Social Media and the Rise of Surveillance-based Advertising

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Abstract

The rapid rise of surveillance-based advertising has sparked heated debate, albeit one devoid of historical context. This paper traces the connections between surveillance in advertising and the development of social media, arguing that the two are born of common economic, technological, and cultural conditions. The Internet businesses that emerged most successful from the dot-com bust of 2000 found ways to flourish amidst a general profitability crisis by changing the relationship between producer and consumer, and, ultimately, embracing surveillance as a business model. This surveillance has intimate connections to the social media discourses of openness and empowerment, and developed as a response to tensions in the commodification of information.

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The rapid expansion of surveillance-based advertising has prompted a flurry recent debate. On the one hand, the advertising industry considers new tracking technology to be the goose that laid the golden egg of the Internet and speaks of dire consequences to anything beyond tepid self-regulation (Direct Marketing Association, 2010). On the other hand, prominent consumer advocates characterize current practice as laying the groundwork for a total surveillance society (Calabrese, 2011). Sorely missing from this debate is a sense of historical context: what are the cultural, economic, and technological dynamics under which surveillance-based advertising has flourished? The expansion of surveillance also presents a curious puzzle. Social media comes with the promise of user empowerment and yet also delivers a level of surveillance that many people find creepy (and frequently lands Internet companies in legal trouble, as in the case of Google's "Buzz" and Facebook's "Beacon"). While some observers describe surveillance as the "flip side" of social media (Morozov, 2011), this paper argues that the two are more intimately connected through a shared technological, cultural, and economic history.

Targeted advertising

Near where I live, a billboard recently promoted a pickup truck as "a big juicy steak in the land of tofu." The image of a powerful truck climbing over impossible terrain probably failed to resonate with residents who passed underneath each day, since the billboard was situated at the entrance to "Little Saigon," a neighborhood with several small tofu factories and seven Vietnamese groceries. The "land of tofu" billboard highlights the difficulty that has faced advertisers for a hundred years—the frequent disconnect between the message and its intended audience. Every diabetic forced to sit through a soft drink commercial represents a small addition to the mountain of economic inefficiency in traditional marketing.

Targeted advertising promises to solve this problem, once and for all, by rationalizing the match between ad and recipient. In the words of one industry association, "Irrelevent advertising is just

silly, really. Thats why advertisers use targeting to show you ads that you will be interested in." (Interactive Advertising Bureau, 2011). An advertising network (the intermediately between advertiser and website) may target ads using a person's geographic location, search history, web browsing behavior, demographic profile, purchase history, social network relationships, and content analysis of the website. Some industry players (e.g. TARGUSinfo, 2009) see the future of advertising in the combination of these methods, particularly behavioral, demographic, and social network data.

Regardless of method, all targeting is based on a simple premise: every encounter between an advertisement and a consumer should be as efficient as possible. A preliminary industry survey from 2009 found that clicks for ads using "behavioral advertising," a common form of targeting that utilizes interest-profiles built from browsing history, resulted in over twice as many sales as the industry average, and up to ten times as many sales for certain types of behavioral advertising (Beales, 2010). By 2011, one large survey of the online advertising industry concluded that targeted advertising was now "ubiquitous" and was bringing significant revenue gains (AudienceScience, 2011).

Despite a consensus that targeted advertising is more effective, the industry still fears a user revolt, with privacy issues prompting "marketers to use online behavioral advertising...75 percent less than they would otherwise." In the words of one ad executive, "If you can diminish the privacy concerns, money will flow into online behavioral advertising," (Lohr, 2010). The industry is right to be worried, but also hopeful. Recent studies have painted a picture of Internet users as uncomfortable about being tracked (TRUSTe, 2008), but also a preference for accepting "relevant" advertising rather than paying for currently free services (Ponemon, 2007). Although it is impossible to know the exact scope of targeted advertising, it is safe to say there is a quiet revolution under way in how Internet sites make money: over 90 percent of Internet advertising is brokered by only six companies (Attributor, 2010), and all these are aggressively promoting targeting techniques based on surveillance data in their promotional material.

The crisis of information capitalism

To make sense of this transformation in the business model of the Internet, we must look to the economic, cultural, and technological dynamics that have led us here. At its heart, the practice of using detailed surveillance to target advertising is rooted in the tensions within information capitalism over the last 30 years.

