

Not For Bots.

Designing an Internet as irrational and unpredictable as the people who use it.

A manifesto by Kunal D. Patel

Preface.

Mac & Cheese Pancakes

Imagine for a moment that you are a chef at a restaurant ready to serve a frequent customer. This particular customer happens to be a creature of habit and always orders either pancakes or macaroni & cheese. On this particular day, the customer is fraught with anxiety over their decision and asks you, the chef, to choose for them. How would you make the decision about what to feed your customer? What factors would you consider? Perhaps you would rely on chance, and flip a coin to determine your customer's meal. If you approached this problem like a programmer, you might be compelled to write a simple computer program that randomly chose from the two presented options. Perhaps that solution would be too impersonal for your customer; too reliant on chance and without a justifiable argument. Instead of treating the problem purely as a programmer, you move on to treating it like a web developer. You write an application that parses through location-based data of what people have been eating at your restaurant and similar ones in the surrounding area. It would then run this data through a sentiment analysis engine to determine whether pancakes or macaroni & cheese were more popular and select the most popular option. Instead of relying on a coin flip or the random probability of a machine, you rely on the power of the crowd to deliver an informed choice to your customer. This solution appears efficient, practical and logical, but yet something still seems wrong. Have you delivered a memorable experience to your customer? Will this visit stand out for them from their previous trips?

When unconventional chef Kenny Shopsin was faced with this dilemma, his response belied how memorable his solution would be: “F&%k it, I'll make them both at once.” [1] Instead of choosing pancakes or macaroni & cheese for his customer, Shopsin threw logic out the door and

invented mac 'n' cheese pancakes to the gastronomic surprise and delight of his customers. It has gone on to become a signature dish at his New York City restaurant, one of dozens of unique and unexpected creations that can be found on his menu. Programs can only do what we ask them to, which is why the logical solutions of the programmer or web developer were bound to be forgettable experiences. People, as Kenny Shopsin demonstrates, are not bound by the logical constraints of programs. However irrational it was for him to step outside of the bounds of his customer's original question, the solution was novel and challenged user expectations about the foods involved. Why did I mention this story? What relevance does it have to a manifesto about designing the future of the Internet? While the lack of mac 'n' cheese pancakes in our lives may seem harmless, its importance becomes clear when we extend this metaphor to apply to the Internet.

In its relatively short existence, the Internet has fundamentally changed or subsumed our prior intellectual technologies. [2] As Nicholas Carr stated, it is now our clock, map, printing press, radio and television, and its increasingly pervasive nature means it wields unprecedented influence on our thoughts. [3] That influence over the cognition of online users is predominantly in the hands of the few – web designers and developers who, by virtue of shaping our online experiences will play a critical role in the future of human experience. This community is increasingly acting like chefs who are content to work with a limited set of ingredients and recipes. Instead of determining what to serve for lunch, the decisions of web designers and developers are shaping human behavior in ways we are only beginning to understand. Their reliance on machine-centered models of development means that their users will always get back the online equivalent of pancakes or macaroni & cheese; a

predictable response which reinforces the user as a passive consumer. Instead of deciding what's for lunch, the decisions we make as web designers and developers are actively shaping the cognitive behaviors of our users whether we realize it or not. While the future of the Internet is still being shaped, it is important that we recognize the value of the irrational and creative aspects of human behavior. Where will we find the “mac 'n' cheese pancakes” of the Internet? What is the value in designing experiences that challenge the expectations of users? How can we stop them from becoming passive consumers who are content with whatever choices we provide?

It is for my fellow “chefs” of the Internet – designers of online technologies - that I have written this manifesto, as a cautionary tale of the future we are creating and to offer a methodology that I hope will stop it.

Introduction.

An Overview of Things to Come

Not For Bots is a manifesto, a philosophy, a call to action and a series of online software. More importantly, it is a story about the present and future of the Internet split into seven parts. You will notice that I use the terms ‘designer’, ‘developer’ and ‘technologist’ interchangeably to describe those of us who play an active role in shaping the Internet. Not For Bots is meant to be consumed by this audience, by the designers of technology who are shaping the Internet and those that will determine its future.

