the expense of stopping redirecting search traffic to its rivals, hampering them economically as a result. 'It is a choice between allowing Google to co-opt one's content and not competing at all'—Yelp's CEO declared at the hearing (US Senate, Senate Judiciary Committee, 2011).

Furthermore, the economy of reputation driven by reviews and the importance for businesses of ranking high in Google's local index to become visible to potential customers have contributed to the emergence of forms of what Fuller and Goffey have termed 'evil media'. That is to say, 'media practices of trickery, deception and manipulation' (2009, 142) such as local spam and "bad" search engine optimization practices. The sentiment of several users in Google Places Forum for Businesses describes both the generalized frustration with spamming activities in the platform as well as its widespread occurrence:

I am finding it very frustrating that spammers and competitors and vindictive people can just spam your Google Places account, therefore potentially ruining your reputation and losing you businesses. This is second or third time it's happened to me. And last time Google removed the spam but it took a very long time (Google Places Forum).¹⁴

Spamming practices are rampant in Google Places. This is the case particularly since October 2010 when Google integrated its main search engine results with Google Places listings. This change potentially drives

¹⁴<http://www.google.com/support/forum/p/Places/thread?tid=08d2c94d32c6d59c&hl=en>

more traffic for small and medium business that under the PageRank ranking system would have never had presence in the main results. This adjustment in the search engine (PageRank algorithm) to include the place pages index (PlaceRank algorithm) opened up the practical possibility of ranking higher in the main organic results by achieving a high local search ranking, which is comparatively much easier to manipulate—as it will be illustrated below. As a result, search engine optimization firms and reputation management companies have been exploiting the vulnerability that this amalgamation of algorithms brought about to gain competitive advantages for clients.

Based on the analysis of Google Places Forum for Businesses public archives I have identified three basic modalities of 'evil media':

1. Fake reviews: A first modality involves reputation management companies that guarantee their clients minimizing the effect of negative reviews and improving search engine rankings by writing reviews and building georeferences all over the web in order to build what they call online reputation. For example, 365Outsource, a company that provides search engine optimization services targeted to Google Places, offers so-called 'customized reviews tailored to (...) business needs'. It is worth noting that the intensive labour for the "quality review writing" these companies offer, at the scale that spamming requires, is often outsourced to low-wage countries. In the aforementioned case, the company outsources its services to the Philippines, a well-known player in back office services and call centres in the global labour market.

This user describes the behaviour of a business allegedly hiring these services¹⁵:

In 2010 mostly they had 1 star reviews. In 2011 they had 5 star reviews starting in May on a frequency of every 6-12 days until present. This is at a rate slower than most popular Milwaukee major franchises, large corporations etc. Digging deeper I noticed each reviewer has reviewed almost the same 2-5 companies. A local car dealer, a local hotel, a local

¹⁵ All the quotes taken from Google Places Forum are reproduced exactly as they originally appeared.

sports store, dentist and doctor. It wouldn't be odd except its almost the same places each time (Google Places Forum)¹⁶

Another common practice is negative false reviews posted directly by local competitors or clients:

Our reviews have several that are outright false (posted by a competitors employee, who has never even been into the store). All the 'experts' say you have to give a measured response that show you care about their feedback and will use it to serve people better in the future. But when someone is simply heaping negatives like 'extremely rude' or 'worst experience ever' when they have never been in, how do you handle that? Repeated attempts to flag have produced zero results" (Google Places Forum).¹⁷

In extreme cases false reviews can even assume the form of extortion practices:

I have had several customers ask for unreasonable things that they have no right to including several hundred dollars with the threat that if we did not give in they would post a negative review. On one occasion we had someone make a post that was horribly negative (definitely defamatory) and they told us they would remove it if we paid them \$500.00. I have heard that some of the reputation companies have actually posted negatives which they then offer to remove for a fee. In any case, how do you respond to a clearly extortionate review? Of course facially, these reviews do not violate the Terms of Service (Google Places Forum).¹⁸

2. Fake locations: another common practice consists of creating false addresses for businesses. The main aim is to become visible in more locations and as a result showing more frequently in the organic results due to the abovementioned blending of algorithms. This strategy is particularly used by businesses that provide their services off-site.

¹⁶ <http://www.google.com/support/forum/p/Places/thread?tid=2d2c48fd50222d7f&hl=en>

¹⁷ <http://www.google.com/support/forum/p/Places/thread?tid=13fe27758cab1efe&hl=en>

¹⁸ <http://www.google.com/support/forum/p/Places/thread?tid=13fe27758cab1efe&hl=en>

Is it OK for a company to set up multiple locations on google places even if they are not based in those locations [...] Is it OK to set up lots of fake locations in order to manipulate results?' (Google Places Forum)¹⁹

3. Malicious labelling: Google sources the updating of its local database from its users rendering thus the database vulnerable to potential malicious uses. In this common spamming practice users abuse a feature in the platform that allows them to label a business as permanently closed by simply submitting a 'report problem'. Because it is such an easy way to handicap a competitor, 'Place closed' spam labels is a tactic used as a way of unethical competition among business:

User 1: My Massage Therapy practice, AG Massage, is not showing up when searched on Maps unless you search for it directly (typing in the name), where it shows up as "Permanently Closed". I never changed it to closed and I don't know who else has access to changing it.

User 2: I am having the same problem, is it possible for the average everyday person to say that your business is closed on Google? Does this happen frequently? I need to get this cleared up so any help would be great! Thanks.

User 1: Yes, apparently ANYONE can go into your listing and mark it "permanently closed.

User 3: It happens quite often. It is part of a scammer/competition building technique. If they can get you to "close down" even for a few days they can shoot past you in the 10 tear drop system. This does not always work, but it is becoming more and more common (Google Places Forum).²⁰

On another level, in as much as Place Pages are automatically generated for every place for which an address and telephone have been published online, every business owner is compelled to enrol in Google's platform at risk of not being able to have any control over his/her business web presence. A listing remains open for public editing until its ownership is claimed and later

¹⁹ <http://www.google.com/support/forum/p/Places/thread?tid=18bb8fb9f092ecd3&hl=en>

²⁰ <http://www.google.com/support/forum/p/Places/thread?tid=7bbebf8d124f28f8&hl=en>

verified by Google following a verification process protocol. For those who do not want to be included in the Places' database, on the other hand, Google makes the process of opting out particularly difficult. The user is required to sign up for a Google account and confirm its identity using a verification PIN number sent either to the address or the phone number as registered on Places database. So similar to the principle of robustness in computation, while the platform is liberal in what it includes (inclusion as a system default), it is.

According to Google Places webpage, as of December 2011 there are approximately 50 million Place Pages over 70 countries worldwide, out of which business owners have claimed more than 8 million already. This amounts to approximately 16% of business locations. Furthermore, Google has made active efforts to expand its places database, and hence its share in the local search market. They have sponsored initiatives all over the world, with particular interest in countries in Africa and South East Asia, where small and medium business have low internet presence, to get them online. The initiative contemplates offering free or cheap domain name and web-hosting as well as training and guidance to business owners throughout the process. However Google provides all these services on the condition that businesses set up a Google account with a respective Place page. The terms of service reads: 'if you opt in as part of the sign-up process, have that website automatically added to Google Places' (Getting Kenyan Business Online, n.d.).

In Google Places once a Place page is claimed its owner is subjected to a regulatory regime that encompasses a set of rules over content (e.g. prohibition of spam, sexually explicit material, the use of offensive language and certain words including the word Google), and a proposed set of protocols (hCard and hReview microformats) to make that content better suitable for Google's indexing technology. And at the level of the representational, the platform imposes a set of categories, a form of template, as to how places are represented online. Google also policies the

database through its guidelines and discussion forums to make sure users adjust to good search engine optimization practices. A failure to comply with this regime may result in disciplining measures such as rejection of a listing, suspensions, denial of access to the listing, or its complete deletion.

Business owners are made responsible for collecting local data, structuring content according to guidelines, policing reviews, creating ads and coupons, and tracking users' search behaviour to optimize the place profile and advertising. All the labour put into this data maintenance makes the database more robust and more valuable, while decreasing the value of the ever less relevant businesses websites. In fact, there is well-founded concern that Google may be trying to divert traffic from local business websites by placing its Places pages in a prominent position in the organic search results, higher than the listings of the actual business web sites, including in the results basic contact information such as telephone, address, and map directions that could make irrelevant to visit a business webpage. More critical, Google links those results directly to its Place pages. In doing so, Google is placing itself as an obligatory intermediary between potential customers and local businesses, a privileged position when you are foremost an advertising-led company. This strategy lies though in succeeding in persuading webmasters to adopt the protocols necessary to structure local data so it can be made indexable by the search engine's spiders (web crawler technology). Recurring to its rhetoric of transparency and openness²¹, which fits well the hegemony of circulation of information upon which Google's economy rests, it prescribes the adoption of 'local' protocols (standards of identification for local/location data):

By using structured markup to describe a business or organization mentioned on your page, you not only improve the Web by making it easier to recognize references to specific places but also help Google surface your site in local search results [...] Tell us about your content so that we know who you are and what content you have to offer if additional opportunities arise (Google Maps, n.d.).

²¹ "Transparency is a core value at Google [...] We believe that more information means more choice, more freedom and ultimately more power for the individual." (Google, n.d.)

Regardless of what those 'additional opportunities' may be, and despite that most business owners may perceive this as of potential great use/value, businesses websites that comply by these protocols to code their content give away value to Google as it is rendered extractable, repurposable, and commoditizable through Place pages. What is at play under this form of 'protocological control' (Galloway, 2004) is therefore the capturing of the 'surplus-value of flow' (Deleuze and Guattari, 1983) generated by the releasing of local/location data, through the appropriation of the online presence of places and the very expropriation of the possibility of capitalizing on data traffic.

Google's approach with Places is similar to its Maps strategy that made that service become the de facto mapping platform of the Internet: offering a free of charge platform with an open API to attract developers, build audiences, collect the implied metadata resulting from its usage, test technologies and services, all in order to foster an 'ecosystem' around the resulting database. Thus, aiming to become the underlying database of a location-enabled world, Google opens up its places database (the Places API) for free for developers to build their services upon. However, this comes at the expense of capturing them within its advertising regime. According to the Places API documentation, in order to get access to the database a developer must 'provide a valid AdSense publisher id'. The document also adds: 'calculation of Place information may generate [...] advertising which must be displayed to the user in some fashion.' The logic of value creation here is twofold. On the one hand Google extends the reach of its advertising program to new platforms, and on the other hand it enriches its database with the incoming data generated by third party apps. In order to use the Places API a developer must comply with the Google Maps API terms of service, which states regarding content license:

By submitting, posting or displaying Your Content in the Service, you give Google a perpetual, irrevocable, worldwide, royalty-free, and non-exclusive license to reproduce, adapt, modify, translate, publicly

perform, publicly display and distribute Your Content through the Service for the sole purpose of enabling Google to provide you with the Service in accordance with Google's privacy policy (Google Maps API, n.d.).

This model entails a database economy whereby value is extracted out of the collection and mining of the data produced in Google's different services. Through the aforementioned forms of capturing users' distributed-labour²², therefore, Google manages to set up a circuit of database co-production that continuously feeds back into a cycle of production as the data contributed by users makes Google's place database more valuable, attracting as a consequence larger audiences (including developers) and making more necessary for small businesses to get incorporated. In this mode of production local businesses are then both captured as customers of Google's advertising programs and producers of local/location data.

More broadly, Google Places can be also understood in the light of a process of commoditization of the online presence of places and the social relations that map them in different ways. Akin to the Monopoly board game, by owning the database of places, that is, by expanding a monopoly over the world's metadata, Google gets to charge rents out of the accumulated value produced by users, local business owners and developers through its advertising system. The 'expropriation of the commons through the rent', as Negri and Vercellone argues (cited in Pasquinelli, 2009: 94), constitutes the main mechanism of valorization of the contemporary economy. This is in fact the most common economic strategy in the Web 2.0 model: build a monopoly (commonly enclosing user-generated media content) and then capitalize on it through rent. In this light Google exploits social space by extracting rents out of the access to the cultural commons of places its platform encloses through its advertising system.

²² Free labour in information economies has been widely and critically discussed in: Terranova, 2000, 2010; Cote and Pybus, 2007; Bermejo, 2009; Scholzs & Hatzog, 2009; Fuchs, 2010; Caraway, 2011, Kang & Mcallister, 2011.

5.5 Location-based platforms' spatial rationality

[computers] know where we've been and they'll make suggestions for where we go (Eric Schmidt, Google Executive Chairman).

The increasing production of geocoded data is rendering the city a platform for aggregation of information, and a new navigation interface in its own right. This rises questions as to what degree the attention economy, responsible to a great extent for the creation of value in the regime of the digital, can be put into effect in the experience of city. The broadcasting of location, for instance, has already made it possible to link latitude-longitude coordinates to social spaces allowing platforms to turn numerical data into attention value, becoming thus one of the main mechanisms to measure the social desirability of places as it aids tracking where people are going (hot spots or places trending).

In a similar manner, and beyond simply counting places check-ins, a patent describing methods to enhance and refine user geolocation shows how Google is able to extract location data from different sorts of data generated across its services (e.g. email archives, calendar entries, search history, map history, etc.) (fig. 5.7):

[...] A method for refining a location estimate of a user's physical location [...] comparing the estimated current location with one or more heat maps [...] each heat map being derived from at least one electronic database containing information about the user (Google Inc., 2009d).

Such technique may also be used with aggregate geocoded media (or media containing location clues) to generate density heat maps of activity for an entire population, enabling Google to map out places drawing attention (social desire), and ultimately figure out potential spaces of consumption. This outcome, as it was already pointed out above by the Vice President of Location and Local Services at Google, is precisely the ultimate goal of the company in local advertising: harnessing the propensity of users to engage in

certain acts of consumption according to where they are. The argument I want to put forward, therefore, is that geocoded media as metadata about the world may be put to work in this way to measure the value of socio-spatial relations in terms of attention value.

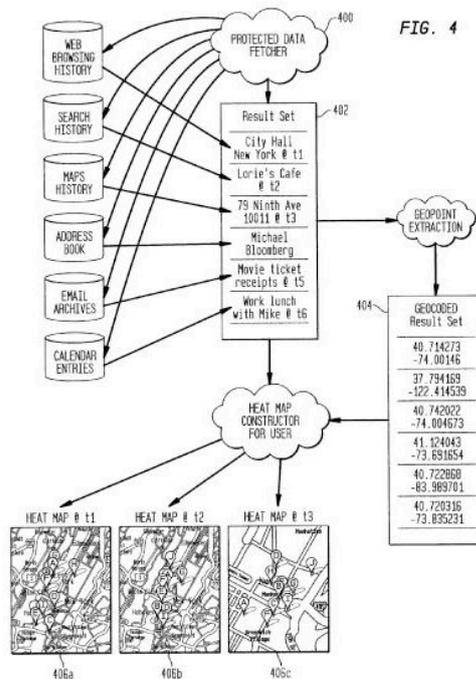


Fig. 5.7 Google's patent illustration of a geolocation module performing a location correction process.

Locational marketing is founded on controlling attention by using geolocation technology to drive populations to desired places. In this respect the technical capacity to measure attention allows location platforms to work as marketing platforms themselves. In fact there is a double nature to their operations. All the main location platforms offer local businesses services to manage users (CRM, customer relationship management) with the aim of turning them into potential customers. Google Places in particular offers analytics (fig. 5.8) to help business owners monitoring what kind of searches are performed to find their businesses, so they can fine-tune metatags and listing descriptions accordingly to attract more traffic and hence clients. The

platform's analytic tools also include time and demographic data about visitors to assist targeting coupons. For example, a business owner can understand the frequency of visitors based on days of the week and time so he/she can adjust marketing strategies accordingly. Moreover, it offers the functionality 'where driving directions come from', which maps out the post code areas of visitors that request directions; a tool of great value when it comes to identify the geography of consumption for a business, including spotting zones to target marketing campaigns or locate potential new businesses. In short, what is offered to marketers is a platform of database marketing that taps into Google's data in order to modulate spatial behaviour (see: Manzerolle, 2011), that is, put in marketing terms, bringing customers to the 'point of sale'.

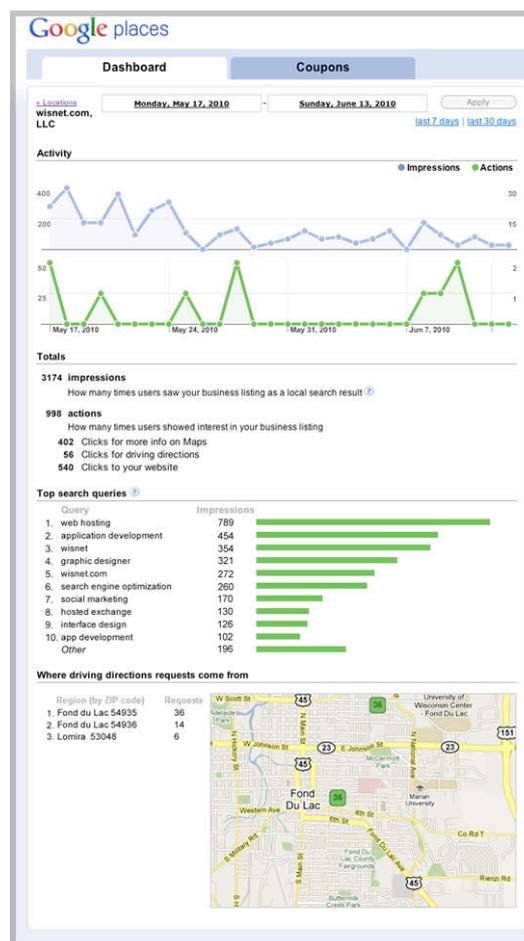


Fig. 5.8 Google Places Dashboard Analytics

Google's key location-based advertising patent describes the possibilities of location data to serve ads and evaluate their performance, as well as to allow businesses to do price arbitration according to potential customers' location by figuring out prices nearby to offer deals:

Location information is determined (or simply accepted) and used. For example, location information may be used in a relevancy determination of an ad [...] Such location information may be associated with price information, such as a maximum price bid. Such location information may be associated with ad performance information. Ad performance information may be tracked on the basis of location information. The content of an ad creative, and/or of a landing page may be selected and/or modified using location information. Finally, tools, such as user interfaces, may be provided to allow a business to enter and/or modify location information, such as location information used for targeting and location-dependent price information (Google Inc., 2010a).

At present location targeting is embedded in Google's advertising system, comprising, among other options, geofencing. This technique allows marketers to specify a point on map with a radius or a polygon marking a geographical area within which ads are targeted. This is how Google presents its mobile advertising service:

Google mobile ads let you connect with the right customer at the right moment, wherever they are. Is your customer just around the corner from you? Advertisers can easily target or tailor your message according to location and automatically show your customer relevant local store information, like phone numbers and addresses, to enable them to take immediate action (Google Mobile Ads, n.d.).

Another form of locational marketing employed by Google involves tagging real places with QR codes (quick response code), a form of print-based hyperlinking ('hardlinks'). In 2009 Google started a campaign called 'Favorite Places on Google' to promote their use selecting one hundred thousand businesses in the US based on its PlaceRank algorithm rankings. These businesses received window decals containing a unique QR code that when scanned with a smartphone takes the user to their respective Place page.

By linking real spaces with its location platform *in situ* Google enabled users to get coupons and discounts, mark places to be remembered in the future, find reviews or write them directly. Later on in 2011 Google ended support to QR technology and adopted instead NFC (near field communication), a radio communication standard for mobile devices. This technology achieves the same 'hard' linking function of QR codes but made it simpler as it requires just a single 'touch' or tap of the mobile device rather than a more laborious scanning procedure. This move is understood in the light of a business strategy that seeks to strengthen Google's position as the last intermediary between consumers and local businesses. Google has teamed up with mobile phone manufacturers, credit card companies, and payment processors to set up a mobile payment system (Google Wallet) to pay for goods and services directly with smartphones equipped with NFC technology. This way Google is able to tie users throughout a process comprising from looking up for local information on mobile phones, and providing directions (geolocation), to actual in-store purchase. While gardening the metadata that would enable tracking when location-targeted advertising results in an actual act of consumption. This data would serve as a measure of the value of a given ad, as well as making possible to implement pay-for-performance business models similar to online pay-per-click advertising.

In all these locational forms of advertising targeting we are presented with 'the power of code enacted spatially in the processes of governmentality' (Dodge et al., 2009, 1290) to open up urban space to marketing government. With the technical possibility of tying information, people and objects to location setting the conditions to the emergence of new forms of governing the arrangements of bodies and commodities in space, location platforms can be understood thus in the light of governmentality as 'the right disposition of things' (Foucault, 1991, 93). As I have argued in this case study, 'the right disposition of things' in Google's location platform is completed via an algorithmic logic that entails a geodemographical spatial ordering according

to which subjects are located, or better, locate themselves, for the purpose of marketing governance.

According to Google Places launching press release the aim of the platform is 'to help people make more informed decisions about where to go' (Google, 2010). What locative media platforms are offering us is a new mechanism to orientate us in the world and ultimately governing the access to space as such (see: Stiegler, 2003). The spatial rationality underpinning these mechanisms of orientation, as I tried to demonstrate here, entails a worldview in which social space is coded in such a way to better suit the mode of capture of the attention economy, and socio-spatial relations are mediated according to a logic of maximization of consumption (reviews, ratings, recommendations, coupons, etc.). All in all, the way the geocoding of information, people and objects has been articulated in location platforms constitutes 'a new 'post-phenomenological' commodity architecture (...) [that] combine[s] interactive systems (...) and commodities with the spaces and times of everyday life' (Thrift , 2008, 43).

To briefly summarized this case study findings in a few lines, it was identified the main program underlying Google's location technology whereby social space, and hence modes of life, are ordered according to a geodemographic spatial rationality. Secondly, it was shown how the geocoding of the media and its assemblage into databases (i.e. geoindexes) renders space subject to novel forms of governance resulting in further commodification of social spaces.

Chapter 6

The Annotated City and the Politics of Visibility - the Case of Geotagged Media in Flickr

6.1. Introducing the case study

The Google case study revealed how geocoded data is put to work in the government of social space. It mapped out the relations between location platforms, control and capital. From that perspective, it was important to understand the technological, social and economical logics shaping the composition of location-enabled socio-technical systems. While that case study was focused primarily on economic production, this case study will change the focus to cultural production. It will seek thus to address locative media in its productive dimension enabling forms of collective expression. This entails looking at what communicational and cultural practices, and what forms of knowledge, the annotation of space with media has given rise to. The examination will also scrutinize the articulation between location-enabled media platforms and the circuits of culture and affects in urban spaces, inasmuch as the city is today interfaced with the databases aggregating and organizing our collective spatial annotations.

I begin this chapter by providing a necessarily brief overview of the platform. Flickr is the most popular photo-sharing platform on the Web. As of August 2011 Flickr was reported to host more than 6 billion images. Although in terms of amount of photos Flickr is not the top site for photo storing. It has been surpassed by Facebook (as of February 2012 the social media platform hosted 36 billion images). Even so, Flickr remains the largest database of geotagged content on the Internet exceeding the hundred millions. Moreover, Flickr links geolocation with a tagging system and other forms of social metadata (comments, favourites, groups) (Skågeby, 2009) that allows rich

media annotations, providing consequently rich descriptions of those places media is linked to. The study of Flickr is important therefore because on the one hand its database of geotagged content represents a valuable cultural repository about places that is available to the researcher through an open API. On the other hand, and inasmuch as it hosts an active community of so-called 'geotaggers', it provides an ideal ground to study the cultures of use flourishing around this media practice.

In its inception Flickr was just a component of an online game in development, a mere chat functionality that allowed players to share photos in real-time. One of the co-founders, Eric Costello, recalls in an interview:

It wasn't a photo sharing site, so much as it was a place where you could go to chat and talk about photos. But none of that activity was stored in any asynchronous way – there were no Web pages that hosted the conversations people were having about photos (Webcite, 2005).

That original Flash chat application was thereafter redesigned in 2004 as a web site to host photos and help users to organize them using a tagging system. Flickr's co-founder narrates how the social sharing functionality wasn't actually the backbone of the original platform's architecture but would gain its prominence later on as a consequence of users' input feedback and its patterns of use: 'the social network was built in just so that you could restrict access to your photos'—he points out. 'But what has really taken off with Flickr is that it's turned out to be a great platform for sharing with the masses, and not just with your small collection of friends' (Webcite, 2005). During its first years, before Internet giant Yahoo acquired it, Flickr shared the infrastructure governance with its users in regards to designing and incorporating features (Garrett, 2005 cited in Cox, 2008). Flickr's co-founder goes on to remark: 'We have not historically been a very metric-driven company. We do look at numbers, but really we just keep our ears open. We listen to what people say to us on our forums' (Webcite, 2005).

Users don't need to set up an account in order to have access and browse Flickr's media repository. Flickr's photo search engine 'Explore' is open access and includes different options of navigating the public collection, through interesting photos by month, tags, groups, sets and location. However, if non-registered users want to upload their own content, create collections in the form of albums, tag or comment on other users' photos, and build a social network or join groups of interest, it is necessary to become a member via the free registration process.

Users organize their media albums using a system of classification built-in in the platform based on adding metadata to single media objects in the form of textual tags, the so-called folksonomic classifications. Individual collections of photos can also be opened to other users to contribute describing and classifying Flickr's repository. Research on the use of decentralized tagging system in Flickr has showed social contribution and sharing as main drivers animating this practice (Ames et al, 2007). The tagging functionality not only contributed to make Flickr popular since its origins but has also made it an attractive platform for revitalizing media archives. Flickr runs the 'Commons Project', a partnership with several public and private cultural institutions to host their photographic archives and make them available to their users, who, on Flickr's view, can help enrich them by adding tags and comments: 'Your opportunity to contribute to describing the world's public photo collections'. At the time of writing the project comprises 56 participant institutions from all over the world including archives from cultural heritage institutions, libraries, and universities (The Library of Congress, Smithsonian Institution, National Media Museum, New York Public Library, The National Archives UK, The U.S. National Archives, NASA on The Commons, etc.).

Yahoo Inc., Flickr's owner, claims that, citing a comScore research from 2011, its photo-sharing service comprises nearly 80 million users worldwide that upload approximately of 4.5 million photos and videos per day. Yahoo sells to potential advertisers an audience-commodity (Smythe, 2006) profiled as affluent men aged between 18-34 (Yahoo! Advertising Solutions). Other

studies have presented a more detailed profile of Flickr's demographics. Photographers, both professional and amateur (Flickr's community manager addresses Flickr users as photographers), as well as students, bloggers and people working in the new media and technology sectors have been claimed to constitute the core of the community (Meyer et al., 2005; Cox et al., 2008). We may find this audience profile mirrored in the register of the most popular cameras used within Flickr community as determined by the metadata embedded in users' uploaded pictures: the iPhone ranks top in the list followed by professional and semi-professional cameras.

As other Internet services that flourished after the dot-com bubble of the early 2000's, Flickr is a proprietary platform based on a centralized client-server information architecture that -unlike per-to-per networks - does not allow users to take their data out of the platform (this is true for free account users whose access to data is restricted as will be further explained below). Hence, though users retain ownership over the uploaded content it remains confined behind the platform's walls (a service model also known as walled gardens or data silos). Regarding content licensing, the default setting for any media object uploaded to the platform is 'all rights reserved', however copyright holders can set different Creative Commons licenses to facilitate different forms of media sharing and reuse.

Flickr uses a mixed business model strategy. Like most web 2.0 services it offers a free service supported by serving advertising. To do so the platform harnesses its pool of user-contributed metadata for selecting the appropriate ads to serve along specific photos using relatedness metrics (Yahoo! Inc., 2006b). Nevertheless advertising is not Flickr's main profit strategy. One of its co-founders states in an interview in 2007: 'The core of the business is the premium subscription service, and we do much better in that than we expected in the early days' (Computerworld, 2007). The company relies then mainly on a 'versioning' model whereby users can choose to pay for a premium service that grants them unlimited archive of photos and analytics. Finally, Flickr has also worked, however tangentially, on an alternative

business strategy serving as an intermediary between users and companies willing to pay for their photographs. This is the basic 'marketplace' business model characteristic of online companies such as eBay. Flickr has currently a partnership with Getty Images, the world's largest distributor of digital photographs, to sell curated pools of Flickr's content upon users' agreement (users get about 20-30% of every transaction, however the percentage of profit retained by Flickr as intermediary is not disclosed).

To outline the major lines of the argument that follows, the first section will examine the cultures of use of geotagging in Flickr and how these practices intersect with cultural processes. The following section will address how the collective annotation of places is sorted in the platform, and in this process how our sense of place, that is, our very perceptual and subjective experience of space, may be shaped through the imagery that is made available to us. In subsequent sections I examine the databases aggregating and organizing our collective spatial annotations, particularly, I will look at the ways of representing space embedded in their codings and what kind of spatial practices they may promote. Lastly, the chapter will look at the articulation between the platform and affectivity to access its implications in terms of mediation of sense of place, to finalize analyzing the generalized annotation of urban spaces in the light of the cultural economies of the city taking as a case study annotations of the London Borough of Hackney.

6.2 The generalized annotation of the word

So far throughout this dissertation the term geotagging has been used interchangeably with geocoding. For the purpose of this case study it is worthwhile to point out again their differences and explain why geotagging is used here instead of the more overarching term geocoding. Even though geotagging is in fact a form of geocoding, the former corresponds to a non-expert and mainly socially oriented practice as it is used to share the location of a media object or broadcast user location, whereas the latter has been

historically ascribed to geographers, cartographers or computer experts. Secondly, the term geotagging as such was allegedly coined by a member of Flickr's community and gained widespread use within it. It is therefore pertinent to use the language of the object of study rather than the more technical terminology.

There are two basic forms of geotagging content in Flickr. Either the user can drag the photo over a map and drop it on the specific location where it was taken, a process that automatically inscribes the photo with location metadata (Flickr Blog, 2006); or Flickr may read the location metadata directly from photos taken with GPS-enabled devices. In this case location is stored within EXIF records (Exchangeable image file format) in the form of lat-long coordinates, which is an industry standard for storing metadata in media files (within JPEG and TIFF for image files, and WAV for audio files). Flickr also lets users to assign a geographical accuracy level to uploaded content that ranges from world level to street level, as well as setting further privacy controls over geotagged photos through a technique known as geofencing. With this feature users can draw a circle on the map to delimit a geographic area (up to 10km wide) to set up restrictions as to who can be granted access to location information (private, or visible to contacts, friends and/or family) (fig. 6.1).

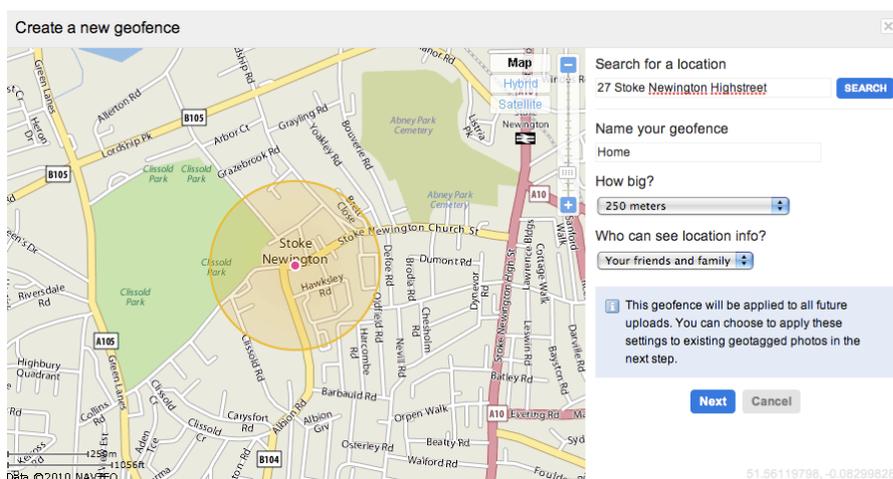


Fig. 6.1 Geofence privacy feature

Finally, it is worth looking at the history of geotagging in Flickr because it shows how the platform not only shapes cultural production—as it will be examined below—but also reveals how, conversely, it has been socially shaped. From the beginning of the platform, when GPS devices were not still widely available, the Flickr community figured out a way to georeference photographs using the platform's tagging system (e.g. using 'place tags' such as UK, London, Brixton, etc.) (Winget, 2006). Later on one of its members would develop a mash-up (mapping site) called Geobloggers that combining Flickr's data and Google Maps could actually localize photos on a map. In what could be considered a hack, the developer, Rev Dan Catt, devised a script that permitted users to add so-called 'triple tags' to encode photos with geolocation. The technique required a syntax (namespace, a predicate and a value) to add location information to a regular tag (geo:lat=[coordinate value] and geo:long=[coordinate value]). Although the mapping site was a third party application that was not hosted in Flickr as such, the technique spread within the Flickr community through a Flickr group called 'Geotagging', which the developer opened himself, and where users still gather to discuss the technical aspects of geotagging. Due to the prompt widespread adoption Flickr incorporated the geotagging functionality in August 2006 (renaming triple tags as machine tags). Moreover Flickr hired the developer for this purpose and Geobloggers was shut down as a mapping site to remain just as a personal blog. Currently, the practice of geotagging in its original form using machine tags is in decline because Flickr does not store location metadata in tags anymore, nevertheless it persists within users/developers that may want to integrate photos with third party applications, and those geotagging places where Yahoo Maps does not provide data at certain accuracy levels.

