

# 20

## Spatial profiling, sorting and prediction

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### Introduction

This chapter traces the rise of spatial sorting techniques from nineteenth century credit reporting and mapping of social problems through to the constant tracking and spatial sorting conducted through networked searchable databases and Geographic Information Systems, often termed the ‘geospatial web’ or simply ‘geoweb’ (Scharl and Tochtermann 2007). Underpinned by Big Data, the concentration of data through cloud computing (Mosco 2014), and expanding sources of new data, such as the ‘Internet of Things’, the geoweb is driving a diverse set of processes ranging from ‘smart city’ planning, to sales and marketing, home loans, credit card availability, healthcare, and even now social life and individual identity. Increasingly code, space and human subjectivity are co-constructed (Kitchin and Dodge 2011, Murakami Wood and Ball 2013). The approach of this chapter is to take seriously Bruce Schneier’s (2012) suggestion that we understand ‘Big Data’ in the same way that we talk of ‘Big Oil’ or ‘Big Pharma’; in other words, that attention must be paid to the political economy of ‘surveillance capitalism’ (Zuboff 2015).

### Credit Bureaux, Market Research and Segregation

Commercial credit reporting bureaux began operations in northern US cities in the mid-nineteenth century. The Mercantile Company, which became Dun & Bradstreet<sup>1</sup>, was formed in 1841, and by the turn of the century companies were operating offices across the USA and in Canada (Madison 1974). Their records allowed businesses to search for individuals on the basis of their financial behavior, began to underpin the decision-making of the banking and insurance industry, and enabled private and state detective agencies – from Pinkerton’s to the FBI – to sort suspects, in the latter case, because these private bureaux held vastly more data on individual Americans than state agencies (Lauer 2008, 2010).

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<sup>1</sup> Dun & Bradstreet remains a large business analytics company, with a market capitalization of just of \$4 Billion US (all market data in this chapter were obtained from Reuters data via Google Finance, 1<sup>st</sup> November 2015).

The application of credit reporting techniques expanded rapidly. In the early twentieth century, a new commercial discipline of market research emerged, revealing new ways of understanding desire and motivations of consumers, and how to exploit them. One of the earliest was the AC Nielson company, which began by conducting household surveys of grocery purchases in the 1923, but with the penetration of radio and then television into American households, expanded into analysis of listening and viewing habits.

From its inception such research was interested in place. Forms of classificatory social mapping emerged alongside a host of other such techniques developed by gentlemen amateur scientists, motivated by muddle of philanthropic, welfarist, utilitarian and Social Darwinist philosophies in nineteenth century Paris and London. For example, Charles Booth's colour-coded streets in his 17-volume atlas of poverty (Davies 1978) – e.g. Black referred to 'vicious, semi-criminal' populations – were not far removed from the early market research companies' socio-spatial classification systems. Arvidsson (2006) shows how the 'ABCD' method of simultaneously classifying groups of consumers and space combined a static idea of wealth-based class divisions, xenophobic conceptions of citizenship and belonging, and the commercial imperatives and the abilities of the marketers. According to Paul Cherrington of the J. Walter Thompson corporation, for example, Category D, was "Homes of unskilled laborers or in foreign districts where it is difficult for American ways to penetrate" (Cherrington 1924, quoted in Arvidsson 2006: 49).

Racist classificatory schema could be found in the form of racially segregated state schooling, to the 'redlining' of black neighbourhoods by real estate, banks and other financial services. While citizen and government action created policy changes, from the bussing of pupils to ensure mixed schools to new laws that prohibited redlining, spatial segregation and racial social sorting has persisted. For example, redlining continues to be practiced, as research into so-called subprime lending that triggered the global financial crisis from 2008 indicates: "as the patterns of foreclosures [...] begin to mirror subprime activity, these vulnerabilities clearly produce racially disparate social and economic outcomes for residents of cities experiencing stress and change" (Hernandez 2009) and "residential segregation constitutes an important contributing cause of the current foreclosure crisis" (Rugh and Massey 2010: 644). Similarly, the predictive policing of individuals and neighbourhoods is often racialized (Harcourt 2006).

