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# Avoiding the Ghetto through hope and fear: an analysis of immanent technology using ideal types

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**Abstract** With over one hundred million smartphone users in the world, mobile, spatially-aware devices are radically altering how individuals move through and experience both physical and social environments. This article presents a theoretical and methodological framework for engaging the emerging geoweb as part of a longer tradition of research into society and technology. A close reading of Microsoft's Pedestrian Route Production patent, dubbed the "avoid ghetto GPS", is used to construct two ideal type futures—one hopeful and one frightening. One where spatial technology ensures efficiency, safety, and new forms of coordination, while the other algorithmically sorts society by race and class. Despite not yet and potentially never existing, the patent offers a viable means through which potential futures are made real in the present. Through comparative analysis of these futures, their underlying commonalities are drawn out, revealing the relationship between technology and the delimitation of human experience. This analysis avoids grand narratives and teleological arguments, while making it possible to draw forth the unthought acceptance within each ideal type for the future: the continuing shift of human life itself towards a teleological, always already-calculated standing-reserve. The work on technology of Martin Heidegger and Herbert Marcuse (re)situate the geoweb within long-standing theoretical work on technology and its role in society, modernity, and capitalism.

**Keywords** Geoweb · Technology · Gps · Ideal-type · Patent · Standing-reserve · Futures

## Introduction

> Like any technology, the geoweb has both good and bad uses. (The Economist 2007)
>
> Is it still necessary to repeat that science and technology are the great vehicles of liberation, and that it is only their use and restriction in the repressive society which makes them into vehicles of domination? (Marcuse 1969, p. 12)

As this special issue attests, the geoweb is a popular topic in both academic and popular discourses right now, and for obvious reasons. Broadly seen as the digitization and integration of spatial information with communication and analytic technologies, the geoweb has had and continues to have profound effects upon economies, politics, and social life. To paraphrase Michael Goodchild, as we now know the locations of a large number of *things*- people, vehicles, goods—we are able to do all kinds of things we couldn't do before (Schuurman 2009). The digitization of location has shifted what is and what can be done both at the level of international commerce and state action as well as

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the everyday lives of individuals moving through and interacting with the built and social environments. When discussing such a recent technological development, it may seem odd to begin with an epigraph over 50 years old; however, in developing a theoretical engagement with the geoweb, this paper argues that Marcuse's hopeful vision of a technological future remains part of a productive method for understanding the relationship between society, technology, and the potential impacts of future technological developments. I demonstrate that within modern discussions of the geoweb lies a tacit acceptance of a technological, teleological ordering of life that directly animates Martin Heidegger's concept of standing-reserve. Examining the geoweb within the context of the much longer history of technological thought found within Heidegger and his student, Herbert Marcuse, allows for a resituating of the societal and political implications of a novel technology even as it spreads through society.

As technologies achieve ubiquity within a society, they recede from view becoming unconsidered amenities of everyday life (Brown 2001). Computer-based technologies are particularly prone to this retreat as programmatic results often appear "automagically" to end-users (Kitchin 2011). While new spatial technologies have already spread through and altered society in such diverse ways as elections (Berry 2011), disaster response (Goodchild and Glennon 2010; Miller 2006; Parry 2011), and start-up funding (Wilson 2012), they remain, at least partially, objects of consideration and scrutiny. One reason is simple: they represent an always incomplete and tenuous process of spatial ordering. In other words, they break and, when broken, the previous unconscious means by which they functioned becomes obtrusive, inserting itself into consideration through its very lack of functionality (Harman 2010). A recent example of this would be the coverage and discussion of Apple's new Maps app and its widely acknowledged failures (Chen and Winfield 2012). Another cause of consideration is that many spatial technologies remain immanent, possible with existing technology, but not yet existing in and of itself. This paper examines one such potential geoweb technology: Microsoft's recent *Pedestrian Route Production* patent (*PRPp*), infamously dubbed the 'avoid ghetto' GPS (Milo 2012). The intense, divergent views expressed within and in response to the *PRPp* represent a battle over what role geoweb technologies may come to play in society. Whether this potential technology becomes a great tool of liberation, domination, or something else entirely, the patent and resulting discussion demarcate futures made real in the present (Kinsley 2011). Following Kinsley (2012, p. 1557), patents are an object, like "reports on trends, stories, or models" that are "felt as anxieties or hopes, but those futures do not cease to be absent in so far as they have not and may never happen." Patents go further than "techniques of imagination", though. In addition to "formulat[ing] particular spaces of possibility" for future development (Kinsley 2012, p. 1558), patents, as formal, legal documents, are used not only to protect what presently exists, but also to secure for capitalization ideas which may, or may not, eventually come to exist. In this way, although no published algorithm exists that describes the *PRPp* and no code has come to market, the relationship between technology, capital, and society is shaped within the not-yet-existing algorithms described, demarcated, and protected in the patent.

