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Dwelling in the Web: Towards a Googlization of Space

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Abstract: *How is the Googlization of space, people and things affecting the production and dissemination of knowledge within society? Which spatial patterns characterize the searching and finding of information on the Web, and vice versa? Beyond doubt, the spreading GeoWeb in general and the user-driven production of geo-referenced information in particular, has pluralized the representation of spatial conceptions in global networks of communication. But it has also created a domain of scarcity within digital information. Increasingly, the Web – which once held the promise of unimpeded access to the wide world – is beginning to segment our view of the world through social and spatial filtering, with implications for various societal action fields. On the one hand we are dealing with a 'Backend Googlization' through the way localization technologies profile countries, cultures and communities, but on the other, we are dealing with user practices that are changed by 'Frontend Googlization,' created through individual appropriation of new geomedia technologies.*

The aim of this discussion paper is firstly to provide an overview of current georeferencing and localization services*, and secondly to introduce and discuss their* appropriation practices *and* their role in the societal processes of the creation of order and institutionalized arrangements*. To this end, the paper takes geomedia to be an integral part of the everyday constitution of reality that renews the relationship between the Web and the social ground. It argues that the role of geomedia in the processes of the creation of order (within and through the Web) is constituted through specific production and consumer practices. This conceptualization of geomedia as cultural products distinguishes the paper from already existing research projects in the fields of media studies, geography, and critical GIS/cartography. Finally, relevant policy areas are deduced from the*

interlocking description of practices and social impacts of geomedia technologies. The consequences of the analyzed Googlization of space for social and political spheres of activity are as follows.

First, we can recognize a repersonalization of the Internet*, through the mobilization of media, but also through the ever greater importance of social networks. Both of these factors are increasingly turning the public space into a semi-public, more and more privatized and personalized space. This development is strengthened by the currently favored political efforts at regulation, in that all geographic location data are allocated the same protection rights as any other type of personal data. Secondly, we can detect* a reterritorialization of the Internet*, in that ever more contents are being georeferenced, either through cartographic visualization (GeoWeb), or through adaption to the geographical origin of the IP address (geotargeting). Space is thus becoming classifiable sociologically and available for consumption economically. In this case, mobile Internet applications, which can be located per se and thus can permanently provide us with a 'sense of space,' are acting as an additional catalyst. Both developments, that of repersonalization and that of reterritorialization, are making the Internet less and less of a virtual reality.*

0 Navigational Preposition

The present multidisciplinary collaboration results in a quite extensive paper. However, the different sections can also be read separately. To guide our readers, a table of contents is offered below:

1. Section One lists an overview of current georeferencing tools and poses questions about the future GeoWeb;
2. Section Two discusses the way media studies and geographic paradigms have related to 'space,' and seeks for points of integration between the disciplines;
3. Section Three deals with how practices of user appropriation facilitate the construction of different forms of space, namely augmented, enacted and transduced spaces;
4. Section Four considers the impacts of geolocation technologies taking part in practices of demarcating and profiling;
5. Section Five sketches 'social action fields' and relevant policy areas;
6. Section Six presents a short conclusion of the paper.

1 Introduction: Groundworks of the Googlization of Space

Searching and finding information on the Web, something that now appears to be determining the production and dissemination of knowledge within our society to an ever increasing extent, is often summed up using the catchphrase 'Googlization.' This neologism, that can now also be found in dictionaries, is being critically evaluated (Lovink 2008; Rogers 2009b). However, if Googlization affects our personal information, opinions and habits, and if it affects our use of knowledge accumulated in books and databases, then it is worthwhile to look at Googlization not only as a phenomenon of "infrastructural imperialism"

(Vaidhyanathan 2011) by one company, but as a fundamental development in the use of the World Wide Web.

It is certainly true that "in less than 10 years since the search engine first appeared and spread through word of mouth, Google.com has radically altered the rules of the game for at least six major industries: Advertising, software applications, geographic services, e-mail, publishing, and Web commerce itself" (Vaidhyanathan 2007). In the following, however, we shall not be pursuing the question of how a specific company has changed all other media, but rather how the changes it has brought about are mutually interdependent. We argue that these interdependencies can be understood as dialectical between the Internet and space. This understanding basically concerns how space becomes a new paradigm for search, communication and interaction, but also concerns how space serves the representation and delivery of content and therefore results in browsing behavior being substantially influenced by spatial structures. The question of the Googlization of advertising, software applications, e-mail, publishing, Web commerce, *and* geographic services thus becomes a question of the Googlization of advertising, software applications, e-mail, publishing, and Web commerce *on the basis of* geographic services.

The term 'GeoGooglization' will therefore be introduced here to outline the searchability and "deambulation" (Latour 2005) of people, things, signs *and* space, but also the searchability and deambulation of people, things, signs *with reference to* (their most often implied and implicit) geospatial codes. GeoGooglization therefore initially means nothing more or less than a clarification of the Googlization of space that is under discussion here and should also serve to dispel any possibility of generating the long-term discussion

within geography on the difficulties of differentiating between space and place within the context of this paper.

First and foremost, this kind of differentiation introduces demarcations into scientific disciplines that are also present without the effects of media, and would therefore only overlay the discourse on the (re)drawing of (new) boundaries. In addition, the dedifferentiation also occurs with reference to a newer discussion in (media-)geography (Döring/Thielmann 2009b), and also in the cultural and social sciences, who want to transubstantiate space and place, who understand space as a verb und take an epistemological instead of an ontological point of view (Doel 1999; Löw 2001; Massey 2005; Thrift 2008b). GeoGooglization therefore also refers to the fact that it is not only since the advent of the Internet that "data are the sendings of their addresses" (Siegert 2009). At the same time, we must note that it was only through the Internet that a "truly universal addressing resolver" became established:

> The logic of a truly universal addressing resolver would include not only 'things' we process and communicate as discreet information, things much bigger than us and much smaller than ourselves in scale, things much slower and much faster, would also resolve 'us' as points within their possible communicative fields. (Bratton 2010)

Therefore, in the following, if GeoGooglization is discussed, then above all in order to underline that the mediation and mediality of communication in space, of space, and with regard to the understanding of space, has changed substantially with the proliferation of the Internet into all spheres of life.

Although it was feared that 'absent presence' would lead to the decline of urban spaces, the announced 'end of geography' at the hands of networked information and communication turned out to be an over-reaction (Graham 1998;

Crang/Graham 2007; Gordon 2008). With the expansion of media, an "explosion of place" (Staple 1997; Graham 1998) has also taken place that reveals itself, amongst other ways, in "multinuclear spatial structures" (Castells 1989), a "multiplicity of locals" (Sassen 2006b), "hyperlocality" (Sterling 2007), "cybernetic localism" (Faßler 2008) and "netlocality" (Gordon/de Souza e Silva 2011). The British geographer Nigel Thrift (2008b) even postulates an era of new "a-whereness." In doing so, he essentially attributes the methodological and theoretical interest in questions of location to three developments:

- The *massive expansion of mapping and geocoding* in all areas of life (Abrams/Hall 2006; Börner 2010; Wood 2010) – in particular with the aid of "map mash-ups" (Crampton 2010) and geobrowsers like Google Earth (Parks 2009);
- The establishment of *geographical information systems (GIS) and, with them, of a geodemography* that not only represents socio-statistical distributions, but is also driving the development of a new classification (Burrows/Gane 2006; Parker et al. 2007);
- A *change in the locations themselves*, such that they are no longer made up of a "set of fixed points" (Thrift 2004) but follow a *network of relations and connections that is modeled logistically* – that is, realized with localization technologies such as GPS, WLAN or RFID through the options of tagging and tracking (Crang/Graham 2007; Coyne 2010; Hayles 2009).

All of these developments are in essence media technological developments that can be summarized under the term "geomedia" (Thielmann 2007; Döring/Thielmann 2009a; Thielmann 2010; Lapenta 2011): georeferencing media that result in a socio-technological reorganization of our handling of space and location. Geomedia must therefore be understood as global communication media, their application and use being linked to concrete physical locations. On the one hand, this includes the growing range of media hardware equipped with GPS, WLAN and RFID localization technologies and, on the other, the expanding GeoWeb with its cartographic software created for lay people. The geomedia,

which first became known through the digital media revolution, are technologically speaking location-independent, although their contents are location-dependent. The renaissance of cartographic images is characteristic for the locational dependence of geomedia communication. In this case, the actual topography or the grid not only serves the purpose of a base layer for maps, satellite images, and aerial and panoramic photos as well as their hybrids, but is also (and increasingly) the instrument for the selection and control of all search operations on the Internet, whether of videos, photos, news or wikis.

While the debate on the "abolition of the sense of location" (Meyrowitz 1987) was closely linked to the establishing of the Internet (Beck 2003), the topographical success is taking place against the background of the expansion of localization technologies (GPS, WLAN, RFID). A new locational-aware generation of media users is currently developing (Thielmann 2010) due to the convergence of localization, entertainment and communication technologies (de Souza e Silva/Sutko 2009). This generation is becoming aware of the fact that our respective locations on the planet correspond to a coordinate made up of latitude and longitude.

A substantial component of this trend lies in the expansion of location-based services that contribute towards a "re-grounding of the self" (Tuters/Varnelis 2006), change social networking (Galloway 2008; Elmer 2010) and suggest transparency in logistics, distribution and globalization processes (Popper 2007). We have long been confronted with a new and complex form of "automatic production of space" (Thrift/French 2002; Dodge/Kitchin/Zook 2009) through "machine-readable geographies" (Dodge/Kitchin 2005) and "software-sorted geographies" (Graham 2005) that is contributing to an increasing technologization and commodification of urban spaces (Crang/Graham 2007;

Hardey 2007). But to date, the medial quality of localization and navigation technologies has remained largely unconsidered in this process – in particular, the questions of how the process of positioning is integrated into a discursive system of spatial description and how available knowledge on the merging of cartographic signs and the handling of maps contributes to the moment of positioning.

For this reason, it makes sense to provide in this chapter an introduction to the *fundamental techniques and practices that are linked to the collection, processing and presentation of geodata on the Internet*, before we move on to a disciplinary analysis (Chapter 2) and an introduction to concrete applications and strategies for the frontend and backend areas (Chapters 3 and 4).

1.1 Digital Earth, Mirror Worlds and Spatial Data Infrastructures

The ongoing convergence of mobile communication, Internet technology and geospatial technology is leading to an increasing integration of geospatial technology into mainstream IT (de Man 2007). This is the technological basis for what is called the "Geospatial Web" or the "GeoWeb" (ESRI 2006; anonymous 2007). In order to approach the term "GeoWeb," a first statement could be the following: "The term Geospatial Web or GeoWeb describes an emerging environment rather than a technical development." In this sense, it refers to the geospatial organization and use of information, services and applications supported by the Internet. In the vernacular, the GeoWeb is normally associated with digital maps, routing services and locating services. Pick (2008) outlines the GeoWeb as a "user-friendly environment that supports less technically skilled web-based users" who utilize geospatial knowledge services that are dynamically interrelated and orchestrated. In his blog, Jon Udell (2005) even announced a new era for civil society:

"In the very near future, billions of people will be roaming the planet with GPS devices. Clouds of network connectivity are forming over our major cities and will inevitably coalesce. The geoaware Web isn't a product we buy; it's an environment we colonize. There will always be markets for proprietary data. But the real action will be in empowering people to create their own services, with their own data, for their friends, family, and business associates. Google Maps isn't just a service, it's a service factory."

Referring to these descriptions, the term 'GeoWeb' might be *narrowed down to a certain user group and some driving technologies and an economic framework* that create the user-friendly environment and enable geospatial knowledge services. Those components enable the democratization and increasing ubiquitousness of production and distribution of geomedia, spreading the GeoWeb (see Figure 1).

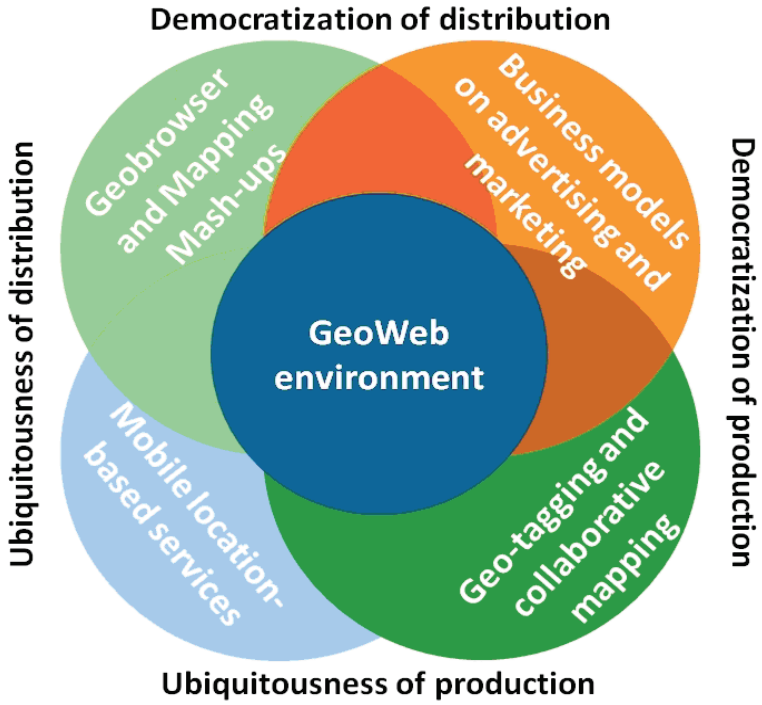

Figure 1: Technologies and economic framework that create the environment of the GeoWeb

Scharl and Tochtermann (2007) name virtual globes like Google Earth or NASA World Wind as the enabling technologies for the GeoWeb, grounded on the former U.S. vice-president Al Gore's vision of a Digital Earth. Gore conceived a multi-resolution, three-dimensional representation of the planet that would allow scientists, policymakers and even children to navigate through space and time (Gore 1998). Seven years earlier David Gelernter (1991), a scientist at Yale University, had envisioned the concept of Mirror Worlds. Gelernter took the notion of a Digital Earth to the level of a technology or software that "puts the universe in a shoe-box." He imagined it serving as an interface for us to interact with our everyday living environment through our computers. Also during the 1990s, the GIS industry started working on an ambitious project subsumed under the term "Spatial Data Infrastructures" (SDI). The idea was to create an interoperable web-service-based GIS environment to overcome the proprietary boundaries of hitherto monolithic Geographic Information Systems. The overarching aim was to ease public access to geodata and the development of GIS services in the administrative and economic sectors, but the industry also envisioned services for lay users and citizens. Basically, SDIs integrate original sources of geodata by standardized geo web-services and thereby create an interoperable environment to build services that can be orchestrated to applications arbitrary (Fischer 2007). The main institution to define the specification of the geo web-services is the Open Geospatial Consortium (OGC).[1]

1.2 GeoBrowser

While SDI initiatives more or less successfully aim at administrations and the economic sector, the free-of-cost virtual globes offered by Google and Microsoft have revolutionized the domain of consumer services. Google Maps, Bing Maps

[1] http://www.opengeospatial.org

and Yahoo!Maps are in fact global Spatial Data Infrastructures, but with some limitations and easements that make them very successful. The providers of virtual globes overcome past shortcomings that have made SDI rather unattractive for consumer applications (Fischer 2010a). The companies purchase all their geodata from private and governmental suppliers and integrate them into their own respective virtual globe environments. They provide a graphical interface to a global coverage of map and satellite data, as well as basic geo-coding (e.g. search for an address) and routing. They follow a model of free geo web-services: The geodata are not freely accessible, but the use is broadly free. On the one hand geo web-services can be used freely, but not the geodata; on the other hand, private use is free of cost, but not commercial use (see also Chapter 1.6).