By "information capitalism," I do not mean conjure fanciful images of a post-industrial society, but rather the way in which, over the last thirty years, the management and analysis of information has come to play a vital role in global capitalism, and information itself has become an increasingly important commodity. In this way, the increased importance of information can be understood a longstanding processes in capitalism (Schiller, H., 1981), since as much as half of the information and services sector is directly tied to industrial and agricultural production (Webster, 2006). Nevertheless, the grow in importance of information is undeniable: by 1980, information technology was the largest category of US corporate capital investment, growing to 45 percent of all capital expenditures by 1996. In 1970, similar investments represented a paltry seven percent (Schiller, D. 1999).

What happened in the mid-1970s to trigger such a rapid rise in information technology investment? The oil shock and recession of 1974 marked the final blows to an age of global prosperity based on Henry Ford's model of mass production. From the end of World War II until the 1970s, world commodity prices remained high, industrial productivity and real incomes

increased rapidly, particularly in the US. In addition to mass industrial production, the Fordist model rested on the logic of mass consumption, corporate collaboration with organized labor, and Keynesian state intervention. By the 1970s, the profitability of Fordism had been greatly weakened by the gradual expansion of global markets and increasingly intense competition among industrial states. In this environment of tenuous profits, the deep recession of 1974 created a temporary crisis in capital accumulation. What we now call "neoliberalism" first emerged as a response to this crisis: many corporations employed the "spatial fix" to undermine labor power and restore profitability by serially moving industrial production from place to place (Silver, 2003); and a political project emerged to construct a neoliberal state, one hostile to unions and public ownership, and determined to dismantle regulation (Harvey, 2005).

In the new more globalized marketplace, increased competition and a need for rapid communication over great distance led to a massive expansion in investment in information and communication technology. Coordination of global supply chains was made possible only by advances in global communication systems. This world-spanning infrastructure was also a precondition for global integration of financial markets and services. More directly, corporations universally identified information and communication as necessary for competitiveness (Webster, 2006).

In *The Work of Nations: Preparing Ourselves for 21st Century Capitalism*, Robert Reich (1991) synthesized an emerging consensus that elevated information technology from a supporting role in the new economy to the center stage. As the US Secretary of Labor from 1993 to 1997, he also played a key role in shaping US and UK "third way" policy. For Reich, rational bureaucratic efficiency was no longer flexible enough to compete in the global market. To succeed, the US needed to shift its labor toward activities that added more value and could command higher wages and profits. This meant products and services that were knowledge and information intensive. By the 1990s, the infrastructure originally created by corporate demand for *private* networks had matured into the public Internet (Schiller, D. 1999), and national policy aligned with economic changes already under way to aggressively promote information-based jobs (especially in the UK under the banner of the 'knowledge workers').

This transformation toward an economy dependent on the commodification of information was instigated in part as a reaction to the crisis of profitability under Fordism, but a reliance on information as a source of profit presented its own difficulties. On the one hand, we rely on the free market to allocate resources, including information. Efficient distribution, therefore, rests on our ability to commodify information. On the other hand, markets and governments only function when citizens and consumers are well informed. Thus, we also have a tradition of unfettered access to information. These two impulses are not easily reconciled. In the case of the US, this tension runs through 150 years of law and political debate over the press, copyright, patents, and broadcast spectrum. The increasing importance of information as a commodity central to the economy has made this tension stronger (Schement & Curtis, 1995).

Although the world economy is now reliant on the exchange and production of information as an essential intermediary in profit-making activity, this process of commodification is complicated by some of information's peculiar qualities in the digital age. Not only is there an infinite and exponentially increasing supply of information, increasingly, it is no longer possible to simply transfer data from one place to another without creating a duplicate. When our communication infrastructure was based on analog circuit-based networks, the transmission of information was fleeting and prone to degradation (or stuck in the physical world, trapped in printed words on paper). Now, with packet-switched digital networks, there is no fundamental distinction between creating a perfect copy and moving the original. Every attempt to move information creates, as its necessary byproduct, an exact replica of the source. To be sure, significant effort has been

invested in creating an illusion, via Digital Rights Management (DRM), of a separation between storage and transmission of information, but the underlying property of digital data makes this a costly and difficulty undertaking.