The paper proceeds as follows: First, how scholars have addressed the geoweb is briefly examined. This section presents the geoweb as a specific coupling of emerging spatial technologies with new communicative ones (section "Studies of the Geoweb"). A comparative method based on ideal types is then developed in order to examine the futures offered within potential technologies (section "Methods: ideal types, close reading, and the future"). A close reading of the *Pedestrian Route Production* patent (*PRPp*) and its resulting press are used to construct two potential futures found within the same technology. One presents a future of possibilities, built around narratives of coordination, efficiency, and safety (section "Hopeful futures: coordination, efficiency, and safety"); the other of limits and threats, built through fears of classism and racism as created through a process termed teleological red-lining (section "Fearful futures: limiting life and teleological red-lining"). These potential futures exist as ideal types offered by the same technology; they are futures that are called into being by the patent and those writing about the patent. This comparative methodology allows each potential future to interact with each other dialectically, revealing a false dichotomy. The paper demonstrates that each ideal type future demands an acceptance of a calculative ordering, rationalization, and radical efficiency as the ideal of society (section "Calculated-in-advance and

life as standing-reserve"). This underlying acceptance speaks directly to Marcuse's (1991 [1964], p. 153) critique of a "*technological* a priori which projects nature as potential instrumentality, stuff of control and organization." The particular patent studied, *PRPp*, offers to place in the hands of a private corporation using private algorithms, the ability to route the very walking patterns of citizens through cities, organizing along their own axes where users go and what they see.

The novel, communicative, spatial technologies that make up the geoweb are finally (re)situated within this long-standing critical engagement with technology, demonstrating not only the continuing viability of the theory, but also the important terrain of "what has not happened and may, in fact, never happen" (Massumi 2007). In this light, the paper concludes by emphasizing why a potential technology should be discussed from its conception, outlining an agenda wherein technology is examined and critiqued *before* it becomes a *de facto* part of everyday life (section "Conclusion: why now?").

## Studies of the Geoweb

When discussing the geoweb and its related concepts, it is difficult to provide a precise definition or definitive history—different empirical focuses lead to different theoretical definitions. Starting from the broad definition of the geoweb as the "merging of geographical or mapping data with a range of web content," this section charts a brief history of the term as well as how it has been studied by geographers. By drawing attention to the commonalities in how the geoweb has been studied, two important trends are highlighted: First, there has been a lack of theoretical engagement with the topic. Second, while etymologically the combination of "web content" and spatial data leads to the term geoweb, the 'web' is fundamentally a tool for communication. In addition to merging spatial information with web content, the geoweb is therefore intrinsically involved in the communication of said information. The geoweb, in other words, involves rendering spatial information knowable through new communicative technologies.

One of the earliest uses of the term "geoweb" is found in a 2001 paper by Leclerc et al. (2001, p. 1) which describes a "global infrastructure" of searchable geo-referenced metadata stored in a "new top-level domain called.geo". While.geo was rejected by the Internet Corporation for Assigned Names and Numbers (ICANN), many of the innovations called for by Leclerc et al. have been realized in the past decade (Greenman 2001). In 2005 Google released its Maps service and application programming interface (API) for general public use. This API allowed programmers and developers to make use of Google maps for their own applications; users could now contribute and develop geo-referenced information on the world-wide web. Since 2005, multiple other companies have released similar mapping and programming tools—Microsoft's Bing Maps and the open-source OpenStreetMaps for example. These developments reflect a growing belief that all information may be organized and searched *by location*, a concept Google calls the "geoindex" (Crampton 2009). Along with this acceptance has come the rapid rise in investment in and development of geo-referenced internet technologies. Since 2009, more than $115 million has been invested in location start-ups (Miller and Wortham 2010 in Wilson 2012).

During this period of rapid growth, academics have engaged with the geoweb along a series of trajectories. As Leszczynski notes, early geographic study of the geoweb was largely *descriptive* in nature (2012). These studies "attempt[ed] to com[e] to terms with what, exactly, the geoweb 'is' by itemizing that which is new and unique about it" (Leszczynksi 2012, p. 74). They often situate the geoweb in contrast to traditional GIS and cartography (Sui 2008; Crampton 2009; Elwood 2009). Other studies have focused on the *volunteered* nature of the geoweb. Seeing Volunteered Geographic Information (VGI) as a special geo-referenced instantiation of Web 2.0 (Goodchild 2007), studies have looked at how this information is being adopted by government agencies (Johnson and Sieber 2011), used in times of crisis (Miller 2006; Palen et al. 2009; Goodchild and Glennon 2010; Morrow et al. 2011; Presley 2011; Thatcher 2012b), or created and experienced for personal use (Hecht and Gergle 2010). Although potentially seen as a subset of VGI, *participatory* engagements with the geoweb have focused on how non-state and non-traditional actors have used the geoweb to represent and make claims upon society (Budhathoki et al. 2008; Elwood 2008). In contrast to a focus on use and adoption, *technical* studies have engaged directly with the development of geoweb technology and infrastructure (Savelyev et al. 2011; Janowicz et al. 2011). More recently, authors have

begun to raise questions over what can be termed the *political economy* of the geoweb. Leszczynski (2012) has examined the geoweb as part and parcel of neoliberalism, while Wilson (2012) has looked at location based software as a mutable investment for capitalism. Earlier studies examined the implications of corporate control of visibility (Zook and Graham 2007) and the corporate creation of a "god's eye view" of reality (Kingsbury and Jones 2009).