## Cluster Analysis and Geodemographics

Combining data on individuals and communities with mapping produced a new form of picturing populations in place. Geodemographics was pioneered by General Analytics Company, which developed multivariate cluster analysis to replace the ABCD types of classification systems, converting official US government census data into more commercially usable forms, based around the well-understood postal ZIP codes (Goss 1996, Kaplan 2006). Subsequently, as the Claritas corporation from 1971, the company adapted its system to the digitally encoded data that the US census began to deploy from the late 1960s (Monmonier 2002).

Cluster analysis models were further modernized with the advent of Geographic Information Systems (GIS), as has the US Census Bureau from 1990, with the Topologically Integrated Geographic Encoding and Referencing (TIGER) systems<sup>2</sup>. Multiple specialist spatial data companies have emerged which combine census-based geodemographic data with other data on individuals from other sources: from market surveys, credit and loyalty card records, and court records (Turrow 2006). Some, like CACI's ACORN UK-based system<sup>3</sup> (see: Burrows and Gane 2006) are national specialists; others have much wider coverage.

Cluster analysis divides people in places into more sophisticated 'market segments' than ABCD classifications. Claritas's system, PRIZM, now part of the Nielsen group<sup>4</sup>, currently has 66 segments, produced from data classed from 'lifestage' to 'urbanicity.' A simple version available online is MyBestSegments<sup>5</sup>, with more sophisticated and detailed versions for paying customers, including maps down to the ZIP code level. PRIZM is clearly hierarchical in its formulations, however light-hearted some of the designations. The segments range from 01 Upper Crust:

“the wealthiest lifestyle in America – a haven for empty-nesting couples over the age of 55. No segment has a higher concentration of residents earning over \$100,000 a year and possessing a postgraduate degree. And none has a more opulent standard of living.”

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<sup>2</sup> This remains the basis for the geographical sorting and representation of US census data, see: [http://quickfacts.census.gov/qfd/meta/long\\_LND110210.htm](http://quickfacts.census.gov/qfd/meta/long_LND110210.htm)

<sup>3</sup> ACORN website: <http://acorn.caci.co.uk/>

<sup>4</sup> Nielsen was bought and then split up and sold by Dun & Bradstreet. In 2006 it was reformed, backed by private equity from a consortium including the Carlyle Group, and expanded by acquiring Marketing Analytics and public opinion-polling organization, the Harris Group. Nielsen is not a publically traded company, but it was rated as the world's largest market research company in the Honomichl 2014 rankings from the American Marketing Association.

<sup>5</sup> PRIZM ('MyBestSegments') website: <https://segmentationsolutions.nielsen.com/mybestsegments/Default.jsp>

Further down the scale are categories like 32 – New Homesteaders:

Young, upper-middle-class families seeking to escape suburban sprawl find refuge in [...] a collection of small rustic townships filled with new ranches and Cape Cods. With decent-paying jobs in white and blue-collar industries, these dual-income couples have fashioned comfortable, child-centered lifestyles; their driveways are filled with campers and powerboats, their family rooms with PlayStations.”

Finally, one the lowest categories, 65 Big City Blues:

the highest concentration of Hispanic-Americans in the nation. But it's also the multi-ethnic address for low-income Asian and African-American households occupying older inner-city apartments. Concentrated in a handful of major metros, these middle-aged singles and single-parent families face enormous challenges: low incomes, uncertain jobs, and modest educations.

As a system aimed at marketing, the classifications still stress likely purchases and consuming habits in every segment: Big City Blues folks might watch Univision and read *Star* magazine, rather than the Upper Crust’s favourite Golf Channel and *The Atlantic*, but they are still assumed to be consumers.

### **From Data to Relationships**

Market research was transformed again from the 1980s onward, with the rise of Customer Relationship Management (CRM), which advocated a more personal and trusting relationship between ‘brands’ and consumers created via multiple data (Murakami Wood and Ball 2013), and algorithmic processes of dataveillance (Clarke 1988), datamining, or Knowledge Discovery in Databases (KDD). Companies like Nielsen are still essentially curators of such data, using proprietary algorithms to generate particular data sorted from their own databases.