Information capitalism is pulled by conflicting forces: we have a longstanding tension in liberal-democracy between information as a commodity versus information as a right, an infrastructure that can only copy information, and an economy increasingly dependent on extracting profit from the commercial exchange of information. As a result, it is very difficult to sell information when identical or roughly comparable information is available for free somewhere else. Take, for example, a service like craigslist.org. It has two dozen employees, and yet is largely responsible, by some estimates, for a $10 billion reduction in newspaper classified ad revenue in the US alone (BBC, 2009). In the last decade in the US, newspaper revenue declined 68 percent (Vanacore, 2010) and music album sales have decline 52 percent, including online sales (Smith, 2010). Chris Anderson is currently the most vocal adherent of the view that digital infrastructure makes information difficult to commodify. "Information," he writes, "wants to be free in the same way that life wants to spread and water wants to run downhill" (Anderson, 2009). He posits an iron law to digital commodities, one that can never be escaped: their price always tends toward free. Anderson's argument hinges on the marginal cost of digital distribution. With industrial production, the cost of each unit produced declines with greater production. At some point, greater economies of scale no longer reduce per unit cost, and the market generally settles on a price. With digital distribution, the marginal costs continue downward infinitely. There is never a point at which producing more units does not lower the overall production cost per unit. As marginal cost approaches zero, it is almost certain that there will be a competitor offering a similar digital product for free. Because you cannot stop "free", the only choice left is to embrace "free" as your core business model.

Despite the fact that many information commodities, like cable television, have proved remarkably non-free, Anderson's iron law has salience for any sector where the technology for digital distribution has matured. Anderson is quick to point out that some information will become more expensive: anything that requires customization and non-automated labor will generally become much more costly over time.

These tensions in the information economy can be seen in the spectacular dot-com crash of 2000. By the late 1990s, the Internet was the new frontier and the rush was on to stake an early claim. Capital flowed into Silicon Valley from around the world as companies eschewed traditional business practices and earning ratios. In early 2000, the party came to an abrupt end. By March, the stock prices of technology companies spiked rapidly upward and collapsed with $2 trillion in market valuation vanishing in a single week. Within the first five weeks after the peak, and the tech heavy NASDAQ dropped by over a third and Internet stocks lost over half their value (Cassidy 2002). Within two years, NASDAQ alone lost $5 trillion in valuation from its high (Gaither & Chmieleski, 2006). Obviously, the dot-com bubble could not have existed without the hyper-speculation that characterized the early Internet years. Nevertheless, a significant factor in the bust was the inability of many Internet companies to produce sufficient profit from information they generated and then mostly gave away.

Web 2.0 and the culture of openness

By 2004, it was clear that some companies had managed to emerge unscathed from the dot-com bubble. In fact, many were thriving. In San Francisco, "thought-leaders" (as described in conference publicity material) gathered to make sense of the new terrain, a collection of practices grouped together under the umbrella of "web 2.0." If the bubble Internet economy was version

one, the new more sound model was version two.

In "What is Web 2.0," Tim O'Reilly crystallized and popularized the consensus that emerged from this conference (O'Reilly, 2005). "What is Web 2.0" has become one of the most widely read and influential tech manifestos of all time. Although O'Reilly was not the first to articulate any of the constitutive ideas, the coherent model that "What is Web 2.0" presents has definitively set the terms of discourse in Silicon Valley. Although web 2.0 and social media are not synonymous, web 2.0 is a useful enumeration of specific practices common to most social media. Two of the primary aspects of this model include *the web as platform* and *collective intelligence*.[1]

Behind the *the web as platform* is the idea that Internet companies must embrace the sharing of information for free. What before many thought of as their greatest disadvantage would be embraced as as their greatest advantage. Rather than standing alone, web 2.0 companies succeeded, the thinking goes, if they are able to interface with the interconnectivity that makes the Internet powerful. The first impulse of many Internet companies is to guard the information on which their business depends. According to the web 2.0 model, this impulse is exactly wrong. Instead, data which is locked up in a "walled garden" or a "data silo" should be set free. By embracing open, standards-based protocols and allowing their data to be used by other people and companies, a web 2.0 company is able to harness the entire Internet and connect its service with everyone else, providing mutually beneficial value.