The above categories—*descriptive, volunteered, participatory, technical, and political economic*—are meant neither as a comprehensive typology of geoweb studies, nor as definitive categories to which works adhere. Much work has and will continue to blend across multiple categories. For example, a study might look at both the *participatory* and *political economic* effects of a mobile application, or the *technical* construction of a *volunteered* application may be presented. The categories are meant as a heuristic for understanding the multiple trajectories taken by academic geographers studying the geoweb in recent years. While precise definitions and empirical focus shift with research design and purpose, constant throughout is an understanding of the geoweb as a form of communicative spatial technology. In each category, the geoweb is always a specific type of technological form: one that renders spatial information knowable and disseminable through technological programs, applications, and tools that all rest upon algorithms and code. The remainder of this paper offers a theoretical engagement with the geoweb *within* discourses of technology's role in modern society through a focus on a particular communicative spatial technology. The spatial, communicable nature of the geoweb opens to criticism a new space in which "little has changed *despite* dramatic technological development" within capitalism (Andrejevic 2005).

A close reading of a single patent and its resulting press—Microsoft's "Pedestrian Route Production" patent (Tashev et al. 2012) or the 'avoid Ghetto' GPS (Matyszczyk 2012)—constructs two potential futures offered by a single technology. These futures serve as ideal types for a comparative analysis that reveals the geoweb to be both liberating and controlling, enabling corporations even as it gives users new ways to communicate and organize (Maguire 2009). Constructing the potential futures as ideal types avoids the common dialectic of technology between hope and fear that can obfuscate more nuanced shifts in society (Boyd and Crawford 2012). The following section describes the methods used and subject of analysis.

## Methods: ideal types, close reading, and the future

On average, over one-thousand patents are filed each day in the United States (U.S. Patent and Trademark Office 2012). Although technically representing existing inventions, patents have become a key way of owning knowledge and controlling research directions (David and Foray 2001). They no longer, if ever, principally protect existing material inventions, but rather serve as a legal framework through which to capitalize knowledge. Due to this, the examination of patent pools has become a potential method for examining the political economy of the knowledge society (Mackenzie 2009; Berry 2011). However, this shift also creates an environment in which patents call into being potential futures, rather than simply protecting existing presents (inventions). New patents are anticipatory in the sense that they make potential futures present, they are a cognitive tool through which potential futures may be examined (Kinsley 2011). Close examination of these potential futures against not only each other, but also the existing present, draws out the entangled relationship between capitalism, technology, and society.

Hamilton and Heflin (2011) note that much writing on technology falls into a binary trap of utopic and dystopic representations. When presented as fact, dialectical relationships between fear and hope (Horkheimer and Adorno 2002 [1947]; Kingsbury and Jones 2009), liberation and repression (Marcuse 1969), and other utopic/dystopic framings can obscure subtler shifts within technology's relationship to society (boyd and Crawford 2012). Nuance can be ignored through an emphasis on grand narrative and teleology. Ideal type comparative analyses are well suited for the rigorous examination of what might be with what is. Comparative ideal type analysis recognizes from the outset that the constructed potential realities do not reflect what is, or even, necessarily, what will be. They provide a non-deterministic framework through which the present may be interrogated while avoiding the transformation of nuance into teleology.

The term ideal type has a long history within sociology and other disciplines. Defined by Max Weber, ideal types form the basis of a comparative

methodology that gives "precise meaning" to terms and concepts (Weber 1968, 20). Ideal types are a "one-sided *accentuation* of one or more points of view" that allow for "a unified *analytical* construct (*Gedanken-bild*)" through an arrangement emphasizing their one-sided nature (Weber 1949 in Calhoun et al. 2007, p. 211). Ideal types provide a method of analysis by serving as hypotheses against which to test reality (Weber 2005 [1930]; Mommsen 1977). Unlike Tonnies' normal types, which are purely conceptual tools, ideal types draw out and highlight the main elements of existing reality. As a method of analysis, they are not meant to exist in and of themselves (Weber 2005 [1930]). Rather, through their precise definitions, they "perform [their] functions in formulating terminology, classification, and hypotheses" against which the world may be interrogated (Weber 1968, p. 21).

This paper presents two alternative ideal type futures found within discussion of the same technology: U.S. Patent 8090542, Tashev et al.'s (2012) "Pedestrian Route Production". Unlike the vast majority of the 400–500 thousand patents filed each year, "Pedestrian Route Production" provoked immediate and widespread reaction. It was covered by *All Things Considered,* provoked a public response from the head of the Dallas branch of the National Association for the Advancement of Colored Persons, and was the subject of thousands of blog, twitter, local news, and social media posts (Keyes 2012; Williams 2012). The attention focused around a proposed feature that would automatically route users around 'dangerous' neighborhoods using unspecified demographic and crime statistics. The patent itself stresses the utility, efficiency, and safety offered by the yet-to-be-available technology, while the NAACP president decries the potential racist undertones. In these and other writings on the patent, the authors are not critiquing a world that is, but rather one that might become: On the one hand, the patent itself, and some press, highlight a hopeful world of coordination, efficiency, and safety. On the other hand, much of the press, like the NAACP president's response, express fear for a world automatically generated through software in a classist and racist image, where algorithms automatically route end-users towards only those pre-approved capitalist destinations.