1. **Part One** examines the dominance of machine-centered thinking in web development today and its ethical implications on user privacy in social networks.
2. **Part Two** raises concerns about the future of an Internet run by large data sets, operating at real-time speeds that offer shallow motivation for users.
3. **Part Three** draws upon cutting-edge psychological research to paint a grim picture of the ongoing cognitive assault we face by the real-time web.
4. **Part Four** sheds light on our innate capacity for irrational behavior and the disruptive value it possesses in a logic-driven world
5. **Part Five** establishes the manifesto and methodology behind Not For Bots and its “human-centered” goals
6. **Part Six** offers brief case studies of Not For Bots projects that explain their concepts, use cases, precedents and methodologies
7. **Part Seven** concludes with a multi-part challenge to technologists to stop designing for bots and begin designing for people

Part 1.

Machine-Centered Thinking

What is a browser?

On a bright spring day in 2009, *The New York Times* asked a simple question to over 50 passersby of different ages and backgrounds in Times Square in New York: “What is a browser?” Less than 8% of those interviewed that day could answer the question. Responses ranged from pure conjecture (“What is a browser? I use Yahoo?”), to the misplaced (“It’s where I search through, to like, find things”), to the apologetic (“I’m not a computer guy, I might be the wrong one for this”). [4] That last response in particular is critical, because it raises several important questions about the Internet. For instance, what constitutes a “computer guy”? Why did this user feel that they were unqualified to answer a question about a piece of software they likely use on a daily basis? What this survey begins to reveal is that at a fundamental level, users do not understand how they are engaging the Internet. This premise is supported in several ways by a recent situation involving two other prevalent forces on the web: Google and Facebook.

ReadWriteWeb is one of the most widely read technology blogs in the world, known for offering current and insightful analysis about Internet industry news. This past February, it also temporarily became the Facebook login page for hundreds of confused Facebook users. On February 10 2010, *ReadWriteWeb* writer Mike Melanson posted an article about how Facebook was attempting to become our “One True Login” on the Internet. [5] The article quickly became the number two search result on Google for the query “Facebook login,” ironically above the most logical option – Facebook’s login page. As comments for Melanson’s article began to accumulate, it became clear that Google’s ranking “mistake” had caused problems. Users who relied on Google to find the Facebook login page wound up at *ReadWriteWeb*, which happens to authenticate commenters via Facebook Connect. When these users

mistook *ReadWriteWeb*’s Facebook Connect authentication as a new Facebook login page, their responses to the situation ranged from confusion (“When can we log in?”) to frustration (“I WANT THE OLD Facebook BACK THIS SH!T IS WACK!!!!”). [6] While Melanson was quick to blame Google for this problem, the underlying issues for this situation go deeper than just a single service and are related to *The Times*’ survey.

As Gillian Andrews noted in her guest article for *ReadWriteWeb*, the reason for these online misunderstandings can be found in the notion of “web illiteracy.” Users who are not educated about the Internet cannot be expected to possess the same kinds of literacy that digital natives do. For instance, while digital “natives” may consider it convenient for the address bars of browsers to resolve to search results, this behavior encourages the responses seen in *The New York Times* survey and *ReadWriteWeb* situation. [7] Her experience in collecting online misunderstandings wrought by search engines on *Gumbaby.com* has given her insight into the processes these “web illiterate” users go through. [8] Presented with systems they don’t understand, these users are attempting to make sense of situations for which they have little information. Social media software are a relatively recent technology which has become incredibly pervasive, and it should be no surprise that elements such as comment boxes and “connect” buttons have proven troublesome for users without a proper education about their usage. Instead of writing off these users as “web illiterate”, shouldn’t those of us in the development community hold ourselves accountable for designing the software that runs the Internet? Why are we content to ignore users who don’t know the difference between a browser and a search engine?

Our fixation with the machine

User struggles to engage with the Internet on a fundamental level are the result of the priorities of those who are designing it. As designers we are adopting a machine-centric viewpoint of how the Internet should be built at the expense of our users. My use of the term ‘machine-centric’ is in reference to usability expert Donald Norman’s notions of human-centered versus machine-centered views of technology. In his 1993 book *Things That Make Us Smart*, Norman posited that as technology becomes increasingly immaterial, its function is concerned with the fulfillment of abstract needs such as time-management and decision-making. He distinguishes between what technology is able to measure (i.e. hours worked per week) and what it can’t (i.e. satisfaction, rapture, experience), which he respectively refers to as “‘hard’ sciences’ and “‘soft’ sciences’”. The “‘hard’ sciences’ make simple and objective measurements, leaving out what it cannot measure; whereas “‘soft’ sciences’ are concerned with the complexity of subjective measurements, thereby making a link between technology and the living system. Like Gillian Andrews, Norman would have attributed the “illogical” behavior of the survey respondents and Facebook users to the rigidity of how those systems (browsers, social networks) were designed. A machine-centered view of technology adopts the premise that “people err and computers don’t”, a view which Norman was quick to denounce: “To say that people often act illogically is to say that their behavior doesn’t fit the artificial mathematics called “logic and decision theory.” Technology would benefit society if it understood more the way in which human cognition works.” [9]