Collective intelligence refers to the aggregate capacity of Internet users to provide both better answers and more data than could all the employees one might possibly hire. The key insight is that Internet users do not simply consume value, they are in fact the source of value. Users comment, rate, review, share, link, and upload—in short, they create all the ephemeral qualities that make a site appealing, and often all the concrete content as well. If you want users to volunteer their intelligence, you must create a system which is easy to use, seductively fun, and interactive (often framed in the context of "empowering" the user). Part of the web 2.0 model relies on the blanket observation that information companies with larger databases tend to make more money, and by far the fastest and most accurate way to fill a database is to "crowdsource" it for free (i.e. outsource it to the masses).

The web 2.0 model is an inversion of the logic at work in Fordist vertically-integrated mass industrial production. In many cases, the product flows in reverse, from the end user to the Internet company, and then back out again. Fordism relied on high wages and stable corporate-union relationships. The Internet relies on the capture of vast amounts of free labor, given voluntarily and often in the pursuit of leisure (Terranova 2000). Rather than stable labor relations, unionization is effectively non-existent and it is uncommon for workers to stay with a particular Internet company for longer than two years. In the place of careful planning and rational calculation of risk, a web 2.0 company embraces flexibility and breakneck innovation. Where a traditional company stakes its survival on control of the information that gives it a competitive edge, a web 2.0 company allows everyone to have access.

The web 2.0 model is not without notable skeptics (e.g. Graham 2005). Indeed, some of the most vaunted web 2.0 companies violate many of the web 2.0 rules while following others. Craigslist and Facebook, for example, are notorious for making it difficult for third parties to access their data (although they pay lip service to the idea of the web as a platform just as much as any web 2.0 company).

1 The third major theme of Web 2.0 to emerge from the conference was *flexible production*, the idea that small nimble development teams using more lightweight technology were outperforming their larger lumbering competitors.

Individually, the ideas that compose web 2.0 were not new in 2004. Pop-sociologist and futurist Alvin Toffler long ago predicted the rise of the "prosumer" (a portmanteau of "consumer" and "producer"). He conceived of the consumer as an essential part of the value chain of production (Toffler ,1980). Many of the key ideas in the web 2.0 model are presaged by early books on the "new" or "digital" economy (e.g. Tapscott, 1997; Kelly, 1998). Since computers were first tapped as tools of business, there has been a drive to create "open systems" that can exchange data with one another (Kelty 2008).

Irrespective of its validity or newness, the emergence of "web 2.0" is significant as an articulation of a cultural and political project. The fact that few companies follow all its prescriptions does not lessen its importance. The model can be thought of as an "ideal type" of Internet business, an internally consistent set of logics and practices that hang together as a coherent whole. The idea of web 2.0 has congealed as both the rational way to run an Internet company and as a normative ideology around the proper and moral way to conduct business. Good companies share information openly, bad companies horde it. Good companies empower users, bad companies make user interactions difficult.

Internet programmers and technology planners have internalized the ethics underlying web 2.0. In his memo "the meaning of open" to Google employees, Senior Vice President Jonathan Rosenberg typifies the enthusiasm for the web as a platform. After debasing the conventional wisdom "that companies should lock in customers to lock out competitors," Rosenberg writes:

> So we need to constantly push ourselves. Are we contributing to open standards that better the industry? ... Open up as much as you can as often as you can, and if anyone questions whether this is a good approach, explain to them why it's not just a good approach, but the best approach... An open Internet transforms lives globally. It has the potential to deliver the world's information to the palm of every person and to give everyone the power of freedom of expression... There are forces aligned against the open Internet—governments who control access, companies who fight in their own self-interests to preserve the status quo. They are powerful, and if they succeed we will find ourselves inhabiting an Internet of fragmentation, stagnation, higher prices, and less competition (2009).

Just as "open standards" and "open information" have a political and ethical edge, *collective intelligence* is often seen as a form of radical democracy. Perhaps the most extreme example is from Kevin Kelly, founding editor of Wired Magazine. Kelly (2009) proposes that web 2.0 is leading toward a "new socialism" based on ad-hoc decentralized participation, volunteer labor, and free information. Although Kelly's view is extreme, the more general idea that technology should be designed to maximize participation in order to empower users is nonetheless widely held among Internet technologists.

The monetization of web 2.0

Noticeably absent from the web 2.0 model is any way to make money. Yes, bad companies rely on customer "lock in," and good companies embrace openness and innovation, but how, exactly, does one profit from a product you give away?

