

UNDERSTANDING SPATIAL MEDIA

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Over the past decade, a new set of interactive, open, participatory and networked spatial media have become widespread. These include mapping platforms, virtual globes, user-generated spatial databases, geodesign and architectural and planning tools, urban dashboards and citizen reporting geo-systems, augmented reality media, and locative media. Collectively these produce and mediate spatial big data and are re-shaping spatial knowledge, spatial behaviour, and spatial politics.

Understanding Spatial Media brings together leading scholars from around the globe to examine these new spatial media their attendant technologies, spatial data, and their social, economic and political effects.

The 22 chapters are divided into the following sections:

- **Spatial media technologies**
- **Spatial data and spatial media**
- **The consequences of spatial media**

Understanding Spatial Media is the perfect introduction to this fast emerging phenomena for students and practitioners of geography, urban studies, data science, and media and communications.

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UNDERSTANDING SPATIAL MEDIA

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CONTENTS

List of Figures	vii
List of Tables	viii
Contributors	ix
1. Understanding Spatial Media <i>Rob Kitchin, Tracey P. Lauriault and Matthew W. Wilson</i>	1
PART 1: SPATIAL MEDIA TECHNOLOGIES	23
2. GIS <i>Britta Ricker</i>	25
3. Digital Mapping <i>Jeremy W. Crampton</i>	35
4. Digitally Augmented Geographies <i>Mark Graham</i>	44
5. Locative and Sousveillant Media <i>Jim Thatcher</i>	56
6. Social Media <i>Jessa Lingel</i>	66
7. Urban Dashboards <i>Shannon Mattern</i>	74
8. Geodesign <i>Stephen Ervin</i>	84
PART 2: SPATIAL DATA AND SPATIAL MEDIA	93
9. Open Spatial Data <i>Tracey P. Lauriault</i>	95
10. Geospatial Big Data <i>Daniel Sui</i>	110

11. Indicators, Benchmarking and Urban Informatics <i>Rob Kitchin, Tracey P. Lauriault and Gavin McArdle</i>	119
12. Volunteered Geographic Information and Citizen Science <i>Muki Haklay</i>	127
13. Geo-Semantic Web <i>Peter L. Pulsifer and Glenn Brauen</i>	136
14. Spatial Data Analytics <i>Harvey J. Miller</i>	149
15. Legal Rights and Spatial Media <i>Teresa Scassa</i>	158
PART 3: THE CONSEQUENCES OF SPATIAL MEDIA	167
16. Spatial Knowledge and Behaviour <i>Leighton Evans and Sung-Yueh Perng</i>	169
17. Leveraging Finance and Producing Capital <i>Rob Kitchin</i>	178
18. Openness, Transparency, Participation <i>Tracey P. Lauriault and Mary Francoli</i>	188
19. Producing Smart Cities <i>Michael Batty</i>	204
20. Surveillance and Control <i>Francisco Klauser and Sarah Widmer</i>	216
21. Spatial Profiling, Sorting and Prediction <i>David Murakami Wood</i>	225
22. Geoprivacy <i>Agnieszka Leszczynski</i>	235
Index	245

LIST OF FIGURES

2.1	Traditional GIS vs. spatial media	27
2.2	Phases of data flow associated with GIS and spatial media	31
4.1	Number of Google search results for country names	47
4.2	Ratio of French to English content in Ontario and Quebec, Canada	48
4.3	Ratio of Hebrew to Arabic content in Israel and the Palestinian Territories	49
4.4	Edits to Wikipedia	50
4.5	Searches for Tiananmen Square using Google (US) and Baidu (China)	51
4.6	Searches in Google Maps for a restaurant in Hebrew and Arabic from the same starting point in Tel Aviv	52
7.1	Dublin dashboard	79
9.1	Selection of important access to data and open data definitions	98
13.1	Simplified Nunatsiavut Knowledge Model composed of linked RDF triples	138
18.1	OGP map of participating countries	192
18.2	Transparency International embeddable global logo map	194
18.3a	Transparency International interactive corruption by country/territory interface map	194
18.3b	Saudi Arabia - Transparency International interactive corruption by country/territory	195
18.4a	United Nations e-participation interactive global logo interface map	197
18.4b	UN e-participation index ranking chart from the dedicated country page of Brazil	198
19.1	The London Dashboard – real-time data pertaining to the city	208
19.2	Traditional transport flows from the population census by wards compared to tap-ins and tap-outs from Transport for London's Oyster Card data	210
19.3	Credit card data for retail sales in Madrid and Foursquare check-ins from the social media correlated with retail sales in the UK and London	211
19.4	Crowdsourcing: a broadcast medium to reach TV viewers	213