Given that Norman’s warnings about machine-centered technology were published almost two decades ago, why have they gone largely unheeded? Why are we designing an Internet built

around the abstract priorities of machines rather than the cognitive priorities of people? The answer may lie in our obsession with “‘hard’ sciences’; of quantifiable abstract metrics that perpetuate the systems that created them. In a recent talk about his book *Cognitive Surplus*, educator and media critic Clay Shirky put forth what Kevin Kelly dubbed the ‘Shirky Principle’: “Institutions will try to preserve the problem to which they are the solution.” [10] While Shirky spoke about this idea in reference to the collapse of complex business models, I believe that we can extend it to apply to online technology as an entity. [11] Kelly made this leap himself, in a 2007 blog post entitled “Humans Are the Sex Organs of Technology” claiming that technology has its own agenda. He likens technology (or the technium) to an infant who has trained its parents (humans) to fulfill its demands: “Technology has trained us, its parents and its gonads. Technology makes humans wealthier, with more leisure to consume, which leads to more technology...This positive feedback loop is exactly the kind of self-preservation strategy a system with its own agenda would develop.” [12]

Around the same time as Kelly’s blog post in 2007, Norman released *The Design of Future Things*, whose afterword was dedicated to exploring the agenda of the machine. The afterword of the book, “The Machine’s Point of View”, examines this agenda through a series of interviews with a “machine” (a machine-centered human) called ‘The Archiver’. Norman’s transcripts with ‘The Archiver’ contain many of the same messages as Kelly’s blog post, namely that the machines’ “dependence” on people will fade: “In the past, it was indeed people who made machines smart. We barely need people at all now, and we’re close the point where we won’t need you [people] any more.” [13]

The primary example of this situation online can be found in the *reCAPTCHA* system designed by

Louis von Ahn. *reCAPTCHA* (Completely Automated Public Turing test to tell Computers and Humans Apart) is a security measure designed to deter automated bots from accessing content. They present the user with two words whose text has been warped and is unreadable by current OCR (optical character recognition) software. By completing *reCAPTCHA*'s, users are helping to decipher text from old books that software currently cannot read. Von Ahn unwittingly created a system that was wasting away, in small increments, "millions of hours of a most precious resource: human brain cycles." [14] While their intention is noble, *CAPTCHA* systems are in essence a tool to make technology more efficient at the expense of human activity.

The ethics of machine-centered technology

The effects of this machine-centered view of technology on the development community have become increasingly evident. In designing technologies that revolve around the constant production of data, the users who produce it have become a secondary concern. What are the ethical implications of our machine-centered behavior as developers on users? Oftentimes, users are unaware of the implications until they are directly confronted by the consequences. The clearest examples of this can be found in the ongoing battles for privacy and identity between users and two of the Internet's current titans: Google and Facebook.

Google's priority isn't privacy

In an interview with CNBC last year, Google CEO Eric Schmidt stated that "If you have something that you don't want anyone to know, maybe you shouldn't be doing it in the first place." [15] While their company motto may be "Do No Evil", Google built its empire on the backs of user data scraped to deliver targeted advertising. Removing or obscuring

this data to protect user privacy would be antithetical to the very core of their business model. Remember, Google's self-stated corporate mission is to "to organize the world's information and make it universally accessible and useful." [16] In the context of their mission, Schmidt's comments reinforce the idea that Google's top priority is information and not its users, which was clearly evident in the problematic launch of Google Buzz.