1.3 Mapping Mash-ups

One of the main building blocks of the GeoWeb is Application Programming Interfaces (APIs), which enable providers of virtual globes to permit anyone to use their globe and combine it with new layers of geo-coded content. APIs allow for homogeneous access to the global stock of geo-referenced information and the composition of advanced applications. Various so-called 'mapping mash-ups' have emerged,[2] combining the capabilities of the mapping platforms with hitherto spatially-unable web services (Soutschek 2006). Basically, mash-ups are web applications that combine content from multiple sources in a way that is

[2] Examples are:
- Housing Maps: http://www.housingmaps.com
- Wikimapia: http://wikimapia.org
- HealthMap: http://www.healthmap.org

seamless to the user.[3] Some mash-ups even offer their own APIs to enable further mash-ups to be built. Mash-ups are also focused more on content combination than on service combination, but this is not compulsory, as APIs are somewhat of a service interface as well. Today half of all mash-ups are classified as mapping mash-ups that use geo-references to combine various web services and databases (Novak/Voigt 2006).

1.4 Collaborative Mapping, Geo-tagging and Volunteered Geographic Information

Open-data projects like OpenStreetMap (OSM)[4] are another building block supporting the emergence of the GeoWeb, since geodata from governmental and private sector mapping agencies is expensive and tailored to public-sector tasks. OpenStreetMap (OSM) was founded in 2004. The OSM community records geodata worldwide about everything that could be of interest and compiles all this information in a geo-database known as 'the planet file.' They use GPS-enabled devices to record tracks and Points-of-Interest (POIs) and to digitize geodata from authorized aerial images.

Next to their own contributions to a worldwide geo-database, commercial service providers invite their user communities to improve their own geo-databases. Examples are the MapShare Technology of navigations service provider TomTom (Fischer 2008) and Google Map Maker (Boulton 2010). Currently, more and more social network communities are integrating, or are even based on, the idea of collaborative mapping. Their members communicate, review and comment on everyday spatialities by using geo-referenced

[3] In contrast to mash-ups, SDIs use the concept of service orchestration, which actively calls and organizes a chain of web services. Mash-ups are rather new applications that emerge from the combination of content.

[4] http://www.openstreetmap.org

information. That is, user-generated contents are tagged with geographically explicit references, a practice that is called geo-tagging. Practices like this are subsumed in the term "Neogeography" (Turner 2006; Hudson-Smith/Crooks 2008; Rana/Joliveau 2009). The spatial annotations have so far been given various names, including place-tags, social tapestries (Lane/Thelwall 2005), geonotes (Espinoza et al. 2001) or sticky notes. They amplify communication between users by a common framework of orientation – the map (Drimmel/Riegel 2007). These participative approaches are an important part of the ongoing network revolution. People as prosumers smoothly change between consumption, creation and co-production of media content. They enable more people than ever before to recognize and solve local problems (Tapscott/Williams 2006).

It is symptomatic for the GeoWeb that it absorbs and conflates with the social media domain and changes the way geoinformation is produced, turning the traditional system of geoinformation production upside down. In the past, the production of maps was a task mainly for professionals like cartographers and geographers, who had a certain expertise in handling Geographic Information Systems. Public and private mapping agencies were the dominant institutions in producing and distributing geoinformation. That is why there is sometimes talk of the GeoWeb 2.0 (Scharl/Tochtermann 2007) being the real revolution. However, Gordon (2007) assigns the emergence of the GeoWeb by means of a massive emergence of online mapping services as a typical characteristic of the Web 2.0.

Public and private agencies still provide a large share of geoinformation for various administrative, scientific and everyday activities. But they are increasingly supplemented and, especially in the domain of everyday activities, replaced by virtual communities that collaboratively create geoinformation

contents. While geo-tagging commonly refers to the individual sharing of information tagged by geo-code, the term "collaborative mapping" rather indicates cooperation, a project of all users with an overarching aim. The participation of users allows for "crowdsourcing" (Howe 2006) of the production process and achieves a cost-reduction for the deployment and maintenance of geodata for applications. From the perspective of the traditional mapping agencies, crowdsourced geoinformation is termed Volunteered Geographic Information (VGI), because users are considered to participate voluntarily in the production process. In times of a declining supply of geographic information worldwide, Michael Goodchild (2007) gives a very contrastive view on both sides of production:

> The worlds of VGI and the traditional mapping agencies could not be more different. The latter represent the top-down, authoritarian, centrist paradigm that has existed for centuries, in which professional experts produce, dissemination is radial, and amateurs consume. Expertise in this world is measured with objective indicators such as advanced degrees; progress requires consensus and is therefore slow and deliberate; and costs rise steadily. The world of VGI is chaotic, with little in the way of formal structures. Information is constantly being created and cross-referenced, and flows in all directions, since producers and consumers are no longer distinguishable. (Goodchild 2007)

Goodchild expresses the concerns of governmental mapping agencies, which still consider crowdsourcing a 'difficult' topic. The qualitative requirements for geodata in public-sector duties are very high. The assertion of an appropriate data quality by crowdsourcing is a sophisticated task, and it seems difficult to ensure the reliability of administrative geodata that is required by law. Governments spend billions to create large-scale geographic data to fulfill their

civil and military responsibilities. Frequent updates are necessary due to the ever-changing nature of the earth's surface. Geographical completeness, i.e. coverage, is another indispensable requirement for spatial datasets that increases costs and is therefore another driver for the "natural" selection of geographic information collected by national mapping agencies. Goodchild (2007) states that "with some exceptions, only a very small fraction of human knowledge of the planet makes its way through the various processes used to acquire, assemble, and disseminate geographic information."

1.5 Long-Tailing of Geographic Information Media (Geomedia)

As the concept of 'Long Tail Economics' (Anderson 2006) suggests, collaborative mapping and geo-tagging in the GeoWeb environment can serve marginal geo-referenced information interests. While analogue geomedia such as tourist maps are rivaling goods and require large-scale sales, digitalization and Internet technology allow extensive democratization of distribution of geo-referenced information, and have done so since the early days of the GeoWeb. But the costs of production were still high: Governmental mapping agencies had to tailor production to administrative tasks, and private mapping agencies needed to align production on a broad and popular demand to create marketable products. Cost-intensive production of geo-referenced information could not serve specific or short-term spatial interests on the 'long tail.' But collaborative approaches to mapping created an environment for the democratization of the means of production as well (Fischer 2010b). Thus non-profit applications and applications for specific spatial interests, when they were realized, helped people to dwell in the GeoWeb. These 'geographic information media' (geomedia) are mass-market applications utilized by laypeople for everyday personal activities, with no professional scientific aim (Turner 2006; Goodchild 2008). They represent space

by a broad range of visual and verbal forms of expression. But novel legal regulations, business models and the diffusion of GPS-enabled mobile phones connected by mobile Internet are still essential components for the growth of the GeoWeb and the emergence of geomedia.

1.6 Business Models based on Advertising and Marketing

The provision of free-to-use virtual globes involves a great deal of expense on the acquisition and integration of global mapping data. Traditional business models in the geoinformation sector rely on selling products and data that are bound by legal regulations strictly limiting their usage. By contrast, the new actors in the GeoWeb environment combine their services with advertising and marketing. They simultaneously free up the usage limitations on virtual globes and encourage the creation of mash-ups and applications for consumers by novel legal regulations and licenses. Special licenses regulate private and commercial use and even grant a right of special use for science, education and non-governmental institutions (Google Inc. 2010; Microsoft Corporation 2010). OSM data is distributed by a Creative Commons Attribution-Share Alike 2.0 License (CC-BY-SA) and an Open Database License (ODbL). With these licenses, OSM data can be used for commercial reasons until the source is referenced and the end product is free for use again (Creative Commons 2010). The ODbL in particular protects collections of singular geographical features (Amos et al. 2009).

If applications are successful, they generate a certain audience and win its attention. The application providers can sell this attention on the advertising markets to generate revenues from their applications (Hepp 2004). Concurrently, the application providers collect information about the personal spatial characteristics, propositions and patterns of behavior of the users by logging

their present and past uses. In this way, application providers can 'up-value' the produced audience for the advertising market (Battelle 2006). In order to use the application, a user is not charged money, but his or her attention and private location information are monetized instead.

These advertising- and marketing-based business models are typical for applications in the GeoWeb environment that link location with advertising purposes. The models range from simple context-aware notifications to sponsored content that is part of the geographical search. Usually the number of Page Impressions (PI) affects the revenue (Sadeh 2002). Completely sponsored content is met with store finders, e.g. Starbucks, McDonald's or Aldi. The transition to location-specific models (Marketing Business Models) is fluent. These models focus on directing attention to the call of a local business. Although single local businesses are normally in the foreground, approaches for comprehensive city-wide marketing are not unusual (Fischer 2009). Since Google's and Microsoft's geo-browsers are the basis for most GeoWeb applications and do not allow for paid-content business models, the use of advertising- and marketing-based business models is rather determining. Paid-content models, which demand payment for the distribution and use of content and applications, are now barely implemented.

1.7 Location-based Services

As more and more location technologies, such as RFID, spread through the GeoWeb environment, GPS-enabled mobile phones have become a key component for Location-based Services and the GeoWeb. Location-based Services (LBS) are considered 'the' solution for managing and coordinating people, places and activities, as they enable a single user to access spatial information with respect to his or her current situational context of action (Raper

et al. 2007). On May 1st, 2000, the White House announced that the United States would stop intentionally degrading the accuracy of the Global Positioning System (GPS) for civil uses and thereby open a market for commercial uses of GPS (White House 2000). When GPS users got an instant upgrade of their devices' accuracy, they were enabled to pinpoint their own location and the exact location of a vast range of items. Since then, the number of GPS-enabled location-based services has grown relentlessly; by 2013, their market revenue will touch the U.S. ten-billion-dollar mark (Research and Markets 2011). The growing number of smartphones is driving the widespread use of mobile mapping applications. Gartner forecasts that Location-based Services and mobile search (including local search) will be among the top three mobile applications in 2012, while phones will overtake PCs in mobile Web access by 2013 (Gammage et al. 2009). Even over the course of the past year, mobile Internet use has grown by 17.3 percent in Germany (Tomorrow Focus Media 2011).[5] Today, maps, navigation and search are already the most popular applications on smartphones after news and games (Nielsen Company 2010).

Personal navigation is expected to remain the most popular consumer application over the next several years, but it won't be alone: Friend-finder, local information searches, family tracking applications, and enterprise applications (including workforce tracking and fleet management) will all find niches under the LBS umbrella. In 2008, friend-finding was anticipated to be the next service launched for mass consumption (ABI research 2008) and it is already moving forward, as we see in Google Latitude, Facebook Places and Foursquare. To ensure the future success of LBS, however, some important service-related

[5] This survey also revealed that 20 percent of people interviewed indicated that they used stationary Internet less frequently due to mobile use.

developments are still required. Wider availability of all-inclusive data tariffs will spur service usage, which will in turn reduce users' concerns about how much data value-added services like LBS might consume. The numbers indicate that GPS-enabled mobile Internet applications are emerging as a fundamental building block of the future GeoWeb environment. Mobile applications are driving the development of the GeoWeb towards a convergence with pervasive, ubiquitous computing and the 'Internet of Things' (Weiser 1991; ITU 2005; Greenfield 2006; Bassoli et al. 2007).

1.8 The Expansion of Geomedia and its Ubiquitous Consequences

The determination of a user's location, or of user interest in a location, is an essential issue for geomedia, for both the users and the providers of applications in the GeoWeb environment. When Jon Udell used the term "geoaware Web" (Udell 2005), he referred to the salient point of the GeoWeb: It makes web-based activities aware of location and links them to territorial snippets on the earth's surface. Location awareness can be described as the ability of people to make decisions based on the awareness of their location and/or of the objects and people that may influence their decision (Beinat/Steenbruggen 2009). In the GeoWeb, location awareness is increasingly driven by the use of mobile phones, which accompany people at every turn, record their tracks and allow them to leave geo-referenced notes. It makes online communities, search and gaming sensitive to locality, and links web-based communication, collaboration and information collection (Schön et al. 2011) to a territory by geographically explicit references. Thereby a new geographical paradigm for the organization of the cultural sphere of the Internet emerges (Marotzki 2003).

Location awareness also supports new dealings with space. It supports a changing sense of place and a changing sense of the means of being local, which

are embraced by the term "NetLocality" (Gordon/de Souza e Silva 2011), referring to geomedia as a user interface for location-centered search, exploration, communication, interaction and transaction. At the same time, location awareness means *disclosure* of location and creates an immense data-source for location analytics, the analysis of the user's spatially related agendas for political, scientific and economic purposes (Fischer 2011a). Thus the practices of the GeoWeb might be both empowering and disempowering for its users (Pierson 2010; Gordon/de Souza e Silva 2011).

As a consequence, computer media are increasingly becoming metamedia (Manovich 2008) or media platforms (Döring/Thielmann 2009a; November et al. 2010) that no longer simply reconfigure the contents of other media (Bolter/Grusin 1999), but also integrate their production forms (Rogers 2009a). Many of these newly available digital media are created by the formation of new hybrids through the transformation of media into software that reacts to concrete medial requirements on location. For example, after the destruction wrought by Hurricane Katrina, 'placemarks' and 'map mash-ups' were initially distributed on the Web by inhabitants with local knowledge, before Google had incorporated this functionality into the software product (Crutcher/Zook 2009).

Geomedia research is thus confronted with the task, above all, of answering the question "What is media after software […] or, more precisely, what has happened to media after they have been software-ized?" (Manovich 2008) This question will certainly be raised when all sorts of objects fitted with RFID radio tags are incorporated into the Internet. "RFID forms part of the Google strategy," pronounced Google's "Chief Internet Evangelist" Vint Cerf, who simultaneously introduced one of his favorite topics: IPv6, the Next Generation Internet Protocol

(Boulton 2008; Schmidt 2011). The main feature driving adoption of IPv6 today is its larger address space, which allows any object to be given an Internet address.

Will geomedia therefore emerge in the near future as the *next great wave of modern digital technology*? There are several indications that this is happening:

Free data

A vast untapped reservoir of geo-located content in the form of GIS data referring to every part of the world has been publicly funded through taxation. Just as the early Internet relied on public funding and open standards to foster innovation, geomedia that work on the basis of GIS data are turning to the open sources that were also the groundwork of Internet development in the past.

Scarcity of information

The second argument in favor of the emergence of geomedia is scarcity of information. On paper at least, a claim of scarcity of information might seem at odds with the free availability of geodata. But just as the music economy only blossomed once music was available as a "thing" to be bought on records, an image economy might blossom only after images are allocated to temporal and locally limited spatial resources and events. Scarcity plays a very central role in this, as is the case with all economic processes. Even if digital data can themselves never be scarce (the basis of the current crisis in the media economy), the spatial coordinates still create a region of scarcity within digital information, since they limit accountability to geocoded data and the accountability of geocoded data.