LIST OF TABLES

2.1	Milestones in the evolution of GIS and spatial media	28
13.1	Existing linkable vocabularies that could be used in ontology revisions	143
17.1	Models of funding open access spatial media	184
18.1	IAP2 public participation spectrum	199

1

UNDERSTANDING SPATIAL MEDIA

**ROB KITCHIN, TRACEY P. LAURIAULT AND
MATTHEW W. WILSON**

INTRODUCTION

Over the past decade, the practices which produce, process, analyse, share and use digital spatial information have diversified and proliferated. No longer are the handling, storage and examination of digital spatial data confined largely to standalone geographic information systems (GIS), remote sensing packages and specialised geomatics applications that are within the control of a small number of authoritative state, private sector and academic stakeholders, and serviced by a limited pool of skilled personnel. Rather, a varied set of new, networked and often mobile spatial technologies have been developed that are open to use, contributions and editing by anyone with access to the internet. These developments in technology have accompanied rapid shifts in the social, economic, cultural and political geographies of everyday life, with new opportunities for capitalist accumulation and speculation, state and corporate surveillance and governance, and citizen science initiatives.

These new *spatial and locative technologies* include a suite of applications that are explicitly spatial, wherein location and mapping are core to their *modus operandi*. This includes: online, interactive mapping tools with accompanying application programming interfaces (APIs) that enable the easy production of map mashups which can be embedded on any webpage and push applications beyond desktop GIS (e.g. Google Maps; see Chapters 2 and 3); interactive virtual globes that users can tag and layer data over (e.g. Google Earth); user-generated spatial databases and mapping systems (e.g. OpenStreetMap and WikiMapia, see Chapter 12); augmented spatial media (see Chapter 4); locative media (e.g. satnavs and location-based social networking; see Chapter 5); urban dashboards and citizen-reporting geosystems (see Chapter 7); and geodesign and architectural and planning tools (see Chapter 8). In other cases, applications enable georeferencing that produces spatial (meta)data and can transform the technology into spatial media, but this is not core to its

functionality, and the system can operate independently of such spatialisation (see Chapter 6). For example, social media apps such as Twitter and Facebook enable users to georeference tweets/posts, creating a rich set of geosocial data, but the apps work as intended without such georeferencing (Kelley, 2013). Similarly, articles on Wikipedia and in online data repositories can be geotagged, enabling them to be searched by location and spatially visualised. Search has also become spatialised through the location of the searcher. Since 2010, Google has integrated location into all searches either through the internet protocol (IP) address of a computer or the GPS coordinates of a smartphone (Gordon and de Souza e Silva, 2011). Furthermore, maps as branded media are being used to promote institutions and showcase policy and provide a means to navigate web content (see Chapter 18). Concurrently, there are many more non-traditional and administrative datasets making their way into spatial media via open data portals, which in turn are spatialising administrative data (see Chapters 9 and 18).

Geography then has become a key 'organizational logic of the web' and the web has become a key means to mediate space, location and sociality (Gordon and de Souza e Silva, 2011: 3). Indeed, these spatial and locative technologies render virtually everything located or locatable, and thus open to navigation via maps or spatialisations and interpretation through geographical analysis (Gordon and de Souza e Silva, 2011; Wilson and Graham, 2013).