Chris Anderson (2009) observed that most Internet companies have only three viable options: give away information in order to sell a related product; give away information to most people while charging a small set of customers for a premium product; or third party advertising. For

some Internet companies, these strategies are enough to become profitable, particularly when their content is user generated. Other companies (particularly newspapers), have found it difficult for their Internet presence to produce sufficient revenue even when deploying a combination of all three strategies.

Of these strategies, advertising is by far the most important. To overcome the inefficiencies of traditional advertising, the logic behind web 2.0 is also at work in building more effective advertising based on surveillance. In 2007, Tim O'Reilly gave this advice to would-be Internet developers: "It is no longer enough to know how to build a database-backed web site. If you want to succeed, you need to know how to mine the data the users are adding, both explicitly and as a side effect of their activity on your site" (O'Reilly, 2007).

O'Reilly had in mind a prototypical web 2.0 business, one that had found itself awash in user data. As the cost of digital storage continues to plummet, there is little incentive to throw anything away. The most successful Internet companies no longer simply provide a direct service, they also analyze their accumulated data for patterns and social relationships. This analysis might be presented to the user, for example, in the form of recommendations and trending topics. This is no small matter: for Amazon and Netflix, better recommendations has resulted in millions of dollars in additional sales. Just as often, the analysis is kept private as part of "business intelligence" used to help a company extrapolate future trends and increase revenue, for example, when Facebook experiments with different ways of getting people to linger on the site (Economist, 2010).

Tim O'Reilly's advice to mine all the data of a user's activity may be the logical extension of web 2.0, but it is also precisely the basis of targeted advertising that is based on surveillance data (some targeted is not based on surveillance, but most is). Both web 2.0 and surveillance-based advertising, at their most fundamental levels, are about the user's labor adding value. Regardless of whether this labor produces data explicitly (e.g. written comments or social network connections), or produces data incidentally (e.g. the trail of webpages a user visits), these data are the lifeblood for both web 2.0 and surveillance-based advertising. Yahoo's ad targeting, for example, uses data mining to predict user behavior by processing the 12 terabytes of information that passes through its servers on a daily basis. Yahoo can predict, with 75 percent certainty, which visitors to its automobile site are going to buy a car in the next three months (Sloan, 2007). Just as the raw input comes from the same sources, the algorithms used by web 2.0 and targeted advertising companies are based on the same techniques.[2]

In both cases, the web user's free labor is understood as a form of empowerment, even as it creates value for the Internet company. Google took great pains to emphasize the benefits to the user when it announced its foray into targeted advertising (or "interested-based" advertising, as they prefer to call it). "We believe there is real value to seeing ads about the things that interest you," announced the official Google blog (Google, 2009). In a statement typical of advertising industry rhetoric, Rocket Fuel, a prominent targeted advertising network, declares on its website that it wants "to turn online ads from an annoyance into a useful complement to your web surfing experience." Better ads means more money for websites, which in turn creates "better products and more free features and content... It's a virtuous cycle we're happy to be part of..." (Rocket Fuel, 2010).

Web 2.0 companies think of the Internet as a platform, and ideally an open platform. Rather than build walls around their data to ensure locked-in customers, a web 2.0 company embraces

2 For a comparison of data mining techniques between advertising and web 2.0, see Li, Surendran, & Shen (2007) or Yang, Dia, & Cheng (2006) in relation to Segaran (2007).

information exchange—so long as the company is still able to gather data on their users and monetize their activity. Both Google and Facebook have created open protocols designed to undermine the competitive advantage of the other by making certain data more readily available. In the battle between Google and Facebook, Google knows more of what people value on the Internet and Facebook knows more of the social relationships among people. With "Buzz," Google is pushing hard for open protocols to enable any site to have access to relationship data. According to Google's Open Web Advocate, "this is a down payment on where we're going with the open, social web," (Kirkpatrick, 2010). With the "Open Graph" protocol, Facebook is able to capture information on everything its users "like" on the Internet. In addition to undermining the key advantage of the other company, each open protocol is designed to generate increased access to users' behavior, relationships, and interests—the necessary raw material for surveillance-based advertising.