Geosemantics

Linking geo-references with images creates the possibility of accessing the ever-increasing quantities of visual information. It is obvious that an increasing

number of images are being produced, transmitted, and stored on the Internet. This parallels the situation in the earliest days of the Web, even though at that point text-based data were to the fore: When information is present in excess, only accessing it determines whether it actually becomes available. The history of protocols and formats on the Internet demonstrates how a series of different types of orders were drafted to this end before the WWW standard finally became established (Haigh 2008). In the next step in development, these vast quantities of data were made available by text-based search engines. Metadata fulfill an important task in the search for images and the indexing of visual information, because the so-called 'content' of the image is limited in its ability to aid in a search through large numbers of images in a constructive manner – it's a problem of the "semantic gap" (Smeulders et al. 2000).

This is where location coordinates can help in the archiving and sourcing of images. After all, increasing numbers of appliances are now capable of linking image data with GPS coordinates. Image formats such as the EXIF standard used by most digital cameras already contain corresponding metadata fields. More and more cameras are utilizing GPS technology to geotag digital images automatically by recording the latitude and longitude of the location where each photo was taken. Photo-sharing Web sites such as Picasa provide options for sharing images on a map of the world and can utilize the information stored in the image's EXIF file to pinpoint the spot where the photo was taken.

Dan Catt, senior engineer for Flickr, who claims to have introduced geotagging into the Web sphere in March 2005, announced at the 2008 Where 2.0 Conference that Flickr will georeference its complete image stock. Thus in the near future one will probably not find on the Web any picture or any video that is not georeferenced. In the same year, Google announced a fundamental change in

their product policy: The shift from Google Maps to "Google *on* Maps" (Ron 2008), which pinpoints the development that Google's geosearch is becoming the platform for any kind of information we are looking for. Maps may thus become a dominant way of interacting with networks. However, even this may constitute only a first step toward the vision of one day establishing 3-D spaces as a medial interface (Manovich/Thielmann 2009). "Physical space, when rendered a tool, becomes a metaphor for the network" (Gordon 2009: 397). While it continues to provide instructions for navigating physical reality, it provides at the same time a platform on which all data can be plotted. This therefore leads us to pose the question of how the 'Internet of Things,' which has the tendency to withdraw from human perception, can actually be visualized (Bratton 2010).

In this sense, geomedia can lead the way for developments driven by the IPv6 Standard, in that the majority of objects that surround us can be given an Internet address. Our environment is thus increasingly medially addressable and can thereby be located. Geomedia are thus the forerunners of the change from an 'Internet of People' to an 'Internet of Things,' which makes research into them all the more important. This Internet of Things necessarily operates with an expanded meaning of the term 'thing,' that could, in essence, also be formulated as follows: "The Internet of Things isn't about the things; it's about us" (Goetz 2011).

2 (Geo)Media & Space: (Inter)Disciplinary Questions and a Step Beyond

Research into the phenomena of media and space linked to society ordinarily addresses either media sciences or geography. To do justice to the "rebirth of space" (Staple 1997: 219), media studies have been characterized by a recent 'spatial turn' in a similar way to other social and cultural sciences. On the other side and contrary to this development, geographic paradigms have experienced a 'de-spatialization' during the last decades, which finally led to a 'media turn' in geography. In consequence, these two perspectives are getting closer and closer to one another. The critical mapping research approach is meeting communication and mediation (media sciences), as well as mapping (cartography) and spatial approbation (geography). Finally, the concept of code/space is considered highly suitable to the present relationship between space, media and society from a transdisciplinary perspective and with regard to recent practices within the framework of a Geoweb on both the frontend and the backend.

2.1 The Spatial Turn in Media Studies

In his sketch on communication geography, André Jansson (2007) attributes the spatial turn in media studies (Falkheimer/Jansson 2006) not to localization technologies, but to even more fundamental technical innovations in the medial landscape. In addition to the establishment of televisual satellite transmission, he points to the shift from stationary to mobile telephones as well as from the office PC to the networked laptop, through all of which computer-aided user contexts become more fluid.

Like no other medium, the mobile telephone demonstrates that technology and the development of cities in the 19th and 20th centuries have fundamentally changed our perception of space (Buschauer 2010; Völker 2010). While up to now all things global were "reduced locally" (Krotz 1997) and all things public were

transferred to the private sphere, above all by television acting as a 'window on the world,' mobile media are characterized by the opposite, in that they evict the private sphere into the public sphere (Morley 2003). Even so, mobile media can be understood to be a "domesticating technology" (Silverstone 2006; Hartmann 2007). Downloaded micro movies, self-created pocket films, the exchange of mobile phone pictures, and casual and location-based games are all indicators of a converging personalization and localization of media practices (Hjorth 2009). Furthermore, it is only through mobile media and the social web, with their basic media practices of 'saving, sharing and storing,' that the fundamentals of the networked society are being brought to the fore (Castells et al. 2007). This observation has the following disciplinary repercussions for research in media and communication studies.

The proliferation of the spatial turn in media research reveals itself, among other ways, in (a) mobile, localizing media technologies and user habits that are expanding the media scientific subject area. Associated with this is the basic discussion on how new media and media platforms change our perception of location and space (Buschauer 2010); how they result in an expansion of spaces (Manovich 2005) and contribute towards a "tuning of place" (Coyne 2010); and how, conversely, it is only through multiple spaces that the requirement for medial multitasking is created (Mersch 2011) and a "visual regime of navigation" (Verhoeff 2012, forthcoming) is made possible.

Furthermore, (b) a disciplinary interest in questions related to space and location – an interest that goes beyond new individual media analyses – has become established. After numerous artistic "spatial upheavals" (Ott 2009) in modern art, the spatial turn in the arts has mainly resulted in bringing the scientific and artistic questioning of what is 'real' and reterritorialized space back to the fore

(Kudielka 2005; Wagner 2010). This is manifested, for example, in an observable dedifferentiation of modal and medial spaces in film (Agotai 2007; Frahm 2010) and through the appearance of fundamental "hybrid forms composed of media and space" (Demuth 2007; Manovich 2008). In this case in particular, a scientific focusing on medial/artistic practices in the transformation of geospace can be recognized (Gethmann/Hauser 2009; Avanessian/Hofmann 2010; Autsch/Hornäk 2010) – and this from different perspectives: three-dimensional (Schröter 2009), multi-dimensional (Manovich/Thielmann 2009; Jensen 2010) and orbital (Bexte 2008; Zinsmeister 2008; Bergermann et al. 2010). This development goes beyond what is understood to be art, as an "historical yardstick of spatial awareness" (Kemp 1996: 13). Spatio-analytical discussions can currently be detected in numerous cultural and socio-scientific subdisciplines – for example, in discourse theory (Glasze/Mattissek 2009), emotion research (Lehnert 2011), epistemology (Joisten 2010), science studies (Suchman 2007-10; Shapin 2010) and software studies (Mackenzie 2010; Kitchin/Dodge 2011). In addition, with the aid of the 'core discipline' of geography, there are attempts under way to integrate the (in some cases long-established) individual research directions of geography of art (DaCosta Kaufmann 2004), geography of music (Krims 2007; Johansson/Bell 2009), geography of literature (Moretti 1999; Piatti 2008) and geography of film (Bruno 2002; Lukinbeal/Zimmermann 2008) in a cross-disciplinary and cross-media fashion (Döring/Thielmann 2009b; Günzel 2009).

This has (c) consequences for media studies itself, as its "spatial forgetfulness" is subjected to a new evaluation (Winkler 2009), its spatial connotations are rendered more precise (Zenck 2010) and its "space inversion" experiences a differentiation (Günzel 2007; 2010). A shift in interest from questions relating to space to questions relating to location is taking place through the fragmentation

and parceling of spatial experiences, the medial collection of individual locational experiences and the use of mobile media as, essentially, a procedure "bound to location and grounded in contiguity" (Hagen 2009: 362). This feeds a research requirement for concrete case studies and media research related to location, as is made clear, in particular, by the historiography of technology, which is increasingly analyzing global media phenomena within their local situational contexts (Ceruzzi 2008; Schwoch 2009; Aspray/Hayes 2011).

2.2 *The Ohter Way Round: Despatializing Geography?*

Geography, i.e. human or social geography, is a scientific discipline that researches the relationship between society and space (Werlen 2000). At first sight this notification seems not very complicated. But a rough survey of the historical development of human geographic paradigms shows that this relationship is very hard to catch and that many conceptual problems and open questions occur.

To get over the theoretical deficits of classic geography (to describe, explain and relate things in spaces and regions), a *spatial approach* within (!) geography began to be established well before the recent spatial turn in social and cultural sciences in the early 1970s. In particular, the basic idea was to conceptualize space not as a reservoir that contains all entities and in consequence also society, but rather as a determinant regarding the distance between related things. The approach was to understand space as a system of positional relations and to explain social phenomena with the overcoming of barriers of distance (see Bartels 1970; Hägerstrand 1971; Abler et al. 1971; Hagget 1973; Carlstein 1986). But attempts to explain the social sphere with physical concepts of space (distance) attracted a major critique with regard to the suitability of natural and social sciences and a masking of the human as an individual actor. In consequence, new approaches

arose that did not focus on space per se but on the human perception of spaces as the cause of spatial characteristics of social phenomena. Within the framework of this *cognitive turn* in geography (see Downs 1970; White 1974; Buttimer 1976; Brassel et al. 1986; Golledge/Stimpson 1996), which was first established in the U.S, the basic research question turned from "How does space account for society?" to "How does the subjective perception of space influence individual decisions?" This was a very important step because social geography consequently turned for the first time into a social science, both in its concepts and and in its methods. Furthermore, it turned to a moderate constructivist basis in such a way that neither the environment, nor space per se, but the mediated and perceived meaning of space, was viewed as the prime mover in humans making (spatial) decisions. But the basic aim of explaining humans' spatial behavior, even with the new cause of perception, remained.

Based on the general critique of behaviorism, i.e. the validity of causal explanation on human behavior or rather on the hermeneutic critique of naturalism and causality in social sciences (Weber 1924), a re-orientation of social geographic paradigms began to be established in the late 1980s with regard to social theory. Paasi (1986) delivered a social geography concept according to Giddens' Theory of Structuration (Giddens 1984) and Klüter (1986) in response to System Theory (Luhmann 1984). Both approaches, even when not in agreement with each other, had in common that for the first time (at least in European geography) the social geographic conceptualization of space radically turned to a social constructivist basis. That meant that space was no longer seen as an entity existing on its own terms, with a greater or lesser impact on the social sphere. Space, in these perspectives, was rather the result of social construction. Or, more pointedly, if nobody thought about space, space would not exist. Werlen (1987)

went one crucial step further. His suggestion was not only to think of space as a social construct; rather, he claimed everyday regionalization (= social construction of spatial meanings via everyday social actions) to be the central question of social geographic research. This idea turned the social geographic paradigms upside down: The question became not "What impact has space on society?" but "How does society construct space and what impact does this construction have on everyday life?"

Of all the impacts on social geographic theory, Werlen's social geography of everyday regionalization (Werlen 1995; 1997) was the most influential new approach. But as was to be expected, this constructivist turn was criticized from many directions (e.g. Meusburger 1999). The biggest reproach related to a feared abandonment of geography itself – a "space exorcism" (Blotevogel 1999). And in point of fact, Werlen's paradigm does not care about space itself. The basic idea is that any meaning of space and place is constituted via social actions (= regionalization). Based on three models of social action (purposive-rational, norm-oriented, intersubjective understanding), he defines three types of action-based regionalization: Productive-consumptive, normative-political and informative-significative modes of regionalization. In consequence, his research program is interested rather in the social production of the meaning of space by analyzing actions within the framework of these regionalization modes to identify the modes of socio-spatial characteristics of recent societies.

Despite all the critiques, Werlen's concept was bolstered by a) its social theoretic consistency, b) its suitability to (post) modern life conditions (Beck 1986; 1997), and c) the first empirical evidence (Werlen 2008a). At the latest, it had begun to prevail by the first decade of the 21st century. Based on the establishment of this constructivist concept of space in the geographic debate, new approaches arose

with regard to different social theoretic conceptions. In the beginning, these were mainly action-based, linked to Werlen, system-theoretic and post-structuralistic; later, they were more differentiated and crosscutting. But all of them had in common the view that spaces, i.e. regions and places, are a priori non-existent and are only constructed socially via cultural representations. They led to the scientific perspective of "new cultural geography" (Gebhardt et al. 2003), with the aim of researching the constructedness of geographies.

Ever since this *cultural turn* (at least in German-speaking social geography), the debate has opened to other, especially English-language, schools of thought and non-geographic concepts of social space-production, as well. Probably the most famous approach is Lefebvre's sociological theory of the production of space (Lefebvre 1993), which has had a renaissance in geography since the late 1990s (Schmid 2005). In this concept, space is characterized by the trialectic of spatial practice, representation of space, and space of representation. As Jekel (2008) points out, the conceptual suitability of Lefebvre's theory and Werlen's concept of informative-significative regionalizations is just one example of the increasing convergence between sociological and social-geographic theory development (Giddens 1984).

However, the state of the art in recent social geography is targeted to research the construction of spatial meaning and its impact for society. Based on the idea of informative-significative regionalizations (geographies of information and geographies of symbolic appropriation), it seems trivial that this aim can only be realized with the analysis of spatial meaning transport, i.e. communication in general. By the way, it was not least this assumption that led to a *linguistic turn* in social geography (Schlottmann 2008). But to get into recent (spatial) meaning construction, it is necessary to have an idea of the present constitution of

communication structures and information procurement regarding space and time. To get to the heart of this, it can be mentioned that our recent daily life has been spatiotemporally disembedded (Werlen 2000). Technological progress is coincidentally responsible for the sociotemporal acceleration of everything (Rosa 2005) and a time-space compression (Harvey 1989). This has two implications. In the first place, regarding the means of locomotion, the barriers to overcoming distance have rapidly decreased over recent decades and, in consequence, the scope of personal action has increased. But in the second place, and this is much more interesting, our exponentially increasing access to Information and Communication Technologies (ICTs) has pushed face-to-face interaction to the edge (even if it is still important), so that the bulk of communication nowadays is technologically mediated (Werlen 2008b). Nor is it only our one-way consumption of almost all our information that is highly engineered – so too is our communication with our social environment. This phenomenon had its origins in the emergence of the mobile phone network and has now reached an unforeseen intensity through the combination of Web 2.0 and mobile Internet. Concerning our relationship to spatiality, space (in a classic conception) seems to be a less and less important consideration for everyday life. Yet, on the other hand, spatial meaning production and its symbolic approbation are becoming increasingly multiplex throughout the modern, latterly decentralized, media. Glocalization (Robertson 1992) accounts for "space [having] lost its importance while gaining in significance" (Baumann 2001: 110).

In consequence, and based on the thesis that the meaning of space is produced via communication about space, social geographic research has to deal with this catalyst of (spatial) meaning transport, i.e. recent media. This notion finally led to a *media turn* in social geography that, according to Döring & Thielmann (2009a:

46-48), is typified by at least four strategies: 1) geography of media and geography in media, 2) media-generated geographical imaginations, 3) media construction and transformation of physical spaces, i.e. places, and 4) critical focusing on new geomedia. This last field, which arose as a convergence of geoinformatics and social geography from the ideas of the new cultural geography and critical cartography, *has a crucial importance for research within the society-media-space* '*triangle*,' since it deals with all aspects of recent geomedia as very powerful representations of space, as Lefebvre (1993) puts it. It reflects on the problematic rebirth of the traditional spatial approach in geography (see above) as part of the increasing impact of GIS and the dangerous geospatial re-reification of non-spatial categories in the course of a spatial turn in social sciences, as Werlen (2008b) argues with reference to the territorial war against terrorism, based on the ideas of Huntington (1996). Furthermore, it does justice both to the current rediscovery of spatiality throughout new geomedia/mapping technologies and to citizen empowerment regarding spatial interpretational sovereignty by new structures of meaning production through social media, i.e. the balance shift between production and consumption of information (Ritzer/Jurgenson 2010).