The next two sections develop ideal types of the potential futures offered by the *PRPp*—one of hope and one of fear, one of possibilities and one of limitations. Developed from popular press writings and a close reading of the patent itself, these two ideal types accentuate the promises of the technology. In so doing, the commonalities found within both ideal types is foregrounded: a shift towards life as a rendered and calculated in advance standing-reserve, following Heidegger's (1977) work on technology in modernity.

## Hopeful futures: coordination, efficiency, and safety

> As a pedestrian travels, various difficulties can be encountered, such as traveling through an unsafe neighborhood or being in an open area that is subject to harsh temperatures. (Tashev et al. 2012)

Developed by the U.S. Military, GPS was originally seen as "a classic case of a technology in search of a market" (Tristram 1999, p. 70). By 2012, there were well over one-hundred million GPS-enabled, location-aware, devices in use in the United States (Cheng 2011). No longer in search of a market, GPS-enabled devices embody the burgeoning digitization and resulting commodification of location. "Ubiquitous Advertising" is the "killer application for the 21st century" as location-aware technologies seek to go beyond simply providing destinations and towards shaping consumption (Krumm 2011; Wilson 2012). Microsoft's *PRPp* is part of this general trend towards the commoditization and personalization of ubiquitous, digitalized location information. In both the patent itself and some press coverage, the yet-unreleased technology is presented as improving end-user's lives. These positive narratives are constructed along three major axes, that of *coordination*, *efficiency, and safety*.

### Coordination

In both the popular and academic press, one of the most exciting possible uses for location-aware technology is that of coordination. Thrift (2004, p. 186) refer to the possibility of "just in time coordination" wherein spatial proximity becomes the means by which coordinated events organize "just in time." Sutko and de Souza e Silva (2011) have more recently suggested that this shift reflects the replacement of

time *with* space as the means by which society is organized. Instead of organizing to be in a specific space at a certain time, end-users are "automagically" (Kitchin 2011, p. 945) informed by their location aware devices when their friends are within a certain distance (Kitchin and Dodge 2011). Focused on commercial and end-user applications, the *Pedestrian Route Production* patent offers the potential for this 'new' form of coordination.

The proposed technology is "bidirectional": it is capable of "collect[ing] route or location information" as well as transmitting "collected data or direction set[s]" to other services or users (Tashev et al. 2012, p. 14). Through this process "routes can be produced upon multiple devices that lead to a common meeting point" (*ibid*.). In giving an end-user example, the patent suggests that this technology could be used to find "a small child that has become lost from her parents" (*ibid*.). While Microsoft's system has yet to be released, other applications demonstrate a range of possibilities for new means of coordination. A competing personalized GPS system called Scout.me offers to enable users to "make plans with friends via social sites" (Cooper 2012). Scout.me seeks to create an experience in which "all content will automagically appear on your phone" (*ibid*.), end-users routed to the appropriate destination at the appropriate time. These and other applications open vast potentialities for new forms of coordination.

## Efficiency

> What the technology actually does is collects and analyzes data to give the users the best possible route (Ngak 2012)

GPS directions are well known to provide what is algorithmically determined to be the fastest, shortest, or most efficient route. Aimed specifically at car navigation, GPS units are both helpful and disciplining technologies—saving time even as they enforce the interests of concerned outside parties like the police, car rental agencies and the like (Dodge and Kitchin 2007, p. 272). The *Pedestrian Route Production* patent seeks to explicitly enroll pedestrian navigation in similar considerations of efficiency. The *PRPp* is aimed at "a person traveling in a natural manner, such as walking, swimming, climbing, etc." (Tashev et al. 2012, p. 13). Detailed route analysis will create a set of directions that "allows a user to take more diverse paths that can compensate for a general lack of speed" (Tashev et al. 2012, p. 11). This best route, as determined by the device, will be the "shortest route or a route that takes a least amount of time (as determined by underlying algorithms)" (*ibid*.). Much like driving directions, the goal is a technology of efficiency and this efficiency is both helpful and disciplining. The *PRPp* seeks to enroll the end-user into a certain type of walk home, the "best possible walk home" that "avoid[s] any and all transit headaches," but this best possible is one predicated upon being the shortest and most efficient (Murphy 2012). Users of the *PRPp* are conditioned that travel should be about reaching an end-point in the quickest manner possible. 'Best' is always determined by underlying algorithms and always defined for the end-user, not by her.