According to Flickr's figures (Flickr Blog, 2009) one in every 30 photos (3.3%) that get uploaded has location metadata, while two thirds of those are public and accessible. An independent study that analyzed a sample of 158 million images uploaded in 2010 found that the proportion of geotagged objects is slightly higher (4.3%) (Friedland and Sommer, 2010). Despite the relative low

percentage of geotagged content in Flickr, there is a propensity to assign location context in the way people organize their content. Looking at the all time popular tags in Flickr reveals that approximately one out of four tags in Flickr corresponds to a place tag (26.5%) (fig. 6.2). This figures equates with a 2008 study of Flickr's tagging system that identified the percentage of place tags in 28%, placing it first among all categories followed by objects, people, events and time (Sigurbjörnsson and Van Zwol, 2008).

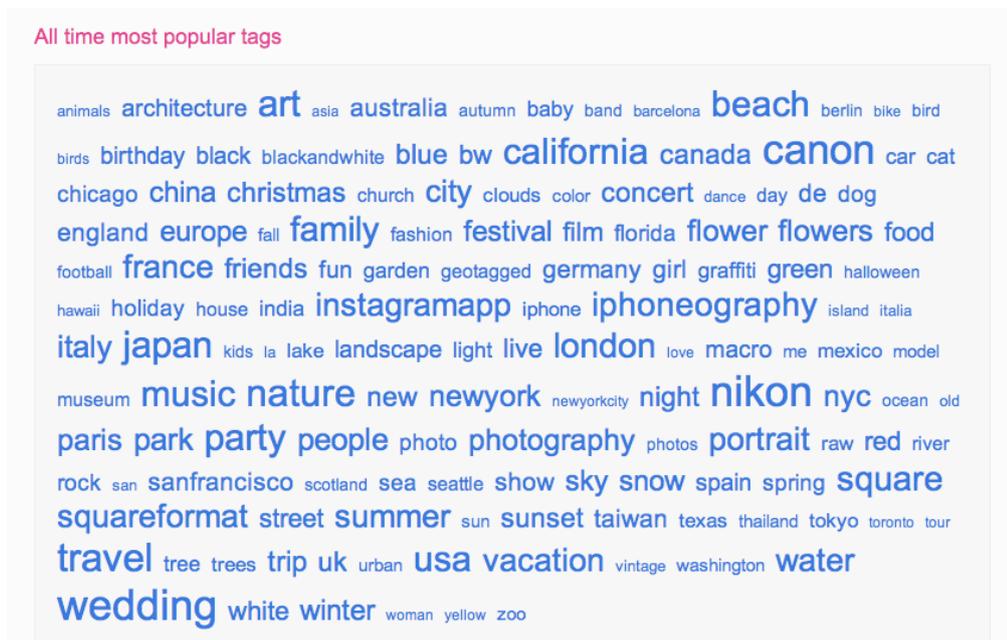


Fig. 6.2 All Time Most Popular Tags (February 2012)

Unlike exclusively dedicated location platforms (e.g. Foursquare), automatic geotagging in Flickr is an opt-in feature. Users have to explicitly authorize the platform to parse location coordinates from the photo's EXIF header by changing their privacy settings. Hence most of Flickr's repository of georeferenced content is manually geotagged. Whereas media automatically geocoded with GPS coordinates may be more accurate in terms of geographical precision compared to manually geotagged media, it turns out to be less relevant when it comes to documenting the actual experience of

place, inasmuch as everything is geocoded regardless its location context specificity. Manual geotagging, conversely, is an "act of communication" that tells something about place in the explicit act of disclosing location (Girardin et al., 2008). This user on Flickr's geotagging group puts it this way:

Geotag events only if they are specific to a certain location—Locations are germane to certain events, and some events are more important than others. It's probably OK to geotag Mardi Gras photos to Bourbon Street, or photos of a Cub's game to Wrigley Field. I'm sorry, but the location of little Suzy's 7th birthday party probably doesn't need to be tagged, nor does your last Fourth of July cookout, unless the location of either of those events has some appeal to the general public. You don't have to geotag everything that happens in your back yard. Geotag people only if they are specific to a certain location [...] Little Suzy and her friends at the birthday party don't need to be tagged. Conversely, photos of people in context can tell lots about the flavor of an area. I have photos of some punk rockers at Trafalgar Square. Both the location and the subject matter are compelling. Some may want to take the "we were here" photos, which I think would be acceptable in this context (Flickr Geotagging Group, 2007).

Previous ethnographic studies have investigated the motivations of individual users to geotag content (Ames and Naaman, 2007; Erikson, 2009). I want to focus in this section instead on what are the cultures of use in forms of collective practices of spatial annotation. Put it differently, this is the question for the types of cultural and communicational practices that are enabled by geotagging within the affordances of the platform (see: Langlois, 2008). In order to address this question 389 Flickr groups were selected for study following the procedure described in the methodology section. The selection criteria were the following: groups that either set geotagging as a rule of participation or explicitly encourage its members to geotag the content uploaded to the group.

Groups in Flickr are user-created and can be public or private. The latter are not accessible through Flickr's site and require an invitation to join. Most groups, however, are open for any user to join and submit photographs, yet some made their content accessible to anyone while keeping participation

'invitation only'. Secondly, inasmuch as they are based on a common interest in a particular topic rather than just a random set of photos, groups are a form of curating content. It is a common practice that groups' administrators navigate Flickr's collection in search for photos to invite submissions to the pool. Likewise, users that decide to submit a photo are also part of this curatorial process. Lastly, groups allow a discussion space outside the commentary of singular photos. This platform's affordance permits the constitution of public forums where not only different relationships between users are possible but also the aggregation of collective knowledge about a place.

The modality of analysis evaluates groups quantitatively in terms of participation and mapping typology. With regard to participation the proportion of users per group (fig. 6.3) reveals that the majority of groups are medium size (comprise of more than 10 members) (50%) followed by large groups (comprise of more than 100 members) (30%), whereas the percentage of groups that do not manage to enrol other users is low (4%). The significant interest in this type of collective media practices suggests that geotagging is not circumscribed in Flickr to the public presentation of the self ('I was here'), characteristic of social location platforms (e.g. Google Latitude, Foursquare, Gowalla, etc.).

The typology used to describe the kind of content mapped in these groups is as follows: a) geographic mapping: includes groups that map a particular geographical area; b) thematic mapping: includes groups that focus on mapping a particular subject in relation to a specific geographical area; and c) technical: includes groups of users of third party applications or particular devices (GPS-enabled cameras and GPS systems) experimenting with geotagging. The majority of groups practice thematic mapping (57%) (Fig. 6.3). This result suggests that rather than been just a practice to document places (e.g. 'Geotagged Berlin' Group), geotagging is also used as a form of mapping or spatializing knowledge (e.g. 'Disused London Underground Stations' Group).

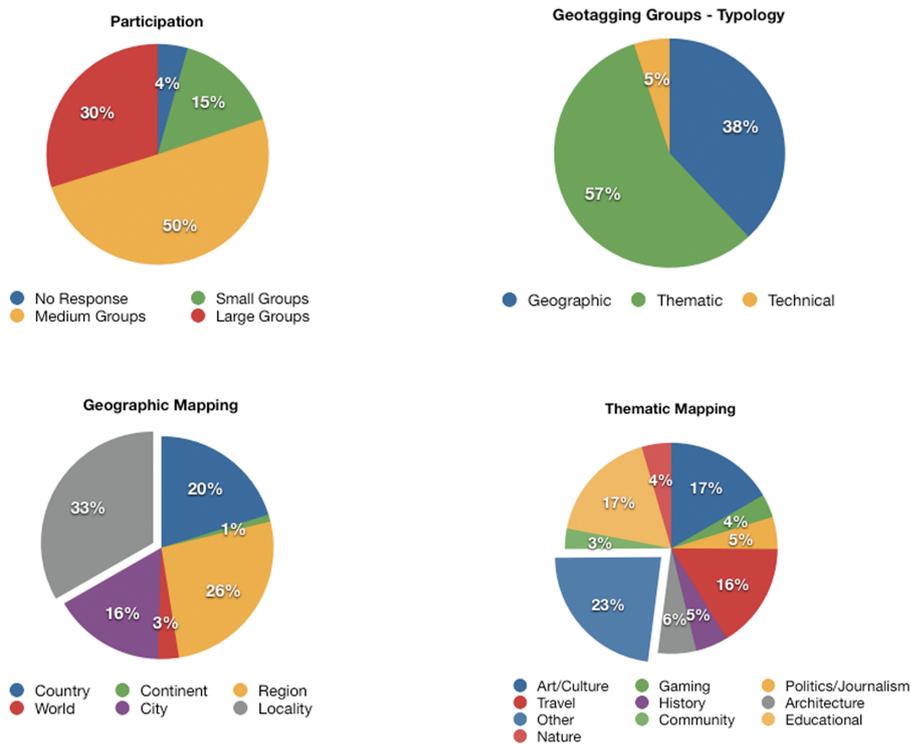


Fig. 6.3 Flickr Geotagging Groups – Content analysis

In the category of geographic mapping the results show that there is not a strong prevalence of a specific geographical level for annotation (fig. 6.3). One third of the groups are devoted to annotating localities, nevertheless 62% of groups are rather evenly distributed at the larger levels of region, city and country. Interestingly though, despite the young urban demographics of Flickr, rural/natural photography (forests, rivers, national parks, etc) (63.8%) is prevalent over urban photography (neighbourhoods, postal codes, streets, buildings, etc.) (36.2%). One hypothesis is that there could be a positive correlation between the community of GPS adopters constituted mainly by travellers, explorers and outdoors enthusiasts and users forming geographic mapping groups to document places.

It is also worth pointing out that groups practice mapping for a wide range of subjects, so diverse and sometimes so idiosyncratic that approximately one

out of four groups (23%) fall outside the predefined categories of analysis. The sheer diversity of cultural practices geotagging is used for ranges from the wide popular travel and nature photography, to mapping abandoned buildings or street art, geolocating library photographic archives and photos from the past, reporting natural disasters or tracing economic recession, playing location-based games, researching flora and fauna, documenting places that no longer exist, serving as an instrument of community planning, or performing psychogeographic exercises among others (Table 1). Travel accounts for 16% of groups devoted to thematic mapping. This category could be considered the usual suspect since geotagging is evidently useful to keep location records of the new places people visit, therefore, it is particularly significant that education (17%) and arts/culture (17%) have the similar representation weight of travel.

Thematic Mapping Groups by Category - Examples			
CATEGORY	NAME	MEMBERS	ABOUT
Architecture	Cathedrals UK	2107	'For images of Cathedrals in the United Kingdom to display the architecture of the buildings and towers, the majesty of the interiors or simple architectural details such as windows, gargoyles or furniture'.
			http://www.flickr.com/groups/cathedrals/
Art/Culture	Geotagged Literary Places	13	'Only geotagged places where famous writers have come from, those they travelled to or lived in. Landscapes, cafés, theatres and other places and journeys they have immortalized in their work'.
			http://www.flickr.com/groups/geoliterature/
Travel	The Ground In	8	'As frequently travellers know, many times the only glimpse of a city that you ever see is of the airport, train station, or bus station as we pass through. This group is for photos of the ground at airports, train stations, and bus stations as you travel. People and other objects may be included in the shot, but it must be a shot primarily of the ground'.
			http://www.flickr.com/groups/the_ground_in/

Nature	Dragonflies Around the World	1231	'Dragonfly and damselflies only, from all over the world. Must post location photo was shot. Dragonflies around the World enables us to see what species are in other areas and compare to what we have found in our own backyards'.
			http://www.flickr.com/groups/dragonfliesarou ndtheworld/
Gaming	Guess Where London	51	In this social game users post photos of places in London for other users to identify and geotag.
			http://www.flickr.com/groups/gwl-geotagged/
History	Tracks to The Past	108	'This is a group to do with the transport routes of the past. Photos showing evidence of ancient trackways, old roads and highways, disused railway lines and canals, bridges leading nowhere'.
			http://www.flickr.com/groups/1323984@N24/
Community	Armenian Diaspora	76	'I created this group to post pictures of Armenian events taking place in different parts of the world, OUTSIDE Armenia. This means that we want pictures that show: - Armenian COMMUNITY events taking place OUTSIDE Armenia (parades, special ceremonies, concerts, etc.). -Community centers, churches, or any other type of building that belongs to the Armenians (living OUTSIDE Armenia)'.
			http://www.flickr.com/groups/armeniandiasp ora/
Politics/ Journalism	Guardian Recession Monitor Photos	216	'So it looks like we're in a recession, or heading for one. Or are we? How do we know? We want to see your shots of how the recession is (or isn't) affecting your area. Have you spotted: Shops closing down, or in robust health? Empty restaurants? Clusters of for "sale" or "sold" signs on your street? Special credit crunch-related offers in the supermarket? Less fancy bottles of wine in your neighbour's recycling bin? However you interpret the signs of recession (or not), we want to see them all, through your eyes - or rather, through your lens'.
			http://www.flickr.com/groups/guardian-recession-monitor/

Educational	Flora of The British Isles	384	'The group photo pool is an indexed online Identification Guide of the WILD plants of Britain. Obviously you may simply look through the photographs in the groups pool, but the real benefit of the group are its indexes of plant names - both common and scientific (Latin) names - to enable easier identification of plants you may come across'.
			http://www.flickr.com/groups/gbflowers/
Other/ Uncategorized	Stinky Corners of London	10	'A place to post images of those corners of London that downright pong. The idea is to build up an olfactory map of the smelliest subways, alleys and stairwells of the city so geotagging your photos is recommended. Describing the smell in your tags or description will help too'.
			http://www.flickr.com/groups/stinkylondon/

Table 1. Thematic Mapping Groups by Category – Examples

The same platform that provides the medial affordances for the conformation of groups around common interests facilitating the socialization of media annotations of place (sharing and commenting) and their visualization on maps, also shapes what can be known and what kind of spatial practices are promoted. The examination of geotagging cultures of use within Flickr community primary tells us that beyond a technical practice geotagging is foremost a communication practice. As the analysis suggested, users engage in communication practices that are themselves creative and empowering ways of collectively producing knowledge about places. Gordon and de Souza e Silva (2011) have termed 'network locality' the form that local knowledge assumes in the context of locative media. At the same time, these communication practices also have the potential to give rise to other forms of knowledge, namely locational knowledge. Following Thrift, locational knowledge can be expressed as 'knowledges of arrangement and disposition' manifested, for instance, as a certain gain in 'cartographic awareness' or the 'experimentation with new forms of inter-relation between

mapping and the senses' (2008, 18), which ultimately represent a new horizon of possibility for different practices of space.

In another important related sense, in an ethnographic study of users geotagging practices Erickson identified an interesting communication pattern. What apparently is presented just as a public presentation of the self in a particular location ('self in place' in the researcher conceptualization) is directly linked with the conservation of personal memory:

Curiously, the activities of self-presentation (broadcasting for an external audience) and self-preservation (broadcasting for oneself) appear to be interwoven. What becomes an archive is often first presented to an audience— typically a perceived community, but also the larger public—as a contemporaneous travelogue, documentary or proxy broadcast. Later, when viewed in the aggregate, a collection of broadcasts stand in as a digital composite to support the desired need for self-preservation (Erickson, 2009).

This tension between public display and personal archive surfaces in Flickr's Geotagging Group discussion threads:

User 1: 'I've just started geotagging some of my photos and was wondering if it'll actually make any difference? Will it gain my photos more exposure on Flickr? What are the benefits to geotagging? So far very few people have ever asked "where did you take that?". So i don't see that as a benefit. I'd love to know all your thoughts on this. I'd like to geotag more if I thought it was a worthwhile thing to do'.

User: 2 'I geotag almost all my photos [...] I don't do it for the benefit of other users, I do it so that 5 to 10 years down the road, if I want to know where a photo was taken, the information is there'.

User3: 'Of course, people won't ask you where you took a certain picture, but I have quite a few pictures taken in the past (where 'past' equals 10-30 years ago) and I would give anything to remember where the heck I was!' (Flickr Geotagging Group, 2009)

In another discussion thread a user says: 'I'm trying to have a location for all my pictures. It helps me with my memory, which is why I geotag in the first place' (Flickr Geotagging Group, 2007).

There is an explicit emphasis here on the use of geotagging as a mnemotechnique, that is, as an aid to memory. Geotagging would facilitate both the collective documentation of places (collective memory) and serve also as a personal record of experience (individual memory). The use of geotagging in Flickr as a form of 'contemporaneous travelogue' where the user keeps the record of all the places ever visited, a personal archiving practice so to speak, could be conceptualized drawing from Foucault as a 'technology of the self'. Although producing and archiving annotations of places in a social media platform does not constitute an 'account of oneself' as such, it is yet directly productive of subjectivity²³ (see also: Wilson, 2011). In this sense, on Stiegler's view, the process of individuation (subjectification) is threefold, at the same time psychic, collective and technical: the '[technical milieu] is the condition of the encounter of the I and the we: the individuation of the I and the we is in this respect also the individuation of the technical system' (Stiegler, n.d.).

6.3 An algorithmic sense of place

In this section I want to analyse how the collective annotation of places described above is sorted in the inner workings of the platform. The aim is to start delineating how the platform may shape our sense of place, our very

²³ Drawing from Plato's criticism of the technology of writing in the Phaedrus as a material external support for memory, particularly the opposition between anamnesis (recollection) and hypomnesis (memory outside memory), Foucault analyzes the relationship between the mnemotechnique of the hypomnemata in ancient Greece and the production of the self (individuation). Although hypomnemata comprehends philosophically all kinds of externalizations of memory (writing, photography, phonography, cinema, etc) (Stiegler, 1998), Foucault refers to a particular mnemotechnique. The hypomnemata is "a type of notebook [...] for personal and administrative use", which could take the form of "account books, public registers, individual notebooks serving as memoranda." Foucault poses the question of hypomnemata as a technology of the self in these terms: "As personal as they were, the hypomnemata must nevertheless not be taken for intimate diaries or for those accounts of spiritual experience (temptations, struggles, falls, and victories) which can be found in later Christian literature. They do not constitute an "account of oneself"; their objective is not to bring the *arcana conscientiae* to light, the confession of which – be it oral or written – has a purifying value. The movement that they seek to effect is the inverse of this last one. The point is not to pursue the indescribable, not to reveal the hidden, not to say the nonsaid, but, on the contrary, to collect the already-said, to reassemble that which one could hear or read, and this to an end which is nothing less than the constitution of oneself." (Foucault, 1984).

perceptual and subjective experience of space through the imagery that it makes available to us.

Similar to the way that the core of the photo search engine is built around the concept of what is called by Flickr 'interestingness' (the 500 most interesting photos on Flickr for each day), location search (Flickr Map and Flickr Places) sorting criteria is also driven by this logic, in this case, however, the only option left to the user is to sort photos by most recent. So the locative functionality of the platform privileges newness but foremost interestingness. This is one of Flickr's coders explaining the functioning of Flickr Map, particularly why the user just gets few results instead of the whole clutter of all geotagged photos for a place (e.g. among the potential thousands of photos of the Eiffel Tower which ones should be visible on the map):

I should probably mention at this point that if you go directly to the map and click the dots icon in the top right that you'll see a smaller number. This is because we added a rolling upload-date to the initial search to return the most interesting photos in the last month or so, rather than always have the same (all-time) photos show up forever, possibly reinforcing their interestingness (Flickr Blog, 2009).

The visual, presence as such, is determined in the platform by the logic of interestingness, to the extent that Flickr has denominated precisely its ranking algorithm 'Interestingness'. The algorithm patent documentation reads: "media objects, such as images or soundtracks, may be ranked according to a new class of metrics known as 'interestingness'" (Yahoo! Inc., 2006a).

The question of how the algorithm sorts annotations is the very question of governance of access to representations of place. In an algorithmic processing of images where newness and interestingness become the ordering principle, representations of place are subordinated to the flow of information. Flow becomes the governing order of the visual. Accordingly, the algorithm treats photos not as carriers of meaning but as informational objects that in their dissemination (flow) acquire qualities that are susceptible

of calculation. Representation thus has the status of information. Put it succinctly, 'it is not about signs, but about signals' (Terranova, 2004, 16). In an informational milieu characterized by instability, therefore, a semiotic examination of Flickr's photos is far less important than a processual understanding that look at the operational logics governing the access to whatever media object and ultimately frame the production of meaning as such. This analytical approach necessitates therefore a post-representational understanding (Thrift, 2008) of Flickr's imagery.

What rules organize then the storage and transmission of geocoded media objects in the platform? In regards to data storage Flickr's business model sets the limits of circulation of data flows by establishing differential access privileges. Unlimited access to archived content is exclusively granted to paid subscribers, whereas for free accounts access is limited to the 200 most recent photos uploaded. Although content remains stored in the database even after the 200 photos limit set for free accounts has been surpassed, this content cannot be viewed nor get indexed by the ranking algorithm. Moreover, free accounts have an upload limit of 300MB worth of photos per month. The economic management of the service, enacted technically through the limitation to archiving and data access, brings about an asymmetry in terms of representation inasmuch as the number of photos uploaded by free users that can be part of the pool composing the imagery of places is in this way restricted and consequently overshadowed by paid users' contribution.

There is another category of users—widely overlooked in previous studies of Flickr usage (Ames and Naaman, 2007; Erikson, 2009)—that utilizes Flickr's database of photos to build upon new applications (programmers or developers), or mash-ups—which do not require programming knowledge—to repurpose data for personal use outside Flickr's platform. In these cases the access to data is managed through an API (Application Programming Interface) that operates as an interface between the external application and Flickr's database. To look at Flickr's Places API is particularly relevant in

terms of cultural politics since the database is basically non-commercial. Flickr's API documentation reads: 'The Flickr API is available for non-commercial use by outside developers. Commercial use is possible by prior arrangement'. Even so obtaining a commercial API key from Flickr only grants the developer permission to charge for his/her software. It does not grant any permission to use Flickr's repository of photos itself for commercial use unless, the API terms of service states, it is authorized by the photo's owner through creative commons licensing.

The affordances of Flickr Places API include traditional data queries in local/location databases like looking up for information about places or geocoding methods. But it also offers more interesting possibilities for developers such as identifying places trending, that is, places driving social attention, as well as exploring places by user-generated tags, or sorting places by user profile, including the harnessing of social networks for this purpose (Annex 1).

According to Cramer and Fuller the APIs produce 'asymmetries of power' as they 'establish descriptions of operations that are allowed and assigned a priority or blocked' (2008, 151). The API's terms of service is explicit in this regard: 'Flickr may also impose limits on certain features and services or restrict your access to parts or all of the Flickr APIs' (<http://www.flickr.com/services/api/tos/>). Flickr's Places API normativity includes, for instance, limitations to the amount of data it can parse in a single query. For some of the methods this limit is set on just 100 registers (Annex 1). Another example of these limitations, faced in the course of this research project, includes the access to certain geographical accuracy levels. The Places API for instance does not allow retrieving tags at the level of street and neighbourhoods where the implicit local knowledge embodied in tags could be more valuable for potential third-party applications. In this line, more important restrictions are put in place to protect the platform's business model and prevent any potential undermining of its position: 'You shall not [...] use Flickr APIs for any application that replicates or attempts to replace

the essential user experience of Flickr.com' (<http://www.flickr.com/services/api/tos/>). Similarly, certain functions (calls or queries) are kept under the exclusive platform's control in order to regulate the flows of data, thus guaranteeing a dominant position with respect to third-party applications. This is a form of guaranteeing the commercial control of the database. Like it is the case in most social media platforms, therefore, Flickr's database is at best semi-open. Even though it does grant access to data it does so only 'under stricture of specific grammars of action and expression' (Galloway, 2011, 241).

On the other hand, the understanding of data management should be also extended to the principles of circulation of geocoded media objects within the platform. In order to do so we have to look at the functioning of the algorithm. According to Flickr's Blog 'interestingness is a ranking algorithm based on user behaviour around the photos' (Flickr Blog, 2005). Since this algorithm is a commercial secret it has been deliberately black-boxed, so the variables used to measure the relationship between users behavioural patterns and media objects can only be sketched by looking at the information provided in its respective patent documentation. The main factors determining algorithmic ranking in Flickr as identified in the analysis of the patents 'Interestingness Ranking of Media Objects' (Yahoo Inc., 2006a) and 'Media Object Metadata Association and Ranking' (Yahoo Inc., 2006b) are:

1. Quantity of social metadata linked to the respective media object (tags, comments, additions to favourites, additions to groups, annotations), or attention metadata as it were.
2. Access pattern to the media object ("number of click throughs or views of the media object").
3. Number of users contributing with metadata.
4. Social relations between users. For instance, photo comments from a user predefined as friend or family member may carry a different weight than a comment made by a casual user.
5. Time varying behaviour of all these factors.

Unlike most algorithms that rely chiefly on implicit automatically generated metadata (e.g. Google's PageRank value for a webpage), Flickr's algorithm is structured as a system for valuing attention as it is expressed in the form of human-generated metadata, both implicit (e.g. a picture number of views) and explicit metadata (e.g. number of comments). Attention here is produced in the process of socializing media objects. What is expressed in the workings of Interestingness is not other than the same economy of attention characteristic of the digital regime, whereby in an information milieu of abundance value is measured in terms of the capacity of attracting audience attention. Caterina Fake, one of Flickr's founders, delineates the discursive underpinnings of the logic expressed in the algorithm through what she terms 'the economy of interestingness'. I want to draw attention here to the way mentalities may translate into code. She asserted the following on her personal blog:

In any social software system there are systems of value other than, or in addition to, money, that are very important to people: connecting with other people, creating an online identity, expressing oneself -- and not least, garnering other people's attention. What is more pleasant than the benevolent notice other people take of us, what is more agreeable than their compassionate empathy? What inspires us more than addressing ears flushed with excitement, what captivates us more than exercising our own power of fascination? What is more thrilling than an entire hall of expectant eyes, what more overwhelming than applause surging up to us? What, lastly, equals the enchantment sparked off by the delighted attention we receive from those who profoundly delight ourselves? - Attention by other people is the most irresistible of drugs. To receive it outshines receiving any other kind of income (Fake, 2006).

'The economy of interestingness' in-built in the workings of the algorithm brings about important consequences in terms of the interplay between medium and code. While the affordances of the medium, as it was analyzed above with geotagging-driven groups, enable collaborative forms of cultural production; on the other hand, the algorithm sets the conditions for the constitution of an informational milieu where media objects compete individually for attention. In this logic objects circulating through better

connected channels (robust individual social networks, that is, users having more contacts; or groups with most members) are more likely to thrive and get more exposure, garnering as a consequence more attention metadata and hence visibility in the algorithmic rankings²⁴. This situation creates a positive feedback effect that reinforces the power of few nodes. In other words, it is government by ‘the rule of the most heavily linked’ (Hindman, 2003). The platform is shaped thus in the interplay and tensions between a social logic of cooperation and a computational logic of competition. The analysis undertaken so far has to be complemented therefore by acknowledging that the platform is competitive at the ontological level.

Some users are well aware of these network dynamics and have tried to devise strategies to deceive the algorithm in order to gain exposure in the rankings. These practices are both common and disapproved at the same time within Flickr community, which use the condemnatory expression “attention whores” to refer to people engaged in them. For example, one widespread practice is posting photos to as many groups as possible.

The set of patents also delineates how location metadata is articulated in the measurement of interestingness. It is worth noting here how user location may be used as a means of delivering personalized results (geotargeting). The method identifies data neighbouring relations to use them as a signal of interestingness, either by computing the proximity of media objects to user location or the proximity of media objects to other media objects previously annotated by the user:

[...] The metadata processing logic may compute the interestingness score based upon a location associated with the media object and with a user requesting a score for the media object. For example, the metadata processing logic may indicate that a media object is more interesting to a particular user if the location associated with the media object is associated with a residence of the user (e.g., near or in the same geographic region as the user's residence), associated with a residence of another user having a predefined relationship with the

²⁴ Thus, in Tiziana Terranova words, “[the] operation of signification is secondary with relation to a primary operation which is that of the reduction of a situation to a set of more or less probable states and alternatives as constrained by the interplay between a channel and a code” (2004, 24).

user, such as a friend or family member, or associated with a location that is itself associated with a threshold number of media objects that have been assigned metadata (e.g., tagged or favorited) by the user (Yahoo Inc., 2006a).

Finally, location metadata records of media objects associated with the user may also be a factor determining interestingness:

[...] For example, the metadata processing logic may, for a particular user, positively factor into the interestingness score of an image of the Washington Monument the fact that the user has designated as favorites a large number of images associated with the Washington, D.C. area. This assumes that location metadata indicating the Washington area has been associated with the image of the Monument, e.g., by the poster of the image or another user entering the location through a tag field or separate "location" field when assigning metadata to the image (Yahoo Inc., 2006b).

Location metadata has been used in previous research on Flickr to identify places driving attention (Girardin et al, 2008; Crandall, 2009). More broadly, media geographers have mapped the so-called geoweb identifying a clear uneven spatial distribution of geocoded media (Zook and Graham, 2007; Crutcher and Zook, 2009; Graham and Zook, 2010; Zook et al, 2011). The "asymmetrical nature of geo-coded information" (Zook et al, 2011) is represented visually by few centres concentrating most spatial annotations and wider zones that are barely annotated (Fig.6.4). Scott Lash describes these patterns of inequality in the production of information as a new geography composed of live zones where the density of information flows is high and dead zones where they are light or even absent (2002, 28). Moreover, this pattern of unequal distribution is replicated at every granularity level, from continents (e.g. Africa and Latin America are for the most part dead zones in Flickr), to country and urban levels where usually city centers are live zones while dead zones commonly correspond to the deprived neighbourhoods in the urban periphery. Another factor affecting the distribution of social media that must be taken into consideration is the

respective popularity of social media platforms across countries. For example, a geography of Facebook would render countries with high density populations and information flows such as China and Brazil invisible in relative terms since Renren and Orkut, respectively, are the most popular social networking platforms in those countries.

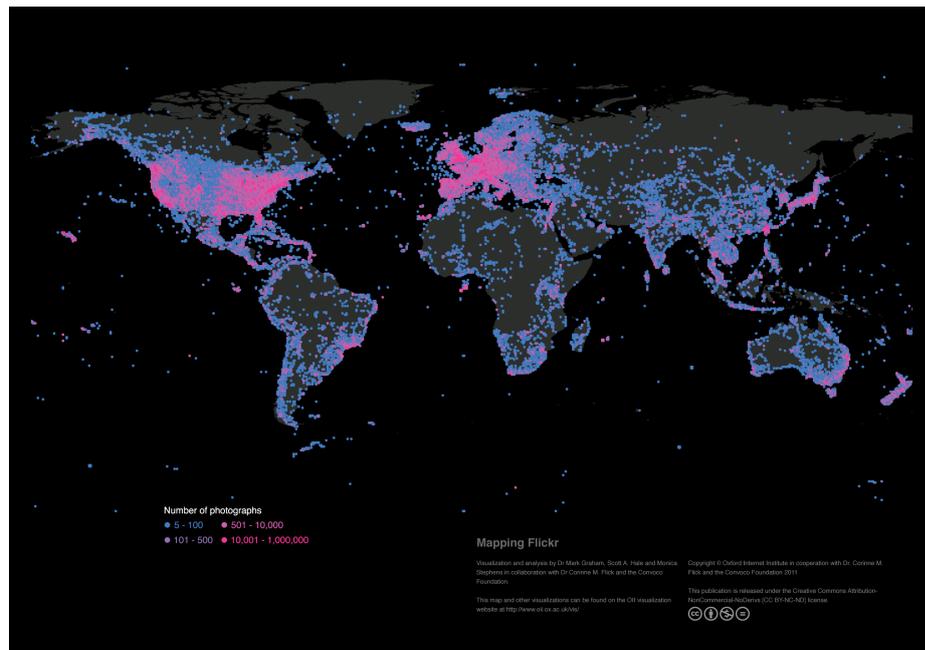


Fig. 6.4 World Distribution of Flickr's Geotagged Content. Source: Oxford Internet Institute, 2011.