2.3 Critical Cartography, Critical GIS – Critical Mapping

The change brought about by the GeoWeb in the appropriation and production of geomedia, i.e. maps and geographic information, intensified and renewed studies in the field of critical GIS and in the inextricably linked field of critical cartography. Using one term for both, Jeremy Crampton speaks of "critical mapping," whereby he circumvents a definition of 'map' and rewrites mapping very broadly as a "human activity that seeks to make sense of the geographic world" (Crampton 2010: 12). Critical mapping, then, is a link between

geographical social theory and geographic information science (Sheppard 2005; Schuurman 2009). A starting point came in the late 1980s with the seminal work of Harley (1988; 1989), Pickles (1992; 1995) and Wood (1986; 1992). They criticized the technocratic and positivist approach of GIS and argued for a closer consideration of social and political impacts of GIS, regarding the social constructedness of spaces being represented. Pickles (1995) depicted "representational technologies (such as GIS) produc[ing] new codings and practices, and with them new possible geographies." Having been frequently used to communicate and naturalize the spatialities of administrative, economic and political interests in the past, GIS are considered to serve for the claim of objectively representing space. GIS act as agents that establish new perspectives on space and contribute to the constitution of our social conceptions of space (Harley 1989; Wood 1992; Elwood 2007). These scholars thereby form a basis for a social constructivist perspective on mapping and geospatial technology.

In GIScience, mapping space is normally considered only a method. Roughly speaking, it follows a rather process-oriented approach, driven by a linear map communication model that attempts to model the referencing between object and sign in cartographic presentation for fast and accurate perception by the user (Bertin 1974; Faby 2004; Jones 2010b). General stages of mapping include data collection, storage, processing and geo-visualization. In the very beginning, the spatial phenomena to be captured are defined, delineated, selected, and classified (Schuurman 2004). Every stage of production "is based on the translation of spatial phenomena into digital terms. […] Each of these transformations involves a subtle shift in the representation of spatial entities" (Schuurman 2004: 10).

Consequently, it was argued that GIS display a distinct perspective on space and exclude the diverse and differential spatial experiences and perceptions of individuals and social groups represented (Elwood 2006; Gryl et al. forthcoming). It was further argued that the conceptualization of spatial phenomena for GIS was a matter of discourse and power (Harley 1989; Mose/Strüver 2009; Crampton 2010). Hence mappings could never be neutral representations of space. They were products of hegemonial knowledge and a vehicle to produce and maintain these power relations (Harley 1988). On this topic, research work has been conducted on the mapping of global war (Cosgrove/Dora 2005; Strüver 2008), the construction of spatially-related identities (Mose 2009), crime-mapping (Belina 2010), and human-nature relationships (Wood/Fels 2008).

Critics added that GIS are narrowed to certain conceptions of space (e.g. by geometry) and certain forms of reasoning (e.g. by Boolean logic), leading to inadequate representations of non-European conceptions of space and the communicative rationality of everyday life (Sheppard 2005). They also argued that expanding the use of geographic information technologies in society is likely to enhance social inequalities, because social actors have unequal access to them.

After this deconstruction, GIS was gradually reconstructed on a participatory basis that is used for civic participation and public decision-making processes. In particular the reconstruction aimed to include communities in the discourse of GIS. The participatory GIS approach expands the representational capabilities of GIS software to incorporate, represent and analyze differential experiences and perceptions of space and place, and alters their access to and use of the geospatial information. It does not limit GIS to process-oriented issues but focuses on how people represent their geographical environment and who has the authority to

represent space (Elwood 2006). Through this process, research on the political and social implications of techniques for representing people and place play an increasing part in GIScience.

In the 1990s, critics worked continuously towards a research program concerned with epistemological, representation, ontological, socio-economic and participatory issues of GIS. Geographical research, urban planning and other forms of spatial decision-making – such as forest resource management, environmental planning and monitoring – were considered (see Elwood 2006; Schuurman 2009) to be suffering from limitations of technology by means of:

- The exclusion of knowledge from decision-making processes
- Software that obscured the hidden assumptions of the technology's spatial analysis
- The god's-eye[6] view erasing the social, political and economic contexts of spatial phenomena.

Against the backdrop of the emergence of Geomedia, the democratization of production and consumption of geographic information and the mash-up of mapping services and online communities have softened many of these limitations, making it possible to share, communicate and collaborate on places. However, these research issues become ever more important if one is to look behind the curtain of transformation of mappings and a vast amount of new and differentiated geomedial practices driven by:

- New forms of representation: StreetView, Augmented Reality, Social Network View, Location-Based View

[6] The god's-eye view is to be understood as the perspective conceived from a cartographer form above (Goss 1995).

- New modes of production: Prosumption, tagging, online communities, business model
- New contexts of use: Everyday activities, neogeography
- Mappings as interfaces to interact with any spatial resources (increasingly computed resources: Internet of Things), rather than solely a representation of space.

From this perspective new research questions arise and old questions from critical mapping gain new actuality (Crampton 2010). Glasze (2009) refers to the use of geomedia and their impact on the appropriation of space. He argues about the power of spatial filtering and classification, and the authority of commercial service providers over it. Finally, he points to an investigation of the practices, negotiation processes and authorities that affect mappings, e.g. inside Google Inc. or in OpenStreetMap (see also Boulton 2010). Furthermore, several recent issues from critical GIS apply that concern aspects of the digitial divide and exclusion driven by geomedia. Distinct hierarchies might remain that separate potential users by financial and technological means, by expertise or even by geographical locations. Just how user communities link new knowledge to social, political or economic change is still disputed. Therefore Elwood (2006) has already argued for participatory GIS, to examine the diversity of ways that geospatial technologies are used to produce knowledge and meaning. A particular aspect regarding new geomedial practices is the emerging challenges over ethical issues, with a focus on concerns about seeing, watching, representing and disclosing through contemporary geographic technologies (Elwood/Leszczynski 2011). The debate about surveillance and privacy concerns the use of location sharing services, as well as the legal responses to Google's Street View and Google's varying responses to objections against it.

Summarizing, and in order to describe the profound structural change from 'New Media' to 'More Media' (Manovich 2009), geography and media studies are currently reconstituting their fields of research, employing a double focus: On the social and cultural practices acting on their respective media, and on the media acting on their practices. Research in cultural and social studies has performed a 'praxeological turn' and is increasingly investigating medial or mediatized phenomena, with highly differentiated connections between places and cyberspace taking center stage.

2.4 Getting over Disciplinary Borders: The Concept of Code/Space

A very promising approach to get into this relationship between software and spatiality is the well-prospected and cross-disciplinary concept of code/space (Kitchin/Dodge 2011). A basic assumption of the code/space concept is that the Internet does not operate independent of spaces; rather, there are subtly evolving layers of context and practices that fold together people and things and actively shape social relations. Indeed, places themselves are turning into a constellation of computers (Batty 1997) as ICTs have a material effect on how cities and regions are configured, built and managed (Foth 2009; Graham 2004). In order to understand the logic of new media we need to turn to computer science, and go from media studies to software studies (Manovich 2002). That is, instead of asking about the relationship of the program or the media with the world, we should ask how functionalities, components and codes work in the world. Here Kitchin & Dodge (2011) refer to Actor-Network-Theory (Latour 1993), which conceptualizes software as an actant in the world. Kitchin & Dodge argue that software codifies the world into rules, routines, algorithms, and databases. Due to its technicity, software holds a secondary agency as it extends and executes the agency of a primary agent, e.g. a programmer, politician or user (Mackenzie

2006). 'Technicity' refers to the extent to which technologies can augment, supplement, mediate and regulate our lives and open up new possibilities.

According to Kitchin & Dodge, software is embedded at four levels of life:

- Coded objects (e.g. mobile devices)
- Coded infrastructures that link coded objects or are regulated by software (e.g. the telephone and the water supply)
- Coded processes that include a coded infrastructure and a coded object (e.g. the ATM)
- Coded assemblages that combine coded infrastructures (e.g. airport billing, ticketing, check-in, baggage routing)

These codes shape daily interactions and transactions, and their failure can mean inconvenience or even make the difference between something happening and not happening. The work these objects, infrastructures, processes and assemblages do is the product of people and things in time and space. Concurrently, it has consequences for other people and things in time and space. Thereby it works across geographic scales and times and produces complex spatialities. Dodge and Kitchin conceptualize spatiality as being ontogenetic in formulation, that is, constantly in a state of becoming. Referring to Thrift & French (2002) and Zook & Graham (2007), they assume a dyadic relationship between software and socio-spatial practices that form a code/space. Based on Adams (2009), this relationship is not considered deterministic or hierarchical but is labeled as heterarchy, as the container and the contained are never fixed terms.

Code/Space

In code/space, people depend on software to do things and cannot do them without it. Any space that has the capacity can be transduced by code and

constitute a code/space (e.g. a laptop & Wifi transduces a cafe into a work space). Code/spaces can be deterritorialized (e.g. a work-space in a cafe, a bus-stop or anywhere) or territorialized (e.g. a supermarket) and thereby bound to a certain territory.

Coded Space

In a coded space, software makes a difference to the transduction of spatiality, but the relationship between code and space is not mutually constituted. In coded spaces, software often performs augmentation, facilitation and monitoring for people, while in code/spaces software performs control and regulation for people.

On the basis of this approach, geomedia are considered coded infrastructures by means of geo-coded captabases that are created, negotiated and used by both human and technological actors (such as sensors). They facilitate the linking, access, filtering and alternation of properties of located resources (mobile or immobile) by means of geo-coded features, such as Points-of-Interest (POIs). As a characteristic, "coded infrastructures create shifting, scaling networks linking together different actants located at distant sites or even on the move" (Kitchin/Dodge 2011: 77). That is, geomedia transduce spaces like bikeways, restaurants and public spaces as they connect these places by geo-code to global media of communication, making them negotiable, accessible and approriatable for users. The GeoWeb offers different qualities to code space as an infrastructure. While location-based games might re-code space by gamification and make quotidian and functional spaces into meaningful fantasy playgrounds, local search media can make people perceive places differently by reviews and check-ins (see Chapter 3.3), creating new relations between consumers and business owners. Hereby geomedia foster new forms of creativity, governance

and empowerment related to the users' spatial practice, e.g. enhancing their power in consumptive activities. But while geomedia allow users to do things in a new way, they also drive automated management and are a key actant in creating a society of control. Aspects of everyday life are transformed into databases that allow for social sorting (e.g. redlining unprofitable communities) and various ways of surveillance (Kitchin/Dodge 2011). Adriana de Souza Silva (2011) differentiates between government surveillance, corporate surveillance and collaborative surveillance.

To get back to the Googlization of space, a research program within the framework of *all* these thoughts mentioned above, i.e the convergence of digital (cyber)space, mediation and everyday life, would therefore also need to take the Frontend and Backend Googlization into consideration (Rogers 2009b) – i.e., not just the aesthetics, order and appropriation of geoinformation that is transported through the interface, but also the algorithms underlying the mash-up practices (Fuller 2008), the hidden tools and techniques that are most often not visible but unavoidably structure media content spatially in the Web.

If Frontend or Backend GeoGooglization is discussed in the following, then this is, however, not primarily with reference to distinguish different technologies, but is simply heuristic, allowing to characterize the diverse expansion of space and spatial contructions that are inherently linked to frontend and backend technologies. From the perspective of power structures, this kind of differentiation can be meaningful for the circumstance that the backend indicates "power through coercion" whereas the frontend represents "power through consent" (Gramsci 1971). Both poles therefore link questions of power, technology and represeantation while simultaneously referring to different spatial concepts.

Let us start with the frontend part, the geomedia practices and appropriations people are aware of and which more and more people are choosing intentionally.

3 Frontend GeoGooglization

This chapter presents substantial practices related to geomedia that emerged within the current adoption of geomedia technologies. As these practices belong to modes of filtering, searching and navigation mainly on the user side, we term it 'frontend GeoGooglization'. Based on Crang & Graham (2007), we apply a typology of the various geomedial practices that facilitate the 'becoming' of urban environments. We attempt to assign examples for every category. However, several use practices might belong to one application, and vice versa. Firstly, *Augmented Space* refers to all practices that belong to the representation of spaces, providing multiple views of space. These views add, reflect and enhance the user's social conceptions of space in the process of interpretative adoption but do not alter the emergent properties of the city. Secondly, *Enacted Space* emerges in geomedial practices that relocate agency in the world (Crang/Graham 2007). It refers to practices that might be broadly ascribed to the domain of geo-tagging, locating and collaboration, even making people into sensors (Goodchild 2007) and actants (Calabrese et al. 2007) in public spaces, mobility spaces or political spaces. Enacted spaces emerge from practices that react upon and change the social appropriation of spaces directly. Thirdly, *Transduced Space* refers to the concepts of code/space and coded space (Kitchin/Dodge 2011), as mentioned in Chapter 2.4. If geomedial practices hold a transformative capacity for the becoming of space they might be considered to transduce spaces, creating new and unanticipated modes for the appropriation of space.

3.1 Augmented Spaces

The most widespread way of augmenting space has been the paper map but within the GeoWeb environment several new practices of mapping have emerged, presenting different views of a world that is increasingly utilizing mobile devices and their capabilities. They extend from the god's-eye view to a location-based view, a social-network view to a street view. Those practices of mapping follow a similar technical approach, based on a process of data collection, storage, processing and geo-visualization (Schuurman 2004). The paper map and its digital equivalents follow a strictly absolute approach to represent space. They present spatial objects of interest by geometry (e.g. a point, line or area) and signatures that are defined, captured and selected by the cartographer, an editorial team and/or the crowd (Howe 2006), then projected onto a planar grid of the earth's surface. The projection surface is defined by a mathematical approximation of the Geoid (e.g. spherical or elliptical), where every place can be defined by cartographic coordinates (Hake et al. 2002). These maps are usually topographic or thematic maps. The dominant operator for such maps is distance, applied in measuring distances between objects, measuring objects, identifying objects within an area (buffering), and making statements about the proximity and neighborhood of objects. In GeoWeb environments, maps are normally composites of an overlay of multiple layers (e.g. land use plus streets plus Points-of-Interest), which is the "sine qua non methodology of GIS" (Schuurman 2004: 3).

Maps provide a powerful means of detecting patterns of distribution, diffusion and clustering of objects in physical space. However, maps are not vessels of

perfect fidelity on either the physical level or the symbolic level. The technical process of projection and approximation of the Geoid entails various sources of distortion that can have real implications for our understanding of international relations, e.g. the true size of Africa (G.D. 2010), or the range of North Korea's missiles (Jones 2010a).[7]

Besides the technical level and according to research work in critical mapping, maps are a powerful means for the individual construction of meanings in the physical environment (Wood 1992; Schuurman 2009; Gryl et al. 2010). Their god's-eye view in particular is said to erase social contexts and the position of the user (Goss 2003). They naturalize meanings attached to distinct territorial spaces that are selected and generalized by various institutions and social actors that are involved in their production. Similarly, the underlying principle of the map allows for constructions of social space that are mainly restricted to physical distance.