## Safety

> I hate to say it because of the racial implication element,' Lanctot said, 'but what father wouldn't want such a capability for their daughter' (Urken 2012)

> 'I'd be all for it because you can never be too safe.' (Williams 2012)

A key tenet of the *PRPp*, and one that distinguishes it from car based navigation, was its focus on the safety of its end-users. It was this aspect of the patent that generated by far the most press—both positive and negative. For the patent itself, the safety motivation is simple: "it can be more dangerous for a pedestrian to enter an unsafe neighborhood than a person in a vehicle" (Tashev et al. 2012, p. 13). Because a pedestrian is more "exposed" to her surroundings—both physical in terms of weather and social in terms of crime—the *PRPp* seeks to route users around what it determines to be dangerous (Milo 2012).

The *PRPp* technology promises to determine if a user has "historically cared about safe neighborhoods" and adjust route directions accordingly; however, what is considered safe is left unspoken (Tashev et al. 2012, p. 14). The technology feeds "crime statistics, demographic information, etc." into an artificial intelligence that makes "at least one inference or at least one determination" when determining

the route to provide an end-user (*ibid.*). "For instance, the artificial intelligence… can infer if a user will find a route enjoyable due to previous behavior" such as walking "briskly" or stopping "presumably to view a scenic area" (*ibid.*). The exact process of determining what an end-user will find enjoyable exists within the proprietary algorithms of the technology. In the press, the ambiguity of what statistics were chosen and how they were used led to the *PRPp*'s coining as the 'avoid ghetto' application (Herbert 2012; Chansanchai 2012).

The *PRPp* frames this technology around providing safety. Some of the press, without access to any additional information, embrace this stated purpose. Several commentators went beyond the use cases presented by Microsoft to suggest their own visions of a safer future, particularly for women: Anna North, a blogger for the popular blog for women, suggested that with the inclusion of rape statistics, Microsoft would be "arming ladies with some extra information" by informing them of areas to avoid (Herbert 2012). Likewise, if the technology worked through preventative alerts, it could function in a similar manner to Megan's Law's registration of sex offenders and, as noted above, "what father wouldn't want such a capability for their daughter?" (Urken 2012). These suggestions, outside the scope of what Microsoft has promised and hinged on nothing more than an idealized vision of the functionality of the technology, represent a willingness to the ideal type future of hope.

In a telling passage of the patent, Tashev et al. describe a use of the *PRPp* technology that involves *coordination, efficiency, and safety:*

> Historically, at 5 pm, a user can walk from his office to his home on weekdays… [*The technology*] can extract information from a schedule that the user is to attend his daughter's recital in several hours, so it is likely he wants the quickest path. [*It*] can analyze the information and construct a direction set that allows the user to take paths that take him to his home in a quickest amount of time while keeping the user relatively safe (e.g., taking the user through neighborhoods with violent crime statistics below a certain threshold).

In each sub-section above, the yet-to-exist technology of the *PRPp* has offered a potential future. These futures are ones of radical new opportunities in coordination, where children are never lost and groups can coordinate across multiple-platforms to arrive at a single destination. They are futures of efficiency, where the least amount of time (or effort) is spent in navigation, freeing the end-user to concentrate on other aspects of life. Finally, the *PRPp* offers fundamentally safe futures, where rapists and other criminals are simply avoided. All of this is achieved, according to industry analyst Rob Enderle, by technology "doing for us what it's supposed to be doing", limiting our choices but in ways that enhance and automate our lives (Keyes 2012).

This is one ideal type future offered through the *PRPp* technology: it is a society organized through space. Coordination, travel efficiency, and, above all, safety are all ensured through the knowledge and communication of spatial information. In the next section, a second ideal type future is constructed from the same potential technology. In this ideal type, called teleological red-lining, the same re-ordering of society through space, the same limiting of choice through technology, leads to the loss of the heterogeneity of experience as location becomes subordinated to consumption and the drivers of private corporations.

## Fearful futures: limiting life and teleological red-lining

> When you are approaching an area that, based on crime statistics or racial make-up, is deemed undesirable it gives you directions around it (English 2012)

Nowhere in Microsoft's actual patent does the word 'ghetto' actually appear; however, from NPR coverage to the NAACP's comments, the *PRPp* is known as the 'avoid ghetto' GPS/App (Keyes 2012; Williams 2012). Athima Chansanchai wrote for MSNBC "It seems as though the phrase caught on, and like a contagion, has infected and tainted the coverage" (Chansanchai 2012). The phrase 'caught on' because it effectively captured one potential future offered by the *PRPp* technology—a future where society and space are sorted along racial and class based lines via a closed technological system. Much like the safe, efficient future described above, this future does not yet exist—and may never—but, in the fears of

classism and racism through which it is constructed, an ideal type, teleological red-lining, for interrogating the present is found.

## Racism

The *PRPp* promises to use a host of information for determining the route suggested. Included in this list are "crime statistics" and "demographic information" (Tashev et al. 2012). While the algorithms themselves are not disclosed in the patent, and do not yet exist for public consumption, they promise "various processing can take place upon the obtained information, such as ranking obtained information" (*ibid.*). Here the patent explicitly promises to rank and then route based upon racial (demographic) information. On the one hand, it is quite easy to see the potential racial implications of using demographics to route end-users. Privately created and for profit, the technology of the *PRPp* has not disclosed what demographic information it will use or when it will make use of it. This information could easily play out along classist lines (see 5.*b*); however, the racial component is distinct. The *PRPp* opens a future wherein encounters on the street are sorted by race; an unseen algorithm enabling users to only ever encounter those already sorted as demographically similar.