Research on geocoded media has focused prominently on mapping place representations online and cultural phenomena, as well as on the problematization of the unevenness of spatial annotation characteristic of these media geographies. The mapping of the geographies of geocoded content has shown so far a distinct pattern of geographical unevenness in geocoded media distribution, basically mirroring the asymmetries of other so-called digital divides (See: Zook and Graham, 2007b; Crutcher and Zook, 2009; Graham and Zook, 2011; Zook, Graham, and Shelton, 2011). The annotation of places, nevertheless, is not only problematic in terms of representativeness and inclusion. Beyond a certain threshold of inscription

where environments are dense with geocoded data, which is the case of many already heavily annotated western cities, it is rather the specific ordering logics of the visible in-built in the workings of these socio-technical systems that are most prominent in dictating the actual conditions of visibility of places. In this case the critique of geocoded data needs to be advanced from the politics of representation to the politics of code and appearance. As the Flickr coder quoted above pointed out, when an area is cluttered with information the problem becomes what is shown. What most previous research has overlooked therefore is the ordering logic of the visible (what can be seen), and what are its consequences (For preliminary work in this vein see: Zook and Graham, 2007). It will be argued here that this dimension produces new visibility asymmetries that reshape the form of such media geographies.

As stated previously, inasmuch as Flickr's Interestingness algorithm remains a commercial secret it is not possible to replicate it in a simulation with the working datasets²⁵. Through the patent documentation analysis undertaken here we identified however the main ranking factors embodied in the algorithm, even though how those factors relate to each other and what specific weight they carry in the final ranking is unknown. Nonetheless, and within the limits that the API imposes to the researcher, it is still possible to simulate what was identified as factor number one in the algorithm ranking criteria (quantification of attention metadata), which in my understanding of the patents is the most prominent signal the actual algorithm would use. The visualization below shows then a comparison between a set of geotagged Flickr's photos for London (comprised of 92729 registers) and the same set filtered using the Interestingness factor aforementioned (2227 final registers). The visualization of Interestingness (simulation of ranking factor number one) includes therefore only media objects that either have comments, have been submitted to groups or have been marked as favourite (fig. 6.5).

²⁵ There is indeed an API method (`flickr.interestingness.getList`) that allows the retrieval of objects based on Interestingness, however the method is limited to photos for the most recent day or a specified date, and it does not return results for specified locations. This limitation renders this method unusable for this purpose.

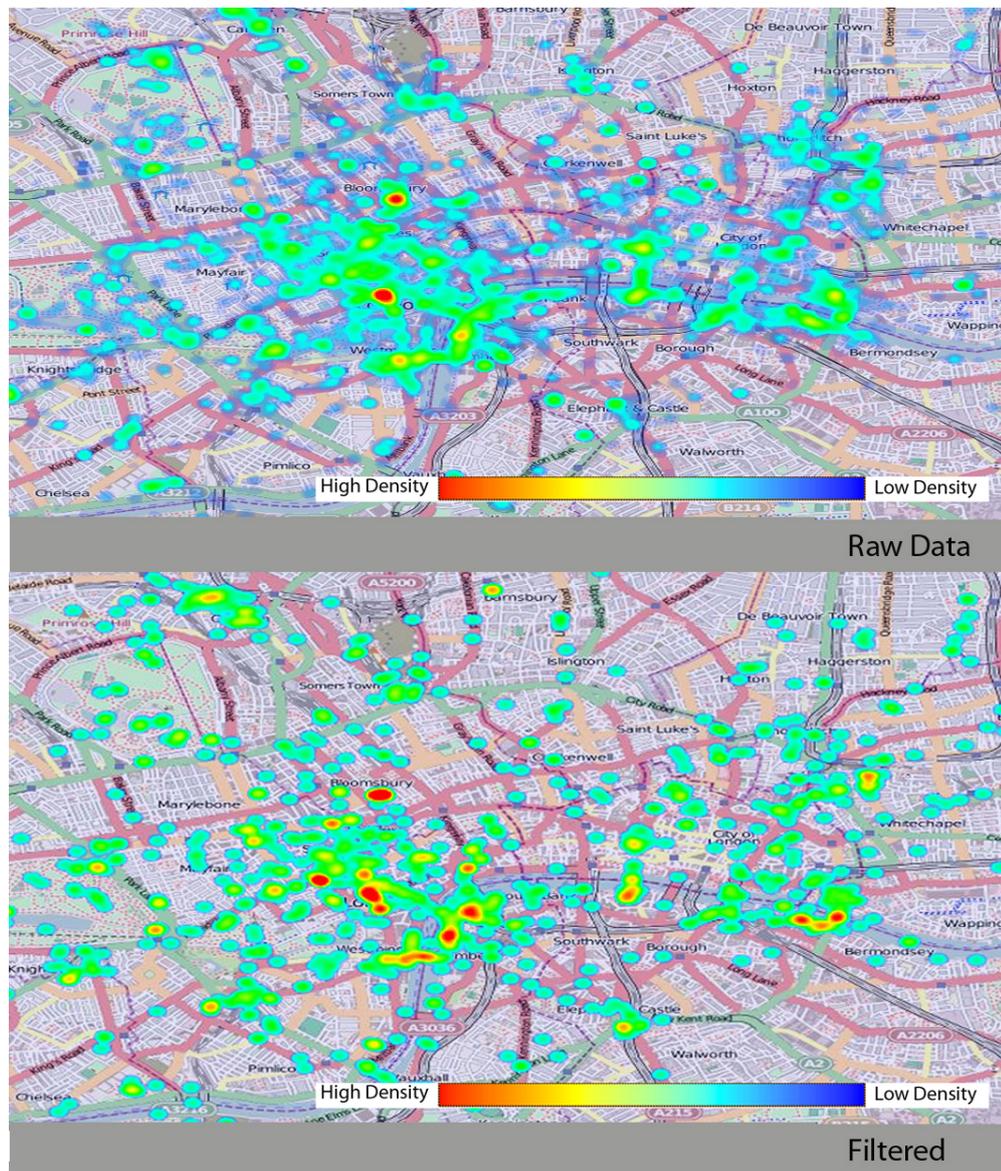


Fig. 6.5 Distribution of Geotagged Photos in London Comparison: Raw data Vs Filtered by Attention Metadata.

The visualization shows that the distribution of objects is in relative terms more scattered in the raw data map, while in the Interestingness simulation it is more clustered. Even though the zones highlighted on both maps are roughly the same, Interestingness would make what is already visible even more prominent while rendering what was slightly visible on the unfiltered map invisible. Hence, it may not come as a surprise that the hotspots on the map correspond precisely to touristic highlights in the city. Whereas just

Trafalgar Square and the British Museum were identified as prominent hotspots in the distribution of objects on the unfiltered map, on the simulation the patterns of distribution highlighted clearly more hotspots. Besides Trafalgar Square and the British Museum other hotspots made visible are Piccadilly Circus, Leicester Square, Tottenham Court Road, House of Parliament, London Eye, Southbank Centre, Tate Modern Gallery, St Paul's Cathedral, City Hall, Tower Bridge and Brick Lane. It could be hypothesized then that the algorithm reinforces spatial asymmetries that shape the users' field of visibility, that is, what is ultimately seen. As a way of illustration, even though a search engine actually makes available thousands of results in a search query, what the final user ends up accessing falls largely within the first two result pages. Similarly, in Flickr, despite the myriad of spatial annotations indexed, the urban spaces that are most likely visible to the final user would tend to conform to hotspots. What is at stake in these results is the difference between retrievability and visibility, which is at the heart of the problem of algorithmic selectivity in ranking (Hindman et al., 2003). Accordingly, although a place such as London may be extensively and diversely annotated, and every single annotation can be individually retrieved, the representations of London that final users are likely to encounter are demarcated by the ordering enforced by the algorithm. This algorithmic regime constitutes thus a vector of asymmetrical visibilization in locative media.

In this light, the imaginings and geographies of places in Flickr are shaped by the economy of attention informing the algorithmic orderings ('software-sorted geographies' Graham, 2005). More precisely, as I tried to argue here, the mediation of place is reconfigured in the articulation of media objects and social relations within specific techno-economical frames. In this way, the quantification of such articulation as it is embodied in social metadata operates as a mechanism of measuring (attention) value, dictating at the same time the conditions of visibility for any representation of place. Wendy Chun has advanced the idea that software may be thought of as ideology made machinic. Following Chun, it can be argued that Flickr through its

grammars of circulation creates therefore an 'invisible system of visibility' (2004, 28).

6.4 Spatial-visual regime

An analysis of the factors shaping what spatial imageries are accessible to us has to comprehend not only understanding how geocoded objects are sorted by the algorithm but also how the places attached to those objects are sorted themselves. This section will start describing the ordering of places in Flickr's database to proceed then to evaluate what kind of relationships between users and space are suggested in this ordering. In order to do so I will use a dataset of geocoded objects (spatial annotations in the form of check-ins) taken from the location platform Foursquare for comparative purposes. The section concludes delineating what is the regime of visibility underpinning the platform. I will understand here regime of visibility as the ways of seeing and representing space embedded in Flickr's codings.

Location-enabled platforms are built upon places (location) databases. Such databases have at the same time their respective ontologies. A place ontology is a data model that describes the way how places are categorized and classified, as well as how these categories are related in the database. In particular Flickr is geo-enabled through Yahoo's location database (Yahoo! GeoPlanet). The spatial categorization in Yahoo's places database is based on the so-called WoEID (Where on Earth Identifiers). These identifications are unique numbers that are never changed or recycled (though they can be deprecated), and since they are numerical identifiers they remain language neutral. Flickr's geo-services works on WoEIDs but use a reduced version of Yahoo's place ontology. Whereas Yahoo's has a set of eleven different place types (continent, country, admin (e.g. state, region, etc.), admin2 (e.g. county), admin3 (e.g. district), town (e.g. city), suburb (e.g. neighbourhood), postal code, supname (e.g. Latin America), colloquial (e.g. French Riviera), time zone (e.g. America/Los Angeles)), organized in a hierarchical model

with their respective geographical relationships (parent (a direct superior to a place), children (a direct inferior to a place), neighbours (places adjacent to a place), siblings (places that share the same parent and have the same place type), belongsto ('places that include a given place as one of their children, or their children's children, etc'.) and ancestors ('places in the chain of parents for a given place') (fig. 6.6); Flickr's uses a simplified version of this ontology with less place categories (continent, country, region, county, locality and neighbourhood), and consequently with a simpler set of geographical relationships between them.

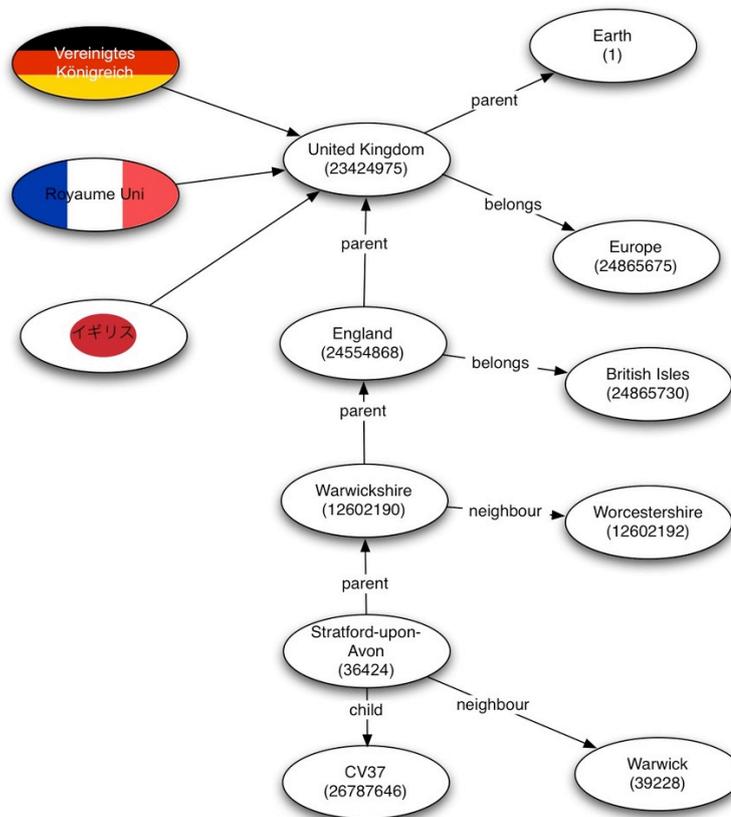


Fig. 6.6 Yahoo's WOID place ontology example for Stratford-upon-Avon. Source: Gary Gale, Director of Engineering, Yahoo! Geo Technologies.

For the purpose of my analysis I will compare Flickr with another kind of location-enabled platform, Foursquare. If, as I will argue, place ontologies are ways of categorizing the world, as such they also embody certain worldviews and modes of knowing the world. Granted that, a comparative analysis is valuable to shed light on the differences in the constitution of such worldviews. Foursquare is a location-based social networking platform where users basically share their actual location (a practice known as checking-in). This platform uses a different ontology approach based on what it terms 'venues'. Rather than standard formal geographical entities, venues are basically defined as points of interest (POIs). Foursquare's place ontology is comprised of 8 top level categories (Arts & Entertainment, College & Education, Food, Nightlife Spots, Great Outdoors, Shops, Travel Spots, and Home/Work/Other) and 235 subcategories. Unlike the top-down place ontology of Yahoo-Flickr, the apparent simplicity and non-hierarchical organization of Foursquare's ontology fits its bottom-up approach to location data, whereby its users can contribute adding new places to the database²⁶. In the process a given user just has to provide a place name along with either a valid address or lat/long coordinates to have a place indexed in Foursquare's places database, though additional richer location data can also be contributed (city, state, postal code, phone, url, twitter account and a description of the place).

In order to evaluate how these two place ontologies demarcate fields of visibility we have to look at the distribution of spatial annotations (fig. 6.9). The visualizations reveal that the patterns of distribution are clearly distinctive for each platform. Annotations are significantly more dispersed and covering larger areas in Flickr compared to Foursquare. The hypothesis put forward here is that the different conceptualizations of place implied in each ontology set the limits for what spaces can actually be annotated and

²⁶ Even though Flickr is powered by Yahoo! GeoPlanet location database it does still allow some forms of bottom-up participation with geotagging, allowing user contestation of the ontology through folksonomic processes: "As the odds are you know more about your local neighborhoods than we do, when you edit a location on the pop-up map you can also see other nearby options and choose one. Over time if everyone continuously tells us we've got somewhere wrong, we can feed it back into the system and update it for everyone else. We'll all stand united, hands joined across the world, singing and taking photographs in perfect world geotagging harmony" (Flickr Blog, 2008)

hence be legible. In the process of geotagging a photo Flickr converts a given set of lat-long coordinates into a place category with a coarse level of spatial granularity for indexation. This is the so-called reverse geotagging, which involves an algorithmic process that uses overlapping bounding boxes to identify and then assign a place name for a set of coordinates. For example, Flickr API returns the result Camden Town in London for the coordinates 51.5432, -0.1519. Foursquare, on the other hand, converts the same set of lat-long coordinates into the more restricted category of point of interest ('venue') fixing thus space into discrete places with a fine level of spatial granularity: The Roundhouse theatre in Camden Town, London. Unlike Flickr there is a place page for The Roundhouse Theatre in Foursquare. The WOEID ontology as it is adopted in Flickr does not include street-level geocoding, so points of interest are not represented in the data model. Consequently, there are no Flickr Place pages for POIs. In this respect the API documentation reads as follows:

[the API] is not meant to be a (reverse) geocoder in the traditional sense. It is designed to allow users to find photos for "places" and will round up to the nearest place type to which corresponding place IDs apply. For example, if you pass it a street level coordinate it will return the city that contains the point rather than the street, or building, itself.

In fact, the API restriction goes as far as obfuscating lat-long coordinates in a place query so a precise locale cannot be identified at all: '[The API] will also truncate latitudes and longitudes to three decimal points'—the API documentation continues. This technical limitation carries a significant consequence. Flickr's indexation of location impedes the capture and accumulation of media annotations by private places, namely businesses, as Foursquare actually does by confining annotations into smaller spatial entities (venues) in its database, allowing this way places to gain visibility and capitalize on attention value (popularity). At stake here is the very technical enabling of the current main business model of location-based services. Consequently, place ontologies are responsible not only for how

geocoded media is indexed, but also, ultimately, for how can it be capitalized. And most importantly, they delimit what kinds of spaces are annotated.

The Marxist geographer David Harvey contends that 'spaces of representation [...] have the potential not only to affect representation of space but also to act as a material productive force with respect to spatial practices' (1989, 219). In this light it is worth examining also what modes of spatial practices are promoted in locative media. Flickr and Foursquare encourage two different sets of relations between users and urban spaces. On the one hand, Foursquare, through its participation dynamics ruled by social competition for prestige (e.g. getting badges or becoming a 'mayor' of a place) and commercial incentives (getting offers, discounts, coupons from businesses), promotes spatial practices of self-presentation and consumption in places. Suitably, its underlying ontology based on the category of venues is composed primarily of commercial entities rather than geographical entities, rendering this way the space of the public street uninscribable and hence invisible. The comparison of distributions between Flickr and Foursquare suggests that the media geography of the latter is mainly commercial as there is a clear tendency to the formation of clusters around the so-called 'Main Street' (fig. 6.7). On the other hand, conversely, it could be argued that Flickr tends to favour the visibility of public space while obfuscating private space. Flickr's ontology permits a type of spatial annotation closer to that of urban graffiti as a writing practice of public space. In other words, it is geotagging as 'digital graffiti' (Hemment, 2006). Whereas in the case of Foursquare, as the operation of the check-in suggests, the user registers or associates himself/herself with mostly private places.

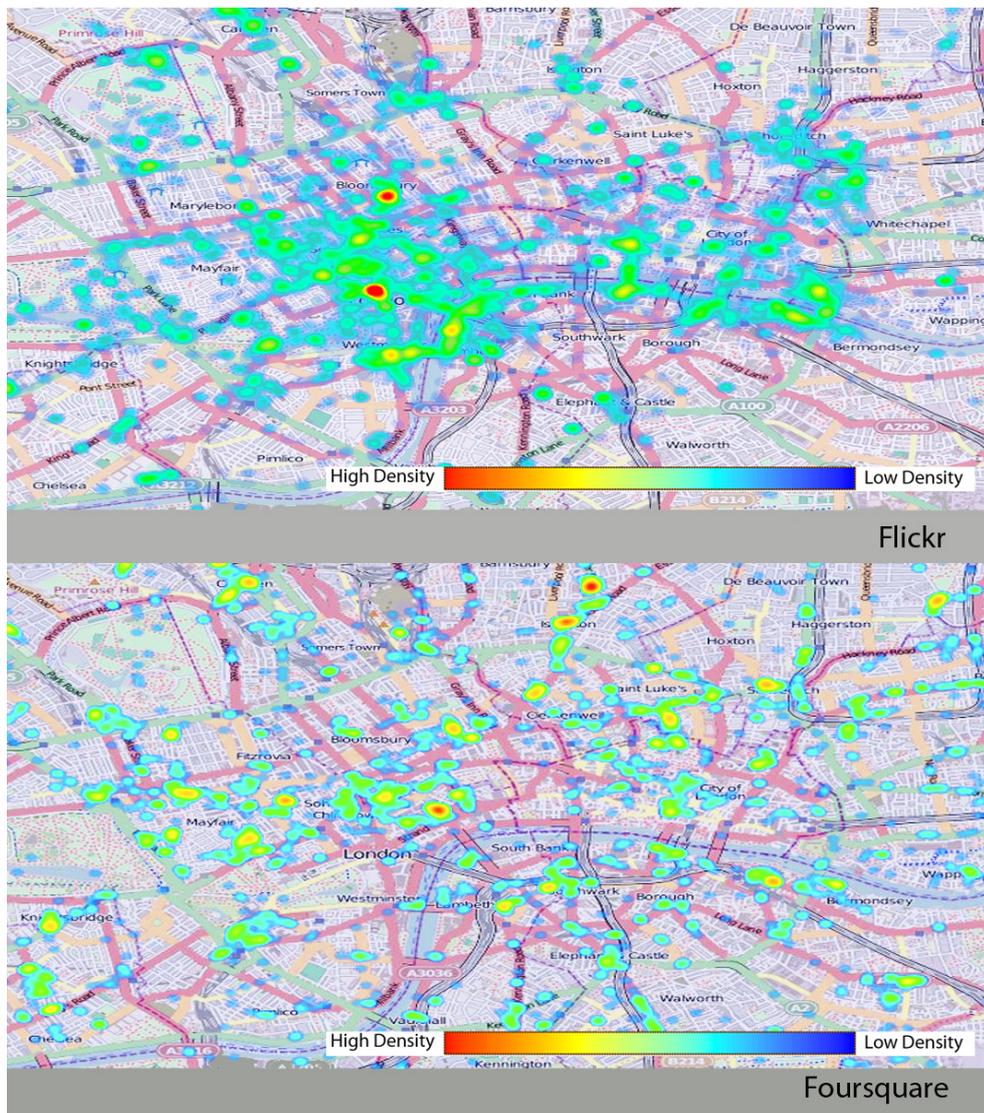


Fig. 6.7 Distribution of Geocoded media objects in London Comparison: Flickr Vs Foursquare.

Different spatial ontologies thus, as it is manifested in the distribution of spatial annotations, crystalize in different stratifications of social space. These stratifications produce different fields of visibility, whereby some zones in the city are rendered legible while others are illegible. Using an expression from Paul Virilio, Flickr could be thought of as a vision machine. The product leader of Yahoo Geo Technology Group asserted in an interview in April 15, 2009: 'What Flickr gives us and what, more specifically, the users of Flickr gives us are a fantastic resource of visually orienting ourselves any place on the planet.' Further, Flickr considers itself to be the 'eyes of the world'. One of

its co-founders formulated the company's mission in these terms in an interview in March 12, 2007: 'We have a concrete vision to be the eyes of the world, the primary source for sharing and discovering what people see all around the world.' This discourse of orientation underpins not only Flickr's corporate identity but also the way its products are marketed. In a Flickr blog post (June 18, 2009) a new service is announced in this way: 'use [Flickr Mobile Nearby] to explore your neighborhood [...] Reload the page as you walk around a city, and see the things that have happened there in the past. You'll see a place through the eyes of the flickrverse.'

Furthermore, Flickr's regime of visibility is extended out of the platform into the Web thanks to protocols that enable network interoperability (mainly JPEG/EXIF for photos and XML for sharing data across platforms). Flickr's photostreams may be in-built in blogs or emails for example. Paul Clapan has termed this distributed visibility enabled by network protocols 'network scopic regime' (2010). More importantly, Flickr's imagery is currently integrated in the most widely used geobrowsers (Google Earth, Google Maps, and Bing Maps). Both Google's and Microsoft's geobrowsers datamine Flickr's database to populate their street imagery, overlaying physical location with Flickr's geotagged media layers (fig. 6.8). As I already pointed out before, Flickr is the second biggest repository of imagery on the web after Facebook, however, unlike Facebook's, Flickr's imagery is allowed to circulate and populate collective imaginaries²⁷, making the understanding of its cultural politics even more relevant.

²⁷ The circulation of Flickr's photostreams are restricted, nevertheless, by the API's terms of use. According to it just media objects under creative commons licenses can be used by geobrowsers: "Comply with any requirements or restrictions imposed on usage of the photos by their respective owners. Remember, Flickr doesn't own the images - Flickr users do. Although the Flickr APIs can be used to provide you with access to Flickr user photos, neither Flickr's provision of the Flickr APIs to you nor your use of the Flickr APIs override the photo owners' requirements and restrictions, which may include "all rights reserved" notices (attached to each photo by default when uploaded to Flickr), Creative Commons licenses or other terms and conditions that may be agreed upon between you and the owners. In ALL cases, you are solely responsible for making use of Flickr photos in compliance with the photo owners' requirements or restrictions. If you use Flickr photos for a commercial purpose, the photos must be marked with a Creative Commons license that allows for such use [...]"<http://www.flickr.com/services/api/tos/>.

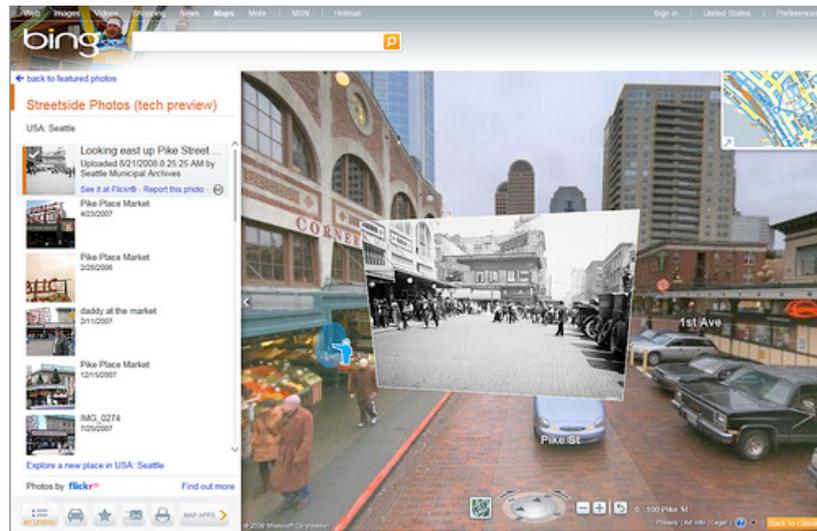


Fig. 6.8 Bing Maps' integration of Flickr's geotagged media. Overlaying of a historical photo of Pike Place Market (Seattle, US) onto Bing Maps' Streetside imagery. Source: Flickr, user BingMaps.

So far I have examined the main technical foundations of this visibility regime: the modes of access to the database (i.e. the API's permissions rules), its ontological spatial structuring, and the algorithmic logic that imposes a ranking ordering. Yet, Flickr is not a stable technological system for user production. Flickr is reflexive in the sense that it is as much shaped and individuated by users' interactions with the platform as it itself shapes user agency and individuation, all in a primary ontogenetic process (Mackenzie, 2003). Consequently, user production impact on the visibility regime should be equally examined.

I have identified three main participation factors shaping visibility in the platform. The first factor is economic, and has to do with the type of account. Paid accounts, as it was already mentioned above, are granted more functionalities including limitless photo uploading. A previous study found that paid ('Pro') users account for 59.5% of all objects while they represent just 3.7% of the entire population of users (Prieur et al, 2007). The study also found that 'Pro' accounts are more active compared to free accounts in terms of social networking (number of contacts), comments (both given and received) and groups they belong to (Prieur et al, 2007). These

characteristics examined under the light of the algorithmic logic described here make 'Pro' users' photos more visible as they carry more weight in terms of attention metadata.

The second factor is social prestige (popularity). Inasmuch as social networks remains the main mechanism of access and browsing of photos, the robustness of a given user social network grant his/her photos more or less visibility. Research evidence has 'showed that for the images produced by good photographers [users], the views and favourites they receive correlate most strongly with the number of reverse contacts the photographer [user] has' (Lerman and Jones 2007).

Another final important factor shaping the algorithm rankings and hence what representations of places the user encounter ('what people see') is participation volume. The statistical analysis of my sample (6671 users) reveals a strong bias in user contribution, evident in the discrepancy between the mean of contribution (13.9 photos per user) and the median (3 photos per user) (annex 3). This asymmetry is explained by looking at the percentiles: 80% (79.96%) of users contributed with only 20% (20.69%) of all geotagged objects in the sample (annex 4). Meaning that a minority of users contributed with the most content. This asymmetry corresponds to a common power law, well documented in network theory research, characteristic of scale-free or aristocratic networks known as the '80/20 rule' (or Pareto's law) (see: Barabasi, 2002). The power law is represented as a continuous decreasing curve indicative of an inequality in distribution in the number of geotagged objects per user (fig. 6.9), revealing a pattern of high clustering. This has become known as a long tail distribution (Anderson, 2006). As a consequence, the results suggest that outliers (so-called power-users or super-users) in the distribution of data are likely to have more influence on what is visible in the platform because of its sheer prominent representation. This network diagram is therefore 'aristocratic' in the sense that outliers shape visibility more than the majority of the population has.

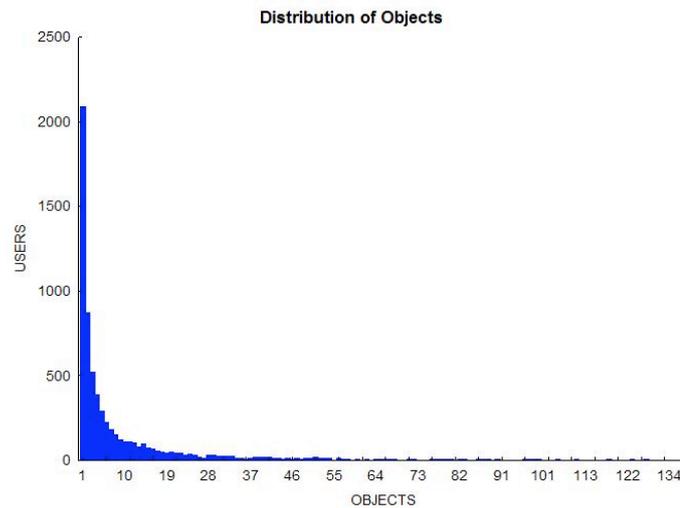


Fig. 6.9: Histogram: Distribution of Objects

Lastly, the question of visibility is also the question of knowledge. That is, under this spatial-visual what aspects of places, what knowledges are rendered visible? What is local? In order to explore these questions, the sample of geotagged photos was sorted into content produced by locals and content produced by visitors using a simple algorithmic procedure. The data distribution patterns reveals that visitors' (or tourists) annotations tend to cluster centrally, corresponding to the city centre areas. While local annotations are comparatively more prominent in the periphery (fig. 6.10), corresponding roughly to zones 2-6 using the London Transport spatial zoning system as a reference. Consequently, the imaginary of Central London - which comprises most of the main landmarks of the city – is mainly produced by the population of visitors, even if they represent just about one-third of the total amount of spatial annotations (28.7%). It is therefore not only problematic the fact that our perception of space as it is mediated by location platforms is being shaped mainly by the young-rich-male demographics characteristics of these services, but also the fact that the tourist gaze may also be amplified in these platforms. This raises a fundamental question: whose collective memory is rendered visible? In this light further research should assess the extend to which the geography of Flickr (of locative media

at large) (fig. 6.4)—particularly for areas in the non-western world—is culturally constructed by (western) flows of tourism, and to what extent this may constitute the formation of 'imagined geographies' (Said, 1995) framing our representations and readings of those places and cultures.

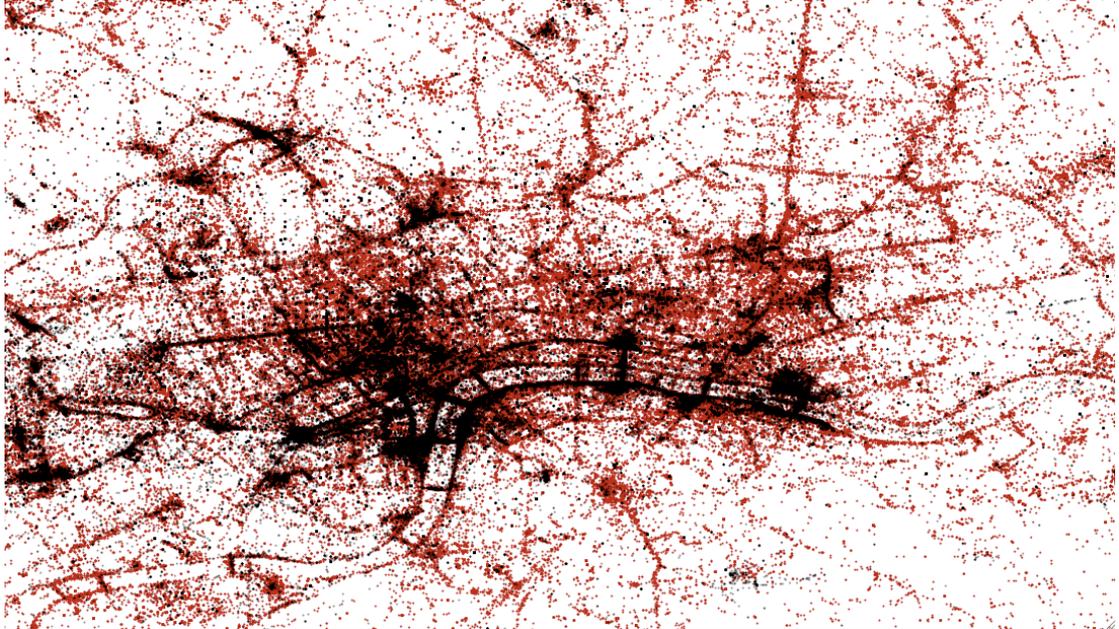


Fig. 6.10 Spatial point patterns: Locals (red) vs Tourists (black) comparison.