While paper maps mainly display one of the multiplicity of attachments of meanings (Wood 1992), in the GeoWeb environment map signatures allow for a much broader negotiation of meanings as maps become windows to an unlimited amount of location-based information and interaction (Edsall 2009; Loidl et al. 2011). Several mobile location-based services use a similar distance-based approach but abandon the god's-eye view of a map in favor of a view from the user's location. It is a different mode of augmenting space, as it narrows down the view to the immediate surroundings.

In contrast to the god's-eye view of maps, the geo-social network view takes a different approach to augmenting space. Though still representing objects by

[7] The use of an unsuitable projection to show the reach of North Korean missiles prompted *The Economist* to question the importance of a missile defense shield in Europe (Jones 2010).

geometries and coordinates, the geo-social network view replaces physical distance as a paradigm with the social connectedness of places and people. Hereby the map is reworked from a distance-based representation of physical space to the representation of physical space by the means of weak and strong social ties within a social network platform, e.g. Qype.com. Referring to Crampton (2010), this mode of augmenting space provides a different way for users to make sense of the geographic world.

In recent years, Google and Microsoft have popularized another mode of augmenting space. They supplemented the god's-eye view with the street-level view, a new way of projecting the earth's surface and allowing users to roam it. Referring to that perspective, this mode of augmenting space might be termed street-view. Street views simulate a walkabout in cities, based on panoramic photographs of various urban canyons. The panoramic photographs are stitched together by geo-reference of their position, result in a continuous walkable map for the user. Thereby it applies a location-based view as well – not, however, referring to the actual position of the user, but to his viewing position on the map. Additional layers can be superimposed using geographic information coordinated to match the panoramic views. Admittedly, this means of augmenting space still rests on geographic coordinates – although technically, meaning is not attached to points, lines or areas, but rather to the spliced panoramic photographs.

Augmented Reality (AR) applications, such as Wikitude.com, Layar.com or Wayfindermobile.com, extend the street-view mode of augmenting space towards a real-time and mobile paradigm, with additional information and graphics being superimposed on the mobile's camera screen. Today's popular smartphones all have integrated cameras, GPS modules, large screens and

enough computing power to do Augmented Reality. Furthermore, fast mobile broadband Internet allows these smartphones to connect to major geo-referenced information databases such as Bing Maps, Google, Qype or all the geo-tagged articles of the Wikipedia. In contrast to direction signs and memorial plaques that tell everyone the same story, AR is considered to have the potential to replace those analogue locative media and customize information sticking to physical space and even overlay historical, future or fictional layers.[8] However, this way of augmenting space imposes new interstices for selecting and naturalizing meaning attached to physical space.

3.2 Enacted Spaces

Termed 'location-sharing' (Tsai et al. 2009), Facebook Places, Plazes.com, Dopplr.com and Google Latitude are exemplary applications where users share their past, present or future whereabouts. They set their position by address or by GPS-enabled geographic coordinates and distribute it to the online community, according to privacy-related rules for publication that range from private to friends-only to public. Thereby location-sharing practices enact public spaces as they are applied to get information about the surrounding area and to organize meet-ups with nearby friends as well (Fischer 2009). Enactment by location-sharing gives rise to new social interactions in the urban space. Research on the interdependence of geomedia and urban public space shows *that user participation* establishes new kinds of shared social conceptions of space and has implications for people's understanding and experience of urban public spaces (see also Humphreys 2007; Galloway 2008; Girardin 2009).

[8] http://www.augmentedrealitycinema.com; http://www.layar.com/browser/showcases/; http://en.nai.nl/exhibitions/3d_architecture_app

Another mode of enacting space relocates agency to algorithms of navigation or the collaboration of drivers (e.g. Waze.com). Automatic tracking even enhances the algorithmic power of navigation, as TomTom's HD Traffic shows. All traffic information from registered TomTom users is collected, processed in real time, and provided again to the users.

Space can be enacted by location-enhanced micro-blogging as well. Post-election tension in Kenya led to the creation of the Ushahidi application,[9] a platform that permits crisis mapping and empowers global citizen journalism by the practice of location-enhanced micro-blogging in political and natural crisis areas such as Sri Lanka, Haiti, Japan or Kenya (Schenker 2009; Bulkley 2010; Naone 2011a). Crisis mapping is commonly understood as the creation, analysis and visualization of real-time data for humanitarian response in crisis areas (Meier 2009). Users of Ushahidi typically share geographically referenced reports from inside a crisis area. This enhances a people-centered information collection for analysis and visualization by crisis reaction forces, field help and an international audience.

Many recreational and consumption spaces are enacted by location-enhanced negotiation and review that facilitate forms of social navigation, "a form of navigation, where people make decisions about their actions based on what other people have done or what other people have recommended doing" (Bilandzic/Foth 2009). It concentrates on the discussion, collection and exchange of information, opinions and experiences bounded by geographical references. Examples are local search media (TMP Direction Marketing 2009; De Mitri 2010) like Yelp.com, Qype.com or Google Places, where active users contribute comments and ratings about services and goods within the everyday living

[9] http://www.ushahidi.com/.

environment. In return, active contributors are rewarded with points for every review and obtain a distinctive status referring to their activity. The audience can retrieve the reviews and ratings in a form of sequenced contributions by location, including general information and photos for each location (Fischer 2008; 2010).

3.3 Transduced Spaces

Geomedial practices that refer to a transduction of space are deeply interwoven with the constitution of space. They become, so to speak, a part of the program of a spatial setting and impose new modes of space appropriation – modes that would not be possible without the practices facilitated by geomedia. One practice, certainly a controversial one, is geo-fencing. It provides a means of ensuring that an object or people are within geographical boundaries, while sending an alert to the user and to a third party (or solely to the third party) if they do not keep within their limits. The subject's movements are captured by location technologies such as GPS or WiFi-detection. Violations of the attached fencing can lead to a reaction by the controller. This practice produces a fenced space of control, often marketed to parents who are concerned not lose control of the action-space of their teenage children.

Another practice, widely termed 'check-in,' produces new consumer spaces, only available for those who check in, e.g. on Foursquare.com. Big businesses, like the U.S.-based consumer electronics chain RadioShack, use Foursquare to attract customers to their shops. Every user who checks in gets a 10 percent discount, while mayors get a 20 percent discount.

Gamification provides another bundle of practices that create transduced spaces, usually spaces of play. Location-based games, such as FastFootChallenge, Touraliy and GPS-Mission, transcend urban life by inscribing the game and their interactions over it. While the player is directed in space by the game rather than

by his personal quotidian habits, he gains a new perspective on space and a chance to reflect on his everyday spatial habits and configurations. Concurrently he experiments with new tactics of space appropriation while he moves through space in accordance with the rules of the game, interacting with other players and executing strategies to win the game (Fischer 2010c).

The various ways in which geomedia create coded space and code/space depict how user practices affect the performance of spaces, and particularly public spaces (see Chapter 5.1). Users apply frontend GeoGooglization to make sense of and negotiate the geographical world, handle social interaction and mobility, and transform space into new and playful environments. Thereby agency is partly relocated to geomedial software, co-constituting a social conception of space and affecting tangible appropriations of space. While users apply frontend GeoGooglization, evermore data on their locations, activities and preferences are created as well, constituting a partial reflection of the users' identity in the Internet. The following chapter will elaborate on the uses of these data in the backend of GeoGooglization.

4 Backend GeoGooglization

The proliferation of geolocation technologies opens up many possibilities for new user practices and modes of engagement. This section is mainly concerned with what is happening 'behind the scenes': Whereas the previous section focused primarily on the direct interaction and instrumentalization of technological tools by the user, this part is mostly concerned with those practices of locating users and objects that are not immediately visible and are also not considered as tools easily put into use.

We will then discuss a few examples of what these technologies do from a socio-technical perspective. What kind of regulatory spaces do they establish; how do they reorganize the Web? Attention is paid to issues of profiling: What does it mean to be an Internet user, what happens with the data that are produced, what do they link up to? These issues produce all sorts of questions about for instance civil rights, but also about the production of (scientific) knowledge in general.

4.1 Backend Web Behavior: Tracking Internet Users

As set out in chapter one, the GeoWeb environment thrives on advertising- and market-based business models in which personal spatial characteristics and patterns of behavior become the main currency for free services. In this paragraph we delve into how this information is automatically collected through web browsing, focusing on IP-targeting and cookies, and how these techniques have been analyzed as practices that redefine notions of space.

Geo-targeting through translating IP addresses is mostly delegated to the backend part of the system. A computer network address is required to send data from a sender to the intended recipient on the Internet. IP addresses are assigned to Internet users by providers, based on geographical criteria. This means that a geographical location can be indirectly allocated to an IP address (and therefore, indirectly, to an Internet user). Such IP geolocations are offered as a web service by a number of service providers, such as IP2Location or Maxmind. These services are essentially based on a tabular allocation of address regions to geographical locations, which can be obtained from the corresponding databases.[10] As the allocation of addresses by the regional Internet registries is subject to change, these tables need to be updated accordingly; this is guaranteed by the service providers who have specialized mainly in the prevention of credit

[10] See http://en.wikipedia.org/wiki/Geolocation_software.

card fraud. Through this process, Geo-IP data have been substantially improved in recent years (Clifton 2010). Their accuracy in terms of allocation at the country level is 99.8 %, although there are substantial differences within the different countries with reference to within how many kilometers an IP address can be located (Maxmind 2010). Therefore, the accuracy of geolocation databases on the city level is still contested (Poese at al. 2011). Although their accuracy on the country level is rather accurate, there is the possibility of using anonymizing techniques (for instance proxies).

In spite of this lack of resolution with reference to geographical addresses and the option of hiding an IP address by using an anonymity network (like Tor), hits of 90% are adequate for many services, e.g., ad-targeting (CPC Consulting 2007; Ott 2008), such that 'reterritorialization of the Internet' (Hoeren 2007) can be referred to within the context of IP geolocation and targeting. IP addresses are assigned in various ways – static, dynamic and hybrid – and all of them can mostly be related to individual users, when combined with other data available on a user's system.[11] As IP addresses identify sites or objects 'related' to a person they can be defined as "secondary digital identifiers" (King/Jessen 2010: 605). With the introduction of Internet Protocol version 6 ('IPv6') identification will be more specific as IP addresses are allocated to unique devices that would have been behind NAT-firewalls in the IPv4 era.[12]

Another example of identification mechanisms that are not very tangible is the use of cookies. To notice their presence, to visualize the fact you're being communicated with, you actively need to block them or add anti-tracking

[11] King & Jessen (2010:606) refer to a study done by Dinant (in Gutwirth et al. 2009) on DoubleClick in which the different IP addresses are sent together with a single cookie.

[12] However, as they determine (at time of writing) only a small amount of the Internet this issue is left aside here.

software.[13] Cookies allow for communication between the user's browser and the server of the website that the user wants to visit and they are regularly described as pieces of text or information that are installed on a user's hard drive. However, it would be more accurate to define them as 'mechanisms', because the 'data definition' of cookies obscures the process by which the information reaches the user's hard drive (Elmer 2004: 130). A browser requests a page from a server and the server sends back the page accompanied with a cookie. Through this process, the browser can be recognized by the server because the user's browser will send the cookie to the server at future visits. Unless cookies are disabled, the location of the user can be determined through, for example, the language settings of the browser or other preferences, such as time zone and search entries.[14]

The accuracy of these mechanisms of recognition needs some nuance, especially when they target users on micro-level. Some computers will be shared by different users (Elmer 2004: 17) and some users will consciously or unconsciously modify their search behaviour or 'game' the search-algorithm (Bollier 2010: 6).

4.2 Demarcation Practices: Familiar, National and Commodified Spaces

Techniques as the ones described above take part in wider demarcation processes that constitute different sorts of spaces in and through the Web. They mark the 'end of cyberspace' (Rogers 2008b), in which one could be anyone and everywhere:

> From a historical perspective on different understandings of the Web, location-aware Web devices indicate a next move away from the idea of cyberspace as a place-less web, to a space in which you are 'sent home by default' (...) Web software

[13] See for example, plugins for Firefox: http://collusion.toolness.org/ en http://www.ghostery.com/.
[14] Even if cookies are disabled, some users can be identified through a process restoring cookies (King/Jessen 2010; Zuiderveen Borgesius 2011).

> now routinely knows a user's geographical location, and acts upon that knowledge. (Rogers 2008b)

In this way, Web devices, and engines specifically, demarcate the Web into spheres which are "co-constructed by engine algorithms and site owner behavior" (Rogers 2008b). For instance, Google, by recognizing the user's location, organizes the Web into language spaces (Google.de), and platforms for communities from a specific geographical location. Video material on YouTube can be delivered differently according to the IP address of the user, thereby making the delivery more fit for the client, or restricting content when there is no license to stream in a certain country.

Some have expressed the critique that by adapting to the user, backend algorithms constitute more and more familiarized spaces (Elmer 2004).[15] Along similar lines, researchers have argued that geolocation technologies are one of the means – among others – of placing 'borders' on the – before presumably – borderless Internet (Svantesson 2004). As an effect the Internet may become more and more fragmented in separate networks – hence contributing to a further 'balkanization' of the Internet. This notion received public attention after Eric Schmidt expressed worries about excessive state regulations of the internet (DPA 2011), but the observation that the Internet gets organized in "multiple network families" is relatively old (Sagawe 1997). (Also this process is not limited to state regulation.) Attempts have been done to prove balkanization processes, for instance by researching query behavior and search traffic between and among countries, indicating that "countries in a similar geographic latitude (…) tend to

[15] This finding conflicts of course with the notion of the Internet as an 'open society' for the exchange of different opinions, or a public sphere, as is it sometimes thought of; in fact, there is a politics of information in the background. Studies of web behavior have problematized more democratic promises that are sometimes too easily read into the Web (Marres 2005).

have similar traffic destinations" (Baeza-Yates et al. 2009), or by showing selective exposure in political web browsing among countries (Kobayashi/Ikeda 2009). Others have, in comparative analyses, in stead stressed the importance of 'preferences' in the establishment of electronic communities versus geographical and technological determinants (Van Alstyne/Brynjolfsson 2005).

The effect of geolocation technologies can be analyzed as a process of 'importing' social borders, or setting limits, to the Web. Alternatively, when not envisioning 'social reality' as being located 'outside' the Internet,,location aware web devices can also be re-directed as a method for social research. For instance, by interrogating how 'rights issues' differ in different local Google results one can visualize different 'national issue spaces,' i.e. which rights are discussed in which countries (Rogers et al. 2009).

As the production of data becomes more and more integrated with the act of consumption (Elmer 2004), it is argued that Web space not only becomes familiarized or nationalized, but also commodified. As a follow up to the above, which is mostly limited to search, devices like digital maps, smart phones, image sharing websites and location-based applications constitute a new social-regulatory system of 'social navigation' (Lapenta 2011). Lapenta regards them as successors to previous regulatory systems like search engines for Web 1.0 and social networking sites for Web 2.0. More than just as a regulation of one's own social space, he argues, the individual's immaterial space is more systematically informatized and commodified, transforming users in a "commodified image" (Lapenta 2011: 22).

Findings as the above, which point to a 'politics of information' in the background, mark not only the end of cyberspace. They also conflict with associated notions of the Internet as a 'free' or 'open' society for the exchange of

different opinions, or a public sphere. In fact, studies of web behavior often problematize democratic promises that are sometimes too easily read into the Web (Marres 2005; Rogers 2012, forthcoming).