Since the mid-1990s and accelerating in the 2000s, the proprietary model has been challenged by the rise of the Internet (and particularly the World Wide Web) and another kind of

proprietary algorithm: search. Although not the first, Google remains the most popular and effective Internet search engine<sup>6</sup>. Search can be considered a form of empowerment, however it is also part of the rise of ‘personal information economies’ (Elmer, 2004) and the increasing responsabilization of consumers. As Elke Krahman (2011) argues, “risk discourses and practices of private businesses offer an alternative vision of the future in which industrialised societies manage their risk through individual consumer choices.” Disempowered subjects of surveillance societies themselves assess the risks posed by their fellow citizens, driven by media and private security sector’s presentations of the worst: “industry’s ability to profit from risk management provides it with a vested interest in the creation, expansion and continuation of the demand for its services. Fear is one of its strongest marketing tools (Krahman 2011: 358).

To exploit these fears, cluster analysis and GIS-based software tools have been adapted to focus on consumers fear as much as desire, in particular crime. Crime statistics have a long and controversial history in themselves (Haggerty 2001), however beginning with New York in 1996, US police departments began to adopt a new management process: Compstat (COMputer COMparison STATistics), based on mapping where crimes occurred in order to rapidly target future resources (Manning 2008).

One of the new commercial online developments of such data is Location Inc.’s Neighborhood Scout<sup>7</sup>, a spatial search tool that allows users to sort places based on three broad criteria – crime, schools and real estate – and provides rankings of cities. The three most popular lists at the time of writing all underlie the importance of fear: “Most Dangerous Cities in America”; “U.S. Cities With Highest Murder Rates” and “Safest Cities in America”. Location Inc. also provides more detailed crime risk data by address, through its SecurityGauge service<sup>8</sup>, which claims to be the most spatially accurate crime data available, “48,000 X the spatial accuracy of the closest competitor”, and a trustworthy prognosticator with “Proven predictive accuracy that consistently exceeds 90%.”

However the underlying rationale is not about people or communities at all, rather it is about risk reduction and profit-maximization for capital: “the best location-based technologies

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<sup>6</sup> Emerging from military research-funded work at Stanford University in the early-mid 1990s, Google has both innovated and acquired over 180 smaller companies to become one of the biggest information-based businesses in the world. Alphabet, Google’s new parent company from 2015, has a market capitalization of over \$510 Billion US; only Apple is bigger at around \$670 Billion US.

<sup>7</sup> <http://www.neighborhoodscout.com/>

<sup>8</sup> <http://www.securitygauge.com/>

possible to empower businesses to make informed decisions that translate to increased revenue and reduced costs.” Individual ‘consumers’ are more important as producers of information for the higher-priced products. This is not obvious to such users, as the data acquired about consumers is generated separately from the use of spatial search tools. However, increasingly, acts of consumption are simultaneously acts of production, or ‘prosumption’ (Toffler 1980). Nowhere is this clearer than on social media. The digital ‘immaterial labour’ (Lazzarato 2006) involved in managing social and informational relationships creates ‘overflows’ (Callon 1998), which are new forms of surplus value for firms to exploit.

As van Dijk (2014: 198) has argued,

“With the advent of Web 2.0 and its proliferating social network sites, many aspects of social life were coded that had never been quantified before—friendships, interests, casual conversations, information searches, expressions of tastes, emotional responses, and so on.”

However, it is not the overflowing data themselves that matter. Big Data is already moving sorting away from older categorical forms of sorting. Instead contemporary sorting “privileges relational rather than demographic qualities” (Bolin and Andersson Schwartz 2015: 1). Of particular interest are so-called ‘non-obvious’ relationships and what Louise Amoore (2011) has called ‘data derivatives’, that would not have existed without vast quantities of data and the new algorithmic tools to correlate them.