As was discussed above, the collective annotation of space by groups of people either familiar with places or passionate about mapping certain knowledges offers possibilities for the documentation of different aspects of places favouring thus the production and dissemination of local knowledge. In the same vein, participatory GIS has explored the potentialities of volunteered geographic information (VGI) to empower communities and make visible local knowledge: '[...] the most important value of VGI may lie in what it can tell about local activities in various geographic locations that go unnoticed by the world's media, and about life at a local level' (Goodchild, 2007, 15). Nonetheless, seen from the perspective of information theory, the informational dynamics of Flickr may rather tend to obscure local knowledge,

particularly in highly annotated geographies. The high prominence of visitors' annotations over locals' in certain areas, likely amplified by an attention-driven algorithmic logic, establishes a noisy communication channel that may indeed screen local knowledge, or circumscribe its field of visibility to low-annotated areas (a clearer channel) or niche audiences (group members and personal contacts).

To recapitulate, it is the layering and prolongations between the technological and the social that define the platform's regime of visibility. More precisely, the specific interplay between the dynamics (and constraints) of content production and the algorithm logics that govern it, as well as the underlying ontology that frames how geocoded data is indexed and made findable. To put it bluntly, in this articulation the vision machine casts a worldview shaped on its image.

6.5 The affective engineering of the city

This section will extend the analysis of the algorithm undertaken in section two taking as a starting premise the assertion that Flickr's algorithm accounts also for an affective dimension in data. The calculation of attention at work in the algorithm, I claim, is more complex than the mere counting of 'eye-balls' as it were, that is, counting number of views (i.e. spectatorship). Flickr does not measure attention based on the hyperlinking model characteristic of search engines either, for instance, counting the number of groups a given photo belongs to. In fact, a large number of groups are penalised in the rankings. In Flickr attention denotes foremost intensity. And it is worth to remember here the way Flickr's co-founder frames attention in the light of interestingness as 'compassionate empathy', 'benevolent notice', 'power of fascination', 'enchantment', and 'the most irresistible of drugs' (Fake, 2006).

Flickr's ranking model is one characteristic of most social media platforms based on the measurement of user 'interactivity with the object' (Gerlitz and Helmond, 2011). That is, this model measures social relations as they are

expressed in the object. Affect should be read in this context then in terms of relationality. That is, as the intensive relations between social networks and media objects. What carries the most weight would be the degree of responsiveness, that is to say, that further engagement with the object after it has caught the user attention (a photo view). Whether the object mobilizes an affective response in the form of a further act of communication: commenting, adding tags or notes, and foremost favouriting an object. Put in Spinozian terms, attention value can be understood therefore as the capacity of the media object to affect the user.

Furthermore, this 'grammatization of affect' (Stiegler, 2010) operated by the algorithm renders intensity traceable as it crystallizes in specific objects. If as Flickr's website reads, 'interestingness changes over time, as more and more fantastic photos and stories are added', the algorithm is then capable of sorting what objects stand out from the uninterrupted flow of images. Looking at the patent documentation sheds some light on how this sorting may be executed:

Interestingness may be a function of time [...] For example, the system designer may set up the score computation to decrement the thus-far accumulated score by a predetermined percentage over time starting at the time the media object was posted. For example, this time decay may cause the score to decrement by 2% per day from the day of posting. This and other means may be employed to prevent the occurrence of "positive feedback loops" where the sorting of media objects by interestingness itself skews the results, causing those same media objects to be more frequently accessed, thereby unnaturally increasing their interestingness scores (Yahoo! Inc., 2006a).

It is only through a consideration of the dimension of temporality that the algorithm is able to differentiate the object's degree of interestingness from mere redundancy. More interestingly, based on these procedures described in the patent it could be inferred that a measure of intensity may be calculated considering the maximum accumulation of attention metadata by a given media object in a short span of time. The algorithm would evaluate number of views, number of users annotating the media object and their

respective social relations all in a time axis that favours diffusion and novelty over constant accumulation and positioning. From a Tardian perspective, it can be argued that a logic of invention and imitation is in fact built in the algorithm. Thus, the algorithm instead of finding norms (spatial fixes), i.e. the most popular photograph for a place or the most representative, it tracks users' process of discovery of interesting photographs and objects' diffusion through the attention metadata accumulated in this process. In other words, Interestingness would map out relations of imitation derived from the circulation of media objects. Arguably, this emphasis on the temporal dimension of media consumption in terms of propagation of imitation (i.e. virality) suggests an epidemic logic underpinning the algorithm (see: Sampson, 2011).

The cultural logic of Interestingness privileges the flow over the archive. At the level of the user experience, Flickr's user interface is based on the design concept of the 'photostream', and embodiment of the flow, which favours the visibility of recent uploaded objects over the archive (Fuster Morell, 2010). The flow is also enforced through the API terms of use. Flickr's policy prevents users to exploit the archive by directly imposing an injunction to share. The API documentation puts it in this way:

The best integrations contribute to the Flickr community by encouraging members to converse, share, and curate. Integrations that primarily use Flickr as a photo storage service or a stock imagery provider miss the point behind photo sharing (as well as violate the Community Guidelines). In other words, *participate!* (emphasis added).

More importantly, this logic underpins also Flickr's business model. The way the profit mechanism is built-in in the design of the platform is twofold. On the one hand, the platform stimulates the constant production and uploading of new objects by way of the interface - the 'photostream' model - so advertising can be more often displayed and placed along the different stages of this process. For instance, Yahoo Advertising Solutions promotes Flickr's 'upload page' as a valuable marketing opportunity: 'take advantage of upload

downtime, and catch members' attention while they wait'. On the other hand, free accounts users have access to just up to 200 media objects. After the user's uploading rate has surpassed this limit new uploaded photos are still archived but older photos cease to be accessible as new ones displace them. The model of constant production ('photostream') pushes therefore users towards the paid service version inasmuch as once users are confronted with the technical barrier of 200 objects they face the need to upgrade version in order to have access to the archive of past photos. Although the archive is subsumed under the logic of the flow it remains central to Flickr's business model given that it is indeed the main commodity being sold.

The expansion of locative media is bringing about a generalized overlaying of urban environments with media layers. And Flickr thanks to its distributed visibility that allows its pool of geotagged images (the largest of this kind available online) to disseminate through other platforms, is contributing to populate the social imaginary of the city. Sutko and de Souza e Silva argue that the accessibility to these layers of user-generated geotagged content is shaping the contemporary experience of the city making it a more intimate one (2011). In this respect, how does the logic of Interestingness affect the user's perception and sense of place? Although this is a question that goes beyond the scope of this project, and would necessitate a phenomenological analysis of audience experience, it could be still argued from the analysis undertaken here that an imagery which is presented as an interrupted flow of images (the photostream), embedded in social networks and infused by their circuits of affectivity, would tend to elude the articulation of sense of place as a narrative form (i.e. 'spatial stories' in Michel de Certeau's terms), while emphasizing instead the affective register of places. 'When I see a picture that I like'—an user says—, 'I look in the Exif to see the location. I don't keep track of these locations, but in certain occasions I realized that I was already planning a trip in the area and this allowed me to add a de-tour to visit another interesting place' (Flickr Geotagging Group, 2009). The urban imaginary as mediated by Flickr is in this way, allegedly, more likely to be

populated by intensive and never stable representations of place than by representative representations (i.e. delivering relevance or authoritativeness). To paraphrase Godard, not a correct image, just an intense image. Thus, and despite the myriad of spatial annotations indexed, the urban spaces that are most likely visible to the final user would tend to conform to hotspots, that is to say, places driving social desire. In the same way, location-based services, and particularly social location platforms, have incorporated ‘trending places’ features that provide analytics to track in real-time the composition and fluctuation of hotspots based precisely on the same principle of computing temporal patterns in geocoded data.

Following Nigel Thrift, the ‘affective engineering’ of the urban imaginary at work in Flickr could be understood in the light of contemporary corporate practices that seek to create ‘suggestible environments’ (2008, 17). That is, producing the worlds where consumption takes place rather than just producing commodities (Lazzarato, 2006). These practices—Thrift continues—‘constitute [...] a shift in the nature of mediation towards ‘worlding’ enabled by new material cultures which allow *the affective priming of space to be systematized* in ways which were not possible before’ (2008, 17, emphasis added).

All in all, if we are to understand the collective annotation of space as a form of software-based cultural memory, which frames at the same time our very subjective experience of place, we have to look not only to its representational dimension but also to its machinic dimension (Lazzarato, 2006; Parikka, 2011), as well as to interrogate how the latter is articulated within the interests of the companies owning these location-enabled platforms.²⁸

²⁸ Drawing from Guattari’s material semiotics, Lazzarato poses this problem in the following terms: ‘The semiotic components of capital always operate in a dual register. The first is the register of “representation” and “signification” or “production of meaning”, both of which are organized by signifying semiotics (language) with the purpose of producing the “subject”, the “individual”, the “I”. The second is the machinic register organized by a-signifying semiotics (such as money, analog or digital machines that produce images, sounds and information, the equations, functions, diagrams of science, music, etc.), which “can bring into play signs which have an additional symbolic or signifying effect, but whose actual functioning is neither symbolic nor signifying”. This second register is not aimed at

6.6 Geotagged Hackney: mapping the biopolitical city

This section will explore to what extent geotagged media could be used to look at socio-cultural processes taking place in the city, focusing particularly on the relationship between culture, place and economy. As it was noted above there is a demographic bias inherent to Flickr whereby certain worldviews should tend to be over-represented. Nevertheless, despite this bias, previous research has demonstrated that there is still potential in using geocoded data to examine culture and society, particularly where it is most spatially concentrated (Zook, et al., 2011; see also: Rogers, 2009). There is a caveat though; generalizations cannot be made providing that Flickr does not constitute a strict representative sample of London's population. It represents just a sub-group.

Considering that, London constitutes a rich case study since it is the second largest geotagged city after New York, representing a robust repository of cultural data about places to examine. Additionally, the following analysis is circumscribed to just one of London's boroughs, Hackney. The selection criterion uses Lash's typology of social space above mentioned. The sociologist proposes a socio-spatial division in zones based on the intersection of two characteristics: 1) the density of information flows, where high density and low density refers to 'live zones' and 'dead zones' respectively. Within the framework of the information economy this spatial division corresponds basically to economic spaces (information-rich and information-poor). And 2) 'identity spaces', classified as 'wild' or 'tame' zones depending on the diversity/stability of the respective population composition. This division 'refer[s] to what social actors do with [the flows]' (2002, 29). In Lash's typology Hackney would correspond to a live/wild zone inasmuch as this borough is mostly a culturally active area with a diverse population composition that makes identity formation less stable (2002, 29).

subject constitution but at capturing and activating pre-subjective and pre-individual elements (affects, emotions, perceptions) to make them function like components or cogs in the semiotic machine of capital' (2006).

Accordingly, the place chosen for study is firstly dense in annotations to guarantee a richer examination, and secondly diverse in terms of its population characteristics to constrict to a degree the already demographically biased sample.

Flickr indexes and organizes geotagged content in the form of Place Pages. There are Place pages for countries, cities and neighbourhoods. The interface is composed of a map showing the respective place location, a slideshow of geotagged photos sorted by interestingness, an index of Flickr's groups related to the place, a list of prominent geotagged photos contributors, a list of all time most popular tags for the place, and lastly an algorithmically assigned distinctive colour that emphasizes the aesthetico-affective dimension of place representations (fig. 6.11). Moreover, every Flickr Place page is encoded in geoRSS and KML formats, as well as human-readable URLs (e.g. www.flickr.com/places/United+Kingdom/England/London), all to facilitate the access and transmission of content by place.

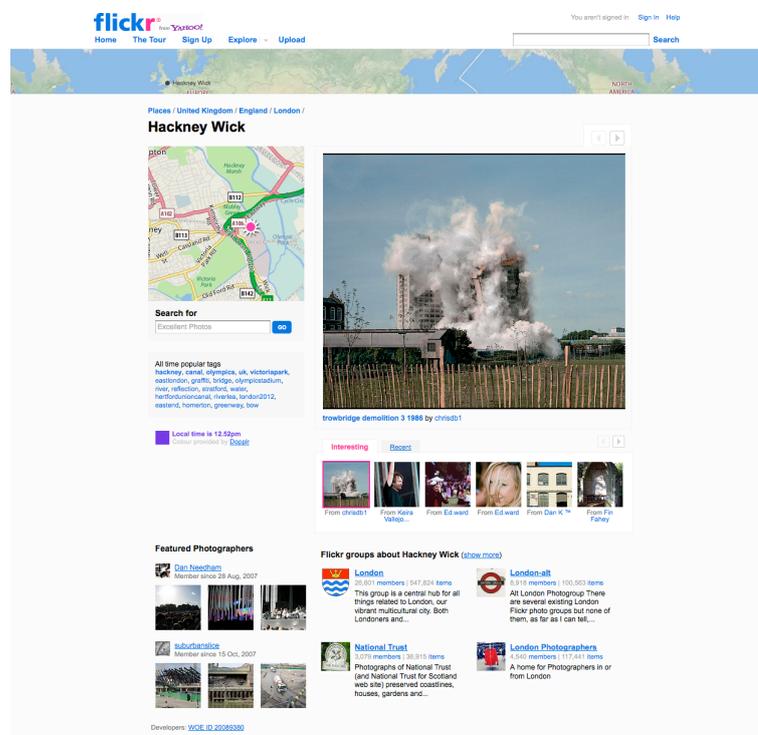


Fig.6.11: Flickr Place Page Layout

In order to examine how Hackney is captured in Flickr I will centre on two core components of Place pages: tags and groups. Though photos as such represent a source of knowledge about the cultures of a particular place, in Flickr this visual knowledge is augmented by users' annotations (tags) adding an extra semantic dimension to it. For instance, a location-based search of photos for the tag 'beauty' can reveal cross-cultural differences in the perception of what is considered beautiful in different countries. Previous research has shown how the association of location metadata (geotags) and textual metadata (tags) makes indeed possible the extraction of place semantics (Rattenbury et al, 2007). Tags, this way, may enable basic forms of place profiling and sentiment analysis as users utilize them to describe the characteristics of places, and the activities and sentiments associated to them.

The Places API allows the retrieval of up to 100 tags for a place query. However, it imposes a limit to the access to tags at the level of neighbourhoods. Tags for Hackney were collected therefore through Place pages, though access was in this case restricted to just up to 20 tags (table 3). Nonetheless this limitation in number represents on the other hand a high degree of representativity of every tag. The first observation confirms previous studies of Flickr tagging system (Hollenstein, 2008) that found large proportion of place tags (place names) in geotagged media samples. In regards to the category narrative tags, that is, tags used to provide a story-context, there is a prevalence of art related tags (e.g. 'art', 'streetart', 'artist', 'graffiti', 'stencil', 'banksy', etc.). Meaning that geotagging is noticeable used to document art across most Hackney's neighbourhoods. A possible hypothesis is that the core of Flickr users (photographers) responsible for Hackney's annotations may be creative workers themselves or cultural 'prosumers'. A final interesting finding reveals a conflict between Flickr's top-down place ontology and users' bottom-up localization of places. Geographical limits are contested by the vernacular geographies and spatial imaginations of Flickr's users. For example, Hackney Central's Place page contains the tags 'clapton' and 'homerton'. De Beauvoir Town is tagged as

being 'shoreditch', Hackney Wick as 'stratford', 'homerton' or 'bow', and even Haggerston or South Hackney are tagged as belonging to another borough ('tower hamlets'). By calling a Places API method it is possible to map out these overlapping vernacular geographies. The results delineate the shape or contour of places using photographs' geotags (WOIDs) (fig. 6.12).

The second aspect I want to consider for analysis is place-related groups. Here I will focus on the most representative of all the borough's groups: Hackney Group. As of 1st March 2012, Hackney Group hosts 13567 objects and 945 members, making it the second largest London borough Flickr group after Greenwich's. The group affiliates itself to a network of other Hackney-related groups including Abney Park Cemetery, Clissold Park, East London, East London Line, Hackney Conservation, Lee Valley and River Lee, North London Line, Springfield Park, The New River and London2012. The group statement reads:

This group is for photos of the eastern London Borough of Hackney, an area of great contrasts, where shabby—and not so shabby—inner city estates rub shoulders with carefully manicured gardens and parks, and the local economy covers a spectrum from the run-down industrial sites on the Lee River to the new media and arts scene of Hoxton and Shoreditch (Flickr Hackney Group).

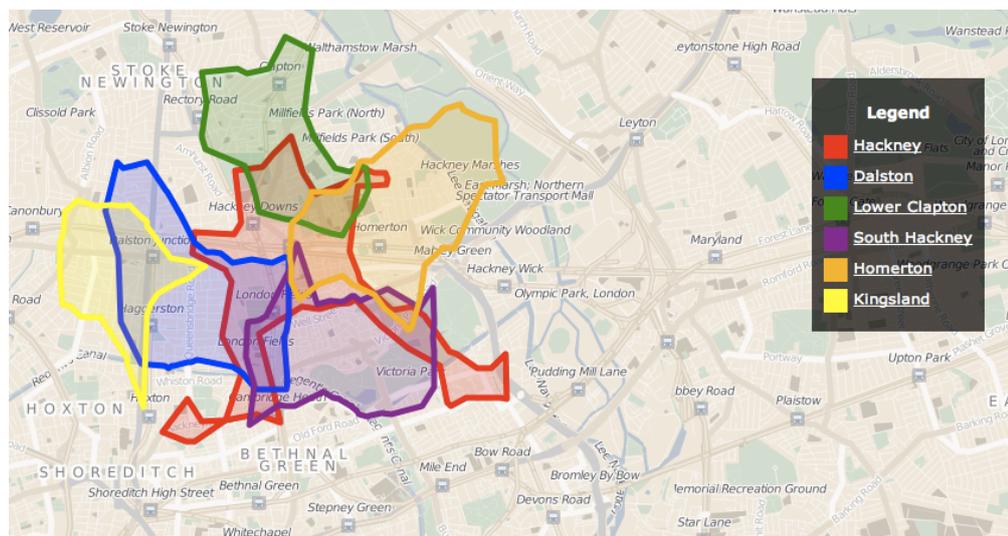


Fig. 6.12 Map of Hackney's neighbourhoods boundaries according to user-generated geotagged content (software: Boundaries).

The rules of participation set regulations in regards to the amount of photos/videos that each member can upload per day, aiming to limit over-representation, as well as restricting content to street photography: 'All shots of flowers, other plant material or nature in general that do not contain *urban context*, preferably Hackney urban context, may be removed summarily' (Flickr Hackney Group, emphasis added).

Interestingly, the dispute over the borough boundaries is also manifested in the group. There are explicit geographical guidelines and forum discussions in this regard.²⁹ Moreover, members use the forum sometimes as a type of local bulletin board (e.g. 'my cat is missing'), and sometimes as a debate space on issues such as historical archives or local community concerns (e.g. raising awareness of buildings in risk of demolition, regeneration and gentrification processes in certain areas, etc.). The group is also a space for off-line socialization as members have used the forums to arrange meet-ups and photography excursions in Hackney (socio-spatial practices).

The visualization of Hackney Group's dataset shows significant differences in the spatial distribution of objects that may help us infer different media practices at play. In a relative comparison with Flickr's aggregated data for Hackney, objects in Hackney Group's dataset are less concentrated and arrange into more clusters (fig 6.13). This visual pattern is corroborated by the spatial statistics. The average nearest neighbor distance index (a measure of clustering) for the aggregated dataset is lower than for the group dataset (annex 5). Meaning that the spatial pattern presents more clustering in the aggregate dataset while, conversely, it is apparent more dispersion in the group dataset. In the visualization of Hackney's aggregated data hotspots are more spatially concentrated around the same zone (Shoreditch, Hoxton and Bricklane), whereas in Hackney Group's visualization the annotations are more distributed covering larger areas in Hackney, including more

²⁹ see: <http://www.flickr.com/groups/hackney/discuss/12847/> and <http://www.flickr.com/groups/hackney/discuss/116875/>

annotations outside of the main streets, and hotspots forming in more diverse zones (Dalston, Stoke Newington, Haggerston, London Fields, Hackney Central). Hackney Group thus displays a different field of visibility that illuminates certain places (and perhaps different aspects of places) that may remain obfuscated by the sheer volume of the aggregated annotations.

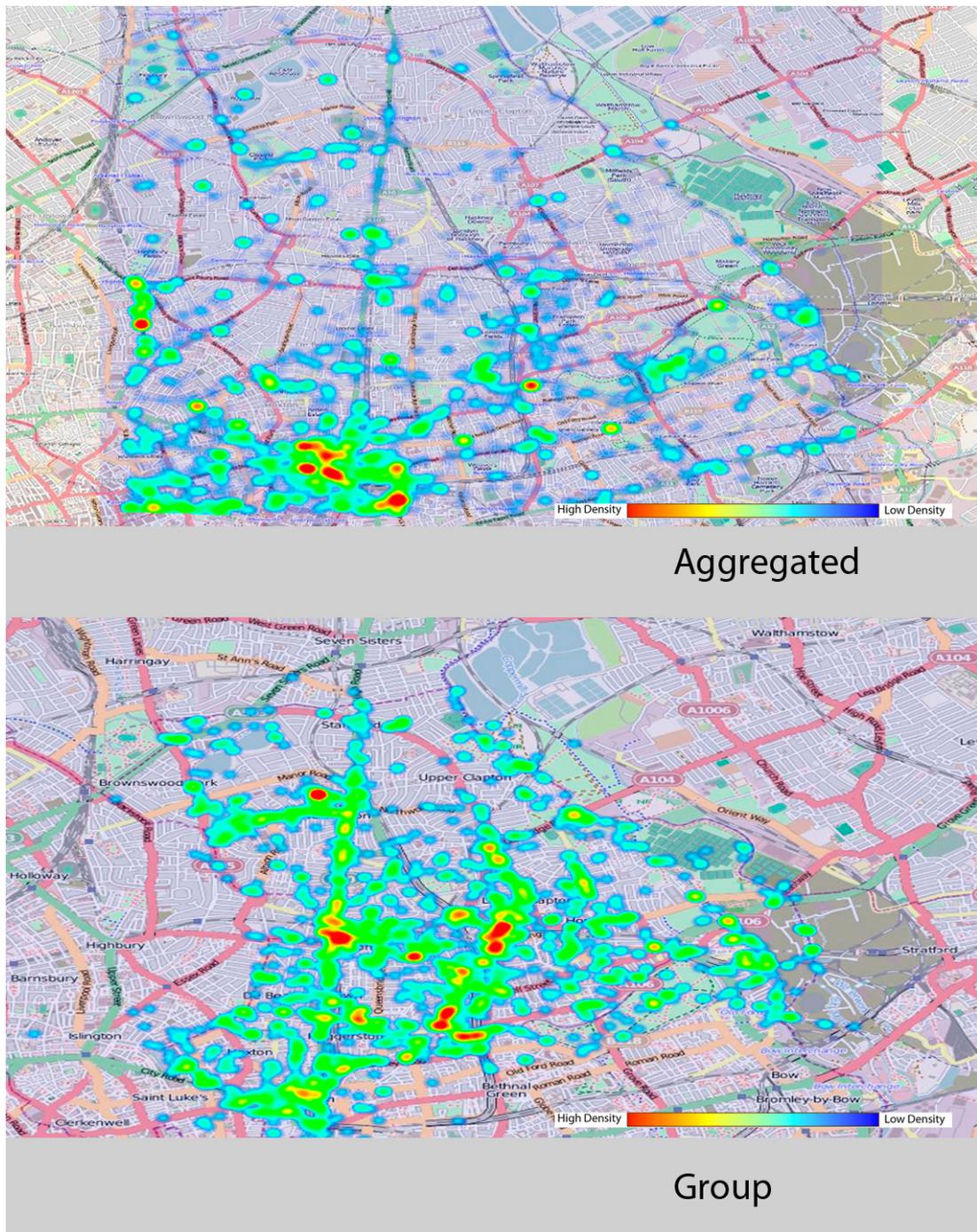


Fig. 6.13 Hackney - Aggregated Data Vs Hackney Group Comparison.

The hypothesis proposed to explain such a difference in spatial distribution considers different communication practices driving the annotations. Drawing from Erickson's ethnographic study on geotagging usage (2009), I claim that the predominating communication pattern in Flickr is characterized by the presentation of the self in place ('self-in-place' broadcasting in Erickson's vocabulary), where the communicative intention in geotagging rests on the activity of the user rather than on the particularity of the place. Hence annotations on the aggregated map cluster heavily around the more vibrant areas of East London in terms of social activity and population flows (bars, clubs, shops, restaurants, cafes, etc.) (Shoreditch, Hoxton and Bricklane). On the other hand, as the analysis of geotagged-driven groups suggested, groups promote collective forms of knowledge production about places (80% of groups are composed by more than 10 people). In this sense they tend to be about documenting the identity of places instead of the identity of the photographer. In 2006, when Flickr incorporated geotagging as an in-built functionality a Hackney Group's member reacted to the new feature in this way:

This is so cool, I just went a bit obsessive on it, focusing on locating my Hackney shots, so an awful lot of the group map pix are mine, I'm afraid. Hope other members will put theirs on it, I like the idea of the picture of the borough that might build up (Flickr Hackney Group).

Another line of enquiry to be considered is to explore what geocoded data could tell us about mobility flows in Hackney. Jahanbakhsh and King (2012) used Flickr's database of geotagged photos to develop an algorithm that employs clustering techniques to predict a given user's likely place of living. The researchers found a power-law in the distribution of geotagged content according to which users are more likely to take photos close to where they live. Although the level of geographical granularity that the algorithm is capable of predicting is low, this research seem to validate other studies methodologies that used location metadata extracted from Flickr's photos as a proxy for population mobility (Girardin et al., 2008a, 2008b).

To explore mobility patterns by following the flows of geocoded information, a spatio-temporal visualization of Hackney dataset was produced for the period August 2007-August 2010. Firstly, we can see in the visualization how Shoreditch and Hoxton, which concentrated the majority of objects by 2007, consolidate by 2010 almost as a monolithic hotspot, becoming even more prominent with respect to the rest of the distribution (fig. 6.14). Secondly, the visualization exposes a directional trend to the spatial distribution of objects. From 2007 the distribution spreads eastwards whilst new spatial clusters appear. New high concentration clusters (hotspots) are formed in Dalston, Hackney Central, London Fields, Hommerton and Hackney Wick. The visualization also shows the formation of clusters in Bethnal Green and Bow, though these neighbourhoods do not belong to Hackney. Whether these spatio-temporal changes in the distribution of annotations may correspond to neighbourhood migration flows or local tourism flows cannot be directly determined from the data. In any case, the influence of tourists' annotation in the final shape of the distribution, I claim, should be less significant than for other more central areas of London. This is because with the exception of Shoreditch, where the predominance of local photos is contested by visitors', Hackney at large (up until 2010 when the sample was taken) remains predominately geotagged by Flickr's local photographers (fig. 6.15).

Furthermore, interestingly, and adding to the observation of recurrence of art-related tags in Hackney's annotations, the resulting spatial pattern (i.e. distribution of clusters) corresponds to the location of the so-called 'creative clusters' of East London. To further explore this correlation it is worth looking at the borough's cultural economy. By 2005, according to an official survey, Shoreditch concentrated the higher number of cultural businesses in Hackney (fig. 6.16). As it was noted above, this neighbourhood aggregated also the highest number of geotagged objects by 2007. More recent data shows another mapping of culture, this one based on cultural production rather than on the provision of cultural services (cultural consumption). By 2009 the major concentration of creative spaces was located in Hackney

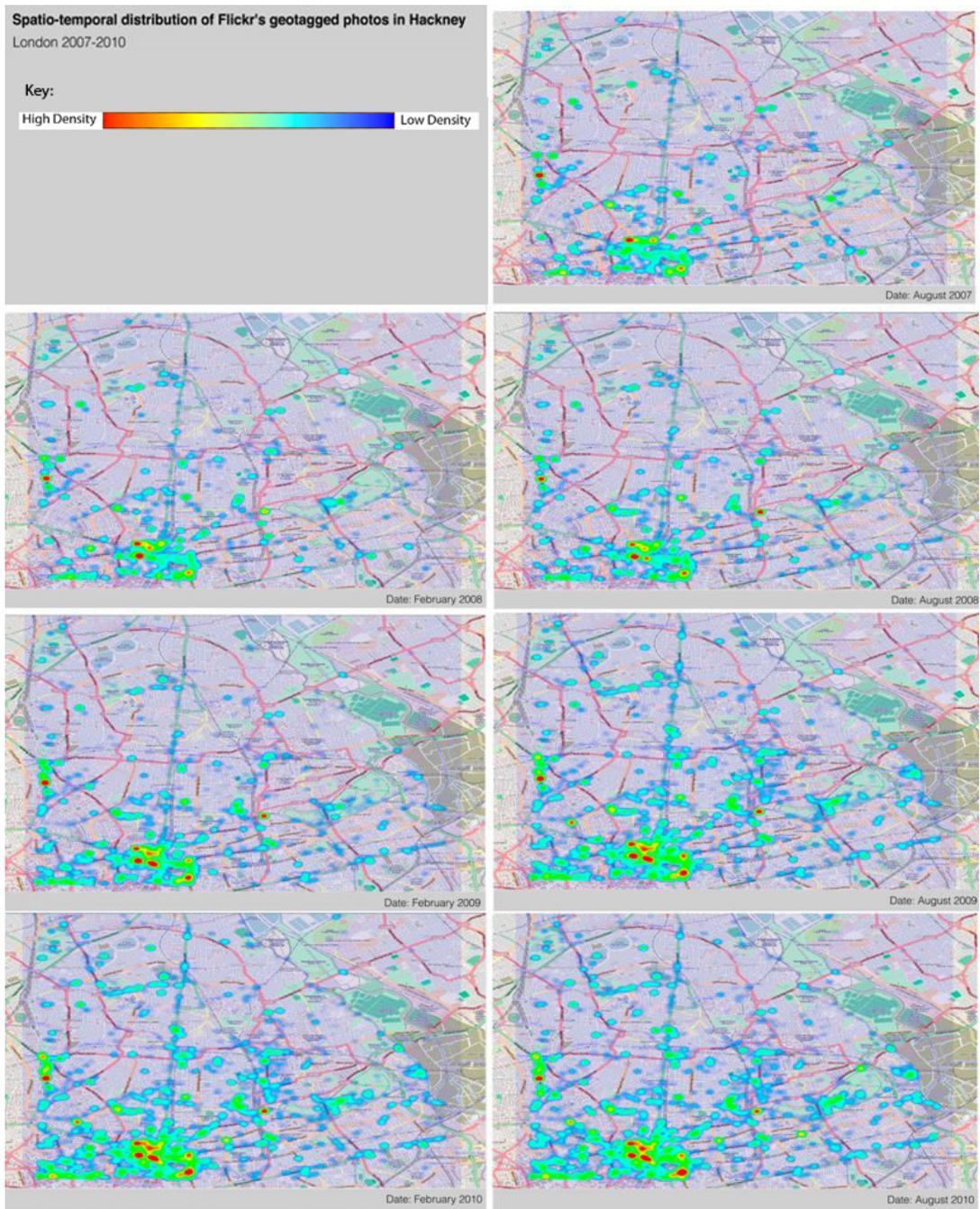


Fig. 6.14 Spatio-temporal distribution of Flickr's geotagged photos in Hackney (2007-2010)

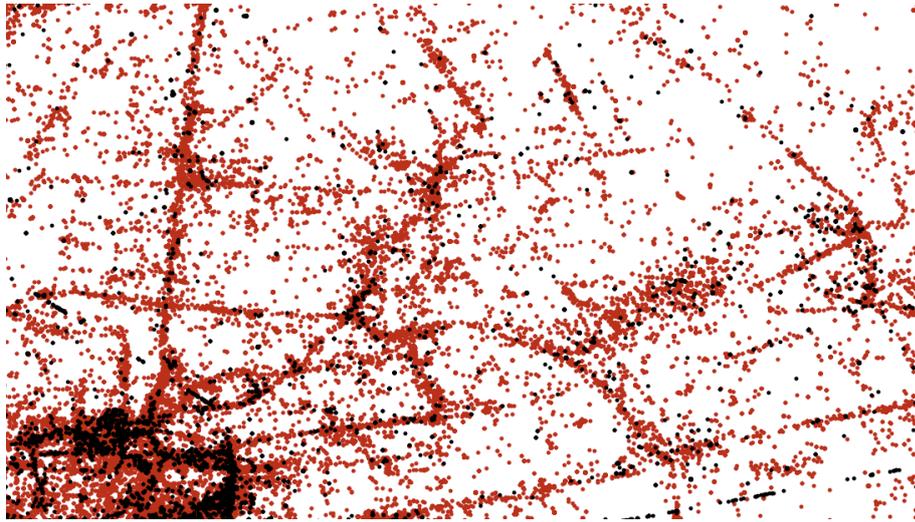


Fig. 6.15 Spatial point patterns: Locals vs Tourists comparison (Hackney detail).