4.3 Issues of Profiling

Devices that identify – and adapt to – a user's location take part in larger processes of data gathering. It is therefore difficult to discuss the impacts of geolocation technologies in isolation. Location data can, for instance, potentially reveal a lot about a person in combination with other data, such as search entries. In debates about data tracking, 'surveillance' is one of the key terms. Surveillance scholars are basically concerned with the way technologies contribute to how the world is organized in terms of their power effects. This body of work is highly influenced by Michel Foucault (1975), who from a certain perspective can be, and has been, understood as a theorist of space.[16] Foucault's notion of the panopticon, which by its ordering of space had "self-disciplinary effects," is despite its age still an unavoidable point of reference, whether scholars are admirers or critics (Haggerty 2006; Lyon 2007).[17] The notion of the power of technology to make people think they are being watched and thereby modify their behavior is applied in various ways – for instance, to social networking sites like Facebook (Westlake 2008).

The application of the panoptic concept has also been widely criticized. One of the key arguments of its critics is that the type or architecture of the technologies

[16] Although some contemporary thinkers understand his work as a study of „inscriptions" (Latour 1990). Also others have maintained that Foucault's work is much fluid than a study of „stable spatial architectures" (Caluya 2010).

[17] Foucault's concept of surveillance draws on the panopticon as envisioned by Bentham. Through its architecture of visible cells around a central tower the panopticon would make prisioners 'feel watched' and make them behave themselves even in absence of the guards. It is an example of how the architecture itself provides an efficient power mechanism that would make the use of physical pressure obsolete.

has changed since the introduction of electronic databases (Deleuze 1992; Haggerty/Ericson 2000; Marx 2004; Haggerty 2006), especially the insight that contemporary surveillance is 'dislocated' and has left the enclosed spaces that are associated with the original concept of panoptic surveillance – surveillance has become 'mobile' (Lyon 2010). A whole strand of thinkers now calls for a different mode of thinking that transcends panoptic frameworks (Lyon 2006) and understands contemporary technologies in terms of networks or assemblages (Haggerty/Ericson 2000; Haggerty 2006). The idea of bodies being watched in a circumscribed space has given way to the notion of more fluid 'data doubles': "virtual/informational profiles that circulate in various computers and contexts of practical application" (Haggerty/Ericson 2007: 4). Those profiles can be used to predict behavior (Lyon 2007), or "targeted for intervention" (Haggerty/Ericson 2000: 606). The online profile or identity and the physical profile increasingly coincide, partly due to location data (Wood 2004; Lapenta 2011). According to Haggerty & Ericson (2000) the age of new surveillance is marked by the experience of the "disappearance of disappearance." Thus, although surveillance has left enclosed spaces, our bodies' movements become relocated.

To be located can hardly be considered a choice, because to be located becomes a requirement for getting access to all sorts of things. For instance, many websites don't function without cookies, making the 'agreement' between the user and the server requesting the cookie 'non-negotiable' (King/Jessen 2010: 600), and in some cases automated (Elmer 2003). According to Rogers (2008a), complying ('click-and-agree') has become a requirement for participation in consumer society: "Those passing most swiftly have their databodies well-formed, like good code." This phenomenon fits with the wider developments in Western

liberal societies in which, according to the social theorist Nikolas Rose, the securitization of identity becomes a condition for access to rights and goods:

> Citizenship is not primarily realized in a relation to the state, nor does it involve participation in a uniform public sphere; citizenship, rather, entails active engagement in a diversified and dispersed variety of private, corporate and quasi-corporate practices, of which working and shopping are paradigmatic. (Rose 2000: 327)

At the same time, he argues, citizenship becomes conditional upon conduct and self-management. What 'falls out' constitutes the 'risky individual.'

Taking this issue back to digital consumer society: Differentiations are being made between users on the "ability to pay, risk or eligibility of access" (Graham/Wood 2003: 229). In the process of collecting data and constituting data-bodies, it is not so much the individual himself who is of interest; it is the sort of individual. The collection of personal data is used to "discriminate individuals into previously categorized consumer lifestyle groups or 'profiles'" (Elmer 2004: 41), or to construct 'customer types' (Rogers 2008a). Those who fall out, and the potential 'social sorting' effect of surveillance (Lyon 2003), has become one of the central concerns among surveillance researchers. David Lyon argues that practices of categorization on the basis of geo-demographic information can potentially (re)constitute distinctions of social class (Lyon 2007: 64). Others warn of the construction of 'sensitive profiles', for instance, of people who, through their smart phones, are located frequently near to casino's (King/Jessen 2010: 608).

4.4 The User and Civil Rights

The unavoidability of being tracked has led to several responses by legal scholars and social theorists who argue for protective measures on behalf of the Internet user's civil rights. One move is made on the level of definitions. Going back to IP-

targeting and cookies, one of the important issues is whether the data produced can be considered 'personal.' Also, there is no appropriate definition of what constitutes 'sensitive' data (King/Jessen 2010; Jessen 2011). For some parties, the definition is relative to the 'phase' of use. For instance, the leading U.S. and EU industry self-regulatory codes (of the Internet Advertising Bureau (IAB) and the Network Advertising Initiative (NAI)) don't classify IP addresses as Personally Identifiable Information (PII) during the phase of *collecting* (King/Jessen 2010). The EU working party, however, does consider them as personal data, not only when they serve as unique identifiers, but also when they identify users through the help of other information. A similar argument goes for cookies (ibid.). In the code regulations cookies are seen as anonymous. By contrast, the EU Article 29 Data Protection Working Party (2011) considers data gained for purposes of behavioral targeting as 'personal' data (see also Chapter 5.6.3).

Others criticize the very process by which the data is obtained, stating that it is not in line with the European privacy and data-protection regulations. For example, the allowing of cookies is organized through the browser settings of the user; thereby the browser settings act as a partner in an agreement. Cookies are allowed for purposes of sending information or when they are necessary for a requested service, such as financial transactions; for other first-party and third-party cookies, the user has to give his or her approval on the basis of free will. Because some websites don't work without them, it is argued that they create dependency relations which conflict with the requirement of informed consent (Zuiderveen Borgesius 2011). Related to this issue is the question of whether users can make a decision that is sufficiently 'informed.' Most users would, due to a lack of time or a lack of knowledge, be unable to understand cookies and privacy statements, nor would they be able to estimate the (sometimes simply unknown) effects of being profiled (King/Jessen 2010; Zuiderveen Borgesius

2011).[18] The existence of various types of cookies makes this estimation even more difficult.

How the data are consequently processed raises several concerns about the impact on legally and philosophically defined concepts such as 'autonomy' but also about social security and the danger of exclusion and abuse (King/Jessen 2010; Hildebrandt/Van Dijk 2010; Zuiderveen Borgesius 2011):

- Behavioral targeting may restrict the user's autonomy because it steers somebody's choices on the basis of their past, the profile might conflict with somebody's self-definition, or there might simply be mistakes at issue;
- anonymized data can sometimes still be traced back to individual users;
- sensitive data may be given to insurance companies;
- unwanted commercial solicitations and exposure to potential types of unfair commercial practices can occur, as well as data security risks and identity theft.

One of the responses and demands on the part of civil rights supporters is that users should have some sort of control over their data. One approach is through implementing 'privacy by design' by adapting technological infrastructures to privacy requirements. Privacy Enhancing Technologies (PETs) are technologies that by their design take people's privacy into account. Examples are encryption technologies, anonymizing browsers, and proxies (Kühn 2009). Others argue that anonymity is only one part of the game. Users should have the 'right to access' their profile (King/Jessen 2010: 589; Hildebrandt/Van Dijk 2010). The argument is that conventional privacy measures cover only the phase of collecting, and not

[18] There are more layers within legal reasoning to the issue of informed consent. For instance, the consent which is organised through browser settings is also not *specific* because it allows for unknown cookies in the future. In addition, the question of whether (standard) browser settings can express an act of free will is an issue in itself (Zuiderveen Borgesius 2011).

what subsequently happens with it: "when the data is amassed, transparency ends" (King/Jessen 2010: 604). The posed claim is that one should be able to correct one's profile, also with regard to future profiling.

4.5 Locating the Principles of Digital Surveillance

Through privacy by design or the adaptation of civil rights to technological society, some of the concerns about the privacy of the individual can be addressed. However, there are more issues left that extend individual profiles. Take for instance the 'AOL case,' the release of twenty million search entries by AOL. The AOL case was a well-known example of a data set that was regarded as anonymous but parts could still be traced back to the persons who produced the data.[19] Besides this being a 'privacy issue,' the case also shows us something about the way AOL formatted their data (Rogers 2012, forthcoming). In other words, it shows how the user – as a data subject – is partly defined by the methodology. The making of data sets – or populations – takes place on the basis of certain markers of what constitutes a data set in the first place, i.e. the logic of what we can call 'population metrics' already enacts data subjects (Ruppert 2011). Therefore, the case is more than a privacy issue: We learn something about the processes of how people are *made up* (Hacking 1999).

Surveillance scholars argue that it is exactly through such practices of categorization – ordering datasets – that power relations are negotiated: "surveillance is not fundamentally about control of the person (though this is often both method and result), but about control of information and activity, the category and the action" (Donaldson/Wood 2004: 380). Because the development of technology and the drawing of these categories can be flexible, also the

[19] This has in turn led to creative interpretations, for instance the documentary *I Love Alaska*: http://www.minimovies.org/documentaires/view/ilovealaska.

impacts, for social groups for example, can go either way. This is what Graham and Wood argue:

> On the one hand, systems can be designed to socially exclude, based on automated judgements of social or economic worth; on the other hand, the same systems can be programmed to help overcome social barriers and processes of marginalization. The broad social effects and policy implications of digital surveillance are thus contingent and, while flexible, are likely to be strongly biased by the political, economic and social conditions that shape the principles embedded in their design and implementation. (Graham/Wood 2003: 229)

Reflecting on the impact of geomedia, how to investigate the principles and design of digital surveillance? How to research the way data populations are constituted and what categories and actions are inscribed into users? Many of the operations and effects of algorithmic systems are rather opaque (Graham/Wood 2003).

One of the main problems addressed in the literature is that a large amount of the relevant research material is proprietary data that is not easily accessed by universities (Lazer at al 2009; Bollier 2010: 2). Lazer et al. remark that even though contemporary 'social' behavior is leaving digital traces everywhere, these are mostly owned by companies in data sets of which social scientists can only dream. One example, famous by now, is 'Google Flu trends.'[20] This phenomenon is also referred to as 'now-casting': "the use of real-time data to describe contemporaneous activities before official data sources are available" (Bollier 2010: 20). The fact that so much data is proprietary data leads to several concerns, of which the privacy of data subjects is only one. Even the consequences for the

[20] Research on health seeking behavior by analyzing millions of Google queries disposed a high correlation with the percentage of physician visits reporting influenza-like symptoms (per state) (Ginsberg et al. 2009). The researchers therefore concluded that this method could help detecting future epidemics, being just ahead of physician visits.

sciences themselves has become an issue: It is argued that existing social theory, being bound to smaller data sets, is leaping behind corporate actors that perform their own research and that this development might result in "a privileged set of academic researchers presiding over private data from which they produce papers that cannot be critiqued or replicated" (Lazer et al. 2009: 721).

In the concerns presented above about the state of social science, expressed by Lazer et al., companies are framed as competitors for a public and autonomous ideal type of scientific knowledge.[21] However, corporate technologies have also become increasingly integrated in knowledge production within the academy itself, as they are more and more commonly used by academics (Van Dijck 2010). Van Dijk argues that because engines conduct their own 'user-studies' – free from the academic requirements to which academics are bound – this 'collective profiling' may eventually also shape the production of academic knowledge. Hyper reflexively, she also points to the phenomenon of these search engines having data on the search behavior of particular research communities. Note that this data in turn serves to accommodate users and optimize – or familiarize – subsequent search results. This brings us to the strange situation that we study Google and Google studies us. How this Google-science complex should be evaluated is an issue for discussion.

4.6 Conclusions and Suggestions for Further Research

Geolocation technologies have impacts in various forms. Web behavior has been observed to demarcate new spaces through location aware devices, practices that

[21] Empirically speaking, this ideal type is hard to maintain: studies of scientific practices have shown that science has always been a co-production of scientists and actors outside of the academy. This counts especially in online research, in which digital devices perform empirical tasks, a reason why Marres (2012, forthcoming) argues for a 'redistributive' understanding of social research that includes a reflection on what are critical methods.

reorganize the Web into increasingly familiar and national spaces or into commodified information environments.

Tracking users' location and search patterns also raise concerns about the effects of profiling. However, researchers are currently confronted with opacity with regards to how exactly practices of profiling take place. This is partly due to their complex nature, and partly due to a lack of access to the data. The way in which researchers in the current situation handle this situation seems to be by studying their effects or their traces. Two approaches to this have been touched upon in this section. One approach is to look at the 'social' effects for particular groups, by exposing "the ways in which these systems are being used to prioritize certain people's mobilities, service quality and life chances, while simultaneously reducing those of less favoured groups" (Graham/Wood 2003). The other is a medium-specific approach that takes the frontend of Web devices as a lesson about backend operations, as suggested by Rogers (2009b): What do search engine returns tell us about the info-political dimension of Web devices, and what do subtle changes of the engine's interface tell us about about algorithmic changes? A second step is to consider, subsequently, how these demarcation practices renew questions of social and political concern, for instance, by focussing on which demarcations control which type of action (Donaldson/Wood 2004) or which space allows for which type of politics (Rogers 2009b).

5 Classification within Social Action Fields

As the preceding chapters outlined, the production and use of geomedia are deeply interweaved into contemporary society, shaping various arenas of everyday social life. The following paragraphs briefly sketch ongoing changes in

policy areas relevant to current scientific and societal discourses. This chapter does not attempt to give a comprehensive view of all the arenas of everyday life that are affected by GeoGooglization. However, it attempts to bring together the views of Frontend and Backend GeoGooglization in a thematic perspective. It depicts the filtering, sorting and commodifiation of public space, the vision of friction-free consumption, and the role of mobile geomedia and collaborative mapping in mobilities and crisis management. While the use of geomedia pervades contemporary society, concerns about geodata protection, location tracking, geotargeting and virtual street viewing are being articulated in public dialogue. The demand for new regulations and the emergence of new practices using geomedia are indications for a new digital citizenry that is in need of grounded competencies in dealing with geomedia. Consequently, discussion of the issues of education and spatial citizenship is acquiring ever-greater intensity.