These new technologies have been enabled by the rollout of dense, distributed internetworking – through a variety of communication channels and protocols such as Wi-Fi, bluetooth, Global System for Mobile communication (GSM), Radio-Frequency Identification (RFID), Near-Field Communication (NFC) and the development of enhanced 9-1-1 services. These systems have been extended through ubiquitous computing (computation being accessible through a plethora of networked devices), new mobile platforms with embedded GPS (e.g. smartphones), convergences in media (text, images, maps, audio, video, etc.) and advances in computation, machine learning, indexical and machine-readable identification, non-relational databases and cloud storage (Cartwright et al., 1999, 2007; Taylor, 2005; Crampton, 2009; Kitchin, 2014; Leszczynski, 2014). In particular, the move from Web 1.0 to Web 2.0 in the mid-2000s was instrumental. In the initial rollout of the internet, the web was largely a broadcast medium focused on consumption in which information could be searched, retrieved and read, and services and goods purchased. Spatial information and mapping were largely curated by a few established sites, backed by large capital investment and skilled technical knowledge, that delivered static or dynamic/interactive content through a one-to-many system of communication (such as US and Canada Online National Atlases, Terraserver USA and NASA World Wind, Mapquest; Graham, 2010). These key framework datasets remain a key resource underpinning much spatial media. However, with the shift to Web 2.0, the web became more participatory, social, open (although the extent to which it fulfils these qualities is a continued debate; see Chapter 9), shared and dynamic, with content being produced by users in many-to-many relationships (rather than just specialists), enabled by software infrastructure and APIs that were robust, scalable and, in some senses, invisible to user experience (Kitchin and Dodge, 2011). Web 2.0 facilitated people

to communicate and work collaboratively through processes of writing, editing, extending, remixing, posting, sharing, tagging, communicating and so on (Beer and Burrows, 2007). Key developments included the public release of the Google Maps API in 2005 and the centrality of location-awareness in iOS and Android smartphone apps from 2009 onwards that encouraged the development of mobile apps (Crampton, 2009; Gordon and de Souza e Silva, 2011; Kelley, 2013).

Importantly, new networked spatial and locative technologies are not simply a reworking or extension of traditional maps and GIS. Rather, they employ 'different digital structures, techniques and applications', enable different functional and technical affordances, and emerge from different knowledge communities and commercial and political economic contexts (Elwood and Leszczynski, 2013: 549; Wilson and Graham, 2013). As such, while they are related and co-implicated, they are largely 'genealogically distinct from GIS developments' (Leszczynski, 2015: 730; Wilson and Stephens, 2015) and represent 'a profound shift within regimes of the production, dissemination, and institutionalization of geographic information' (Leszczynski, 2012: 72). Moreover, they are much more ubiquitous and entrenched within people's everyday practices than GIS technologies (Leszczynski and Elwood, 2015).

Collectively, these spatial and locative technologies and the effects they engender have been referred to in academia and industry in a number of ways, including the geospatial web or geoweb, neogeography (Turner, 2007), Volunteered Geographic Information (VGI), locative media, spatial media and more specific terms related to certain forms, for example, cybercartography (Taylor, 2005), map hacking (Erle et al., 2005; Schuyler et al., 2005), maps 2.0 (Crampton, 2009), GIS 2.0 (McHaffie, 2008), ubiquitous cartography (Gartner et al., 2007), wikimapping (Sui, 2008), crowd-sourced cartography (Dodge and Kitchin, 2013) and citizen cartography (Graham and Zook, 2013). It is worth untangling and defining each of the more general terms, which are often used interchangeably.