Wick (610 studios, some of them housing also galleries), with a second major concentration in Dalston (300) (Muf architecture/art llp, 2009). It has been documented that over the last decade artists have been occupying these area of East London attracted by big working spaces (former industrial buildings and warehouses) and cheap rents. Between 2006-2008 Hackney Wick experienced a 'marked rise in the number of artists' studios and creative workspaces'. 'There must be at least 1,000 artists in the area', a report quotes an interviewed letting agent (NFASP, 2008). This population flow corresponds with a parallel increase in the volume of spatial annotations for that area. While in 2007 Hackney Wick was slightly annotated, by 2009 it already formed a significant cluster. The subsequent rise in cultural production along with other cultural activities (e.g. the Hackney Wicked Festival that took place for the first time in August 2008) brought about by the increasing creative workers migration to the zone are likely contributing factors to such concentration of geotagged media in an otherwise largely industrial area (fig.6.17). Another final noteworthy finding in previous research was the identification of a mobility pattern in creative workers between Hackney Wick, Homerton, and Dalston, reinforced by the transportation system (London Overground line) (Muf architecture/art llp,

2009). Several creative workers have their workspaces in Hackney Wick but live in Dalston, Hackney Central, and Homerton. All these places correspond to hotspots of geotagged content as well.

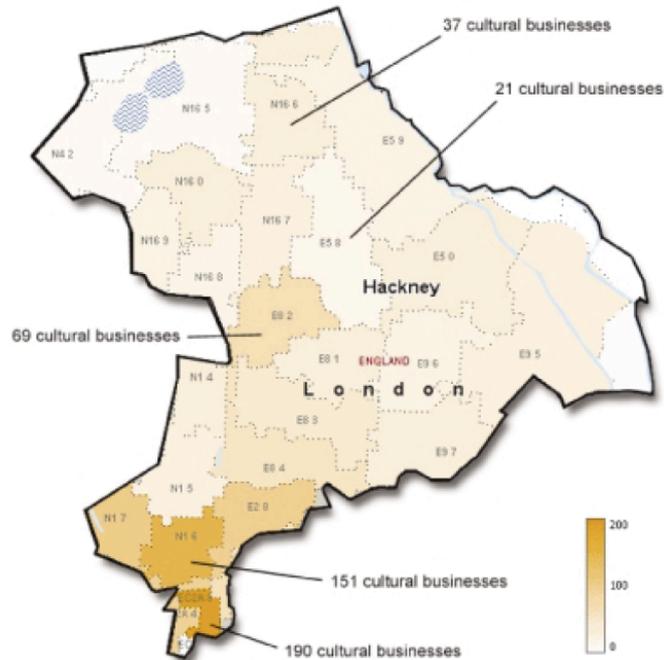


Fig. 6.16: Map of cultural and creative industries in Hackney (2005). Source: Creative Hackney Policy: A Cultural Policy Framework for Hackney.



Fig. 6.17 Map of Hackney Geotagged content - Hotspots. Hackney Wick Detail.

Shoreditch as the hub of cultural services and cultural consumption and Hackney Wick and Dalston as the hubs of cultural production seem to be areas where this correlation between clusters of Flickr's photos and 'creative clusters' is more likely. However this correlation is also replicated in other more residential areas of Hackney. To illustrate, for the Hackney District area the main clustering occurs in places of cultural production (galleries and artists studios) (fig. 6.18). Overall, this is the case for the main hotspots identified in the dataset (Shoreditch, Dalston, Hackney Central, London Fields, Himmerton and Hackney Wick). It can be argued therefore that the geography of 'creativity' in Hackney overlaps significantly with the geography of Flickr.

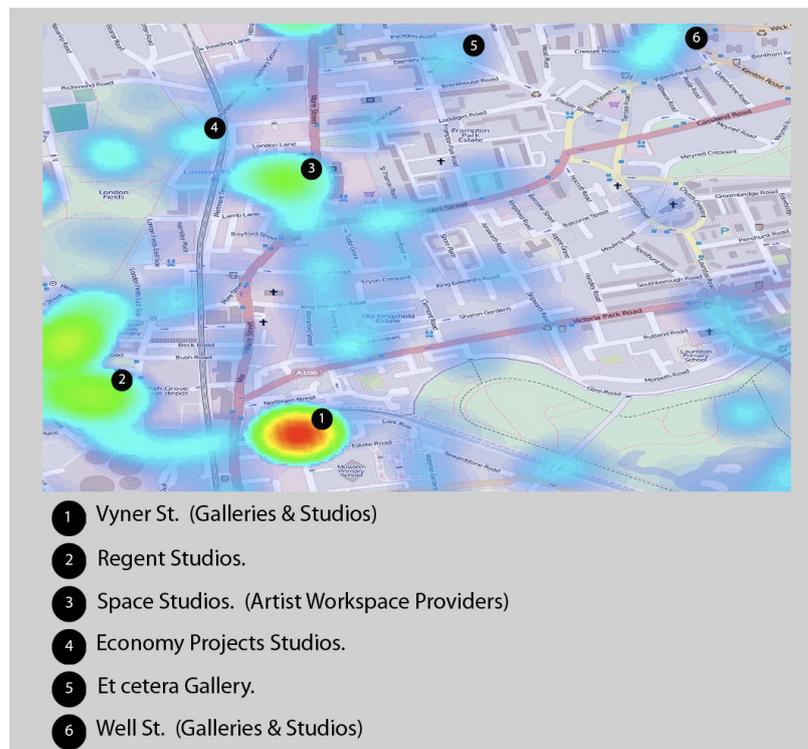


Fig. 6.18: Map of Hackney Geotagged content - Hotspots. Hackney District Detail.

Continuing with the discussion of Hackney's cultural economy another important aspect to consider in Flickr's data is the Olympics taking place in

the summer of 2012, of which Hackney is one of the hosting boroughs. Even though the Olympic Park has been closed to the public since 2007, at least some of the annotations distributed along the canal in the Hackney Wick area can be claimed to be shots of the Olympic Stadium, located right at the east side of the canal (fig. 6.17). Flickr has two major groups devoted to the Olympics: 'Celebrate London 2012' and 'London2012'. The former was created by the user 'London 2012 Official' mainly to document the celebration of London's winning bid. The group has had little activity since then. The second group is an independent group, part of Hackney Group network, that remains active in documenting the event. London2012 Group's statement reads: 'The first and largest on Flickr—an independent, quality moderated pool of London Olympics photography. Includes construction, social commentary, and local insight'. In the first post on the forum a member asserted the following: 'It will be good to see the changes that take place in East London through the pictures submitted to this group'. The group has not only since its inception registered the development of the Olympic park, but it has also registered the social friction a project of such magnitude could create in an area. Its forums have included discussions on the Olympic Legacy Masterplan, the securitization of the area and the prohibition of photography, and the use of the Olympic logo in the group as copyright infringement, as well as documenting the local community hostility to the project through photography (composed as it was pointed out mainly by creative workers).

Although the group does not promote a particular political position with respect to the Olympics ("this pool is not a promotional vehicle—neither for the group admin's photography, nor the agenda of any organization," the group administrator states), political commentary is manifested in the discussions, the photographs and also through annotations. This is visible in the group's tag cloud that lists what arguably could be considered politically charged tags: 'protest', 'demolition', 'regeneration', 'gentrification' (fig. 6.19). Mapping the tag pair 'regeneration-gentrification' sheds light on the politics of place that surfaces here.

London2012 / Pool / Tags

2010 2011 **2012** 2012olympics 35mm allotments andrew andy architecture archive arena art
artist basketball blackandwhitephotography blackwhite blue bowbackdrivers bridge britain building
cameraphone canal canon capital centre city cityscape colour composite condemned
construction crane cranes demolition digital e15 east eastlondon england eu
europe europeanunion games gentrification geotagged graffiti greatbritain
greenway hackney hackneywick industrial innercity kids landscape lea leavalley lee
london london2012 londonist londonolympics londres lowerleavalley
matthewcoleman newham nikon olympiad olympic olympicgames olympicpark
olympics olympics2012 olympicstadium orbit park power protest public regeneration
river road rodinal site sir sport stadium stratford streets time towerhamlets trafalgarsquare uk
unitedkingdom urban valley velodrome wick wilkes work zone

Fig. 6.19: London2012 Group - Popular Tags (February 2012)

The visualization shows how the 'regeneration' tag maps out certain zones in different parts of London that may have undergone processes of urban renewal during the period (2007-2010). However, the only zone in London where the 'regeneration' tag overlaps with the 'gentrification' tag is East London, and particularly the Olympic area (Hackney Wick, Stratford, Temple Mills, Hackney Central and Bow) (fig. 6.20). Regeneration, it is important to note here, is a problematic and politically contested term. Regeneration and gentrification are often used interchangeably depending on the respective political view. Accordingly, regeneration is either consider a form of urban policy that aims to tackle social problems injecting capital in disinvested areas, or it is understood as a neo-liberal form of governance of urban space that pursues the privatization of housing and the commons at large (public space, culture, community, forms of life, etc). In the latter case it is commonly associated with gentrification processes. Thus, the spatial annotation of Hackney with the 'gentrification' tag may be taken as signalling social struggle over space. The conflation of these tags in this particular area exposes therefore a contested urban imaginary between the utopia of social regeneration and legacy and the dystopia of a gentrified post-Olympic Hackney.

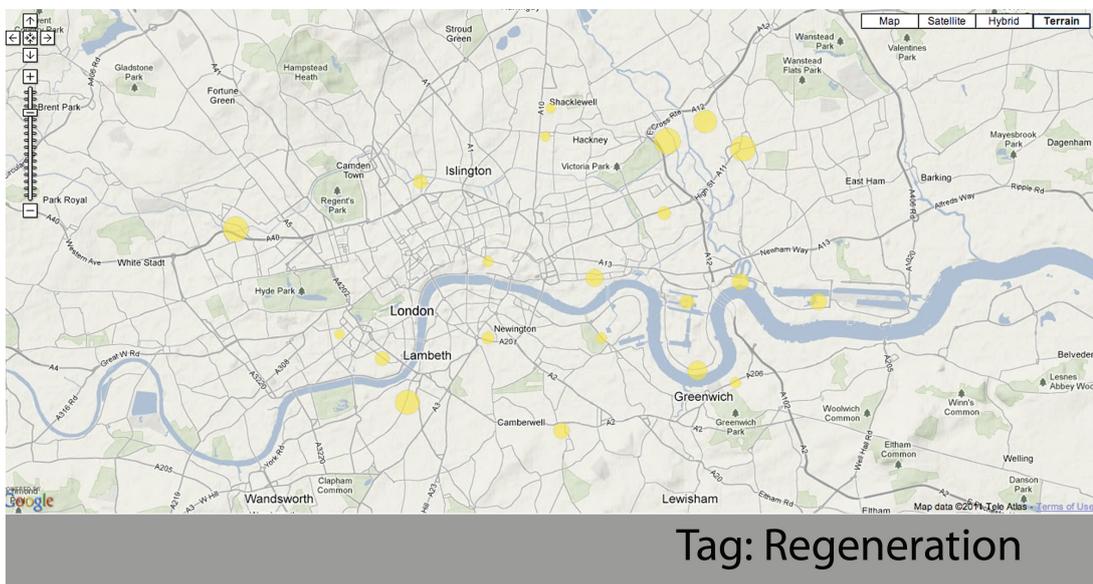


Fig. 6.20: Distribution of Tags: Gentrification Vs Regeneration (dot density maps produced with 'Where What When' application).

Furthermore, Flickr's geography of 'regeneration-gentrification' coincides with the real state market property valorisation projections in London, which concentrates precisely in the Olympic area and the hotspots of Hackney identified here (fig. 6.21). In this respect, London is a case study of implementation of culture-led urban regeneration policies. In 2004 the London Development Agency (LDA) launched the Creative London program to harness culture in order to stimulate and develop the city's economy. 'The

idea that culture can be employed as a driver for urban economic growth' (Miles and Paddison, 2005) is what basically motivates this discourse of the 'creative city' (Florida, 2002). In the Creative London program framework, David Panos points out, it is central the establishment of 'Creative Hubs' across the city. This strategy implies, Panos quotes LDA's head of Creative Industries, 'identifying the areas where [...] there is potential to really consolidate a cluster of activity that might have started to emerge and then dramatically growing that local economy through the creative business sector.' (2004). By way of illustration, in the Local Development Framework for Hackney Wick (2012), under a section entitled 'Shaping Local Character', the document outlines a regeneration policy in regards to how to develop the area into a 'Creative Hub'. 'The Hub' design principles, the document states, include among others points that Hackney Wick should "be the heart of a creative 'hot spot' that will underpin the expansion of East London's flourishing creative and cultural sector", and should also 'support and make strong links to the infrastructure of the Olympic Park'. The document follows prescribing that 'opportunities for public art should be provided throughout the Hub and local artists should be encouraged to use the public realm for exhibition of their work whenever possible' (London Borough of Hackney, 2010). In this process life as such, that is, the creative energies and subjectivities of cultural workers and local communities are put to work to valorise space. As Hardt and Negri well put it,

[...] In the biopolitical economy there is an increasingly intense and direct relation between the production process and the common that constitutes the city. The city, of course, is not just a built environment consisting of buildings and streets and subways and parks and waste systems and communications cables but also a living dynamic of cultural practices, intellectual circuits, affective networks, and social institutions (2009, 154).

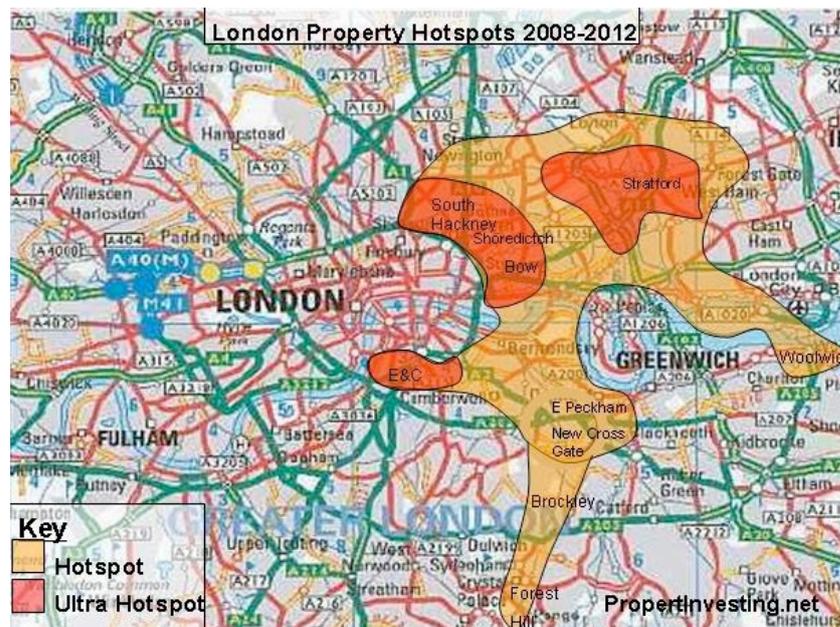


Fig. 6.21 Map of London Property Hotspots 2008-2012. Source: ProPERTinvesting.net

From this perspective, I propose that the correlations found between geocoded data and the cultural economy of the city should be read within the broader frame of the relationship between cultural production and value production that, as I pointed out here, is at the core of contemporary neoliberal urbanism models. This reading will be unfolded in a following chapter.

Finally, having traced the patterns in the distribution of spatial annotations in Hackney (period 2007-2010), and its correlation with the cultural economy of the area, I think it is still important to temper these findings in the light of the limitations on the representativeness of Flickr's demographics. Even so, there is at the same time supporting evidence (i.e. prevalence of art-related tags in Hackney) that such demographics, at least in the case of Flickr's users annotating Hackney, might be composed significantly by cultural 'prosumers'. In which case the use of geotagged media to map the geography of 'creativity', and consequently mapping the close relationship between cultural production/consumption and urban processes should not be dismissed.

Chapter 7

Discussion: Geocoding and the production of governable places

7.1 The Order of Places: The world as a database

To govern, it is necessary to render visible the space over which government is to be exercised. Rose (1999).

From the national postal service to the public telephone to the license plate on every registered vehicle, media are at work replacing people with their addresses. Kittler (1996).

The phenomenon of user-contributed geocoded data has been conceptualised, mainly within geography and cartography disciplines, as 'volunteered geographic information' (VGI) (Goodchild, 2007a), 'neogeography' (Turner, 2006; Graham 2009; Haklay et al. 2008), 'GIS 2.0' (McHaffie, 2008), and 'wikification' of GIS (Sui, 2008), or more widely the geoweb. Regardless of its denomination, what interests me here is the knowledge politics at play in this phenomenon. The proliferation of user-produced spatial annotations embodied in the figure of the 'citizen sensor' (Goodchild, 2007) - an avatar of the so-called 'prosumer' - has been framed as coded production of local knowledge. Further, it has been argued that VGI marks an 'historical return to artisanal local knowledges' (Crampton, 2010, 22) previously regarded as not scientific and consequently veiled under the modern cartographic gaze (Crampton and Krygier, 2005).

In this respect, the case studies demonstrated that both the technology and the practice of geocoding are articulated with the specific technical, informational, cultural, and commercial dynamics (Langlois et al, 2009) of platforms, which demarcate fields of visibility that allow just certain (local) knowledges to be legible. In the Flickr case study we observed that despite

the production of a rich variety of local knowledges the way these local annotations articulate within specific technical systems of sorting and categorisation may render those knowledges obscured. Secondly, since Flickr's algorithm is driven by the economy of attention, what should be regarded as local knowledge is not indigenous proper for certain highly annotated areas in which visitors' annotations (and not those of locals) are prevalent and hence more visible. Another problematic dimension of coded local knowledge is that articulated within the economic logics of platforms, as the Google case showed, it is reformatted as reviews, opinions (sentiment summaries), recommendations, and ultimately as advertising in a process of commodification. This raises fundamental questions, what local knowledge is actually rendered visible? and what counts as local in locative media? It is necessary therefore to advance a critique of the idea of 'local' in the context of the current proliferation of location-based services. Local may be considered along another set of concepts that compose the Web 2.0 discourse (e.g. open, free, social, transparency, cloud, etc.), which are often used by Internet companies to preempt criticism and obfuscate the material conditions of production, whilst promoting the frictionless worldview of informational capitalism.

Thus, in order to understand the politics of knowledge at play in locative media we need Kittler's supplement to Foucauldian discourse analysis. That is, interrogating how the rules that govern knowledge depend also on modes of technical inscription and ways of archiving and processing those inscriptions, that is, on the specificity of media-technological affordances. In this light, the question is what spatial annotations (inscriptions) are selected by a socio-technical system (in Kittler's terms 'discourse network' or system of notation).³⁰ In a similar vein, Miller and Rose suggest that a politics of knowledge, and even further, I argue, a governmentality analysis of inscriptions, should devote 'attention to the particular technical devices of writing, listing, numbering and computing that render a realm into discourse

³⁰ Kittler understands discourse networks as 'the network of technologies and institutions that allow a given culture to select, store and process relevant data' (1990, 369).

as a knowable, calculable and administrable object' (Miller and Rose, 1990 cited in Rose-Redwood , 2006, 475).

To Rose-Redwood the establishment of an architecture of address, namely house numbering, and later on ZIP codes (post codes) in the twentieth century, permitted the standardization of space necessary to make it legible and inscribable. Coordinated sequential numbering, and its abstract form the 'coordinate grid', made possible by affixing specific numerical addresses to individuals enabling thus a more efficient government of the population by securing locatability and improving the efficacy of governmental practices such as taxation and collection of census data (Rose-Redwood, 2006b).

The author also identifies an important relationship between the implementation of house numbering and the emergence of the city directory in nineteenth century America. In its standard form the first city directories were alphabetical indexes of residents (including names, addresses and even occupations), organizations and public buildings with a business listing section at the end. Most versions included also a map, a street index and local history of the city. As Rose-Redwood puts it, the city directory was the 'index to the geo-coded city-text' (2006b, 112). Interestingly, Rose-Redwood found that in many U.S. cities it was actually city directory publishers rather than local authorities that promoted and even carried out themselves through door-to-door census the practice of numbering houses. The city directory was initially a profit-driven enterprise, carried out by private entrepreneurs, often real estate agents or book publishers, who were founded by the city's business community through a dual model of advertising and subscription. The city directory became an instrument of economic efficiency, a form of valorization of time, for house numbering reduced the time needed to locate businesses and carry out commercial transactions, accelerating thus the circulation of capital (2006b, 124-126). As a technology for the economic government of city spaces, therefore, the standardization of space brought about by house numbering can be regarded as a means of the capitalist production of space.

This genealogy of the geocoded world, and particularly the connections between the implementation of the new technology of house numbering, the emergence of the city directory, and modes of economic government of the city is important in order to draw a parallel with our current location-driven media and identify possible transversal relations. The origins of contemporary local/location platforms, particularly those based on local advertising (e.g. Google Places, Facebook Places, Foursquare), could be traced back, I claim, to the eighteenth and nineteenth centuries with the geocoded alphabetical indexing of the city in the form of directories. If, following Rose-Redwood, the city directory was the 'index to the geo-coded city-text' (2006b, 112), local listings databases such as Google Places would be the equivalent of an index of the geotagged city. There are indeed parallels well worth pointing out. Both forms of media are marketing technologies inasmuch as they both profit on visibility in the listings, mainly through selling advertising services. City directories functioned also on a subscription based model, but since in most cases even those businesses that did not pay subscriptions were still listed, a way of highlighting subscribers was listing them with capital letters (Rose-Redwood, 2006b, 114). As the Google case study showed, local/location platforms introduces a new development on this model by capitalizing also on the visibility of users, rendered visible to marketers through access to data analytics and direct monitoring (location-targeting).

In spite of these continuities, the places databases upon which local/location platforms are built upon represent a rupture in the mode of indexation. Firstly, digital geocoding of media objects extends spatial indexation beyond text (lists of people and places names) to include a wider array of media. Secondly, and this is a more fundamental difference, places databases allow the informational indexing of space as such, making possible for users of mobile location-based services, for example, to access location-specific information. Places databases, I argue, should be regarded as a new technology of address that works by assigning an unique place identifier to a specific point location in a database, allowing this way its association with a

potential myriad of datasets. To illustrate, in the case of Google places database a given place may be linked to user-generated geotagged media, websites, reviews, recommendations, wikipedia articles, etc. "Addresses—Kittler contends—are data which allow other data to appear' [...] 'Addresses, literally, create channels.' (Kittler, 1996). In this sense, places databases set the conditions of possibility not only for the circulation of new flows of information, but also the circulation of people and commodities. Hence, if other technologies of address like house numbers and post codes allowed marketers to identify potential markets and reach consumers more effectively through mailings for example (Goss, 1995b, 133), similarly, the places database opens up space for new forms of addressing and hence economic government. These technologies of government, some of them already identified in the Google case, will be discussed in more detail in the next chapter.

In the case studies two different types of places databases were considered, each entailing a different form of spatial categorization: geographical or topical. The main current location-enabled, social media platforms use either one of these types (Table 2). Whereas Flickr's locative functionality uses a geographic taxonomy to index geotagged media (e.g. Europe > UK > England > London > Soho), Foursquare and Google categorize places employing topical taxonomies (e.g. Nightlife > Music Venues > Jazz Clubs). Geographical taxonomies are characteristic of GIS spatial databases. Topical taxonomies, on the other hand, have their direct predecessor in the yellow pages system of categorization. The first generation of online local search engines (Google Local, Yahoo! Local, AOL Local Yellow Pages, etc.) all shared this spatial vocabulary populated largely by business categories (e.g. shops, bars, restaurants, etc.). In Google, for instance, the commercial bias of its places databases taxonomy can be found in the very technical language of its local listings technology patent, in which spatial entities are denominated as 'enterprises' (Google Inc., 2012b). Or it will suffice to look at the level of granularity of classification for commercial entities vis-à-vis non-commercial in Foursquare. For the category of 'Home/Work/Other', for

instance, which comprises types of public and residential places, there exist 14 subcategories, whereas one single commercial category 'Food' has 78 subcategories (<https://api.foursquare.com/v2/venues/categories>). One noteworthy difference with the Yellow Pages industry standard categorization though, which represent a significant evolution in the nature of these 'local' lexicons, is that in social location platforms the vocabularies seem to show an evolution towards more user-friendly categories more centred on human activities and lifestyle consumption, rather than designating mere business services. For instance, Foursquare's place taxonomy includes categories such as 'Nightlife', 'Great Outdoors', 'Gay Bar', 'Dog Runs', etc.

Places APIs							
Provider	Name	Place Type	Place Identifier	Data Standards	Place Search Results	Check-in	Add Place
Yahoo	Yahoo Geoplanet API	Places	WOE ID	XML, JSON, GeoJSON	Name, Type, Location	NO	NO
Foursquare	Foursquare API	POIs	VENUE ID	JASON, JASONP	Name, Type, Location, Contact Info, URL, Statistics, Specials, Tips, Tags.	YES	YES
Twitter	Twitter Places API	Places / POIs	GEO ID	JSON	Name, Type, Location	NO	YES
Facebook	Facebook Places API	POIs	Numeric ID	JSON	Name, Type, Location	YES	NO
Google	Google Places API	POIs	Place ID	JSON, XML	Name, Type, Location, Contact Info, URL, Icon, Ratings	YES	Yes (Requires approval)

Table 2. Places APIs technical specifications

Another line of enquiry to be considered is how places are conceptualized in these ontologies. It is crucial to stress the fact that a spatial ontology is always a 'way of describing spatial entities from one perspective or knowledge system' (Schoorman, 2009, 377). Taking as a reference the World Wide Web Consortium (W3C) guidelines on representation of spatial data on the Web (W3C, n.d.), places databases can be said to be composed of one of the following basic types of spatial entities: locations, places or POIs (Points of Interest), or a combination thereof. 'Location' is a 'geographical construct' defined as a 'physical fixed point' that persists over time. The category 'places' designates large scale 'administrative constructs' (e.g. neighbourhoods, cities, regions, etc.) structured according to spatial relations (e.g. parent, children, neighbours, belongs to, etc.). Finally, a POI is defined as a 'human construct, describing what can be found at a location'. The category is 'used to refer to business locations and tourist or well know sites and locations'. Scale is important to differentiate POIs from places, the former referring to a finer level of spatial granularity compared to the latter. Another important distinction is that POIs are not strictly fixed to a unique location. That is, they can move as the social use of a given location changes. For instance, when a bar is relocated and takes with it its social activity to the new location. POIs have therefore a temporal dimension. Hence, to continue with the example, when a new business opens in the bar's former location a new POI is created accordingly. Due to this dynamic condition some location platforms built upon POI-based places databases allow users to create, edit and add POIs (Table 2). In the case of Google, for instance, we saw how users (business owners) are made responsible for administering these data under a specific set of protocols. Crowdsourcing here is aimed at outsourcing the amount of labour that maintaining an always changeable POI places database necessitates. Think of the sheer quantity of businesses that may close or open in a single day worldwide.

POIs comprise a different regime of authentication for places. In the world represented in POI spatial ontologies there is no such thing as nameless places, 'public street', 'the commons' as such. Every spatial entity has a

name-address(es) pair. In this sense, the POI ontology mirrors the worldview of neoliberal urban politics of privatization and disappearance of public space (see: Brenner and Theodore, 2002; Sassen, 2000). Authentication metadata for POIs may include name, current location, category, address, telephone, email, social media accounts, URI, etc. and essentially an unique place identifier. Authentication serves primarily to link information to places. This way place unique identifiers technically enable the association of data such as media annotations and visitation data with a given locale in a database and, critically, at a fine level of spatial granularity. Therefore, POIs-based places databases are structural in the implementation of certain services that require to be built on top of this kind of data. Google is one example of this, providing marketing services for local businesses based on demographics and visitation data (e.g. loyalty marketing, offers, coupons, etc.), and local advertising that uses the data mining of the connections between places and people to fine-tune targeting. Both marketing services and local advertising are the main pillars of the current location-based services business model. Here the production of abstract space is therefore directly linked to the circulation of commodities and capital accumulation processes (Lefebvre, 1991, 53-59).

Following Bernard Stiegler, the production of metacategorizations via metadata directly facilitates processes of grammatisation (Stiegler, 2008). To Stiegler, grammatisation refers to the 'technical processes that enable behavioural fluxes or flows to be made discrete (in the mathematical sense) and to be reproduced' (Stiegler, 2012). Throughout the case studies we identified the different ways in which metadata may serve to grammatise the articulation of social relations and space. In this process of grammatisation of social space Google crawls the Web for all sorts of georeferences to assemble place listings (place pages). Similarly, Flickr employs geotagged media objects, tags, groups and attention metadata. And Foursquare utilises mainly check-ins. All those elements, geotagged objects, reviews, check-ins and so on, that is place metadata, become place attributes in these geoindeces.

The importance of such grammatisation of space resides in that it makes possible the mathematization of the interaction between people and places, rendering social space thus subject to computation: ranking (local search), profiling (geotargeting), collective filtering (recommendations), etc. Similar to the way the technology of house numbering produced the abstract space of the coordinate grid, the grammatisation of social space and subsequent organization in places databases produces its own form of abstract space: the 'place graph'. Place graph is a concept that I adopt here from some location platforms—Where and Foursquare in particular—that use it to designate the data model representing how different places and their respective attributes (place metadata) are related. As Lefebvre remarks, an "abstract space functions 'objectally', as a set of things/signs and their formal relationships" (Lefebvre, 1991, 49). For instance, Foursquare's place graph is a network diagram composed of nodes: POIs, connected by different signals or edges: flow (how often people move from one place to another), co-visitation (how often a person visit the place and how many people have been to that place before), place category, or recommendations. To Foucault, after Galileo's opening up of space to infinity, localization can only be determined by 'relations of proximity between points or elements' described as 'series, trees, or grids' (1986, 23). Unlike the coordinate grid, though, the place graph is a dynamic configuration of the 'cluster of relations that allow [places] to be defined' (Foucault, 1986, 24): fed back in real-time with every new spatial annotation, continuously remapping the whole city according to mobility flows and social desire (attention). Borrowing from Thrift, this is the diagram of a world 'based on continuous calculation at each and every point along each and every line of movement' (2004, 583).

Nonetheless, why is it important how data is indexed spatially? And further, why is even important how space itself is categorized in these socio-technical systems? For a spatial ontology is a system of categorization and ordering of space it presupposes a model of the world. That is to say, it embodies an ordering that is always a product of a specific 'way of knowing the world' (Schuurman, 2009, 377). From Wood and Graham's standpoint, 'what

distinguishes human modes of ordering is the presence of worldviews entwined with the implicit strategies, worldview that can be translated into new materialities through processes of ordering' (2004). In this light, the place graph abstracts a world in which space is conceived as a collection of discrete spatial entities (POIs), movable and temporal as they are never completely fixed to one location, connected not through hierarchical spatial relations but through contingent socio-spatial relations always changing in response to the flux of populations and spatial annotations. The place graph, arguably, constitutes today the diagram that best represents the intersection between the accelerated dynamism of spaces of consumption in the capitalist city and the digital networked media ontology of flows and personalization (including localization), and hence a main site of interrogation of what forms of modulation of urban mobility we may be dealing with in locative media.

The mappings of spatial annotation analyzed in the case studies provided evidence of a conformation of different patterns of inscriptions in the city for different spatial ontologies. These results suggest that location platforms that categorize space as POIs have a greater tendency to form clusters of annotations around commercial areas compared to those that categorize place geographically. The argument that I want to put forward is that we should expect locative media platforms powered by POI-based places databases to privilege the visibility of spaces of consumption, and consequently promote a kind of 'publicness' in private places. It is arguably the case that we are witnessing an increasing reliance on different types of location-based services to navigate the city (mobile local search, location-enabled social networking, location-based games, augmented reality browsing, etc.) (PEW, 2011). Granted that, and particularly in those cases that rely on places databases built on taxonomies biased towards business services and lifestyle consumption, we should interrogate to what extent these new 'systems of cardinality' (Stiegler, 2003) constitute technologies to sort and order human activity rather than simply provide (geographical) orientation. Programmed not so much to pursue one's desired destination but

to anticipate—or better premeditate (Grusin, 2010)—what this desired destination should be.