On the other hand, the use of undefined crime statistics also invokes a future of racist technological sorting. With an already described emphasis on the perceived safety of the user, the *PRPp* technology will use crime statistics to completely avoid unsafe neighborhoods. In imagining the future of this technology, many authors highlight that the definitions of 'safe' and 'crime' could easily correlate with racial demographic information—in addition to the *PRPp*'s unspecified use of demographic information directly. The "great cultural, social things" that may be found in areas of particular types of crime disappear from consideration as the application automatically routes end-users around these areas (Williams 2012). One author highlighted the difference between avoiding places of "physical assaults and gunfire" versus burglaries, with the latter being implicitly safer for pedestrians (Matyszczyk 2012). Whether this is true or not matters less than that a potential technology will decide that it is functionally true, sorting individuals around and through areas that it deems unsafe or not enjoyable.

## Classism

Beyond the explicit nature of using demographic information to determine route selection, implicit in racial fears of crime statistics is an assumption that "criminality and being poor and not white go hand in hand" (Keyes 2012). For many authors, the *PRPp* presents less a future sorted by race than one of class. The use of demographic information to sort who should walk through certain neighborhoods at certain times based on income and other class considerations are obvious. The relationship between the crime statistics chosen and class, however, deserve some explication.

Regardless of the definition of crime and the statistics chosen to represent said definition, the nature of the GPS technology, its reliance upon algorithms, forces the proposed technology to adhere to a fairly narrow, able-to-be calculated definition. The application must function through code, and the code must be written in advance allowing for calculation to occur (Berry 2011). Some popular press authors see no issue with using violent crime statistics—of avoiding physical assaults, gunfire, and rape (Matyszczyk 2012; Herbert 2012). For some, like Rob Enderle, this is "technology doing for us what it's supposed to be doing" (Keyes 2012). However, if only violent crime statistics were used, then white-collar crime is automatically effaced from considerations of criminality. By automatically selecting what does and does not count as criminal, Microsoft will implicitly "define crime statistics as products of race and class identity" (Urken 2012). In so doing, the technology effectively removes consideration and experience of certain areas from end-users.

## Teleological red-lining

> 'It's almost like gerrymandering,' she said. 'It's stereotyping for sure and without a doubt; I can't emphasize this enough, it's discriminatory. (Williams 2012)

In the ideal type future described above, the efficiency, safety, and coordinative abilities of the *PRPp* have been turned on their head into a disabling technocracy of spatial sorting based on race and class. While it is well established that space is software-sorted, a more recent shift has occurred towards the sorting of location. If software-sorting constitutes the

process through which technologies come to mediate production, consumption, and experience in the modern environment (Graham 2005), location-sorting may be seen as a distinct aspect within this broad process. Location sorting refers specifically to the communicative process through which end-users' 'locations' are disassociated from absolute physical location and are transformed into a calculated value that may be predicted, bid for, and exchanged. Wilson (2012, p. 1270) writes of a shift "toward the use of LBS [location based services] to drive consumers to consume—beyond just assisting them to arrive on location". Location becomes relative to other, algorithmically sorted, people, goods, and services. This allows computer code to shape who consumes what, where, and with whom—the communicative and mobile aspects revealing and eliding what is encountered. This opens a potential future wherein computer-mediation of space leads to *teleological red-lining*. Each part of this term is explained as such.

The directions provided by the *PRPp* technology, or any location aware service, are always derived from a known endpoint. 'Location' must be reduced to a fixed, machine-readable code. In this manner, an increased reliance upon technological navigational aids shifts movement from "autotelic playfulness to teleological navigation" (Sutko and De Souza e Silva 2011, p. 816). The endpoint is always known in advance before direction can be given. The *PRPp* offers to go a step further than simply providing directions to a specified endpoint. It contains an "artificial intelligence component" that "can make at least one inference or at least one determination" of where the end-user would like to go (Tashev et al. 2012). Coupled with a separate, but related patent, *Route Monetization*, the selected destination may be the result of a paid advertising service (Panabaker et al. 2007). In other words, the *PRPp* offers the ability to auction off not only end-user's locations, but also their very paths through the built environment. The implications of this are discussed further in "Calculated-in-advance and life as standing-reserve", for now it is sufficient to highlight that the *PRPp* not only determines routes from an always-already known end-point, but offers the ability to commoditize and decide upon that end-point for its users. The directions given by the *PRPp* are always necessarily teleological.