5.1 Public Space

A much-debated topic in relation to GeoGooglization is the changing nature of public space. While urban space has always been mediated by technologies such as the car, buildings, streets and signs, informational worlds also hold a peculiar structure and geography. While networked communication reconfigures the public nature of space in a way that "urban residents experience the local as a type of microenvironment with global span" (Sassen 2006a), the effect of mobile information technology seems dialectical. Facilitated by mobile devices, the Web pervades urban spaces and brings spaces into the Web, constituting the city as a "haze of software" (Thrift/Amin 2002: 125) that is "comprised of net localities" (Gordon/de Souza e Silva 2011: 85). Thereby global networked communication is not separate from public space and does not disconnect people from public space, but is rather a part of it. The GeoWeb provides additional technologies to

create new contexts of negotiation, visibility, memory and anticipation that alternate the performance of public space as a socio-spatial process, serving an urban society for expression, interaction, communication and confrontation with social reality in the urban heterogeneity (Klamt 2007). According to Schubert (Schubert 2000), a crucial criterion for urban public space is how space is used and conceived – because, regardless of ownership, the meaning of a particular public space arises from the people using it. Schubert implies that the conceived publicness of a space dedicated to the public can also be weakly developed, e.g. parking spaces (see also Rauterberg 2002). However, urban society certainly consists of a plurality of partial-publics of various kinds that constitute public spaces, sometimes even temporarily, as for an event. As this multiple appropriation of space implies conflicts, urban public spaces are lived spaces of differentiation and integration (Klamt 2007). While public spaces include streets, squares and parks as well as restaurants and train stations (Wiegandt 2006), types of spaces are covered that are ambiguously classified as private or public. Such hybrid forms are described as 'semi-public spaces' or 'domestic urban public spaces.' They are shaped by consumption activities, e.g. stores, shops and restaurants (Nissen 1998). Consumption is a matter of public space, since it not only attracts people to populate public spaces, but is also a part of public life. In times of social differentiation and individualization, consumption is vital for the negotiation of social belonging and distinction in urban heterogeneity (Jayne 2006).

Although geomedia do not signify the end of public space, they are changing the nature of how public spaces are conceived and used, particularly in the context of consumption. Thereby Frontend GeoGooglization and Backend GeoGooglization go hand in hand for a filtering and sorting of people and places.

While users employ geomedia to facilitate filtering, participation and empowerment in the appropriation of urban public space, they produce information that assists the commodification of public space and the potential disempowerment of users.

Research on location sharing shows that mobile social networks can encourage participation in the public realm and counteract a feared withdrawal from public space (Humphreys 2010). Furthermore, the use of geomedia changes what people pay attention to public space and thereby goes far beyond filtering by physical proximity. Local search applications, based on user-generated content, add symbolic meanings from below to the dominant meanings of places (e.g. in tourism). Users of local search applications attempt to evaluate and internalise the symbolic meaning attached to locations by profile, status and attitude of user-contributed reviews. Symbolic meanings of space refer to the identification with or the distinction from lifestyle communities, condensing at places like restaurants. Thereby they can achieve a tangible filtering of the urban contingency and are empowered to participate in a lifestyle community of their choice in public space (Fischer 2011c).

Referring to 'networked individualism' (Wellman 2001), the development identified by Fischer is of particular interest for networked individuals seeking to master urban contingency. Networked individualism results in individualized and fragmented spatial contexts of livelihood and the dissolution of activity-spaces. Concurrently, individuals still have a need for places that are meaningful for individual identification and sociability with peers. These barriers of appropriation are bypassed by local search applications, facilitating the mastering of urban contingency and even performing the appropriation to public space to a virtual audience (e.g. by checking-in at Foursquare). However, it is

debatable whether filtering by local search bypasses the experience of confrontation and heterogeneity in urban public space. Geomedia might contribute to the ongoing process of the social unmixing of urban public space and might have an effect on characteristic functions of urban public space. As physical proximity fades into the background during the exploration of public space with geomedia, locational factors potentially become less relevant, effecting considerable shifts in the urban fabric.

Recent research on local search reveals that contributing users experience an empowerment by means of citizen-marketing. They gain substantial power in the two-sided market of platform operators that mediates between local businesses and customers. Using local search applications, they add new meanings to public places as collectibles and commodities in order to pursue individual intentions of community forming and professional self-marketing. Thereby new modes of appropriation of public space are emerging that include partial publics having the capability to contribute to local search. In the course of this, however, those who are not able to contribute because they lack the means of production or access to the technology suffer user-disempowerment in the public space (Fischer 2011b). These new performances of public space might also lead to conflict with existing and well-established practices of non-involved partial publics.

Just as new meanings are added to public space in these ways, location-based gaming is considered to transform the meanings of public space into a new and playful environment (Fischer 2010c). According to Crang & Graham (2007), gaming fosters new social communities – that is, new partial-publics that constitute public space. While geomedia that transduct and enact public space add new meanings, creating new partial-publics and empowering users for tangible appropriation, forms of augmentation of space inherently transform the

publicness of public space, as the ongoing debate about Google StreetView and Microsoft's Bing StreetSide depict. These modes of augmentation provide public space with a visibility and memory that are accessible on a global scale, at any time, for everyone. It makes public space even more public and even more accessible for people. Yet at the same time these companies are very selective in how they augment public space, bypassing public space in rural areas and cities that are considered irrelevant for their customers, and potentially making them even more irrelevant in the future.

Some consider the augmentation of public space as life-enriching and a chance to gain influence on societal development (Biermann 2010a; 2010b; Best 2010). Others fear a decline in their privacy and increased corporate and governmental surveillance, e.g. in the greater ease with which building authorities can now hunt for unauthorized buildings (Czycholl 2011; Seemann 2010). At the moment we are in the middle of a process of learning and negotiation about how digital citizens practice and perform public space in the context of its augmentation. Consequently, it is uncertain how users will deal with the extended publicness and what tactics will emerge to appropriate it. It is also unclear what ethics will emerge for the new geospatial practices, and how the providing companies will be able to (or will have to) adhere to them in the future (Elwood/Leszczynski 2011). The providing companies play a crucial role, as they make the performance of public space by people a commodity for their advertising customers, profiling who is interested in what places.

5.2 Spatial Consumption

These commercial activities on commodifying public space are often driven by the vision of "friction-free consumption" (Crang/Graham 2007: 794), which attempts to facilitate social control by means of geodemographic information,

profiling users and replacing user-agency with a delegated or even algorithmic agency. Geomedia introduce a politics of visibility and memorization of potential consumers' actions in space, a politics of anticipating the uses of space. Geomedia, particularly mobile geomedia, shift the scope of geodemographics from a rather static view of households and Zip codes to a real-time view of the individual, location and action-space. Geodemographics assumes that individuals with similar attributes share similar consumptive patterns, often termed lifestyle, and that they aggregate in natural areas. The underlying spatial assumption is that neighbors, rather than non-neighbors, share a lifestyle (Goss 2003). Companies use geodemographics for analyzing and visualizing customers, target groups and lucrative sales regions for their goods and services. The widespread application of geodemographics for market analysis and marketing effects a systematic production of lifestyles both from consumers and for consumers. This is what Parker et al. (2007) denote as a recursive relation between 'class places' and 'place classes'. By clustering people with a similar habitus, market research spatializes social classes, i.e. consumer lifestyles. Thereby the complex interplay of identity, motivations and predispositions of consumers is reduced to measureable spatial characteristics and patterns in databases. These geodemographic models, mostly by means of idealized (not to say fictional) types of consumers or even anthropomorphized Zip codes, are used in order to materialize, customize and target consumer goods and services. Concurrently, the same geodemographics are used to sort customers who are profitable targets and those who are less profitable, in order to exclude the latter from marketing and service provision, e.g. in the granting of credit (see also Welchering 2010; Witte 2010). Thereby geodemographics systematically produces the conditions of its own reproduction, as commercial companies reify an abstract territorialization into a fundamental spatial unit of social life. They

address spatio-statistical lifestyle identities from consumers, to which consumers are exposed and persuaded to conform, while others are prevented from ever doing so (Goss 2003). Parker et al. (2007) describe this social sorting by software as a process of "place-making reflexive ontogenesis." Relating to social geomedia, he notes that users are even encouraged to present themselves as discrete socio-economic categories on the Internet and thereby reify patterns and profiles by software, e.g. findyourspot.com.

The combination of geo-databases, geolocation technologies and mobile media advances geo-demographics and many of its obstacles into the realms of actions-space, anticipation of consumer needs and real-time consumer response. It goes a step beyond saying "We know who you are and we know where you live" (Goss 2003: 1), to say as well, "We even know where you are now and where you will be in the future." The idea of location-based advertising is to send user-specific offers to mobile devices about nearby shops and restaurants, based on the current location, profile and preferences of mobile users (Rainer/Cegielski 2009). Thereby geomedia enable locations to remember customers, anticipate consumer demands and facilitate a data-driven mass customization (Crang/Graham 2007). The underlying data are collected and analyzed by single-platform providers based on user activities (like Foursquare) or by specialized companies for consumer location analysis, e.g. Locately (locately.com) or SimpleGeo (simplegeo.com). Foursquare's Merchant Platform (Siegler 2011), for instance, offers functionality for customer analysis, advertisement analysis and the creation of special offers for consumers using Foursquare. However, while 2011 was announced as the year of location-based advertising, it seems that the industry's dreams of friction-less consumption have so far not come true (Davey 2011; Coogan 2011). In this context, as in geodemographics, it is worth

considering how consumer location analysis produces the conditions of its own reproduction, how people escape these strategies of surveillance by counter-tactics and invisible movements (e.g. fictional localization, disconnecting geo-location technologies), and how they experience user-disempowerment. Such disempowerment arises particularly from the increasing pervasion of all areas of life by "dataveillance" (Solove 2004), making consumers even more powerless, as "they do not know what information has consequences because they don't know who's gathering it, why they gather it, to what cause they gather it and how they gather it" (Pierson 2010). This is also a matter of selling out locational privacy for free beer (e.g. check-in for free drinks) and the consequential curtailment of consumer freedom in exchange for participation in locations.

5.3 Mobilities

The embedding of computing into all facets of everyday life through the ubiquity of mobile phones calls for a mobilities paradigm that explicitly takes into account mobile communication alongside transport. Communication on the move allows for new forms of coordination, of meeting and of events for people and materials on the move (Urry 2007; Büscher et al. 2011). This new mobilities paradigm understands travel not just as a journey from A to B, but rather as the establishment of relationships between places. Therefore mobility is not separated from place, but shapes the richness of place and constitutes urban life through the movement and flow of people, material objects, maps and images (Sheller/Urry 2006). The enactment of connections from these movements produces privileged spaces, but also less privileged ones, such as happens for smart mobs by illicit meetings and political demonstrations. Thereby the interweaving of mobile communication and mobility is accountable for the loss of collective coordination, and yet concurrently creates new opportunities for co-

presence, enabling more personal forms of social networks to materialize. These social networks develop simultaneously in physical and digital space, embraced by the concept of hybrid space (de Souza e Silva 2011). Herewith mobile geomedia provide many starting points to connect the flows and places of a hybrid space and so to affect emerging mobilities. The techno-social worlds created by mobile locative media games also create new mobilities (Crang/Graham 2007). Location sharing, navigation and applications for fleet management are facilitators of new forms of connection that are still in need of unambiguous agreements and arrangements of time and location. Mobile local search provides a way to keep in touch with places for people who extend their personal networks on the move.

5.4 Spatial Crisis Management

The debate over the booming use of collaborative mapping for crisis management holds a prominent place in public discourse, as here the changes induced by social media become very clear. The crowdsourced creation of crisis maps, outside national crisis-management structures, became well known after Hurricane Katrina in 2005 and the Haiti earthquake in 2010 (Liu/Palen 2010). Today, examples come from every form of crisis, embracing concrete information for concerned people and their relatives, political observation, citizen journalism and the creation of public awareness. Crowdsourced crisis mappings bring together a range of information from crisis areas that helps or relates to the people and helpers in crisis areas and makes the global public aware of the events (Parks 2009; Bulkley 2010; Naone 2011a). Emerging from inside the crisis itself, the mappings strongly affect today's crisis management and the operations of backroom staff. The mappings are currently considered to display reliable and rather unbiased people-centered geographies of crisis. But while natural disasters

do not strike back, hostile political regimes under observation might well do so. Thus even crowd-sourced crisis maps might become a contested issue of manipulation, with their trustworthiness placed in doubt (Naone 2011b).

5.5 Spatial Education and Spatial Citizenship

As discussed earlier in this paper, the Googlization of space and the floating meaning of spatial reference frames in everyday life throughout modern communication channels, i.e. the Web 2.0, have a huge impact on how we correlate space, time and location to one another. In consequence, for a (post)modern society, it is important that citizens (as the foundation of society) are aware of these chances and potentials, but also of the risks of this shifting role of space and location. The most important way of mediating these new views to spatial 'reality' and enabling an emancipatory and responsible approbation of spatial categories and spatial information, is education. This should be understood in a broad sense and as a long-term vision. Contrary to recent trends in European education that have pushed the subject of geography to the edge of the curriculum (Donert 2008), education in geography should be given greater weight. Above all, it must acquire a new purpose. Citizens need to be aware of which phenomena are spatial in nature and which are not. In an era of spatiotemporal disembeddedness, it is important to realize the changed role of spatial impact. Critical thinking about the use of old spatial concepts of reasoning (like the territorialized war against a non-territorial enemy, i.e. terrorism) in general, and an awareness of personal and societal consequences of front- and backend practices in the GeoWeb, have to be encouraged.

As highlighted in the earlier sections of this paper, society is fluid, and our relationship to the world we have in common has changed in recent times. If one of the main aims of education is to integrate (young) citizens into society, then

(by implication) education has to change as well. Bennett et al. (2009) offer one very promising approach for a new direction in citizenship education. They argue that the 'result' of education should be a so-called actualized citizen (a counterpart to the dutiful citizen in classical concepts of political education) who is enabled to participate responsibly in society. They focus specifically on the new communication structures throughout the Web 2.0 that have rapidly changed the balance of power in meaning production over the last few years.

To put these ideas into the context of spatial approbation and into the framework of the GeoWeb, Gryl et al. (forthcoming) propose the idea of "spatial citizenship." This concept delivers a framework of competences aimed at geography education that are important for an emancipatory and critical everyday use of GI in a geoinformation society, and that mediate methods and skills to empower citizens' possibilities to participate in, for instance, spatial decision making. This is based on technical skills, but also goes beyond them and includes critical spatial thinking as well (see Figure 2).

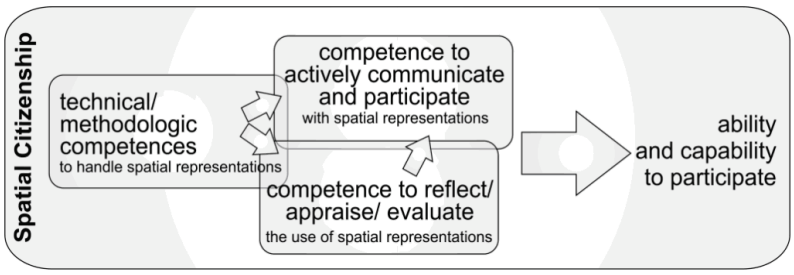

Figure 2: Spatial Citizenship – abilities to participate in a GI society (Gryl et al. forthcoming)

Therefore, spatial citizenship is not the end, but should be the beginning, of implementing these new phenomena of a geoinformation society into education on all levels (from preschool to postgraduate studies), in order to inform students about and empower them with these new modes of our linkage to spatial

meaning(s) on the road of such an "education challenge" (Goodchild/Janelle 2010: 10).

5.6 Geodata Protection

The debate surrounding personal geodata protection on the Internet has flared up in recent years mainly due to Google Street View, although Nokia too launched photorealistic 3D maps in the spring of 2011.

Since Lior Ron, the Google product manager for GeoSearch, made a link to the GeoWeb through a paradigm shift based on Google Maps – in that maps were no longer just one of many options for access to the Internet, but the dominant interaction environment (Ron 2008) – a similar product strategy has also applied to Google Street View. An isolated Web application with a particular functionality has transitioned to a whole new way of thinking about online searches (Gordon 2011). Google Street View is evolving from a sightseeing tool to a comprehensive representation of all the world's information on a map, and is thereby only the next step in this geomedially organized Internet of Things, which Lior Ron (2010) describes as follows:

> Once we actually have all the hyperlocal information fully featured and fully annotated, we can actually go to the next step here, also the final step, which is the hyperlocal Goggle set of information that will be leading us to identify every object in the world – let's say a mailbox or a sign or a window – we annotated in street view. We allow users to consume it in Goggle either by clear reference annotation or what Google does best is also, on top of that, identify a bunch of information that is not there before. And that's the only way for us to actually fulfill those use cases in that solution as well.