Rose-Redwood points out that the first city directory publishers claimed to provide to subscribers the index to the city-text. His historical review of city directories shows how urban space was often compared in the publishers' accounts to a book (a 'ledger') in which serialized house numbers serve as page numbers and the city directory as its alphabetical index (2006B, 101-112). Similarly, it is important to acknowledge—following Manovich—the projection of the ontology of the database onto our imaginings of the city. Thanks to geocoding, the city in location-based services has been rendered archivable and hence available for us to navigate through search. The database, Manovich argues, 'represents the world as a list of items which it refuses to order' (1999, 85). So, put crudely, if the alphabetical index was the mode of ordering in city directories, in places databases (the geindex) this ordering is imposed by the algorithm.

Whilst locative media do not represent a development in geocoding techniques with respect to previous GIS as such, nonetheless, its significance to understand the future shape of the geocoded world resides in the new configurations of their underlying ontologies. Arguably, there is an emergent shift in the modes of categorization of space - particularly visible in location-based services supported by local advertising - from spatial to socio-spatial, from space (geographical space) to place (social space). Which corresponds at a topological level with a move from the grid of coordinates to the place graph.

Places databases offer a mechanism to link our offline and online worlds. In so doing they are central to the mediation of space. The critique of these geindexes underpinning location-enabled communication is important, therefore, because the models implicit to this mediation, how space as such is coded, directly frame what spaces are geo-annotated (visible space) and subsequently what can we know about them (epistemic space). That is, to paraphrase Foucault (2002), places databases produce and naturalize

certain *order of places*. In other words, what information about places is processed, archived and accessed.

7.2 Geodemographics and the rationalization of social space

Information has become the new mapping device that unlocks the city to reveal the inner workings of life, economics, and society in vivid detail. In order to understand, control, and direct market behavior, the proliferation and availability of data on who and where we are has effectively opened up all spaces to statistical and informational analysis, erasing the traditional ways of comprehending space around us (Tsung Leong, 2001, 765-766; cited in Graham, 2004)

Emerging scholarship, particularly in the field of human geography, has explored the relationship between software and space describing the myriad of ways by which code produces everyday spatiality (Dodge and Kitchin 2005; Dodge et al., 2009; Graham, 2005; Kitchin and Dodge, 2011; Thrift and French, 2002; Zook and Graham, 2007). Further, Burrows and Gane have stressed that coded spaces are transforming the nature of social space and, consequently, the space within which 'class, culture and identities play out' (2006, 808). In this light, the case studies evidenced that at stake in locative media is not primarily a geographical mediation of the city but rather a geodemographical mediation, for at play is the sorting of places according to social relations. Building on these findings, the argument I want to put forward is that there is a specific geodemographic ontology underlying the logic of ordering in locative media.

A geodemographic information system (GDIS) can be defined as a technology that combines databases on consumers' data and geographic information systems (GIS) in order to enable 'marketers to predict behavioural responses of consumers based on statistical models of identity and residential location' (Goss, 1995b, 171). These systems are built upon the sociological assumption that location, particularly where we live, signals social and cultural characteristics of a given population. 'Marketers, therefore, conventionally presume that society is spatially sorted by consumption

characteristics' (Goss, 1995b, 171). To Parker et al (2007) these classifications work to further reinforce the spatialization of class that is already inherent to the urban dynamics of class.

The origins of GDIS could be traced back to the end of the nineteenth century with the surveys of life and labour in London (see: Burrows and Gane, 2006; Parker et al., 2007). Back then Charles Booth's poverty maps of London segmented the city into seven categories: wealthy, well-to-do, fairly comfortable, mixed, poor, very poor, and vicious, semi-criminal (1902-1903). Geodemographics' discursive foundations are to be found though in the 1920s with the Chicago School of Sociology's ideas of 'urban ecology' as the city's principle of socio-spatial organization (see: Ashby et al., 2008; Burrows and Gane, 2006; Uprichard et al., 2009). But it was not until the early 1960's, with the introduction of ZIP codes, that demographic data could be associated to spatial data (geocoding). Modern computer-based geodemographics did not appear until the early 1970s, though. The first models basically combined public census data with private consumption surveys to sort populations by postcodes (Philips and Curry, 2002: 143-144; Burrows and Gane, 2006: 794). Even though in its inception this technology intended to serve urban policy purposes, in their current form commercial GDIS produce socio-cultural spatial classifications based on an even wider range of data (consumer credit and purchase data, consumer mailing-lists, life-style surveys, electoral rolls, property valuations, house sell prices, magazine subscriptions, etc.) in order to sort the city into life-style areas to serve mainly market calculations. Those classifications are assigned expressive names to denote lifestyles. To illustrate, PRIZM, one of the main providers of GDIS, uses categories such as 'The Cosmopolitans', 'Simple Pleasures', 'Suburban Pioneers', 'Urban Achievers', 'Young Digerati', just to name a few. These categories basically serve as a matrix to describe consumption patterns.³¹

³¹ It is also worth noting the discourse of globalization and neoliberalisation (gentrification) of the city attached to the worldviews represented in these taxonomies: 'For example, the most prestigious of the inner-city neighbourhood types in UK Mosaic is defined as 'Global Connections', indicating the extent

In the Internet era, geodemographics migrated online and were made available to the public in the form of Internet-based neighbourhood information systems (e.g. upmystreet.com). They basically offer neighbourhood profiles and real estate prices for people to compare. Burrows et al (2005) note that while the images of neighbourhoods were mainly generated before the Internet era by local actors (estate agents, journalists, social workers, etc.), 'Internet-based neighborhood information systems' have rendered possible these images to be Internet-sourced and open to more actors. And this is critical, the researchers argue, because these images have a direct impact both in the life of the neighbourhood inhabitants (e.g. house prices) and in the attitude of other groups towards a given neighbourhood (e.g. local tourism) (Burrows et al., 2005, 1). As such these 'Internet-based neighbourhood information systems' function to divide populations but in a different way traditional geodemographics do. "By making more and more geodemographic information available on-line (some) people are being given express encouragement to 'sort themselves out'" (Burrows and Gane, 2006). For instance, choosing where to live based on fine-grained neighbourhood socio-demographics. In this way Burrows and Gane hint at the potential perils of these technologies in regard to amplifying racial, social and economic divides (2006). The last generation of GDIS already incorporates segmentations based on online behaviour using data from ISP providers. For example, Experian, the prime supplier of geodemographic services in the UK, offers geodemographic profiling of websites' visitors that allows its clients to identify which postal regions send most traffic to their respective websites and compare this with store locations and their customer databases.

to which residents in this type of neighbourhood operate within international rather than national networks. The category 'Cultural Leadership' also nicely distinguishes those classes whose function is to set the political, economic, and cultural agenda of the nation, rather than merely to exercise themselves with the day-to-day management of their operational implementation. The category 'New Urban Colonists' is an explicit description of neighbourhoods which have been subject to a process of gentrification. The term 'Metro Multiculture' conveys the role of a global city as a melting pot. And the category 'Counter Cultural Mix' conveys also the role within the global city of radical intellectual challenge to accepted thoughts and processes' (Webber, 2007, 185).

Contemporary locative media platforms introduce new geodemographic variables. While traditional geodemographics is built on residency, in these platforms households are not the basic unit of consumption any more, instead they include places (POIs). Whereas the household was important because it represented the node connecting people with the marketing network, under this new guise this connection is established instead directly through the mobile phone. In the traditional geodemographic systems framework, 'you are where you live', to borrow the slogan of a geodemographics company (Claritas). In the framework of locative media platforms, where the user's patterns of mobility can be recorded and tracked, 'you are where you go', to borrow this time the slogan of a location platform (Whrrl). This is well exemplified in location sharing: the check-in has less to do with position in space than with what being in a certain place expresses about who you are. To put it in Giddens' terms, 'spatially located activity becomes more and more bound up with the reflexive project of the self' (1991: 147). Paraphrasing Bourdieu (1989), we could think of this operation therefore as the mapping of the 'space of lifestyles'.

In order to further analyze the geodemographic spatial rationality underpinning locative media - particularly local search and social location, the objects of study of this dissertation - I will use a model proposed by Noulas et al. (2011). This model is not a description of any of our current location-based services, nevertheless, it could be considered paradigmatic inasmuch as it concretises what I want to argue are their core geodemographic logics. In a paper entitled *Exploiting Semantic Annotations for Clustering Geographic Areas and Users*, the authors present a model that uses places metadata extracted from a social location platform (Foursquare) in order to produce profiles of geographical areas and human activity. The methodology adopts the same location platform's places taxonomy to create a profile of a given area based on the aggregate of places such area contains and their respective annotations (place metadata). The computer scientists explain the procedure in more detail:

We consider a centre point g within a city and a large square area A . We split A into a number of equally sized squares, each one representing a smaller local area a . Each area a will be a data point input for the clustering algorithm. The representation of a is defined according to the categories of *nearby places* and the attached *social activity* modelled through the number of check-ins that took place at those. In this way not only we know what types of places are in an area, but we also have a measure of their importance from a social point of view (Noulas et al., 2011) (fig. 7.1).

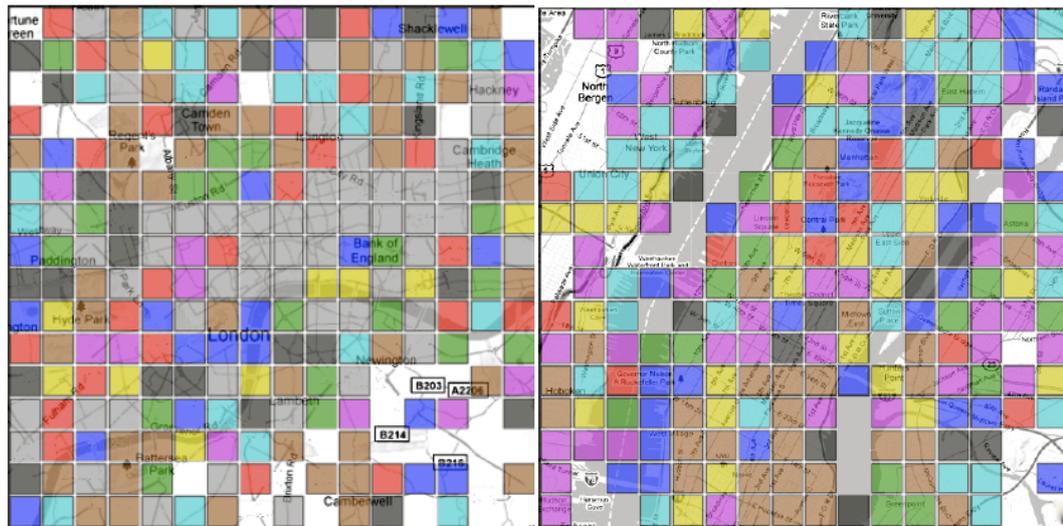


Figure 3: Spectral Clustering visualisation. London (left) and New York (right). Cluster 1: Blue, Cluster 2: Black, Cluster 3: Cyan, Cluster 4: Yellow, Cluster 5: Red, Cluster 6: Green, Cluster 7: Magenta, Cluster 8: Brown, Cluster 9 (London): Gray

Cluster 1(33)	Cluster 2(15)	Cluster 3(35)	Cluster 4(27)	Cluster 5(13)	Cluster 6(16)	Cluster 7(42)	Cluster 8(33)
Parks (0.77)	Home (0.66)	Food(0.57)	Food(0.37)	Arts (0.55)	Nightlife(0.61)	Travel(0.36)	Food(0.42)
Home (0.05)	Parks (0.09)	Shops(0.13)	Shops(0.17)	Parks (0.17)	Food(0.1)	Shops(0.31)	Nightlife(0.31)
Nightlife(0.05)	College (0.06)	Home (0.1)	Home (0.12)	Food(0.07)	Home (0.09)	Food(0.12)	Shops(0.09)
Shops(0.04)	Travel(0.05)	Travel(0.06)	Nightlife(0.1)	Shops(0.07)	Arts (0.05)	Home (0.07)	Home (0.05)
Food(0.03)	Food(0.04)	Parks (0.05)	Travel(0.09)	Home (0.06)	Shops(0.05)	Nightlife(0.05)	Parks (0.05)
Other(0.06)	Other(0.1)	Other(0.09)	Other(0.15)	Other(0.08)	Other(0.1)	Other(0.09)	Other(0.08)

Cluster 1(21)	Cluster 2(23)	Cluster 3(20)	Cluster 4(10)	Cluster 5(24)	Cluster 6(19)	Cluster 7(12)	Cluster 8(45)	Cluster 9(54)
Home (0.54)	Travel(0.37)	Nightlife(0.46)	Arts (0.54)	Food(0.48)	Travel(0.69)	Shops(0.62)	Nightlife(0.44)	Nightlife(0.32)
Food(0.16)	College (0.14)	Travel(0.26)	Travel(0.14)	Nightlife(0.2)	Shops(0.11)	Nightlife(0.11)	Parks (0.29)	Food(0.25)
Travel(0.09)	Nightlife(0.14)	Food(0.11)	Food(0.08)	Travel(0.09)	Nightlife(0.06)	Food(0.1)	Home (0.06)	Home (0.11)
Nightlife(0.08)	Food(0.13)	Home (0.06)	Nightlife(0.07)	Shops(0.06)	Food(0.05)	Travel(0.06)	Food(0.05)	Parks (0.09)
Parks (0.04)	Home (0.09)	Parks(0.03)	Parks (0.06)	Arts(0.04)	Home (0.04)	Home (0.04)	Travel(0.04)	Shops(0.09)
Other(0.09)	Other(0.13)	Other(0.08)	Other(0.11)	Other(0.13)	Other(0.05)	Other(0.07)	Other(0.12)	Other(0.14)

Fig. 7.1: Geodemographic profiling model: London and New York clustering segmentations based on Foursquare's data. Source: Noulas et al., 2011.

Similarly, user profiling is achieved by way of linking people with places through check-ins and correlating them against the places' respective categories, allowing thus for the identification of patterns of co-visitation, that

is, clusters of users that visit similar categories of places (e.g. People who go to X tend to go here) (Noulas et al., 2011).

We can extrapolate a generalizable principle from this model for an understanding of the geodemographic program of locative media: geographical areas may be profiled according to the aggregate of nearby places (POIs) and their respective annotations (place metadata). Equally, people may be profiled in terms of their aggregate relation to places (POIs). This principle contrasts with GDIS in which neighbourhood lifestyle segmentations are formed based on the demographics of the area's inhabitants. The very same geodemographic rationality - 'identify and describe people by place, and vice versa' (Goss, 1995a, 148) - is actualized though through the technological affordances of our current media-technological system: mobility, participation, and real-time. Mobile location-enabled devices and places databases have permitted the sharing and recording of location information and its subsequent data mining for mobility patterns, so replacing the household as the unit of measurement for the POI. In consequence, if traditional GDIS geodemographic bias assumed that social identity corresponds to residency (i.e. similar people live in similar places), under the locative media guise the geodemographic bias assumes that social identity corresponds to spatial mobility (i.e. similar people visit similar places). First GDIS had to assemble data collected from credit bureaus and commercial mailing lists in order to track people's mobility (Monmonier, 2004,146-147). Current location platforms can register mobility in real-time, so the system is fed back continuously with every new user-contributed annotation.

Moreover, unlike GDIS fixed segmentation models, in locative media platforms geodemographic sorting works on metastable orderings (clusters of people and places) calculated by machine learning algorithms (e.g. collaborative filtering or Place Rank). The abstract space at work is fundamentally different. The spaces of GDIS are administrative topographic

grids (Goss, 1995, 148). The place graph, on the other hand, is basically topological. Unlike topography, Mol and Law argue,

[...] Topology doesn't localize objects in terms of a given set of coordinates. Instead, it articulates different rules for localizing in a variety of coordinate systems. Thus it doesn't limit itself to the three standard axes, X, Y and Z, but invents alternative systems of axes (1994, 643).

Accordingly, in locative media platforms space is not measured only in terms of metric distance but articulates alternative metrics. To illustrate, in Google's local search - as the analysis of the Place Rank algorithm showed - spatial entities are not sorted based merely on geographical distance. Distance is also a measure of social relations (i.e. attention value). So the nearest point is not necessarily the closest in Euclidean space. In the topological space of the place graph two physically distant points can be closely connected through social affinity. Distant areas may share a similar geodemographic profile. Even places could be matched at a global scale. For example, an application may find the equivalent of London's Soho in Rome, or may recommend a tourist what places to visit in a city based on the preferences from other cities he/she might have visited before. The place graph, therefore, positions us in geographical and social space at the same time, and in so doing it actualizes a geodemographic ontology.

7.3 The cluster: a diagram of locative networking

[...] The ontology of the computational is increasingly hegemonic in forming the background presupposition for our understanding the world (Berry, 2011, 128).

In order to understand further the geodemographic logic subjacent to present locative media I will borrow the concept of the 'diagram' from Gilles Deleuze. In Deleuze's words the diagram is an 'abstract machine', 'a functioning' 'detached from any specific use' (1988, 34). The diagram, Deleuze explains, 'has nothing to do either with a transcendent idea or with an ideological

superstructure, or even with an economic infrastructure,' nonetheless it 'acts as a non-unifying immanent cause' (1988, 36-37). The working hypothesis is that the form that socio-spatial connections assume in locative media is characterized by proximity, and its corresponding topological pattern is the cluster (or clustered network). For the purpose of the analysis I will refer to this hypothesis as the 'cluster diagram' or 'proximity diagram'.

Clustering classification is by no means exclusive of GDIS. As a matter of fact it is pervasive in our present digital networked media. This mode of classification is constituent of recommender systems (or social-filtering systems) that today shape our cultural consumption (e.g. Amazon for books, Netflix for video, and Pandora for music to list the most relevant ones). Likewise, clustering methods are central in social media to map and suggest networks of contacts/friends (e.g. Facebook or LinkedIn). And in online advertising, particularly contextual advertising and behavioral targeting are also based on clustering classification (e.g. Google AdSense and Doubleclick).

There are two basic types of cluster classification methodologies employed in geodemographic classification. The majority of traditional GDIS use k-means clustering (Everitt, 1974 cited in Harris et al, 2005, 161). Even though GDIS providers keep these methodologies obscured for commercial reasons, Harris et al. (2005) provide a description of the standard procedure (see also: Uprichard et al. 2009, 2827-2828). The basic task is to aggregate large datasets into small units or clusters. K-means algorithms use a deductive model approach to achieve this goal. Firstly the classifiers choose an initial number of clusters (k) often based on variables that signal types of consumers, though they can also be randomly selected by the algorithm. Then each neighbourhood is allocated into a single cluster based on its proximity to each cluster means. Since this is an iterative method the clustering process is repeated and ZIP codes are reallocated when necessary until the clusters become stable (Harris et al., 2005, 161-162). 'In computational terms, the classification process is usually devised to

maximise within cluster homogeneity while maintaining heterogeneity between clusters' (Singleton and Longley, 2009, 291).

The second clustering classification method is k-nearest neighbor. This is an inductive method whereby an unclassified object is sorted not according to a set of predefined categories as in the k-means algorithm, but it is classified based on the dominant characteristics of its neighbours. 'It assigns to an unclassified point the class most heavily represented among its k, nearest neighbors' (Cover and Hart, 1967, 22). Where K corresponds to the number of neighbours considered in the calculation. K-nearest neighbor classification might be implemented in different forms and hybrid approaches to classification in location-based services. Nonetheless, what I want to abstract here for the purpose of the analysis is the common core computational primitive, the so-called 'Nearest Neighbor Rule' (NN) (Andoni, 2009). The NN rule was first proposed by Fix and Hodges in 1951 (Silverman and Jones, 1989), and it can be bluntly formulated as the classification of an object (point) according to the majority vote of its nearest objects (neighbours) (fig. 7.2). NN is foremost a measure of similarity by adjacency relations. Extrapolating from the technical definition, NN classification embodies the fundamental geodemographic principle that equates vicinity (similar neighbourhood) with identity (similar demographics), since it assumes that closer objects in space are more related to each other than distant objects are, so they are more likely to belong to the same class.

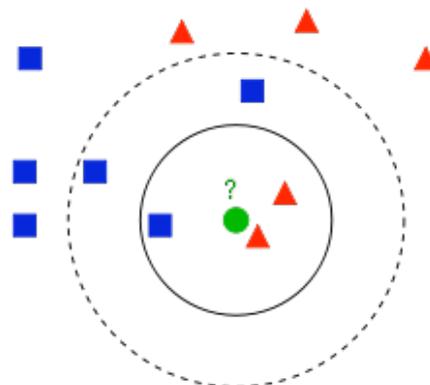


Fig. 7.2: Nearest Neighbor Classification Diagram. Source: 'k-nearest neighbor algorithm' Wikipedia entry. 28 May 2007 upload by Antti Ajanki.

Interestingly, the NN rule also mirrors Tobler's first law of geography, which states that 'everything is related to everything else, but near things are more related than distant things (Tobler, 1970). In fact the NN rule handles data spatially. It assumes that data are points in space (feature space). This way NN maps spatial relations between points, distance and neighbourhood relationships. However, despite this spatial bias, NN algorithms also include the calculation of non-Euclidean distance metrics like similarity measures.

The NN rule is especially central in the mobile ubiquitous information milieu of locative media. For instance, NN is at work in mobile local search whenever there is a query for finding the objects closest to a specified location (nearest neighbour search) (e.g. find the nearest cafe). In this vein, the Google case showed how the NN 'majority voting' logic serves as a measurement of value for places in local search. Google's local algorithm (PlaceRank) measures the density of nearest neighbours to determine relevance: '[a geographical] entity with an elevated density of neighboring entities [annotations] has a greater value than would otherwise be the case' (Google Inc, 2011a). Similarly, in the case of Flickr, we saw how its algorithm processes location metadata in order to identify neighbouring relations to use them as a signal of interestingness (attention value), either by computing the proximity of media objects to user location or the proximity of media objects to other media objects previously annotated by the user (Yahoo Inc., 2006a). Moreover, location-aware recommender systems - integral to social location platforms - may use the NN model to determine similarities between places and between places and users to suggest destinations. This is the specific case of Foursquare, for instance.³² Finally, geodemographic sorting in locative media—as it was discussed in the model above—may use the categories of a given geographical area's nearest-neighbors (POIs) for classification (Noulas et al., 2011).

³² Machine Learning with Large Networks of People and Places. Available: <http://engineering.foursquare.com/2012/03/23/machine-learning-with-large-networks-of-people-and-places/>

As a matter of fact there are various other areas in which the NN problem is the central operative logic in classification and search. Examples include data mining, pattern recognition, machine learning, genetic algorithms (gene expression analysis), information retrieval, and recommender systems (Andoni, 2009). The NN rule appears central to our current informational condition characterized by overabundance of data. Granted that, I want to put forward the hypothesis that the NN rule is nonetheless a primordial principle of organization in locative networking, and further the main governing protocol of the place graph.

In his account of protocological forms of control in networking communication, Alexander Galloway points out how protocols act on networks through a diagram:

Protocol considers first a network as a set of nodes and edges, dots and lines. The dots may be computers (server, client, or both), human users, communities, LANs, corporations, even countries. The lines can be any practice, action, or event effectuated by the dots (downloading, emailing, connecting, encrypting, buying, logging on, port scanning). With this basic “diagram” you can do a number of things. You can connect the dots—all of them—making a totally connected, distributed network with more than one path to the destination. You can also disconnect dots, even delete dots (no paths, no destination). You can filter out which dots are connected to the network. You can create portals for the addition of future dots. You can designate which kinds of lines you want between the dots (for not all lines are equal; some diverge, flee; others converge, coalesce). In short, a network-as-diagram offers all sorts of possibilities for organization, regulation, and management (Galloway, 2004, XVIII-XIX).

In a generic description, the NN protocol would organize the place graph by way of tracing out patterns or relations of proximity among nodes (fig. 7.3). The network of places and users is partitioned in the process into clusters of proximity/similarity nodes. A clustered network form is configured so all nodes (places and users) are assigned to a connected cluster or ‘neighbourhood’. The cluster diagram thus introduces stratification in an initially distributed network. As Galloway and Thacker put it, ‘a given

topological pattern is what cultivates and sculpts information within networks. To inform is thus to give shape to matter [...] through the instantiation of form—a network hylomorphism' (2007, 112).

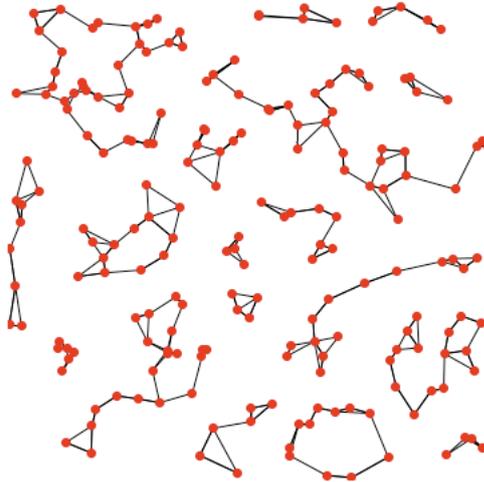


Fig. 7.3: Nearest Neighbor Network Topology. Source: "Nearest Neighbor Networks" from the Wolfram Demonstrations Project.

Proximity—the 'nearest neighbour relation' as it were—is the governing logic of this diagram. However, this concept spans beyond geographic proximity to include also social proximity, that is to say similarity (i.e. affiliation, social relevance, shared consumption patterns, etc). A case in point is that social location platforms monitor users' spatial behaviours and social interactions to find regularities and matches: 'people who go to X tend to go here'. Since proximity is both geographical and social, locability and identifiability are here equated. In other words, in the cluster diagram the user is located both in space and social space at the same time. Previous research has showed the centrality of both social proximity and geographical proximity in locative networking. Scellato et al. implemented graph analysis to compare the socio-spatial properties of location-enabled social media platforms based on location sharing vis-à-vis those based on content sharing. Unsurprisingly, the researchers found that social location platforms tend to foster social networks

composed of local ties clusters, whereas content-based platforms form more geographically dispersed clusters of users (2010). Another study highlighted the influence of geographical proximity in mobility patterns in social location networks. Ye *et al.* (2011) observed a geographical clustering phenomenon in these networks that can be model by a power law distribution. Those findings show that users of these systems prefer places (POIs) that are geographically proximal to those they have visited before.

The diagramming of the city in terms of socio-spatial neighbouring relations raises important questions in regards to spatial practice and urban mobility. Let's take the case of social location, which commonly promotes its services as tools for urban exploration. Dennis Crowley, Foursquare's CEO, explains the remediation of the city through these platforms in this way:

[...]People are giving us one or two or three pieces of data everyday about the places they go to. We can cut that data up. This is a new way to look at your neighborhood based on the places you've been, and your friends have been to. Places that people like you go to. I can look at the East Village of New York in an entirely different way because the Foursquare algorithm redefined the city for me (Gigaom, 2010).

This 'redefinition' of the city through personalization, that is the sorting of urban space according to our previous patterns of mobility and those of our 'nearest neighbours', although on the one hand might open up new possibilities of 'spatial browsing' and curation, on the other hand this might well lead to an intensification of an homophilic experience of the urban encounter. In this respect Vicsek *et al.* shed light on how the NN protocol may influence the spatial behaviour of individual agents and its overall influence on the behaviour of a networked system (1995 cited in Jadbabaie *et al.*, 2003). The researchers devised a simulation model of mobile autonomous agents all moving with similar speed and in random directions upon which the NN rule is applied to control the heading of each agent. The simulation shows that 'the nearest neighbor rule [...] can cause all agents to eventually move in the same direction despite the absence of centralized

coordination' (Jadbabaie et al., 2003, 988). In this way when the NN protocol considers a distributed network of autonomous agents it introduces a vector of centralization, which can be interpreted in terms of homogeneity as all agents end up driven towards one single direction. In Lefebvre's words, "abstract space is not homogeneous; it simply has homogeneity as its goal, its orientation, its 'lens'" (Lefebvre, 1991, 287). Urban mobility would be circumscribed in this view mostly to clusters of neighbouring entities.

Navigating the world through clusters of affinities - which is particularly the case of social location platforms where the social navigation of space is a system's default, and to a lesser extent that of local search - is problematic in terms of the diversity and richness of information and recommendations about places we get. Research on recommender systems has identified a homogeneity problem inherent to these systems, the so-called 'diversity-accuracy dilemma': the more accurate the results the less diverse they are (Zhou et al., 2010). In this regard, homogeneity has also been studied under the term 'filter bubble' to refer to the effects the trend towards the personalization of our communications has on the type of information we get, allegedly reinforcing already constituted identities and narrowing worldviews (Pariser, 2011).

The cluster diagram's communication dynamics can be examined more closely by way of looking at the modelling of epidemics on networks. In this regard Newman (2003) studied the dynamics of epidemic spreading in clustered network topologies vis-à-vis random network topologies. The model implemented shows that

[...] in clustered networks epidemics will reach most of the people who are reachable even for transmissibilities that are only slightly above the epidemic threshold. This behavior stands in sharp contrast to the behavior of ordinary fully mixed epidemic models, or models on random graphs without clustering, for which epidemic size shows no such saturation. It arises precisely because of the many redundant paths between individuals introduced by the clustering in the network, which provide many routes for transmission of the disease, making it likely that most individuals who can catch the disease will encounter it by one route or another [...] however, the many redundant paths between

vertices when clustering is high make it easier for the disease to spread, not harder, and so lower the position of the threshold. Thus clustering has both bad and good sides were the spread of disease is concerned. On the one hand clustering lowers the epidemic threshold for a disease and also allows the disease to saturate the population at quite low values of the transmissibility, but on the other hand the total number of people infected is decreased (Newman, 2003, 5).

If we extrapolate the results to an analysis of information transmission, it can be argued that in clustered topologies information spreads easily and rapidly to cluster members (near neighbours), whereas the chances of the same information to spread to other clusters decreases, meaning that an homophilic tendency modulates communication dynamics in the cluster diagram. Specific studies on social location software usage already pointed out these homophilic tendencies in mediated spatial practices (Humphreys, 2010), and raised criticism of these technologies as to the perils of homophily on the richness of urban life (Crawford, 2008). While there is a cultural assumption that homophily is positive, which may allegedly be the case in some software applications (eg., social networking and online dating), from an ethico-political perspective however, the facilitation of diverse encounters in public spaces remains a desirable democratic ideal of sociability. Hence the importance of design practices and tactical interventions that integrate (encode) or explore the potential for diversity and intersubjectivity in the systems mediating our urban experience (see: Thom-Santelli, 2007).

Abstract space, Lefebvre argues, 'transports and maintains specific social relations' (1991, 50). In the NN topology homophilic-oriented relations are fostered and maintained while xenophilic-oriented relations are discouraged. The 'homophily principle' whereby similarity among nodes fosters network connections is not specific to locative networks however. From information transmission to friendship, homophily is pervasive across many different types of social networks (McPherson et al, 2001). The argument put forward here is rather that inasmuch as it translates geographical distance into social distance the NN rule represents the computational embodiment of homophily

embedded in our new cardinality systems. From this point of view, what is problematic is not that there is homophily in locative networks, but the fact that the NN protocol constitutes a form of enforced homophily – in the sense that though accepted as an access condition to these systems yet it remains non-negotiable (Lianos and Douglas 2000, Lianos, 2003) - on the way we sort and navigate the world. Scott Lash draws attention to algorithmic rules in his account of new forms of post-hegemonic power. He uses the term 'generative rules' to distinguish them from other types of regulative rules. To Lash, even though these rules are virtual they have the power to generate actuals (Lash cited in Beer, 2009, 994). This poses the question whether the cluster topology might actually translate into a topography through the spatial practices and annotations of location-based services users. The mappings of geocoded media carried out in the case studies initially hint at how stratifications of social space may be shaped by different media ontologies. However, if we were to follow the diagrammatic logic delineated here, we might expect to see the spatialization of forms of life (lifestyle consumption) and with it deepening fragmentation of social space into homogeneous clusters and hence social stratification (see: Parker et al., 2007). In view of that, LBS users are more likely to be presented therefore with a phenomenological experience of the world that, as Thrift suggests, is 'much closer to a staged performance in which to perceive the environment is also to perceive oneself' (2008, 94)—epitomized in Google Places slogan: 'connecting you with the places you love'.

Nonetheless, and despite the insights provided by the models presented above, it is crucial to stress the fact that the cluster diagram is but an abstract and deterministic model of locative networking. The diagram disguises user's agency as well as the 'noise' constituent of all human communication. Nor does it account for the serendipity of spatial practices, which even some location-based services try to introduce in the programming of their systems. In this sense the diagram proscribes incompatibility and hence contestation. The cluster diagram might not even be an accurate representation of the actual configuration of socio-spatial relations as mediated in locative media

since in the diagram this configuration is simply reduced to its ideal form. Moreover it can be argued that the diagram might make us lose sight of the particularities of its different embodiments, the varied socio-cultural contexts where it is embedded, and the phenomenologically rich and even alternative contesting media practices of users. Even so, I claim, a topological analysis remains important for the diagram is a shaping tendency materially inscribed in these systems, and as such needs to be problematized in terms of its implied cultural politics. That is to say, to interrogate the moment when computational logics may translate into cultural logics, or vice versa.