The term 'red-lining' was made famous by John Mcknight in the 1970s and refers to a process by which banks, supermarkets, and other institutions refused to offer services within inner city neighborhoods. More recently, concerns have been raised over internet companies' abilities to track demographic information of end-users across multiple web sites. Called weblining, this describes "the practice of denying people opportunities based on their digital selves" (Andrews 2012). The potential *PRPp* technology goes beyond weblining through its ability to use demographic information—of the end-user as well as the surrounding areas—to determine not only the destination, but also the very route that takes a user there. A private corporation, using private data and algorithms, is now able to effectively select what areas of a city are rendered visible and invisible (Thatcher 2012a). Through the use of demographic statistics, areas will be opened and closed based on race and class information—ensuring that, for example, a rich couple is directed through a high end shopping district while a poorer couple is not. In allowing for the commoditization of routes, as the *PRPp* does, it is not simply *location* that has been commoditized, but also *movement* across and through locations. Both consumption and communication patterns across space are now open to technological red-lining in the definitions of safe, personal, and optimal found within the privately-created *PRPp*. The very potential to encounter people, places, and events deemed inappropriate is removed, or simply routed around.

## Calculated-in-advance and life as standing-reserve

Neither potential future described above exists, nor is there any indication that they will; rather, they serve as ideal types present within the promise of a single technology. On the one hand, a world of just-in-time playful coordination that maximizes efficiency and safety to respond to and meet end-user desires. On the other, a world of teleological red-lining in which spontaneity has been transformed into an always-already calculated process that automatically removes places, people, and routes deemed inappropriate or undesirable. In this section, I demarcate an underlying commonality between the two ideal type futures in their acceptance of a particular role of technology in society. Primarily using the theoretical work of Martin Heidegger and his student Herbert Marcuse, I discuss the implications this acceptance has for society.

Against the later-career Marcuse quote that opened this paper, I follow Berry's (2011, p. 2) interpretation of Heidegger, namely that the ever-increasing reliance upon digital technology "transforms our everyday lives into data, a resource to be used by others, usually for profit, which Heidegger terms *standing-reserve.*" The specifically communicative and spatial nature of the geoweb extends an ordering of life as *standing-reserve*.

The potential futures presented are both achieved via technology and, specifically, they are achieved through a given technology's ability to influence and limit how we organize and move through the world. Underlying each ideal type is a reliance upon and acceptance of technology's role in shaping society. To promise a better tomorrow, the technology must be able to shape that future. Likewise, to be feared, it must be accepted as able to effectively delimit society. Technology with no accepted influence upon society is neither hoped for nor feared—it is ignored. To analyze each ideal type, it is necessary to first tacitly accept this technologically determinist framework. In order to hold the ideal types up against both each other and existing-reality, it is necessary to accept their common foundational belief: technology can and will shape society. It is now possible to draw out how the *PRPp* specifically, and the geoweb more broadly, portend to influence society.

Each ideal type presented above relies upon technology as the principle mediator through which society determines where and when someone is. The *PRPp* technology is relied upon to make decisions not only of where one wants to go, but also for how one wants to get there. The use of location-aware technologies and navigational aids increases the importance of space as an organizing agent in society: "people may increasingly rely on the visualization of space rather than the management of time to coordinate appointments and hence social life" (Sutko and de Souza e Silva 2011, p. 815). Further, due to the necessary end-point oriented nature of the technological form (directions are given from two known points), all direction sets are necessarily teleological (November et al. 2010). By combining spatial information with the ability to communicate it to others, geoweb technologies like the *PRPp* present a future where location is always known in relation, where society is organized by space as each individual is counted and sorted by an algorithm. This is just as true in the 'hopeful' ideal type where the *PRPp* routes end-users safely and efficiently to their destination as it is in the 'fearful' one. In a telling interview, Google CEO's Eric Schmidt stated "They [*consumers]* want Google to tell them what they should be doing next" (Jenkins 2010). By placing decision making into an opaque, privately-created technology, "technical devices are delegated performative and normative capabilities which they prescribe back onto humans and non-humans" (Berry 2011, p. 121).

Berry (2011, p. 121) argues that placing decision making in such algorithms shifts society from "knowing *that*" to "knowing *how*"—end-users know *how* to place a phone call using the obfuscated system of their highly complicated mobile phone, but there is no necessary understanding of the technical process by which the mobile phone itself functions. This change causes humans to think computationally: to phrase their wants and desires in a manner that is executable by a computer program. Geoweb technologies, like the *PRPp*, organize location and movement in such a way. In so doing, yet another aspect of life becomes transformed into *standing-reserve*. Standing-reserve [*Bestand]* is taken from Martin Heidegger. It is something that "stands by:" technology that is ordered and ready to be used (Heidegger 1977, p. 17). It can be seen as counted stock, something that awaits its own use in an orderly manner (Edwards 2007). Heidegger suggests that modern technology reveals *what is* in a manner that challenges "energy concealed in nature [to be] unlocked, … transformed, … stored up, … distributed, … and what is distributed [to be] switched about ever anew" (Heidegger 1977, p. 16). Modern technology demands that everything be brought into a calculated and quantified ordering, where the presence of all things is known by their ability "to stand by, to be immediately at hand" ready to be deployed to order and reorder anew (Heidegger 1977, p. 17). An airliner sitting on the runway is standing-reserve as the machine is "ordered to ensure the possibility of transportation"—what it will do is counted, known, and discrete (*ibid.*). The airliner on the runway is "unautonomous," it "has its standing only from the ordering of the orderable" (*ibid.*). Standing-reserve is the reduction of an object to an orderable and calculable system of information that modern society demands (Heidegger 1977, p. 23).