In spite of this comprehensive medial aspiration, Google Street View cannot invoke the media privilege as outlined in § 41 BDSG (Federal Data Protection

Law) in Germany, nor can a court of law view freedom of opinion and expression as overriding the assessment of 'commercial data collection and storage for the purposes of communication' (§ 29 BDSG). Based on their recognized media-statutory status, Google services do not aspire to make a contribution to the democratic formation of opinion, and no journalistic and editorial efforts are made to complement the graphic material (Ott 2011). Allow us to shed some light on the concrete legal situation in Germany.

5.6.1 Street Views

Over the course of the introduction of Google Street View, discussion of a so-called 'geodata protection law' flared up in Germany and created waves internationally. While it is unquestionable that images of passers-by involve personal data within the meaning of § 3 I BDSG, this is more difficult to assess in the case of images of house facades. In addition, there is as yet no clear line in jurisdiction or in the literature on what type of connection between a person and an object must be in place for it to come under the application of any data protection law (Caspar 2009; Spiecker gen. Döhmann 2010).

On principle, the collection of these data requires an assessment of the interests of the affected party and those of the responsible agency (§ 28 Para. 1 Item. 3 or § 29 Para. 1 Item. 2 BDSG). During this process, an investigation must be carried out into whether the interests of the party that is affected by the data collection and that is claiming protection clearly outweigh those of the agencies collecting and processing the data. Google collects its geodata from publicly accessible sources and the information obtained from this provides an image of the social situation. For this reason, the literature prior to 2010 tends to support the view that there is no clear recognizable overriding interest on the part of the owners or inhabitants with reference to images of houses (Ott 2010).

However, over the course of 2010, public discussion increased in volume. In some cases, the press fueled a fear that criminals might exploit Street View images (Metz 2010), as well as a fear that the private sphere would be violated. Google featured frequently on the front pages of the tabloid press (Eisenlauer 2010). All this was accompanied by political activism and criticism of the data protection agencies.

On 7th May 2010, Hamburg and the Saarland submitted an initiative to the Federal Council for changes to the Federal Data Protection Law (Bundesrat 2010; see also Deutscher Bundestag 2010). The draft legislation was to include many points with which Google had already agreed to comply. In the press, the proposed law was dubbed the "lex Google" (Carstens 2010). Among other things, it stipulated that corporate logos and vehicle number plates must be rendered unrecognizable before the images were posted on the Internet or made available within the framework of another service, for example, a navigation system. A right of objection newly incorporated into § 28 Para. 4a BDSG was to grant house owners and tenants the unconditional right to object to images of the building being posted on the Internet.

Individual points in the draft posed some problems, as they threatened to undermine the principles of 'freedom of panorama' and the freedom of the press (Lißmann 2010). The right to free use of public spaces includes the right to photograph landscapes and buildings adjacent to public paths, roads and squares and the publication of the images on the Internet. Finally, in order to guarantee protection of the private sphere, the regulations intended to stipulate the maximum height at which cameras could be mounted (Ott 2011).

The Federal Government has now decided not to pursue the draft legislation any further for the time being. Instead, a self-regulation codex is supposed to render

legal regulation unnecessary. Some of the main players (namely, the Deutsche Post DHL, Deutsche Telekom, ED Encourage Directories, Google, Microsoft, Nokia, Panogate and Panolife) signed up to such a voluntary agreement to protect geodata on 1st March 2011 (Bitkom 2011b). At the core of the voluntary agreement is a central agency for information and objections on the Internet, where citizens can obtain information on the respective geodata services and from where they can submit to the individual service providers any objections they have to the imaging of their houses (Bitkom 2011a).

5.6.2 Location Tracking

Although the self-regulation codex appeared to have brought the discussion to its conclusion for the time being, subsequent revelations that Apple and Android phones routinely tracked handset whereabouts put the issue of geolocation squarely back in the spotlight (Williams 2011; Hotz 2011). Discussion is now proceeding at the European level as to whether geolocation data must be considered as personal data within the meaning of § 3 Para. 9 BDSG (often also referred to as 'sensitive data') – that is, whether geolocation data should be ranked with information used for identification, such as date of birth, names and other key details (Mitchell 2011). An expansion of this catalogue to include personal locational data would of course result in a requirement for greater regulation of companies with reference to the use of such data.

On 16th May 2011, the European Commission's Article 29 Data Protection Working Party released its opinion on the status of geolocation data for the purposes of European privacy legislation. The Working Party proposed that all geographic location data, including GPS, GSM and WiFi tracked data, as used in a wide variety of services such as mapping, geotagging, augmented reality and location-targeted advertising, should be protected in the same way as any other

type of personal data under European law (EU Article 29 Data Protection Working Party 2011).

The implementation of the EU regulation proposal will not be immediate, but the existence of the working party's opinions will force a rethink on how operating systems interact with users. In the near future, therefore, at a minimum, "a user must be provided with an easy way to withdraw their consent, and consent may need to be re-confirmed at regular intervals, depending on how the user accesses the tracking service. The national laws of the various EEA Member States or their regulators may also impose additional limitations or requirements. For example: German law requires that telecommunication providers request consent from the users if they want to use location data generated by those users for any purpose other than the provision of the service. In addition, users have to be given the opportunity to block the transfer of location data for each individual call or message" (Taylor 2011).

If we recall the discussion on Google Street View and location tracking, we see an interesting differentiation at the statutory level (Jessen 2011), whereby "general geographic data need not be considered, but precise, real-time location data are of concern." Real-time location data would therefore have to be included in data protection and privacy laws, whether in the EU or the USA, based on the definition of 'sensitive data.'

5.6.3 Geotargeting

'Geotargeting' (also called 'IP targeting' or 'geolocation') is understood to mean the allocation of an IP address to its geographical origin. The aim of this type of determination of geographical origin is the automatic updating of the contents that are accessed on an IP address. The main applications of this technology are the switching of nationally or regionally differentiated advertising (so-called 'ad-

targeting'); the country- and language-specific design of offers on the Internet; the exclusion of users due to censures or national statutory restrictions (YouTube does not provide access to certain videos in some countries due to licensing problems); and the analysis of user streams based on locational criteria (e.g., with Google Analytics).

IP addresses constitute data linked to a person, and the storage, use and transfer of such data basically requires permission pursuant to the Federal Data Protection Act (BDSG) (Westerwelle 2011). A possible legal option for obtaining agreement from the user would be a pop-up window that offers to locate the contents that have been accessed when a website is accessed and that requires confirmation, e.g., tick-in-the-box. However, due to the duty to provide confirmation and duty of provision (Wedde, in Däubler et al. 2010: 128ff.; Taeger, in Taeger/Gabel 2010: 170 et sqq.) and the associated effects on the user, this kind of procedure makes geotargeting unattractive. It is therefore not used in practice.

The regulations of the German Teleservices Act (TMG) also have little effect on geotargeting. These regulations only govern a) the permission to process user data if these are required for the use of telemedia (§ 15 Para. 1 TMG) or b) the permission without contradiction for service providers to produce user profiles for the purposes of advertising, market research or needs-based design of telemedia (§ 15 Para. 3 TMG). These user profiles, however, only refer to pseudonyms, which is why this empowerment conflicts with the determination of a location, as, by definition, it contradicts the nature of a pseudonymization.

In summary, it is clear that the processing of IP addresses within the context of geotargeting is not covered by circumstances in which permission is granted under relevant legislation either by the TMG or the BDSG (Westerwelle 2011: 133). Geotargeting is only legally possible under the following conditions:

> Due to the personal nature of these data, the analysis of user behavior by using full IP addresses (including geolocalization) is therefore only permissible with the express, clear consent of the user. If no such consent has been obtained, then prior to any kind of analysis, the IP address must be shortened so that it cannot be attributed to an individual. (Dankert 2009, own translation)

However, anonymization of the IP address has repercussions for the precision of the targeting of the location. This is dependent on the number of decimal places. IPv4 addresses are usually written decimally in blocks of four. Each block summarizes 8 bits. In order to ensure no attribution can be made to an individual, the deletion of the last 8 digits is generally viewed as sufficient (Weichert 2011). Taking such an approach, locations can still be determined at 99 percent with an error of 7 kilometers. Errors in country allocation are in the per mille range. Further anonymization results in a rise in the error count. If the last 16 digits are deleted, then the error count for country allocation remains below 4 percent and the location can only be determined to a precision of within 16 kilometers (Kühn 2009).

Whether and to what extent anonymization will be implemented, cannot be assessed here. For example, it is only following on from the criticism leveled by the data protection monitoring authorities that Google Analytics can now be used with an anonymized tracking code (Kraska 2010). However, the fact that, for example, Yahoo has announced its intention this year to extend its search data retention from 3 to 18 months, including the full IP address (Bentley 2011), and the fact that there have been no public protests at undertakings in the USA to oblige all Internet providers to store their customers' IP addresses for at least 18 months (Yin 2011), demonstrates that IP geolocation and IP geotargeting are not

sufficiently important to force the political actors into taking concrete steps towards consumer and data protection. There are two reasons for this:

a) A broad social discussion on the meaning and benefits of geotargeting is made difficult due to the invisibility and mediacy of IP targeting, which takes place in the background and the concrete consequences of which remain hidden from most people. This is where the difference lies in the political discussion on geotargeting when compared with the Google Street View debate, which was about on-location, concrete, visible and observable interventions in public space.

b) Knowledge of the application errors associated with geotargeting and country-specific filtering of certain contents (in particular, advertising and specific TV stations and video contributions) on the Internet is only acquired by study of the history of telecommunications and will probably only be understood by a small section of society as a pitfall in using the Web. Some areas, such as combating fraud in electronic payments or the question of the protection of copyright, are actually regarded in a very positive light. The social benefits here are clear. Therefore, 'digital freedom rights' may find it more difficult to gain public acceptance in such cases.

In contrast, it is more likely that we will soon be speaking of a "geotargeting obligation" (Westerwelle 2011: 136). The boundlessness of the Internet is known to conflict with country-specific legislation. In many cases (e.g., gambling, online gaming), the different legal frameworks require Internet-based companies to provide a localized range of offers. In this case, advocates could argue in favor of the creation of greater legal security for those operating websites and effective protection for the consumer (e.g., from neo-Nazi propaganda, from prohibited political parties and other groups, and from contents that pose a risk to the young and to health, that are permitted in other countries).

In a recent political venture, the German Minister for Internal Affairs has questioned the right to anonymity on the Web (Kuhn/Höll 2011). Simultaneously, in its social network Google+, Google is pursuing a decidedly real-name policy (Biermann 2011) and there are also undertakings on Facebook towards no longer tolerating anonymous users (Kuhn/Höll 2011). However, as even an IP address does not guarantee the identification of the user, it is probably only a question of time before offline identification is required for the use of certain services. This would mean not only a reterritorialization, but also a renationalization, of the Internet. In essence, the discussions about a "virtual Schengen border" (Council of the European Union (2011), whereby Internet Service Providers block illicit contents on the basis of an EU 'black-list,' is moving in a similar direction, if only in Europe.

5.6.4 Political Consequences

The feared "Balkanization of the Internet" (Eric Schmidt according to DPA 2011) is driven less by some form of politically motivated State urge for regulation than it is by reactions to company-based business strategies per se, as well as a mass movement towards defying once socially accepted property rights and copyrights.

Country-specific product diversification, but also the disenfranchisement of the Internet by user-based action, is a challenge to territorial regulation. The consequence of reterritorialization in combination with de-anonymization (through real names, IP targeting, location-based services, etc.) is forcing political authorities to become aware of their powers to act and increasingly to impose national borders on Internet traffic. This has little to do with any "symbolic act against the disease of State authority on the Internet" (Meyer-Lucht 2011, own

translation) or with certain political camps (Bröckerhoff 2011), but is simply inherent in the system.

In this way, the newly drawn boundaries in/on the Internet are inbuilt and self-referential in a similar way to the phenomenon already observed in Chapter 5.2, namely, that consumer location analyses produce the conditions of their own reproduction or that users are encouraged to present themselves as discrete socio-economic Web identities and thereby reify patterns and profiles by software (Parker et al. 2007). Both demarcations can essentially be attributed to technology (more specific software, and even more specific algorithms). Therefore, those who do not desire such a development in the long term would do well to consider whether a 'two-speed internet' (see Arthur 2011), or a de-anonymization, might not destroy their own global business base in the long term, rather than promoting it in the short term.

6 Conclusion

As this discussion paper has demonstrated, the Web, which once held the promise of unimpeded access to the wide world, is now increasingly starting to segment our view of the world through social and spatial filtering. On the one hand, media user practices have been changed by Frontend Googlization – the individual appropriation of new geomedia technologies that form augmented, enacted and transduced spaces (Chapter 3). On the other hand, we are dealing with Backend Googlization, the way localization technologies profile countries, cultures and communities (Chapter 4).

The consequences of this for social and political spheres of activity are evident:

a) *We are dealing with a repersonalization of the Internet*, through the mobilization of media, but also through the ever greater importance of social networks (and their efforts to implement real-name regulations, etc.). Both of these factors are increasingly turning the public space into a semi-public, more and more privatized and personalized space (Chapter 5.1). This development is strengthened by the currently favored political efforts at regulation, in that all geographic location data are allocated the same protection rights as any other type of personal data (Chapter 5.6).

b) *We can detect a reterritorialization of the Internet*, in that ever more contents are being georeferenced, either through cartographic visualization (GeoWeb), or through adaption to the geographical origin of the IP address (geotargeting). Space is thus becoming classifiable sociologically and available for consumption economically (Chapter 5.2). In this case, mobile Internet applications, which can be located per se and thus can permanently provide us with a 'sense of space,' are acting as an additional catalyst.

Both developments, that of repersonalization and that of reterritorialization, are increasingly making the Internet less of a virtual reality. However, this de-virtualization is simultaneously being counteracted by the fact that through the mobilization of the media, we are also experiencing a virtual augmentation of physical 'a-whereness' due to Web applications – the de-virtualization of the Internet is going hand-in-hand with a virtualization of reality. At the policy level, we therefore initially need to ask, which of these developments will assume the greater power of action? Will it be the 'territorial turn' or the 'mobility turn'?

Whichever aspect we look at first, both have far-reaching consequences for the definition of what the Internet is. The mediality of the Internet is changing. It is ever more embedded in everyday actions. It thus appears to be ever decreasing

as an independent medium of communication, entertainment, business, etc., but ever increasing as a media platform, as an embedded infrastructure, that itself is increasingly less apparent. This groundedness confers upon the Internet the property of a sort of 'essence,' of something so essential that it will one day necessarily also be governed by basic rights.

No matter whether the increasing influence of the GeoWeb and geomedia on the discussion of the basic rights in/of the Internet is discussed at national, European, or global levels, technological development will necessarily place on the political agenda the basic right to geomedial and media-locational self-determination on the Internet. In this sense, the Internet-based networking of space is very similar to currency-based unions of states, in that it demands common political action that will be very difficult to avoid.

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