7.4 Towards an environmentality critique of locative media

Through the geocoding of media objects ‘people have the power to document their memories, feelings, biases and reactions to places and share them with the world’ (Graham et al., 2011), resulting in a new ‘synergistic relationship’ between people, places and information flows (Hardey, 2007) that is becoming part of our experience of the city. At the same time this proliferation of geocoded media objects represents a generalized spatial annotation in which media as such constitutes a form of metadata about the world in as much as geocoding establishes an indexical relationship between a media object and location. Additionally, the move towards a geocoded world also comprehends a related trend: the tagging of real space using technologies such as QR codes, RFID tags, or near field communication tags (NFC). A hybrid environmental condition that is often referred to as mixed reality, whereby city spaces are augmented and enhanced with a virtual dimension (Galloway Anne, 2004)³³. The end result of these converging

³³ It is worth noting, nevertheless, that the overlaying of the urban environment with media is not substantially new as such. As Lev Manovich remarks, since ‘the overlaying of different spaces is a conceptual problem that is not connected to any particular technology, we may start to think about which architects and artists have already been working on this problem. To put it another way, the layering of dynamic and contextual data over physical space is a particular case of a general aesthetic paradigm: how to combine different spaces together. Of course, electronically augmented space is unique—since the information is personalized for every user, it can change dynamically over time, and it is delivered through an interactive multimedia interface, etc. Yet it is crucial to see this as a conceptual rather than just a technological issue’ (Manovich 2006 cited in Galloway Anne, 2008, 215).

trends is the 'informational overcoding of environments' (Crang and Graham, 2007).

In this context of data-intensive environments information is becoming a vector shaping urban places, whilst at the same time we are witnessing 'the movement of computation out of the box and into the environment' (i.e. ubiquitous computing) (Hayles, 2007, 349). What is at stake with the multiplication of code and technological devices distributed throughout the space, and technologies such as RFID tags (embedded into any object), is precisely the enabling of the environment to function as a system of distributed cognition. To Katherine Hayles, RFID technology is advancing the configuration of an 'animate environment with agential and communicative powers' (2009, 48). 'The implication here is that things, spaces and even bodies become networked without the knowledge or even awareness of those involved' (Beer, 2007, 231). Hayles further suggests that the implications also entail an ontological change as the world becomes populated now with objects possessing agency (2009, 48).

The technical possibility of linking data to space and environment in such a way enables what Stiegler, drawing from Simondon, calls the creation of 'associated technical milieus' or 'techno-geographical milieus' (2003), through which the environment is converted into a technical function³⁴, and invested with navigational capabilities (see: November et al., 2010; Stiegler, 2003). In this frame mobile phones and other portable devices equipped with sensors (e.g. GPS, compass, accelerometer, microphone, code readers) are able to locate us in the environment and react to environmental data. To paraphrase Rancière (2004), at work is the very redistribution of the sensible into the environment.

Such an assemblage of space, code, databases, and sensing devices is giving rise to a technically-specific type of mediation we can call environmental media. To Mark B. Hansen this new mediological situation is

³⁴ This development has been conceptualized under different terms: mixed reality, augmented reality, 'code/space' (Dodge and Kitchin, 2005 and Kitchin and Dodge, 2011), 'digiplace' (Zook and Graham, 2007), etc.

no longer 'focused on operations of recording storage, and transmission', instead, he argues, 'media now operate as platforms for immediate, action-facilitating interconnection with and feed-back from the environment' (2012, 53). Our media (equipped with sensors) are not only aware of the actual environmental surround but are also reflexive to it, exchanging data and adjusting to it even undertaking autonomous actions. Some of the cases analyzed here already show how media systems give agency to the environmental situation in which the user is implicated, such as information contextualization via geolocation in mobile local search, and place recommendations produced with collaborative filtering techniques in social location. In these cases user and environment are dynamically coupled. Thus, user agency is redistributed to a techno-geographical milieu fed back in real-time with the stream of media annotations. And where the environment continuously readjusts itself in a reflexive relation with the user (second-order cybernetics) based both on the aggregate behaviour of the collective and the individual (personalization).

Drawing from Alfred North Whitehead's process philosophy and its conception of the world as a medium, Hansen's reading of environmental media proposes that in order to understand this form of mediation

[...] We must abandon both object-centered and body-centered models of media experience in favour of a radically environmental approach, the first principle of which is that any act of sensation implicates the entirety of the universe forming the immediate background for the act (2012, 54).

Hansen attributes a radical agency to an environment capable of performing calculations in a feedback relation with our media devices without our direct oversight. I will draw on Hansen's important contribution to the understanding of environmental media, specifically the emphasis on the (computational) processes taking place in the background environment framing our experience of the world, and further propose to supplement his primary phenomenological account with Foucault's governmentality analytic. We shall

call this endeavour an environmentality³⁵ critique of locative media. Such framework would entail analyzing how the specific associated milieus enabled in locative media frame the agency of users and modulate socio-spatial relations.

Following Foucault, environmentality corresponds to a governmental form of reason correlative to the *homo oeconomicus*. Although in his account of the birth of American neoliberalism (Foucault, 2008) the appearance of the *homo oeconomicus* is located in the eighteenth century, this figure represents nonetheless the dominant mode of subjectivity and social relations of the contemporary 'enterprise society' (Lazzarato, 2009) characterized by the 'economization of the entire social field' (Foucault, 2008, 242). To Foucault, unlike the disciplinary subject upon whom intervention is directly exerted, the *homo oeconomicus* is the subject 'who must be let alone' inasmuch as he/she 'accepts reality' and accordingly reacts to it rationally, that is to say, based on a primarily economic calculus (i.e. the maximization of personal benefit) (2008). Brian Massumi goes so far as to suggest that a calculus in the name of self-interest 'is at least as affective as it is rational' (2009, 157). Hence, as an affective-rational subject, and the 'subject or object of laissez-faire', the *homo oeconomicus* is mainly rendered 'manageable' through 'systematic modifications artificially introduced into the environment' (Foucault, 2008, 270).

In a general sense, environmental power is then a type of governmental intervention that acts on the subject, obliquely as it were, through the environment—or the 'milieu' another word used by Foucault. The environment 'is [therefore] what is needed to account for action at a distance of one body on another' (Foucault, 2007, 35). The first attempts to intervene this relationship population-environment as a technique of power are traced back by Foucault to the late eighteenth and early nineteenth centuries:

This includes the direct effects of the geographical, climatic, or hydrographic environment: the problem, for instance, of swamps, and of

³⁵ The concept of environmentality has been developed in: Foucault, 2008, 259-261; and Massumi, 2005, 2009.

epidemics linked to the existence of swamps throughout the first half of the nineteenth century. And also the problem of the environment to the extent that it is not a natural environment, that it has been created by the population and therefore has effects on that population. This is, essentially, *the urban problem* (Foucault, 2003, 245).

In locative media this intervention is operated through the mediation of the environment, or more precisely, through the enactment of an actionable environment or associated milieu capable of modulating users' spatial behaviour. As Crang and Graham put it in regards to ubiquitous computing, 'the enhanced 'technicity' these environments offer comes down to coded objects being networked through more codes and these enabling coded processes to organize new forms of action' (2007, 794). Beyond locative media and ubiquitous computing, however, urban environmentalities should be read against the backdrop of the rising use of military tactics which directly target the environment for population control³⁶, and the more general translation of a war-rationality into programs of urban governance: 'the extension of military ideas of tracking, identification and targeting into the quotidian spaces and circulations of everyday life' (Graham, 2010, xi).

In the past the urban environment has been augmented by different technologies that combined the material and the semiotic in order to influence the population's conduct. Urban advertising is a case in point. From sandwich-board men to outdoors advertising billboards and advertising subsidising public spaces (e.g. advertising in public transport), urban advertising provides an illustration of how through an environmental intervention on the cityscape consumption behaviour is stimulated (see: Cronin, 2006). Locative media introduce, nevertheless, a fundamental change in the degree to which the semiotic shapes the experience of the urban environment, for the semiotic is encoded into programs of spatial governance (software) that are actually executed (i.e. they are performative)

³⁶ See Goodman (2010) for an account of how sound frequencies are used as weaponry to disperse crowds or control spaces by way of inducing 'vibrational environments' of fear and dread. Also, moving from sonic warfare to atmospheric warfare see Sloterdijk (2009).

(see: Andersen and Pold, 2011), causing thus direct effects on the way the world is arranged and hence encountered. In other words, 'code modulates space by significantly altering the conditions through which space is continually beckoned into being' (Dodge and Kitchin, 2005, 178). At stake in locative media governmentality is therefore a form of modulation of the urban environment that is contingent on the affordances of code. This 'computationalization' of the environment is further complicated in the program of ubiquitous computing, where data is not only embedded in the environment to enable interactivity and communication, but the environment as such is invested with more agential power becoming capable of autonomous computation.

The case studies already delineated how different platforms encode and compute social space in such a way that permits the economic governance of the population. As a matter of fact, most of the current commercial locative media platforms have a double nature as marketing technologies. Some examples, however, will help to demonstrate in greater detail how different developments of locative marketing function as environmental technologies. Marketing is understood here as a governmentality, that is to say, a set of knowledges and techniques, which fundamental aim is to control attention. Put in Stiegler's terms, marketing is a form of power ('psychopower') that acts through the systematic capture and organization of attention (2008). For the digital economy is founded precisely on the principle of scarcity of attention (see: Franck, 1999; Goldhaber, 2006), the analysis of marketing is central to understand the politics of locative media - and digital media at large -.

First, I want to consider a Google's recently granted patent that describes a system to serve advertisements based on environmental conditions as registered by users' sensing devices, namely mobile phones. According to the patent document these environmental variables may include temperature, humidity, sound, light, air composition, and speed of movement. Additionally, the patent describes how location information can be used to access services that provide environmental data corresponding to a user's

given location. An advertisement would be targeted then by way of 'matching an environmental condition associated with the advertisement with the environmental condition of the user' (Google Inc., 2012).

Some other implementations might include systems that react to light conditions captured in video or photos, or background noise in a phone call conversation, for instance. To extrapolate from this example to locative media in general, we are presented with a form of delivering media content that dynamically adjust to the environmental conditions of its reception. This technology comprehends therefore a form of mediation in which media not only is shaped by the user's environmental surround but is coupled with it (i.e. media and the environment form an associated milieu), and which has to be understood in terms of its permanent fluctuation. Furthermore, understanding this form of mediation necessitates a radical ecological approach (see: Fuller, 2005; Hansen, 2006) whereby media shall be conceived as 'a milieu of engagement, or relationality for the objects, vectors, agencies and processes that enter into its sphere' rather than a 'matter of mediation and communication between humans' (Parikka, 2011).

There is also an economic aspect described in the patent worth mentioning. The document delineates a business model whereby advertisers would bet for environmental conditions instead of keywords (e.g. Google AdWords)—the most characteristic mechanism of (semiocapitalist) value capture in the digital economy. This turn represents then an interesting move to bioeconomics (Fumagalli, 2010) for at work is the production of value by means of commodification of the bios (e.g. temperature, light, air, etc.).

Regardless whether the technology described in this patent is ever materialized in actual marketing services, particularly considering the privacy implications of collecting environmental data from users' mobile devices, yet this type of research signals the extent to which environmental factors are being incorporated as input in mobile communication. This is a trend that can be well observed in the proliferation of location-aware and sensor-based applications on mobile phones. Moreover, these potential applications of

environmental media should be read less as an exercise in technological forecasting than as a continuation and development of the implementation of environmental variables (for consumer targeting) already enabled with GDIS:

For example a consumer's postcode may be a single tower block. In this case living in a tower block makes a consumer a poor prospect for a lawn mower. Likewise, if a consumer's postcode is characterised as a military base then this consumer is likely to be a poor prospect for a mortgage (Webber, 2004, 228).

Second, and moving to locative media as a form of mediation of the environment productive of territoriality, I want to draw attention to another type of location-based service: persistent location. What I want to illustrate with this example is how the continuous tracking of location (i.e. real-time location) may be used in these systems for the (economic) management of population mobility flows.

Unlike social location or local search that require the active participation of the user through sharing or retrieving location data, this technology, running in the background of mobile devices, extracts this information passively on a continuous basis, and uses it to push geo-targeted content³⁷. This way the user's agency is transferred to the associated milieu. The delivery of such media content, however, is programmed based on predefined preferences set both by users (who have to opt-in to the service) and clients (advertisers and publishers).

Targeting with persistent location works by setting-up a technical territoriality through which new geographic boundaries are drawn, the so-called 'geofences', a digital radius or polygon delimiting precise zones around a place that trigger communication (notifications) once the user has entered such demarcated territory. The variables used in fine targeting users are more

³⁷ Despite persistent location may make us specially wary because of its privacy risks implications, this development in locative media is aligned with a shifting trend in information dynamics observed on the Internet: a shift from a logic of retrieval where we actively search and extract information from data repositories, to a logic of streams where information just find us – as it were - (see: Berry, 2011, 142-149).

complex though, including also 'dwell time' within the geo-fence, users' previous records of mobility patterns, time of the day, and other types of environmental data such as weather conditions. Thus, geo-fencing enables an experience of the city that resembles that of browsing the Internet, since as users navigate urban space their spatial movements expose them with context-targeted content (advertising). The paradigmatic use case example presented by providers of these services considers a user walking the streets, perhaps in a cold winter day, who receives a location-triggered coupon sent from a nearby cafe. So persistent location companies 'rent' virtual spaces (i.e. geo-fences) to marketers, within which they are allowed to communicate with potential clients. The operation at work is one of attempting to capture attention and steering mobility flows through enabling a 'technocratic form of territoriality' (Wood and Graham, 2004).

In some other use cases, geofencing has been used to enact brand environments in public spaces. For example, companies like Goldrum license augmented reality retail state to clients, turning the city into a control space more akin to the shopping mall. Uses of mobile applications powered by persistent location technology are manifold though, ranging from retail to dating services, hyperlocal media, travel guides and real state. Yet what I want to explore here is how environmentally-aware communication is used in the service of marketing governmentalities.

A case in point is Skyhook, the main provider of persistent location technology in the LBS industry. As part of its service this company offers clients access to aggregated anonymized location data from users to help better targeting advertising. Their set of analytics tools provides rankings of places based on different calculations of population density/flows. So, the company claims in its website to be capable of predicting 'the density of people in predefined urban square-block areas worldwide at any hour, any day of the week'³⁸. The rankings comprehend comparisons between different places within a given city (or even on a worldwide scale), and prediction

³⁸ A video showing how Skyhook technology maps population density/flows can be accessed here: <http://vimeo.com/11361656>

metrics to determine 'whether activity in a [place] will increase, decrease, or hold steady' at any given time. Armed with this kind of knowledge, which the industry terms location intelligence, marketers are said to be able to harness the location and mobility patterns of their core customers profile to deliver communications more effectively (e.g. know when and where to offer deals), and hence influence their spatial trajectories: this technology - the company promotes - 'creates the opportunity for advertisers to synchronize crowds'. This increased ability of LBS to perform more sophisticated forms of location-tracking is providing hence mechanisms for rendering visible those 'opacities of mobility' (Crang and Graham, 2007), while facilitating the implementation of technocratic forms of governing the 'biopolitical city' (Hardt and Negri, 2009). Furthermore, potentially rendering actionable the capitalist aspiration to the perfect alignment of the 'rhythms of the city' (i.e. time, mobility, environmental conditions, etc.) with the 'rhythms of the commodity' (i.e. the life cycle of products as well as the provision of services) (Cronin, 2006).

7.5 The securitization of mobility

One central aspect analyzed in the case studies is how locative media may help to map and leverage the economic geography of the city by way of enabling the visibility of commercial places and the subsequent capture and measurement of the collective symbolic capital and social desire associated to those places. It was argued that these socio-technical systems comprise not only territorial but also visibility regimes, or spatial-visual regimes as it were. Simply put, taking Foucault's theorization of the panopticon, an architectural prototype for a prison that produces a space of total visibility (1977), it can be extrapolated that in a similar manner software architectures are productive of specific regimes of visibility³⁹.

³⁹ It is important to distinguish here visibility from visibility, for the former in the case of locative media entails the production of patterns of identification as those obtained from data mining and algorithmic methods rather than visual forms of identification or monitoring. Moreover, visibility needs to be understood beyond surveillance and discipline and under the light of another diagram of power, namely security, as I will argue further below.

In this light, I want to put forward the argument that media specific spatial-visual regimes entail also corresponding differentials in mobility. Although LBS typically present their services as navigational tools to open up the city for unrestricted exploration and discovery, the mediation of the city is first and foremost framed within specific spatial ontologies that ultimately regulate our engagement with urban spaces through categorization. Case in point the POI-based place ontology identified as characteristic of advertising-led LBS encourages urban navigation through commercial categories, and implies a movement vector between fixed points (POIs), that is, straight line trajectories. On the one hand, this ontology makes possible a set of spatial practices like urban exploration guided by recommendations or commercial incentives for example. On the other hand, nevertheless, other forms of exploration and engagement with urban space, for instance, practices of *dérive* (i.e. themeless and aimless stroll) and their characteristic 'circular' trajectories, are prevented insofar as the set of spatial categories (e.g. 'anywhere' or 'street') and relations (e.g. aesthetic or affective) required to encode such practices are not represented in these ontologies. This way, thus, categorization demarcates boundaries that at the same time shape mobility flows in particular ways (Wood and Graham, 2004). In this sense, Briguenti well observes that 'flows and boundaries are complementary rather than opposite entities'. In fact - he goes on to argue - 'boundaries represent a moment of visibilisation of flows and can be imagined as differential gradients of motility' (2011, 402).

So, even though some of the locative technologies analyzed here—geofencing in particular as a critical case—might conjure up images and fears of new forms of (virtual) confinement, environmental technologies do not restrict mobility as such. Unlike disciplinary architectures of confinement, locative media embodies rather an architecture of flows in which the mobility of bodies and communication are not only enabled but directly encouraged. The model then is not that of spaces of confinement, or any new kind of walled city, but the contemporary metropolis *perpetuum mobile*. Accordingly, environmentality would 'involve not so much establishing limits and frontiers,

or fixing locations, as, above all and essentially, making possible, guaranteeing, and ensuring circulations' (Foucault, 2007, 40).

The different techniques to modulate the flows of people examined so far (geotargeting advertising, geofencing, recommendations, gamification, etc.) are better understood therefore as ascribed to a power regime of security and control (Foucault, 2007; Deleuze, 1991). Whereas for discipline the problem of the environment is the problem of 'the hierarchical and functional distribution of the elements' that compose it (Foucault, 2007, 35), under the framework of securitization 'environmental spaces' are left autonomous (Foucault, 2008, 261) supporting thus the flow of people and objects, whilst intervention is exercised only through the mediation of the relationship between the population and the environment.

Mechanisms of security seek the optimization of processes based primary on a 'calculation of cost', which is both a probabilistic and an economic calculus (Foucault, 2007, 20-21). Accordingly, in LBS mobility and communication are stimulated inasmuch as the denser the flows of people and communication, the greater the locationing power these technologies achieve. That is to say, as mobility multiplies so does the database of location data mined to enable the effective tracking and profiling of the population⁴⁰. Where the very capacity to track mobility is directly productive of value. In the context of location-enabled communication, borrowing Massumi's words, "your everyday movements [...] have become a form of value-producing labour [...]" Deleuze and Guattari call this kind of capitalising on movement 'surplus-value of flow'" (2003). At large the economy of commercial LBS relies on this technical capacity of capturing location data from users' communications (i.e. 'surplus-value of flow') and algorithmically cross-referencing it with even more data to reassemble it finally in the form of consumer profiles (see: Zwick and Knott, 2009)—the 'audience commodity' (Smyth, 1981) sold to

⁴⁰ It is worth noting that since the main current LBS claim to operate on anonymized location data, the population has to be understood in this context as the aggregated behaviour of individuals (or the 'dividual' in Deleuze's vocabulary (1992)) rather than differentiated individuals *per se* subjected to panoptic surveillance. That is, as a pattern or a trend in the data against which users treated as obfuscated identifiers are algorithmically sorted.

marketers and advertisers. In this process what is first presented in these services as a smooth space of flows is reterritorialized then in the service of capitalist accumulation. 'Security can be said [thus] to be that operation by which the problem of order [...] is subjected to a strictly economic calculus' (Terranova, 2007).

Taking into consideration that locationing extends beyond the provision of location-enabled communication and services to a manifest attempt to harness location data to align the circulation of commodities with the circulation of bodies in urban space, the securitization of mobility in LBS should be placed within a larger capitalist project of the governance of things. Following La Perriere, Foucault formulates governmentality also as 'the right disposition of things, arranged so as to lead to a convenient end' (1991, 94). In the context of the 'computationalization' of urban environments this project could be traced to the mid-20th century with the emergence of (business) logistics: 'the science of moving objects in an optimal fashion' (Thrift, 2008, 95)⁴¹. Where the right disposition of things is tantamount to 'having the right item in the right quantity at the right time at the right place for the right price in the right condition to the right customer' (Wikipedia, 2012). Logistical processes, Thrift points out, could only be possible with the advent of the technology of address. So 'every thing and every location (the two increasingly becoming interchangeable) could be given a number and become the subject of calculation' (Thrift, 2008, 96).

Put in the perspective of a broader process of standardization⁴² of space, the database, I claim, should be thought of as a new technology of address⁴³. Akin to the way the address system enabled logistical processes, the

⁴¹ Logistics first appeared though as a military set of knowledges in the 19th century. 'The original function of logistics was to organise the supplying of troops in movement through a hostile territory' (Bologna cited in Toscano, 2011). Logistics, however, is just incorporated in the business world after the Second World War in the midst of a process of globalization of commerce that demanded local and national economies to connect to a globalized supply chain, becoming as a consequence 'the central discipline of the contemporary world' (see: Thrift, 2008, 95).

⁴² It is worth noting, nevertheless, that despite debates within the LBS industry about the importance and necessity of having an open standardized places database, not only to achieve interoperability between services but also to avoid issues of duplicates (e.g. a single place identified differently in every database) or to ease data maintenance, the main players continue to compete today to impose their respective databases as the *de facto* standard.

⁴³ Database management capabilities are incorporated in GIS in the 1980's (Berry J., 2008).

(spatial/location/places) database has made possible distinct practices for the tracking and calculation of movement, as well as originating a corresponding set of knowledges, namely location intelligence. Location intelligence can be succinctly formulated as location data put in the service of business strategy. Or, on one of the industry players' view, it is 'the capacity to organize and understand complex events through the use of geographic relationships inherent in all information' (Yellowfin, 2010, 4). Nowadays this range of techniques and practices has found its niche mainly in market analysis, asset management and target marketing, though applications span across various fields including government, real estate, transportation, and financial services.

Furthermore, location-enabled social media are providing for the first time access to real-time location data with a valuable social dimension to it—think of Twitter's geocoded messages or Foursquare's check-ins. So we are starting to witness the emergence of other technological implementations tapping into these databases of geocoded data. There are use cases within the military and the defence sector where streams of geocoded social media feed software systems, which applying spatial and sentiment analytics are capable of modelling the population's behaviour (opinions and sentiments) so as to produce geographic risk alerts that may help to predict and pre-empt civil strife. Examples of these systems include E-MEME (Epidemiological Modelling of the Evolution of MESSAGES), the Worldwide Integrated Crisis Early Warning System (W-ICEWS), and Condor (The Economist, 2012). Broadly, location-enabled social media has proven to be a useful means to map out populations not only as a distribution of bodies in space but also as a form of affective publics⁴⁴, that is to say, as an expression of public perception and mood. Same kind of data has also been used as an economic indicator in experimental algorithms for predicting fluctuations on

⁴⁴ Lazzarato proposes, drawing from Gabriel Tarde, the concept of the public (*le public*) as an embodiment of the population considered as the surface of capture of beliefs and desires, which expresses itself as a variation or a tendency, or—in the context of the cases considered here—as a trend in the data (2006, 72).

financial markets (Bollen et al. 2011), while future implementations in actual trading algorithms seem likely—if not already at work.

The integration of location-awareness into everyday communications, particularly in mobile communication, has set the conditions for a real-time mapping of the city: who populates different places at different times. What is more, the very capacity to register where people have been or where members of their respective social networks have been permits to carry out algorithmic predictions as to where people might be going. Predictions of the type ‘people who visit restaurant X for dinner go to night club Y or hotel Z after’ are characteristic of social location platforms for example⁴⁵. Within this context it is my belief that the database, or more precisely the resulting abstract model of interconnections between places and people - namely the place graph - constitutes an important new organizational frame for the securitization of mobility in the city as it facilitates different mechanisms to systematically modulate it: targeting commercial incentives and advertisings, recommendations, game mechanics, etc.

In contrast with discipline, under environmentality and security the problem of the location and distribution of bodies in space is not one of hierarchical organization (Foucault, 1977, 205). It comprehends rather, Foucault suggests, 'knowing what relations of propinquity, what type of storage, circulation, marking, and classification of human elements should be adopted [...] in order to achieve a given end' (1986, 23). In the light of our case studies this problem could be formulated in terms of computation: the database

⁴⁵ Prediction here is based on the principle that people movements through space are not random. In a similar case, a group of computer scientist at University of Birmingham announced the development of an algorithm that using mobility patterns of people and their social networks is capable of predicting with 24 hours of anticipation the location of a person down to an accuracy of 20 meters. In the scientists own account, the algorithm might be particularly useful for marketing, advertising, and personalised services: 'If a system is able to predict with reasonable accuracy where the user is directed, it could provide geo-localised and personalised recommendations based on his or her future movement' – stated Dr Manlio De Domenico (University of Birmingham, press release, 16th July 2012). The same principle is already in used in security apparatuses as a way of pre-empting crime for example. Geographic profiling, that is, the identification of a person's mobility patterns, is employed today in the mapping of terrorist networks or in attempts to identify probable areas of crime based on records of locations of crimes (see: Rossmo and Harries, 2011). In the case of consumer targeting, the record of a given user's visits to different locations may be used to build a consumer profile based on the characteristics of the places this person has gone to and their respective periodical patterns – such as frequency, date, and time (see: Gidofalvi et al., 2008).

provides the means of storage and classification of 'human elements' - i.e. spatial annotations - (recording/encoding), while the algorithm identifies the 'relations of propinquity' in those elements, i.e. the nearest neighbour relation or geodemographic sorting (calculation/sorting), so to enable a certain software-sorted 'circulation' of people in the interest of marketing governmentalities (locationing/targeting).

Mobility is thus secured for it is anticipated through computation and acted on in the moment of its mediation—that is, an action upon 'possible or actual future' actions in Foucault's terms (2000, 340)—in order to modulate it for economic optimization. Consequently, environmentality entails the constitution of securitized associated milieus which, in accordance with a probabilistic risk management rationality, would preempt negativity from the experience of the city (e.g. unexpected encounters or inertia as mobility's radical negativity) whilst enabling and fostering positive economically productive encounters (e.g. meeting up with friends, visiting recommended places or grabbing good deals). The tracking and modulation of material flows of people to foster the reproduction of 'valuable forms of life' (Arvidsson, 2007) and maximize the economic benefits of circulation (i.e. the capture of surplus-value of flow) constitutes for this reason a biopolitical project:

The organization of encounters in the metropolis is not only a political matter but also immediately an economic one. Joyful encounters are economically significant acts and, in fact, are in many respects the pinnacle of the biopolitical economy (Hardt and Negri, 2009, 256).

Here it is crucial to stress the fact that the associated milieus of LBS are enacted fundamentally as 'choice architectures' (Thaler and Sunstein, 2008 cited in Jones et al, 2011, 484). At stake is not an enforced channelling of population flows but rather an enticement of circulation through choice. In this sense, LBS are presented to the user as basically decision-making aids: recommendation systems, local business reviews sites, local search, orientation tools, deal finders, etc. Some LBS allow sorting the city by setting

filters, alerts, and other criteria. Others go as far as offering a panoptic capacity to visualize real-time flows of people, so users themselves can be aware of the ways in which others populate the city, and adjust spatial behaviour accordingly (e.g. CrowdLogic, CityFlocks and CitySense). While others deliver a default automatic personalization of the city, a truly experience of an urban geography entirely modelled according to users' interests. This program is well expressed in Foursquare's slogan: 'unlock *your* city'. LBS appears to embody a tendency—or 'technicity' in Simondon's terms (Mackenzie, 2003)—to privatization/personalization of public space, which is also characteristic of other mobile media from the walkman to the mobile phone.

From this standpoint, users of LBS cannot be said to be disenfranchised as such, inasmuch as choosing to use these platforms the services provided are perceived as maximizing the agent's interest. Consequently, we shall desist framing LBS as essentially disciplinary apparatuses (Sutko and de Souza e Silva, 2011). In this regard Sutko and de Souza e Silva point out that 'simply having access to others' locations may change how we move through space and how we relate to others' (2011, 812). As a result, they conclude, disciplining of mobility takes place via user internalization of LBS interfaces of panoptic visualization (Sutko and Souza e Silva, 2011, 812). Nonetheless, when it comes to peer-to-peer visibility⁴⁶, users are the active subject of vision rather than its mere passive object, as they consent to be visible either to user-selected individuals or to other users at large in the form of anonymized data, while still retaining control over the conditions of visibility (today most LBS still require opt-in location sharing). This is not the 'state of conscious and permanent visibility' (Foucault, 1977, 201) characteristic of disciplinary apparatuses. Visibility here does in fact shape mobility, albeit not in the terms that Sutko and de Souza e Silva describe. Instead of prescribing spatial conduct or disciplining behavioural variations, visibility at this level

⁴⁶ There are as a matter of fact multiple levels of visibility at work within these systems provoking different power effects and reconfiguring agency in different ways as well (see: Ellerbrock, 2010). Beyond the level of the interface, for instance, I have analyzed in this dissertation how these technologies enable different (non-visual) regimes of visibility through classification and algorithmic sorting.

produces 'freedom' of movement by enabling choice and action. At stake is an empowering visibility as it were (see: Ellerbrock, 2010).

In turn, I claim that forces of normalization are primarily at work at another level. Normalization is statistical and computational, i.e., a probable by-product of a continuous process of cybernetic modulation. In a general case it consists of a feedback loop whereby the aggregate behaviour of individual users feeds the system, which is algorithmically mined to translate apparent randomness and difference into patterns, which at the same time are continually inserted back into the user experience as a metastable order. So the greater the records of spatial annotations the easier it becomes to figure out the socio-spatial patterns that make up segmentations not only to deliver to each user a 'personalized city' but also to better target them. The normalizing vector at play—what I term the cluster diagram—operates rather paradoxically through difference, however its final aim is the identification of similarity clusters, that is, quasi-homogeneous sets of users and places.

In apparatuses of security management operates therefore as an 'optimisation of systems of difference' in an environment that is left 'open to fluctuating processes' (Foucault, 2008, 259), i.e. an overcoded environment that continuously adjust itself according to the aggregated behaviour of individuals, and in which autonomous agents participate in their own governance. From Lianos (2003) standpoint this is the form of control ('institutional control') characteristic of service economies, whereby a managerial rationality, within an economic frame (business model), privileges the most efficient processing of information to deliver services according to the calculation of users' self-interest.

Here, I would like to draw attention to another related issue, namely the 'spatial rationality' (Huxley, 2006) underpinning these systems. I want to point out how LBS project an image of the city as a space of opportunity and self-enterprise. At one level this rationality is translated in a promotional discourse of discovery and empowerment manifest in many of these companies' slogans: 'discover new places to go from people like you' (Whirl);

'unlock your city' (Foursquare); 'discover the world around you' (Loopt); and, 'discover the extraordinary in the world around you' (Gowalla). On another closely related level, it should be noted that in some LBS, participation, and hence the mobilization of people, is driven by the implementation of game mechanics management - the so-called gamification -. To illustrate, on Foursquare users broadcast their location mainly in order to achieve gains either in the form of social capital (e.g. get virtual badges or become a 'mayor' of a place; or 'regular', 'VIP', etc. in other locative media platforms), or economic rewards (e.g. offers, discounts, coupons, etc.)⁴⁷. Here the mentalities of government inherent to these LBS mirror the neoliberal model of markets whereby social participation is conceived as competition and enterprise. A model that has actually become pervasive in contemporary society. Think for instance of internships, where graduates and other unemployed are invited into the production process as free labour force (surplus-labour) with the implicit promise that best performance might lead to incorporation as salaried labour. Likewise, the neoliberal rationality of competition acts as a means of driving mobility and weaving socio-spatial relations (i.e. surplus-value of flow) as users move about urban space calculating future rewards (both social and economic). The experience of the city, like eating in a restaurant or visiting a museum, is, this way, turned into a game in which subjectivity itself is produced as lifestyle by association with places and their symbolic capital – this is location sharing as a practice of 'self-in-place' (Erikson, 2009) - founded upon a competition for status and rewards.