Similarly, in both ideal type futures offered by the *PRPp*, the geoweb ability to calculate and communicate location in relation to others, to have entire

population movements sorted by an algorithm, places both location and the very movement patterns of humans as standing-reserve. Through geoweb technologies, location is known and counted, ordered and ready to be called forth to organize. Although constantly shifting, it is a counted stock—where someone is and when—ready to be called forth in a calculated ordering. In both futures offered by the *PRPp*, routes offered are likewise always a function of a predetermined algorithm. Offered routes always exist as possibilities and humanity certainly retains the ability to choose whether to follow a procured path or not; however, despite the necessary incomplete nature of the ordering, it is an ordering that is tacitly accepted in both futures. It is only because the *PRPp* is assumed to be able to effectively control navigation that it invokes such hopeful and frightening potential futures. In simple terms, even though it is not required to follow a route provided by a navigational aid, when millions of human beings do they are engaging in a process by which their movement is called into being via an always teleological process of calculation between two known points. This process mediates the experience of travel through a counted and known order that can be thought of as standing-reserve. In a field of calculated locations and teleological navigation, human life is sorted and ordered through technology.

Marcuse, a student of Heidegger, takes this position a step further when he writes "the science of nature develops under the *technological* a priori which projects nature as potential instrumentality, stuff of control and organization" (Marcuse 1991 [1964], p. 153, emphasis original). Standing-reserve presents a limited condition, one in which all experience and thought must be subject to calculated control. This instrumentalist horizon of thought delimits the possibilities encountered in life. Technological rationality calls for nature in a calculable and orderable manner, creating a standardized stock of resources and humans, and doing so *through* technology: "technological rationality has become political rationality" a system that offers "only one dimension" that is "everywhere and in all forms" (Marcuse 1991 [1964], ps. xlviii and 11). This is true in each ideal type future presented. In the hopeful one, "radical coordination" serves the logic of efficiency and technological rationality (Marcuse 1982 [1941], p. 141), just as, in the future based on fear, location and movements are commoditized within the "same inflexible rhythm" of mass culture (Horkheimer and Adorno 2002 [1947], p. 94).

The *PRPp* and geoweb technologies, in their ability to calculate and communicate spatial information represent another potential step in this instrumentalist direction. If Graphic User Interfaces hid from consideration how software functioned, navigation technologies are doing the same for location and travel: "distance becomes an abstract category within the navigation system" (Berry 2011, p. 122). Individual end-users' locations are digitized and their very routes through environments are called forth in advance using algorithms created by private corporations for their own purposes.

## Conclusion: why now?

This article examines the geoweb, defined as the combination of spatial information with communication technologies, through the potential futures are offered in a single patent—Microsoft's *Pedestrian Route Production* patent. The futures constructed are ideal types, "most useful hypothes[es] to gain important insights", with which to interrogate both the promise of technology and its present state (Mommsen 1977, p. 376). The ideal types presented offer seemingly opposed potential futures: One of hopeful, radical coordination and efficiency and one of automated classist and racist sorting. These potential futures do not exist, but they both demonstrate an assumed role of technology in society. Whether the single technology in question is viewed as hopeful or terrifying, it works by reshaping society through space, by limiting decisions and encounters based on efficiency or racism, on coordination or class. Ideal types cannot exist, but they reflect an accentuated form by which to interrogate what does. Here they reveal an underlying commonality beyond the simple limiting and reshaping of location as each accepts technology's ability to order life in advance. Both ideal types view human location and movement as an aspect of standing-reserve, ready to be called forth as an ordered, calculated-in-advance organizational resource.

Digital, calculated life as standing-reserve returns the article to the question with which it began: Is technology a great force for liberation or oppression? A complete answer has not and cannot be offered here. It is a question with which the asker, Marcuse,

struggled at times seeing both answers as possible (contrast Marcuse 1969 with the views found in Marcuse 1991 [1964], for example). It is clear, though, that while technology may be seen positively or negatively, it is by no means ever neutral (Heidegger 1977; Gane 2006). Viewing technology as a simple tool of society delivers society to it "in the worst possible way," an unthought acceptance of this continual shift towards life as standing-reserve (Heidegger 1977, p. 4). The technology found in the *PRPp* encapsulates this change—whether it is seen as a positive future of safety, efficiency, and coordination, or a negative one of race and class conflict. The comparative methodology used in this article examines technologies that do not yet exist, to *think* immanent technologies before they exist, working through their promises, threats, and commonalities (Luke 2012). Before the geoweb recedes from view as one more ubiquitous fact of modern life, it is important to question exactly what is opened or foreclosed as life shifts increasingly towards standing-reserve.

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