For states, such relational data are exploited through Open Source Intelligence (OSINT) activities, or by capital through what Facebook<sup>9</sup> calls ‘social graphing’. But there is more than simply alignment here between private marketing and state surveillance techniques. For example, the Non-Obvious Relationship Awareness (NORA) datamining software developed by ChoicePoint, a company that had perhaps the largest American database about US voters and consumers in the mid-2000s, was used to exclude voters; and several consumer data aggregators were of Homeland Security organisations following 9/11 in order to create new state databases

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<sup>9</sup> Currently the largest social media provider in the world with a market capitalization of some \$310 Billion US.

(O’Harrow 2005; Murakami Wood, 2009).<sup>10</sup> Nonetheless, the state still lacks the range of data collected and aggregated by private sector data brokers.

### **From Place to Trajectories**

Given their connection to analysis of risks around property, it is not surprising that cluster analysis targets people and places simultaneously. However, in a mobile world, place becomes a temporary location, one of many shifting data points that define a trajectory. Such mobility is tracked primarily through mobile devices (cellphones, smartphones, laptops, tablets and the small but increasing number of wearables).

One of the primary tracking systems is another 1960s US military technology legacy, the satellite-based Global Positioning System (GPS).

Mobility has also changed the way in which spatial search data is presented to and used by consumers. Search remains central to Google’s operation but has been increasingly spatialized. Google’s mapping services, including the Google Maps, Street View, Google Earth, and a whole range of direction-finding, and location awareness and tracking services, constitute the beginning of a planetary spatial search tool. It is by no means the only such proprietary web-accessible GIS+ system, and there is also an open source contributor-based mapping system Open Street Map. There are also a growing number of location-based social media, such as FourSquare, and ‘mash-ups’, which layer data onto Google Maps or other web-based mapping applications.

Google has courted controversy with concerns around the capture of wireless network information by Street View photography vehicles and private activities caught by chance on their cameras (Elwood and Leszczynski 2011). Google has addressed the latter issue with algorithms that mask faces and automobile license plates, but these are far from infallible. Google has also experimented with combining personal location and movement data onto Google Maps, notably with its Latitude app, which was discontinued in 2013, which mapped contacts who had signed up for the service in real time. However, the recently implemented ‘Your Timeline’ feature also allows users to see their own movements over space and time on Google Maps. At present this can only be displayed to the user, and in order to work, the user must have location tracking

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<sup>10</sup> In 2008, ChoicePoint was acquired by transnational information aggregator, Reed Elsevier, which has since become RELX Group, a growing company with a market capitalisation of nearly \$20 Billion US.

feature enabled on their mobile device, but it is quite likely that many users will have this enabled unknowingly, and are unaware their movements can be mapped. The information can undoubtedly also be datamined for commercial purposes, and British and American intelligence agencies can access Google Maps on mobile devices, alongside other eavesdropping and tracking functions, through the ‘Smurf Suite’ of surveillance apps (Ball, 2014).

### **The Political Economy of Spatial Sorting**

Elwood and Leszczynski remark that with the advent of the geoweb, ‘privacy has gone spatial’ (2011: 13). However, privacy is moving from something that could be assumed with certain exceptions, to something that is increasingly exceptional. Susan Landau (2015) has argued that Fair Information Principles (FIPs) underlying the regulation of personal data are largely incapable of dealing with the combination of big data, automation and mobility. For example, *notification* “simply doesn’t make much sense in a situation where collection consists of lots and lots of small amounts of information” and *consent* is worthless when it is an entry condition for accessing a service.

But privacy is not the only human right under attack in spatial sorting. As Manuel Aalbers has noted, “neighborhood typologies and the maps these typologies are depicted in, interact with the actions of public and private actors, thereby re/producing social space” (2014: 549). For speculators, designations of vulnerability and decline may mark an opportunity for the creative destruction of gentrification and revanchist dispossession (Smith, 1996). Digitally informed rent-seeking redevelopment, combined with policy priorities which favour ‘mixing’, take established places built by poor, ethnic minority and working class communities and in rebranding them, abstract place from people, and force people away from place: a new form of digital redlining.