Lastly, It should be clear at this point that the city is enacted foremost as a space of expressivity. The case studies showed how socio-spatial relations are considered in these platforms according to their implicit attention value (social desire), foregrounding as consequence the 'affective register of places' (Thrift, 2004, 58): urban places heat up, trend, express moods, buzz, are favoured, shared, recommended, and inscribed with personal

⁴⁷ This modality of location-based services could be paralleled with techniques of loyalty marketing, such as frequent flyers programs or card linked offers.

communication. It is this 'affective' background of communication that frames the urban encounter in the experience of locative media. In Thrift's terms, this form of mediation of the environment should be understood as 'worlding' or the creation of worlds. That is, the setting up of 'suggestible environments' within which the user/consumer would exist and act (Thrift, 2010, 17-18). Within this frame environmental power lies thus not so much in enhancing an effective territorial control of the population, but in the possibility of managing a space of aleatory events, 'to plan a milieu in terms of events or series of events or possible elements' (Foucault, 2007, 35), through prediction and affect modulation. Locative media environmentality implies hence the creation of a predisposition of a field of possible actions, the 'engineering of the [joyful] encounter' (Thrift, 2010, 18), for computation renders it predictable and amenable to enticement.

Chapter 8

Conclusion

With the advent of location-enabled mobile devices and the increasing adoption of location-based services, more and more data about our relation to the city is being captured and made machine-readable, rendering social space subject to new forms of calculation and management. Although there is a growing strand of research within the field of geography already exploring the intersections between code/software and space (Thrift and French, 2002; Dodge and Kitchin, 2005, 2011; Graham, 2005; Zook and Graham, 2007; Crang and Graham, 2008), how social space is ontologically framed and computed in emerging locative media systems, and how such translation might shape how users of these services experience urban life, was a problem that remained largely unquestioned.

Thus, by considering the specific technical frames of different locative platforms, I explored some intersections between software and the social production of space. Google local search and media geotagging in Flickr were used then, within this scope, as sites of analysis for understanding current configurations of location-aware communication. The analytical framework that was used for the case studies—borrowing from Software Studies approach to media criticism—focused on interrogating the material layer of such systems (at the technical level of data models and algorithmic logics) in its articulation with broader social and economic dynamics.

The first finding coming from the analysis of locative media cultures of use was that beyond being a mere technique to archive information and make it findable by location, or a means for self-presentation ('I was here'), media geocoding is also used as a way of explicitly sharing (local) knowledge about places in the form of media annotations. Nevertheless, the analysis

demonstrated also how algorithmic regimes function as a vector of asymmetrical visibilization in the way these knowledges are mediated through these platforms, in other words, the ordering of views might obfuscate them. As seen in the two case studies, the ordering logics underpinning these algorithms are essentially attention-driven, which privileges places accumulating media-attention (i.e. 'hotspots' or 'trending places') limiting as a consequence the chances of circulation of these minority but richer annotations in terms of localness of knowledge. Hence, despite the richness of some annotations (also characterized for wider spatial distributions), retrievability (the fact that they can be accessed) does not translate into visibility. This result confirms already well-documented power laws of information that replicate in different network systems (see: Hindman, 2003; Barabási, 2002).

The case studies thus underlined that media visibility of places is played out in the articulation of media production, social relations (i.e. attention) and code. One of the conclusions emerging from this thesis is, therefore, that the study of locative media, particularly any accounts looking at the technological mediation of space, should start by identifying the spatial-visual regimes embedded in these systems that frame the conditions of appearance for any representation of place.

The primordial basis of such spatial-visual regimes was identified at the level of the ontological (in a computer sciences sense). As seen in the comparative analysis between Flickr's and Foursquare's respective places databases, the way space is modelled in ontologies delimits what spaces can be annotated, and hence what is ultimately visible, and what we can know about them. Although this may be a familiar insight to software engineers, the 'worldviews' embedded in these data models have social implications with far reaching consequences beyond information systems design. Here invisibility, i.e., what spatial entities are not represented in the ontology, perhaps matters even more, as exclusion at this level proscribes media activity in those unrepresented spatial entities. The analysis suggested that ontological

decisions upon how space is categorized and encoded enforce also limits upon what sets of relations between users and urban spaces are possible, and what spatial practices can take place. That is, in Lianos' and Douglas' view, they set 'non-negotiative contexts of interaction' (2000). This way, the difference between what modes of spatial practice are formally validated and those that are not, it was concluded, might have direct effects on the shape of actual material flows of bodies.

In regards to how ontologies produce visibility, one important finding emerged from the mappings of geocoded media. The significant difference in the patterns of spatial distribution observed revealed how different ontological configurations might either tend to favour the visibility of public space or private space. The discrepancy in the geographies of visibility was explained by the different uses in these geoindexes of either geographical or topical (business-oriented) vocabularies for place categorization.

The conclusion from the case studies suggested that the ontological frame most characteristic of today's commercial locative media works to 1) encode space according to the model of surplus value capture characteristic of the attention economy, and to 2) enable valuable practices of space. This is part of a broader research finding, namely tracing a link between visibility, mobility, and capital in location-based services.

Although the types of services provided by each locative media platform are, of course, central to justify certain ontological choices (e.g. a location-enabled platform to find deals may opt for an ontology that encodes the world as a space of commerce), what is problematic—in the light of a broader current communication trend towards the integration between mobile, local and social media—is that a significant segment of current location-based services are basically tools for facilitating social navigation of urban space, so at stake in these ontological structurings is what ideal of urban sociability may be encoded in these systems.

I have developed also in this thesis an account of how the accumulation of location metadata in places databases has permitted these services to model socio-spatial relations (i.e. place graph) in such a way as to enable modalities of governing population flows through computation (profiling, ranking, filtering, etc.)—in what it was described as the securitization of mobility. From this analysis I found that the informing rationality of locative media's governmental program is in essence geodemographical. With the Google case, this rationality was identified in the ordering logics of its local algorithm(s), which sorts spatial entities according to the interrelation between geographical distance, social relations, and personal interests. Further, and following this finding, by looking at the technical specifications of the algorithms used in geodemographic classification I identified a common computational primitive (the Nearest Neighbour Rule) shared with some of the computational operations at play in locative media (place recommendations and local search). Subsequently, the thesis proposed a principle of organization of locative networking based on this computational primitive, whose basic logic translates geographical distance into social distance, embodying in this way, the very geodemographic ontology.

Burrows et al (2005) warned that the fact that geodemographic information systems are made available to the public through web services ('Internet-based neighbourhood information systems'), making available geodemographic profiles of neighbourhoods, would encourage people to consciously sort themselves out, consequently contributing to the division of populations by socio-economic class (Burrows and Gane, 2006). This thesis further elaborates this argument proposing that in our current media-technological system of always-on location-aware media, and inasmuch as a geodemographic ontology is materially inscribed in the very machinery's processual principles, locative media might represent another factor of urban social space stratification as the city is automatically sorted into quasi-homogeneous socio-cultural spatial clusters as we navigate it through these systems (software-sorted mobility). A situation in which geodemographic

sorting, the desire for sameness (homophily) as it were, is relegated to the 'technological unconscious' (Thrift, 2004).

The scope of the analysis, however, has not been circumscribed only to study how geolocation is articulated in media-technological apparatuses but has also included how implementations are further linked into larger economic processes. The thesis considered the change in the regime of location data production, from exclusive of government/experts to user contribution, from the perspective of value production. More specifically, the case studies were used as sites of analysis for understanding how value is extracted out of the accumulation of location metadata.

The Google case study made it apparent that locative media's capital accumulation model closely mirrors the one characteristic of the attention economy (championed by Google itself), which can be found replicated also in other advertising-based location-based services. Put simply, in this model location metadata is algorithmically processed to measure the value of socio-spatial relations via quantification of attention (number of georeferences, sentiment of reviews, ratings, check-ins, etc.). While value finds its realization through selling location-based advertising and marketing services. Here geocoding becomes a vector of valorization of places for media annotations translate into visibility (i.e. high search rankings and recommendations), which would attract more flows of people and hence capital. The contribution of this research, though, was to point at the centrality of the database in the process of value appropriation. The case study showed how Google's automatically-generated places database appropriates the online presence of places (i.e. their collective symbolic value), and upholds this 'expropriation' using its dominant position in local/mobile search to incorporate places' owners as users/clients, and enforce upon them a set of protocols on data management. This way value is extracted out of a database of local/location data (i.e. local business listings) produced and maintained by users' labour.

The way Google captures and codes local knowledge in the form of business listings so to articulate it within the local/mobile search market, and more

precisely with its advertising platform (its primordial mechanism of value accumulation), brought to the fore the politics of local knowledge consumption at play in corporate location-based services. The research findings imply a re-assessment of these platforms as facilitators in the social exchange of local knowledge. One of the insights of the case studies was that coded local knowledge—i.e. what local knowledge is rendered visible in these platforms—should be seen from another angle, taking into consideration both the political-economic motives that dictate how it is formatted and the informational dynamics that limit its chances of dissemination. In the light of the mechanisms of commoditization of local knowledge identified in the case studies, therefore, one of the conclusions of this research project is the necessity to challenge the central proposition of these services as empowering tools for the sharing and harnessing of local knowledge. It would be more precise to say that the localization of our communications is empowering these companies with new forms of knowledge—the so-called location intelligence—that are contributing to deploying new mechanisms of governing the population.

From a biopolitical perspective, the collective annotation of space becomes productive in other ways. Thanks to geocoding, certain aspects of urban life become susceptible of being captured in code—that is to say, being grammatized—and thus become incorporated into the process of valorization. For instance, in location sharing—as seen in the case of Foursquare—visiting places functions as a signal of lifestyle (i.e. self-in-place). In other words, geocoding aids locating (valuable) forms of life (i.e. consumer segmentation and targeting). In addition, geocoding aids in the identification of local positive externalities: e.g. local cultural production—as seen in the case of Flickr—or places concentrating social interactions. To what extent the possibility of measuring more aspects of the city's commons might enable mechanisms of enclosure and privatization, besides those already delineated in this study, requires further investigation.

This project followed a specific line of enquiry at the intersection between geography and software studies that has sought to interrogate how code/software produces spatiality (Thrift and French, 2002; Graham, 2005; Dodge and Kitchin, 2005, 2011; Burrows et al., 2005; Crang and Graham, 2007; Zook and Graham, 2007; Mackenzie, 2009; Andersen and Pold, 2011). I hope that my examination of some of the ways in which the geocoding of the media complicates social space is a contribution to this effort.

Research on media geocoding has focused prominently on mapping place representations online and other cultural phenomena, problematizing the unevenness of spatial annotation characteristic of these media geographies. Nevertheless many of these important critical approaches to media geocoding rely on a politics of representation revolving around issues of representativeness and inclusion—i.e. what places and knowledges are made visible in these annotations, leaving thus the politics out of the systems. Another critical shortcoming of this approach is that it ignores the analysis of valorization and exploitation of location data - central to this dissertation. This project advanced thus another approach from which to view the problem of in/visibility in locative media by shifting the focus from the politics of representation to an analysis of the politics of code and appearance (see Zook and Graham, 2007 for pioneer preliminary research steps on this vein). Which, following Crang and Graham (2007), entails making the workings of these technologies visible as well as examining how social space is made visible to them.

The project has also contributed, in the line of software studies, by identifying the database as a main site of analysis to understand the contemporary mediation of space as well as its corresponding modes of governance. While the database has been an object of previous studies in the social sciences—particularly in the field of surveillance studies—it has been largely considered, though, as a 'holder' of information rather than discussed in itself as a medium whose formal structurings may have social, cultural and political implications in its own right (for previous work in this vein see Manovich,

1999). To my knowledge this is the first theoretically informed study exploring the ontological frameworks modelling social space in locative media communication, as well as the role of location-based services databases in shaping population mobility flows. Beyond the analysis of the database, this research project also contributed to the study of locative media software by sketching the principles of the diagram of network organization and (geodemographical) rationality underpinning these systems.

This project has also foregrounded the politics of locatability. As the title of the thesis already indicates, by localizing our media we are rendered visible in new ways for government. In this regard, I hope that the elaboration of environmentality as a form of government central to locative media (and ubiquitous computing) has contributed to provide more critical tools of analysis to assess the political implications that the melding of geocoded data, code and urban space is bringing about. The dissertation adds therefore to previous geographic work on governmentality (Hannah, 2000; Osborne, Huxley, 2006, 2007; Rose-Redwood, 2006a, 2006b; and Crampton and Elden, 2007).

To the best of my knowledge, there is no empirical research of LBS's specific mechanisms of capital accumulation in the existing literature. I hope to have advanced the literature by examining some of the ways in which media geocoding contributes to discipline and economically exploit places. Furthermore—and beyond surveillance and privacy studies' more common preoccupations—this thesis addressed the productive aspects of (user-contributed) location metadata. The present project modestly contributed to the more general endeavor of understanding the role of new media in the political economy of cities by interrogating how geocoding renders urban space subject to novel forms of economic government and further aids the commodification of social spaces. And by looking at the ways in which location-based services encode and compute social space according to an economic program, this project has shed light on a new aspect of the contemporary production of space and the spatial logics of capitalism.

Finally, in a more modest contribution regarding research methodologies, this project has shown the usefulness of examining patent documentation to investigate proprietary code/software—in what would be otherwise 'black-boxed' objects. The social researcher might examine the technical descriptions of the technologies looking for the implied principles of organization and operational logics so to trace potential cultural, social and political biases that might be translated in formal models. Although still limited in scope because the complexity of the actual implementations remain inaccessible to the researcher due to intellectual property restrictions and market interests, this approach—as seen with Flickr's 'Interestingness' analysis—can render the basic working principles of algorithms subject to examination through simulation methods.

The study results have limitations. In addition to the aforementioned difficulty of investigating proprietary software, these platforms are also changeable and sometimes transitory objects particularly difficult to grasp in a social research setting. In the course of this research project, for instance, Google local platform (Google Places) has changed several times, to the extent of existing today re-configured under another name (Google+ Local) including more functionalities. This fact does not invalidate the research results though, nor renders this dissertation necessarily just a historical account. Mutability is a condition of code/software insofar as it is articulated within society's larger social and economic processes. In consequence, the social researcher should stay open to the complications and changes, so to read them against the backdrop of broader cultural, social and technical trends in order to understand the conditions of emergence of certain code-objects.

The results are also partial in the sense that they account for a limited range of locative media platforms. The flourishing industry sector of location-based services are providing users with far more integrations of geolocation comprising different communication affordances and hence different mediations of the city that also need to be accounted for. The validity of this study, however, rests in the representativeness of the case studies, for it

looked at some of the main current players in location: Google (local/mobile search), Flickr (geotagging), and Fousquare (social location).

In regards to the project of government delineated throughout this dissertation, despite the industry hopes in some of the techniques discussed (geotargeting, geofencing and so on) we have to remain skeptical as to their efficacy and profitability. Firstly in the light of the tendency to declining of online advertising value, for it is mainly through advertising that these services realize value. Secondly, we have to consider also that location data is still subject of great controversy for its troubling implications for privacy and security, so ongoing social negotiations as to how the collection and use of this type of data by media companies is to be regulated should affect the reach of these technologies. Furthermore, we have to acknowledge too the fact that projects of government are always contingent and are hardly ever fully realized (Huxley, 2006).

In this conclusion, I now end with some further possibilities for consideration:

-There is a need of more work that attempts to understand what forms of governance accompany the social explosion of location data and location-aware software. Although this thesis represents an effort in this direction, we still know little about the ways in which user-contributed location data is being processed to capture and model urban life, and what modes of governance are taking shape around this type of data. I am very interested in continue exploring this research avenue.

-This dissertation highlighted the importance of the ontological framing of space to the mediation of the city. Accordingly, from a critical GIS perspective, there is a need for multidisciplinary projects that bridge the geosciences, the social sciences, the arts, and the computer sciences work on alternative spatial ontologies, algorithms and protocols in GIS software. Projects experimenting with other codings of space capable of accounting for more heterogeneous socio-spatial relations in the city. Similarly, it would be also interesting to see detailed ethnographic studies of how people resist the

technical framings of these systems in their everyday media practices, as well as other types of 'counter-protological' interventions.

-There is need for further research implementing a wider set of digital methods that permit, within the limitations of commercial APIs, to open up geoindexes for examination in greater depth beyond simply mapping geographies of media content.

-Research that further explores the link between places databases and the cultural economy of city spaces in regards to processes of valorization. Particularly the question whether the affective labour of users geotagging content, rating, reviewing, recommending, and checking in to places, in short, the world's metadata, and its accumulation in publicly searchable databases could be capitalized at a material level in other ways. For instance, exploring the links with real estate speculation and tourism. In this line, I would like to investigate whether geocoding contributes to a process of enclosure of the common of urban life and their further exploitation by way of rendering it calculable, that is, by contributing to its general grammatization (e.g. indexation, measuring, profiling, etc.).

-Finally, it is important to keep questioning the ways in which our new 'cardinality systems'—'the systems that determine space [...] relations' (Stiegler, 2003)—encode space (and socio-spatial relations) to enable modes of government, resisting thus their "congealment into a standardized or 'default' space" (Crandall, 2010, 71). Socio-technical systems, and the power relations they embody, are not fixed. They are 'temporary stabilizations of ongoing negotiations between social and technical agencies' (Röhle, 2009), including programmers, venture capitalists, marketers, regulators and users among others, that necessitates continual re-mapping if we are to understand the conditions of production of contemporary forms of consumption of places.

Annexes

Annex 1: Flickr Places API Methods

Flickr Places API Methods		
Database Operation	API Method	Description
Identification	flickr.places.getInfo	Get information about a place.
	flickr.places.getInfoByUrl	Lookup information about a place, by its flickr.com/places URL.
	flickr.places.getPlaceTypes	Fetches a list of available place types for Flickr.
	flickr.places.getShapeHistory	Return an historical list of all the shape data generated for a Places or Where on Earth (WOE) ID.
Geocode	flickr.places.find	Return a list of place IDs for a query string.
	flickr.places.findByLatLon	Return a place ID for a latitude, longitude and accuracy triple.
	flickr.places.getChildrenWithPhotosPublic	Return a list of locations with public photos that are parented by a Where on Earth (WOE) or Places ID.
	flickr.places.placesForBoundingBox	Return all the locations of a matching place type for a bounding box.
Rank	flickr.places.getTopPlacesList	Return the top 100 most geotagged places for a day.
	flickr.places.placesForContacts	Return a list of the top 100 unique places clustered by a given placetype for a user's contacts.
	flickr.places.placesForTags	Return a list of the top 100 unique places clustered by a given placetype for set of tags or machine tags.
	flickr.places.placesForUser	Return a list of the top 100 unique places clustered by a given placetype for a user.
	flickr.places.tagsForPlace	Return a list of the top 100 unique tags for a Flickr Places or Where on Earth (WOE) ID

Annex 2: Hackney – Most Popular Tags per Neighbourhood

NEIGHBOURHOOD	PLACE TAGS	NARRATIVE TAGS
Dalston	hackney, londonfields, eastlondon, uk, e8, broadwaymarket, queensbridgeroad, eastend, fields, britain	urban, graffiti, londonist, night, street, architecture, demolition, artist, art
De Beauvoir Town	hackney, shoreditch, regentscanal, kingslandroad, n1, uk, haggerston, dalston, hoxton, e8	canal, graffiti, art, londonist, street, park, traffic, sculpture, towerblock, water
Hackney Central	hackney, e8, marestreet, eastlondon, uk, amhurstroad, clapton, homerton, e5, londonfields, tesco, staugustinetower, europe	street, londonist, art, shop, graffiti, bus, architecture
Hackney Wick	hackney, uk, victoriapark, eastlondon, olympicstadium, hertfordunioncanal, riverlea, eastend, stratford, homerton, greenway, bow	canal, olympics, graffiti, bridge, river, reflection, water, london2012
Haggerston	columbiaroad, hackney, eastlondon, e2, uk, bethnalgreen, shoreditch, broadwaymarket, hackneyroad, flowermarket, towerhamlets, hoxton,	graffiti, street, londonist, streetart, sign, stencil, banksy, urban
Homerton	hackney, e9, clapton, eastlondon, east, hackneymarsh, e5, uk, homertonhighstreet	art, estate, street, fashion, sign, canal, hospital, housing, city, river, architecture
Hoxton	islington, oldstreet, uk, tesco, essexroad, shoreditch, hackney, ec1	banksy, graffiti, londonist, guesswherelondon, stencil, streetart, street, gwl, art, sign, girl
Kingsland	hackney, dalston, uk, eastlondon, e8, kingslandroad, islington, n1, eastlondonline, dalstonjunction, ballspondroad, debeauvoirtown	londonist, church, station, architecture, pub, overground, line, road
Lower Clapton	hackney, clapton, e5, lowerclaptonroad, uk, eastlondon, hackneydowns, stokenewington	building, city, londonist, home, urban, kitchen, socialhousing, road, digital, breakfast, exhibition, bros
Shacklewell	hackney, dalston, e8, uk, n16, eastlondon, stokenewington, dalstonlane, amhurstroad, stokenewingtonroad, shacklewelllane	street, road, londonist, architecture, shop, sign, graffiti, light, night

Shoreditch	bricklane, uk, oldstreet, eastlondon, eastend, hoxton, hackney	graffiti, sign , street, banksy, londonist, streetart, city, film, shop, art, urban, reflection
South Hackney	hackney, victoriapark, park, uk, eastlondon, victoria, regentscanal, towerhamlets, e9	park, graffiti, water, urban, tree, art, canal, autumn, trees, gwl, colour
Stamford Hill	hackney, n16, uk, riverlea, eastlondon, e5, stokenewington, greatbritain, britain, springfieldpark, northlondon	river, riverlea, sunshine, londonist, church, towpath, home, barge, wall, londonshopfront
Stoke Newington	hackney, uk, britain, n16, abneypark, abneyparkcemetery	gwl, guesswhereinlondon, graffiti, shop, wall, londonist, park, church, girl, architecture, urban, chapel
Upper Clapton	lea, hackney, lee, walthamstow, riverlea, clapton, leavalley, uk, walthamstowmarshes, leevalley, riverlee, eastlondon	riverlea, river, reflection, pylon, water, bridge, canal, electricity, graffiti

Annex 3: Dataset Summary

Dataset Summary	
Number of users	6671
Mean	13.90
Median	3.00
Standard Deviation	40.17
Minimum Objects per User	1
Maximum Objects per User	1068
Sum - Object	92729
Percentile 10	1.00
Percentile 25	1.00
Percentile 50	3.00
Percentile 75	11.00
Percentile 90	32.00

Annex 4: Dataset Statistics

Number of Objects	Number of Users	Users Percentage	Users Cumulative Percentage	Objects Cumulative	Objects Cumulative Percentage
1	2090	31.33	31.33	2090	2.25
2	869	13.03	44.36	3828	4.13
3	523	7.84	52.20	5397	5.82
4	389	5.83	58.03	6953	7.50
5	293	4.39	62.42	8418	9.08
6	223	3.34	65.76	9756	10.52
7	182	2.73	68.49	11030	11.89
8	150	2.25	70.74	12230	13.19
9	121	1.81	72.55	13319	14.36
10	109	1.63	74.19	14409	15.54
11	110	1.65	75.84	15619	16.84
12	101	1.51	77.35	16831	18.15
13	78	1.17	78.52	17845	19.24
14	96	1.44	79.96	19189	20.69
15	74	1.11	81.07	20299	21.89
16	69	1.03	82.10	21403	23.08
17	56	0.84	82.94	22355	24.11
18	48	0.72	83.66	23219	25.04
19	42	0.63	84.29	24017	25.90
20	50	0.75	85.04	25017	26.98
21	44	0.66	85.70	25941	27.98
22	43	0.64	86.34	26887	29.00
23	31	0.46	86.81	27600	29.76
24	37	0.55	87.36	28488	30.72
25	31	0.46	87.83	29263	31.56
26	19	0.28	88.11	29757	32.09
27	13	0.19	88.31	30108	32.47
28	29	0.43	88.74	30920	33.34
29	33	0.49	89.24	31877	34.38
30	23	0.34	89.58	32567	35.12
31	27	0.40	89.99	33404	36.02
32	26	0.39	90.38	34236	36.92
33	25	0.37	90.75	35061	37.81
34	13	0.19	90.95	35503	38.29
35	11	0.16	91.11	35888	38.70
36	7	0.10	91.22	36140	38.97
37	11	0.16	91.38	36547	39.41
38	18	0.27	91.65	37231	40.15
39	16	0.24	91.89	37855	40.82
40	16	0.24	92.13	38495	41.51
41	20	0.30	92.43	39315	42.40
42	15	0.22	92.65	39945	43.08
43	11	0.16	92.82	40418	43.59
44	9	0.13	92.95	40814	44.01
45	13	0.19	93.15	41399	44.65
46	7	0.10	93.25	41721	44.99
47	11	0.16	93.42	42238	45.55

48	9	0.13	93.55	42670	46.02
49	12	0.18	93.73	43258	46.65
50	15	0.22	93.96	44008	47.46
51	17	0.25	94.21	44875	48.39
52	11	0.16	94.38	45447	49.01
53	10	0.15	94.53	45977	49.58
54	10	0.15	94.68	46517	50.16
55	3	0.04	94.72	46682	50.34
56	10	0.15	94.87	47242	50.95
57	7	0.10	94.98	47641	51.38
58	9	0.13	95.11	48163	51.94
59	3	0.04	95.16	48340	52.13
60	5	0.07	95.23	48640	52.45
61	3	0.04	95.28	48823	52.65
62	7	0.10	95.38	49257	53.12
63	3	0.04	95.43	49446	53.32
64	7	0.10	95.53	49894	53.81
65	4	0.06	95.59	50154	54.09
66	5	0.07	95.67	50484	54.44
67	4	0.06	95.73	50752	54.73
68	9	0.13	95.86	51364	55.39
69	3	0.04	95.91	51571	55.61
70	2	0.03	95.94	51711	55.77
71	9	0.13	96.07	52350	56.45
72	6	0.09	96.16	52782	56.92
73	3	0.04	96.21	53001	57.16
74	2	0.03	96.24	53149	57.32
75	3	0.04	96.28	53374	57.56
76	7	0.10	96.39	53906	58.13
77	5	0.07	96.46	54291	58.55
78	5	0.07	96.54	54681	58.97
79	7	0.10	96.64	55234	59.56
80	6	0.09	96.73	55714	60.08
81	3	0.04	96.78	55957	60.34
82	5	0.07	96.85	56367	60.79
83	4	0.06	96.91	56699	61.14
84	1	0.01	96.93	56783	61.24
85	1	0.01	96.94	56868	61.33
86	4	0.06	97.00	57212	61.70
87	7	0.10	97.11	57821	62.35
88	4	0.06	97.17	58173	62.73
89	3	0.04	97.21	58440	63.02
90	4	0.06	97.27	58800	63.41
91	2	0.03	97.30	58982	63.61
92	3	0.04	97.35	59258	63.90
94	3	0.04	97.39	59540	64.21
95	1	0.01	97.41	59635	64.31
96	2	0.03	97.44	59827	64.52
97	4	0.06	97.50	60215	64.94
98	4	0.06	97.56	60607	65.36
99	5	0.07	97.63	61102	65.89
100	5	0.07	97.71	61602	66.43
101	3	0.04	97.75	61905	66.76

103	2	0.03	97.78	62111	66.98
104	1	0.01	97.80	62215	67.09
105	5	0.07	97.87	62740	67.66
106	1	0.01	97.89	62846	67.77
107	1	0.01	97.90	62953	67.89
108	3	0.04	97.95	63277	68.24
110	4	0.06	98.01	63717	68.71
112	1	0.01	98.02	63829	68.83
113	1	0.01	98.04	63942	68.96
114	3	0.04	98.08	64284	69.32
115	3	0.04	98.13	64629	69.70
116	3	0.04	98.17	64977	70.07
117	1	0.01	98.19	65094	70.20
118	4	0.06	98.25	65566	70.71
119	1	0.01	98.26	65685	70.84
120	1	0.01	98.28	65805	70.96
121	3	0.04	98.32	66168	71.36
122	3	0.04	98.37	66534	71.75
124	6	0.09	98.46	67278	72.55
125	1	0.01	98.47	67403	72.69
127	2	0.03	98.50	67657	72.96
128	4	0.06	98.56	68169	73.51
129	1	0.01	98.58	68298	73.65
131	1	0.01	98.59	68429	73.79
132	2	0.03	98.62	68693	74.08
133	1	0.01	98.64	68826	74.22
134	3	0.04	98.68	69228	74.66
135	3	0.04	98.73	69633	75.09
136	1	0.01	98.74	69769	75.24
137	2	0.03	98.77	70043	75.54
138	2	0.03	98.80	70319	75.83
139	1	0.01	98.82	70458	75.98
141	1	0.01	98.83	70599	76.13
142	2	0.03	98.86	70883	76.44
143	1	0.01	98.88	71026	76.60
144	1	0.01	98.89	71170	76.75
145	1	0.01	98.91	71315	76.91
149	1	0.01	98.92	71464	77.07
150	1	0.01	98.94	71614	77.23
151	1	0.01	98.95	71765	77.39
154	1	0.01	98.97	71919	77.56
156	2	0.03	99.00	72231	77.89
157	1	0.01	99.01	72388	78.06
158	2	0.03	99.04	72704	78.40
160	1	0.01	99.06	72864	78.58
164	1	0.01	99.07	73028	78.75
165	1	0.01	99.09	73193	78.93
167	2	0.03	99.12	73527	79.29
168	1	0.01	99.13	73695	79.47
171	1	0.01	99.15	73866	79.66
174	1	0.01	99.16	74040	79.85
176	1	0.01	99.18	74216	80.04
178	1	0.01	99.19	74394	80.23

182	1	0.01	99.21	74576	80.42
188	1	0.01	99.22	74764	80.63
190	2	0.03	99.25	75144	81.04
191	1	0.01	99.27	75335	81.24
193	1	0.01	99.28	75528	81.45
194	1	0.01	99.30	75722	81.66
197	1	0.01	99.31	75919	81.87
200	1	0.01	99.33	76119	82.09
201	1	0.01	99.34	76320	82.30
204	2	0.03	99.37	76728	82.74
211	1	0.01	99.39	76939	82.97
212	1	0.01	99.40	77151	83.20
213	3	0.04	99.45	77790	83.89
216	1	0.01	99.46	78006	84.12
233	1	0.01	99.48	78239	84.37
234	2	0.03	99.51	78707	84.88
242	1	0.01	99.52	78949	85.14
252	1	0.01	99.54	79201	85.41
267	1	0.01	99.55	79468	85.70
269	1	0.01	99.57	79737	85.99
271	1	0.01	99.58	80008	86.28
285	1	0.01	99.60	80293	86.59
287	2	0.03	99.63	80867	87.21
288	1	0.01	99.64	81155	87.52
301	1	0.01	99.66	81456	87.84
302	1	0.01	99.67	81758	88.17
306	1	0.01	99.69	82064	88.50
319	1	0.01	99.70	82383	88.84
327	1	0.01	99.72	82710	89.20
330	1	0.01	99.73	83040	89.55
341	1	0.01	99.75	83381	89.92
347	1	0.01	99.76	83728	90.29
351	1	0.01	99.78	84079	90.67
358	1	0.01	99.79	84437	91.06
365	1	0.01	99.81	84802	91.45
387	1	0.01	99.82	85189	91.87
414	1	0.01	99.84	85603	92.32
421	1	0.01	99.85	86024	92.77
424	1	0.01	99.87	86448	93.23
436	1	0.01	99.88	86884	93.70
490	1	0.01	99.90	87374	94.23
591	1	0.01	99.91	87965	94.86
592	1	0.01	99.93	88557	95.50
605	1	0.01	99.94	89162	96.15
748	1	0.01	99.96	89910	96.96
814	1	0.01	99.97	90724	97.84
937	1	0.01	99.99	91661	98.85
1068	1	0.01	100.00	92729	100.00
Total	6671	100.00			

Annex 5: Spatial Patterns Statistics Summary (Software: ArcGIS)

Spatial Patterns Statistics Summary (Average Nearest Neighbour)		
	Aggregate Data	Hackney Group Data
Observed Mean Distance	7.433953	32.251528
Expected Mean Distance	28.889360	103.905590
Nearest Neighbour Ratio	0.257325	0.310393
z-score	-154.140925	-70.688600
p-value	0.000000	0.000000

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