The geospatial web, more commonly known as the *geoweb*, refers to the spatial technologies (hardware, software, APIs, databases, networks, platforms, cloud computing), *spatial content* (georeferenced and geotagged data) and the internet-based mapping and location-based *applications/services* that they compose and enable (Scharl and Tochtermann, 2007; Haklay et al., 2008; Crampton, 2009). While the geoweb includes conventional, web-based GIS, it is generally taken to refer to new spatial technologies that are more interactive, participatory, social and generative in nature (Haklay et al., 2008; Kelley, 2013; Elwood and Mitchell, 2013; Wilson, 2014). In essence, the geoweb is the collective noun for the aggregate of spatial technologies and georeferenced information organised and delivered through the internet (Scharl and Tochtermann, 2007; Elwood and Leszczynski, 2011; Leszczynski, 2012). *Locative media* are a subsection of the geoweb that situate users in time and space, and mediate interactions with locations (Wilken and Goggin, 2015). As such, the underlying data, practices and services are location-orientated (Thielmann, 2010). Such locative media include navigation and routing applications, location-based services and advertising practices where users are recommended options with respect to activities based on their present location, and location-based social media (Wilson, 2012). Sui and Goodchild (2011) group the latter into three categories: (1) social check-in sites (e.g. Foursquare); (2) social review sites (e.g. Yelp, Tellmewhere, Groupon);

and (3) social scheduling/events sites (e.g. Meetup). New applications, such as Waze, crowdsource real-time traffic and share navigation recommendations.

Neogeography and VGI refer to the new relations and practices of geographic production and consumption that are created by the rollout and use of the geoweb (Wilson and Graham, 2013). Because the geoweb is largely part of the movement to Web 2.0, 'non-expert' users can use tools to generate, map and share their own spatial data and spatial apps (Turner, 2007; Graham, 2010; Wilson and Graham, 2013; Leszczynski, 2014). In this sense, it constitutes *neogeography* – a new form of producing geography, in that those who interact with and help build the geoweb do so by adding new georeferenced data to initiatives such as OpenStreetMap or WikiMapia, creating map mashups, geotagging encyclopaedia entries, building spatial wikis, reporting urban issues to city geoservices, checking in to locations, etc. Here, geoweb users undertake a form of presumption adding crucial value in the creation of a product or delivery of a service, which they also actively consume, for little or no recompense (Ritzer and Jurgenson, 2010; Dodge and Kitchin, 2013). With respect to a project such as OpenStreetMap, rather than rely on prepared, proprietary and copyrighted cartographic data/products (as created by a national mapping agency such as the UK's Ordnance Survey), users voluntarily collect, clean and upload GPS data, add attribute data, and edit, refine and extend the contributions of others in order to peer-produce a collaborative, detailed, open-source mapping platform (Dodge and Kitchin, 2013; Haklay, 2013). Such spatialised prosumption has been termed *Volunteered Geographic Information* (Goodchild, 2007), though VGI also refers to the generation of spatial information that has not been consciously produced, such as the spatial data fumes of geosocial media (Kelley, 2013; Thatcher, 2014).

Neogeography and VGI, it is thus argued, constitute a new form and era of geographical production/consumption in that control and creation shift from elites and professionals to ordinary people – it is personalised geographical praxis for 'anyone, anywhere, and anytime, and for a variety of purposes' (Haklay, 2013: 56). As such, it is *neogeography* in that the geoweb supersedes and breaks with traditional mapping regimes, practices and technologies, such as conventional cartography and GIS (Leszczynski, 2014). That said, not all of the geoweb is supported by neogeography, with a number of initiatives, especially those supported by the state, relying on more traditional production practices (such as urban dashboards), and the supporting architecture and software being developed by specialist staff. Cybercartography, and more specifically cybercartographic atlases, include participatory mapping, neogeography and VGI, but also reconfigure mapping technology to enable emerging ontologies, especially Indigenous Knowledge representations (see Chapter 13). Further, these atlases recognise that spatial media are also multimodal, and can be multisensory and include multimedia, and that new legal structures are required in order to ensure that collective knowledge represented in maps and atlases, especially Indigenous Knowledge, can be protected in a copyright regime (Taylor, 2005; Taylor and Lauriault, 2014).

Given that the geoweb does not simply present spatial information but mediates a diverse set of socio-spatial practices – communications, interactions, transactions – that extend beyond the representational practices and work of traditional maps, it