Mark Andrejevic has updated the ideas of the ‘digital divide’ to talk of “a form of *data divide* not simply between those who generate the data and those who collect, store, and sort it, but also between the capabilities available to those two groups” (2014: 1674). This divide is exacerbated by its being hidden from the public gaze in the black boxes of algorithm-driven systems (Pasquale 2013).

However, the data itself is not simply *elicited*. Data is increasingly *generated* through the manipulation of basic emotional states (desire, fear etc.); the information economy is also an affective economy (Thrift 2006). The combined manipulation, measurement and application of



affect exploits what would otherwise be ephemeral, unrecorded and quickly forgotten sentiments (van Dijk 2014). Even in newly gentrified spaces, “biopolitical marketing [...] captures the value of relatively autonomous processes of social communicative and cultural production that occur in the urban environment” (Zwick and Ozalp 2011: 248), extracting surplus value from the prosumer behavior of denizens. This too is often unnoticed. Shoshana Zuboff points to firms such as Google and Facebook experimenting with users’ feelings in real time and that “this new phenomenon produces the possibility of modifying the behaviors of persons and things for profit and control” (Zuboff 2015: 85). This transformation is also visible in market moves, for example Nielsen has acquired companies such as NeuroFocus and Innerscope, specialists in neuromarketing, which attempts to harness developments in the science of the brain to marketing (Murakami Wood and Ball 2013).

Such power demands accountability and regulation, yet Zuboff shows that Google rejects such demands, even though their products function as essential public utilities. The situation is profoundly different from earlier forms of capitalism in which capitalists, although powerful, could be brought down: “Google”, she says, “bears no such risks” (Zuboff 2015: 88). On the contrary, the relationship between capital and state is one in which risks are transferred from capital to the state, and in which individual risk is opportunity: as Elke Krahnman argues, “the fact that risks can never fully be eliminated promises insatiable demand” (2011: 357).

Moreover, the state seemingly has little interest in assisting citizens in holding information corporations to account. As van Dijk (2014) points out “the institutions gathering and processing Big Data are not organized *apart from* the agencies that have the political mandate to regulate them” (van Dijk 2014: 203). A close relationship between technology producers, private data aggregators and public administration has been particularly central to the hegemonic American neoliberal model of capitalism. The state reduces, manages and compensates for the risks inherent in investment decisions, and in return, it seems, corporations cooperate with the state in providing user data, as all the largest information corporations do as part of the NSA’s PRISM program (Greenwald 2014)<sup>11</sup>.

However, the diffusion of anticipatory surveillance throughout state, corporate and personal action, means that any central locus of power may be, like the individual capitalist,

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<sup>11</sup> The NSA’s PRISM program has no relationship to Nielsen’s PRIZM software.

spectral. Palmås (2011), drawing on DeLanda (1991), calls this ‘panspectric’ rather than panoptic surveillance, and Zuboff’s (2015: 80) recent analysis of ‘surveillance capitalism’ agrees, asking not only that we replace Bentham’s Panopticon in our analysis, but that we also that we replace the figure of Orwell’s Big Brother with a more diffuse but pervasive, ‘Big Other’:

“habitats inside and outside the human body are saturated with data and produce radically distributed opportunities for observation, interpretation, communication, influence, prediction, and ultimately modification of the totality of action. Unlike the centralized power of mass society, there is no escape from Big Other. There is no place to be where the Other is not.”

Dan Trottier (2014: 69), however, gives some hope in the incompleteness of any such process, and the very human structures in which activities are still embedded, “while large scale data monitoring is possible, such practices are shaped by situated cultures and material constraints,” and it is probably too early to judge whether the results current efforts to regulate and control, “fledgling agencies and legal uncertainties are grounds for emerging configurations and unanticipated hazards”. It seems a poor sort of hope. However, in the recognition of the political economic forces driving ubiquitous surveillance, there is at least the possibility for action.

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