Web browsers and the watchful cookie

Unlike traditional media, where content is broadcast or printed and distributed in a one-way direction, digital media allows for every moment of contact between content and audience to be a recording event. This record of contact provides the material basis on which a measurable and predictable system of advertising can be built by extracting value added by the customer, often without their explicit knowledge. For some traditional mediums, the ability to record each moment of contact is being experimentally grafted on using face recognition, as in the case of billboards that swap out the current advertisement to better match the demographics of the passer-by (Gray, 2010) or vending machines that have tripled sales by tailoring drink recommendations to the current customer (Lies, 2010). In the case of the web browser, no high-tech innovation is required: the ability to record audience behavior has been built-in for a very long time.

The very first web technology did not allow tracking. Most communication performed by a web browser is governed by a protocol called HTTP, developed by Tim Berners-Lee in 1991 in order to help academics collaborate. At its first conception, HTTP was intended to be a stateless protocol: each time you accessed a web page, the web server would respond as if seeing you for the first time (Berners-Lee, 1992). The first graphical web browser, NCSA Mosaic, initially developed by Marc Andreessen while a graduate student, added images to the web for the first time but kept the stateless nature of HTTP. Both Andreessen and Berners-Lee considered, and rejected, the addition of statefulness to the HTTP protocol for privacy and security reasons (Shah & Kesan, 2009).

The situation changed very quickly when Andreessen left academia to found Netscape, the corporation responsible for popularizing the web. Netscape had a contract in 1994 to develop an online shopping cart application and needed some way for the web browser and web server to maintain a consistent state across pages. Existing methods for establishing a state in HTTP were insecure and prone to errors. Netscape took a few weeks to hack together a method of establishing stateful HTTP connections by allowing a web server to store a small file on the user's computer (Shah & Kesan, 2009). They called this small file a "cookie." Because Netscape had a near complete monopoly on both web browsers and web servers at the time, cookies very rapidly came into widespread use.

When you visit a web page, your browser contacts a web server to fetch the content for the page. Advertisements, however, typically originate from a server owned by the advertising network, not the website you have visited. The advertiser's server is called a "third-party host" and any cookies it sets are called "third-party cookies." As soon as cookies were introduced to Netscape,

advertisers began using third-party cookies to track what ads a user had seen.

By the time the Internet Engineering Task Force (IETF) got around to establishing a standard for stateful HTTP sessions, cookies were firmly entrenched. Although most IETF members objected to Netscape's cookies, preferring instead other proposals with better privacy and security mechanisms, a compromised was reached to create a standard for cookies (Shah & Kesan, 2009). The IETF protocol for cookies was finalized in 1997 and added several privacy improvements. Most notably, the IETF standard required web browsers ("user agent") to reject third-party cookies by default:

> ... a user agent MUST disable all cookie processing (i.e., MUST NOT send cookies, and MUST NOT accept any received cookies) if the transaction is to a third-party host... The starting or continuation of such sessions could be contrary to the privacy expectations of the user, and could also be a security problem (IETF, 1997).

Early in the drafting of the IETF proposal, advertisers were in a state of "panic" (Bruner, 1997b), having grown reliant on third-party cookies. One advertising executive said the proposed standard "begs the question, how is the Web going to be funded?" (Bruner, 1997a). Netscape's position, in testimony before the US Federal Trade Commission, was that third-party cookies should be blocked (Federal Trade Commission, 1996). Despite this, after a back-door lobbying campaign from the advertising industry (Bruner, 1997a), both Microsoft and Netscape chose not to follow the IETF cookie standard and allowed third-party cookies by default. Since Netscape and Microsoft enjoyed a near total duopoly of the web browser market, and because very few users change the default settings, advertisers were able to continue to use third-party cookies. In the subsequent decade, the cookie controversy mostly died down—even amidst a dramatic expansion in the level of tracking via third-party cookies. Because of rapid industry consolidation, ad networks gained both a high degree of overlap (a single site will support many ad networks) and a high degree of coverage (a single ad network will often serve a large percentage of the market). For example, in 2009, huffingtonpost.com displayed advertising from twenty seven different ad networks, and google's ad network was able to track 92 of the top 100 websites, as well as nearly 80 percent of all active domains (Gomez, Pinnick & Soltani, 2009). This ubiquity allowed ad networks to build customer interest profiles from a fairly complete image of a user's web browsing behavior.

The advertising industry has successfully defended their ability to track users using third-party cookies. Microsoft engineers in 2008 quietly added an ability in Internet Explorer 8.0, enabled by default, to detect tracking and automatically block it. Again, once advertisers got wind of this, a quiet but intense lobbying campaign from advertisers led Microsoft executives to step in and remove the technology (Wingfield, 2010). Two years later, this event was repeated with the non-profit Mozilla Foundation, maker of the Firefox browser: an engineer wrote code to automatically remove third-party cookies, only to have this code quickly removed by executives after being alerted its implications by the advertising industry (Angwin & Ante, 2010; Soghoian, 2010).

The technological foundation of the web allows every moment of contact between a user and online media to be a recording event, sometimes as a result of intentional design and sometimes by accident. In the case of cookies, this development was a conscious decision heavily influenced by financial concerns. In other cases, however, the capacity for surveillance built into the web protocols is more a product of unintended consequences. Take, for example, the HTTP Referrer: when a user clicks on a web link to visit a new page, the browser is supposed to report the user's prior page to the web server (the HTTP protocol suggests that web browsers allow the user to disable this—advice that no web browsers have ever followed). The HTTP Referrer was

originally intended to help fix bad links (Berners-Lee, 1992), but can now be used, in combination with other techniques, by advertising networks to create a fairly complete picture of an individual's social network (Krishnamurthy & Wills, 2009). Unlike cookies, the HTTP Referrer has not sparked a public debate. As web browsers have become more powerful and complex, they have also come to leak more information to the web server. These seemingly innocuous bits of information (e.g. the list of fonts installed on the user's computer) can be combined together to create a fingerprint that is nearly unique from person to person (Eckersley, 2009). Using a series of tricks, hacker Samy Kamkar has created an indestructible "evercookie" to demonstrate how nearly impossible it is prevent persistent tracking of contemporary web browsers, even when run in an "enhanced privacy" mode (Kamkar, 2009).

Conclusion

Commercial surveillance is deeply entrenched in the technical and economic practice of social media companies. Both targeted advertising and social media share a common, and effective, response to the contradictions of information capitalism: encourage users to generate data, mine this data for trends, and sell it back to them as empowerment. The open and democratic aspects of social media are also the grounds on which social media has been able to generate revenue through the monetization of surveillance, both of explicit and incidental data. Sometimes by design and sometimes by accident, the material basis of our Internet infrastructure facilitates this surveillance and will be very difficult to change.

In the short term, there are inescapable changes coming to targeted advertising. Both the European Union and the United States are poised to pass into law (or begin enforcement of) requirements for prior informed consent before personal information may be gathered by a third-party[3]. Amid growing public debate, Google, Microsoft, and Mozilla have begun to equip web browsers with anti-tracking controls, albeit modest and ineffective ones.

Despite the hyperbolic objections by some internet companies and advertising networks to changes in law (Rooney, 2011) and web browsers[4] (Carr, 2011), advertising will likely follow the model adopted by some internet companies of providing incentives in exchange for personal data (Clifford, 2010). Research is underway to allow users "to participate in the collection and reselling of their own personal information including compensation to users for allowing their browsing behavior and personal information to be tracked," (Rice, 2009). There is a goldmine of value to be extracted from the behavior of Internet users, and every reason to believe that some of this money will be returned to the individual in exchange for consent. For a small financial reward, most people have been thus far willing to opt-in to tracking programs: two thirds of customers in the US have at least one grocery loyalty card (CIOinsight, 2003). A future where users must opt-in to tracking is unlikely to change the entanglement between social media and surveillance. As more of the media landscape adopts the social media model of web 2.0 and grows reliant on targeted advertising, the expansion of surveillance deeper into everyday life is likely to continue unabated into the foreseeable future.

3 In the case of the US, Senator John Kerry is currently circulating a draft "Privacy Bill of Rights" that requires opt-in for third-party tracking. In the case of the EU, Directive 2009/136/EC (commonly referred to as the "Cookie Directive") amends Directive 2002/22/EC (know as the ePrivacy Directive) to require both prior and informed consent before third-party tracking may take place (according to the legal opinion of the Article 19 Working Party, established by the directive). This directive comes into force on May 25, 2011.

4 One advertising executive reportedly told the CEO of Mozilla, "If you do this, you're single-handedly breaking the web," in reference to the "Do Not Track" HTTP header proposed for Firefox (Carr, 2011).

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