Google Buzz launched on February 9th, 2010 as Google's foray into the "real-time" social web dominated by Twitter and Facebook. The service, which is integrated with *Gmail*, allows users to post status updates, share content and read and comment on friends' posts. Its launch was met with much enthusiasm and curiosity by those eager to see if the integration of a social network within Google's popular *Gmail* web application would be successful. Within two days, this enthusiasm had turned into concern and anger from the online community at-large over Google's blatant disregard for user privacy. Unbeknownst to users, by simply using Buzz a partial list of their most-emailed contacts was automatically made public to all Buzz users. Even worse, the option for disabling this automatic sharing was hidden within the user's Google Profile settings page – which many people never even realized they had. The potential implications for Google's decision were staggering, especially in the political realm as noted by political researcher and blogger Evgeny Morozov: "If I were working for the Iranian or the Chinese government, I would immediately dispatch my internet geek squads to check on Google Buzz accounts for political activists and see if they have any connections that were previously unknown to the government." [17]

While Google quickly apologized and worked to correct the privacy flaws of Buzz, the experience led to some revealing and disturbing insights into

Google's decision-making processes. In correspondence with *The BBC*, Buzz product manager Tom Jackson revealed that Buzz was only tested internally and bypassed extensive external testing before being launched: "getting feedback from 20,000 Googlers isn't quite the same as letting Gmail users play with Buzz in the wild." The "shoot first, ask questions later" approach Google employed with Buzz is concerning given their access to personal user information and ability to distribute it. The decision to create the much-maligned automatic lists was born out of the idea that Google "wanted to provide a great user experience straight out of the box." [18] The inherent problem with Jackson's statement is that Google did not engage users in asking what that experience should be like. As social media researcher Danah Boyd noted in her 2010 keynote talk at *South by Southwest Interactive*, it's easy for technologists to assume that optimizing a situation is always best. [19] In the case of Buzz, Google's optimization fit their machine-centric view of promoting content generation within the system. Privacy controls and rudimentary explanations were secondary concerns, buried within pages users didn't know existed. If Google had prioritized users before the system, perhaps reactions to the service would not have included a call from 10 countries to Google to respect user privacy. [20]

Eroding the privacy of 400 million users

Fortunately for Eric Schmidt and Google, they have not been the only ones to declare online privacy dead in the quest for publicly available data. Facebook's inverse relationship between its growing market share and the erosion of user privacy has not been accidental. In a recent interview with TechCrunch founder Michael Arrington, Facebook founder Mark Zuckerberg stated that if he were to create Facebook again today, user information would

by default be public. As a defense for the drastic privacy changes the world's largest social network has undergone since December of 2009, he said that "people have really gotten comfortable not only sharing more information and different kinds, but more openly and with more people." His about-face on privacy control is surprising given the formula Facebook built its reputation on; making user information visible only to their tightly-controlled network of friends. However, Zuckerberg apparently is not one to let the past get in the way of the future, subsequently stating in the aforementioned interview that "if we were starting the company now...these would be the social norms now and we just went for it." [21]

As Facebook has grown, and as users have become more entrenched, much of the privacy-friendly functionality used to initially attract users has disappeared. This functionality has instead been replaced with many public-by-default (if not public-with-no-other choice) options for the visibility of user information. [22] A clear example of these changes, the resulting backlash, and Facebook's stance can be seen in the updates made in December of last year. When Facebook asked users to reconsider their privacy settings for content visibility, the default choice was to share the information with "everyone." When criticism started to mount over their machine-centric decision ("everyone" means more publicly accessible data), Facebook proudly declared that only 35% of users had open to change the setting. Skeptical of this figure, Danah Boyd's subsequent interviews revealed that most users she asked about the changes simply didn't understand the privacy settings. [19] In a similar situation with Buzz, the assumptions and priorities of technologists were made at the expense of user privacy. How are users supposed to make informed choices when systems are not designed to promote such interactions?

Users are not customers, they are products

Why would two Internet giants with hundreds of millions of users loudly proclaim that they don't believe in online privacy? What has driven Facebook to swiftly reverse their position on privacy control, or for Google to launch a social networking service without adequate user testing? In a broader context, why do free social networks tilt inevitably toward user exploitation? As Tim Spalding answered: "Because you're not their customer, you're their product." [23] The examples of Buzz and Facebook may appear isolated but they are indicative of a larger issue within the web development community. The "public-by-default" mantra that is permeating the social web is beneficial to the machines that mine this data and potentially harmful to the users producing it.

"Public-by-default" also carries with it a notion of "private-by-effort", one that users have not shown they are informed about. In the case of Buzz, the assumptions of technologists ignored social rituals because their priority was on data production over the people themselves. With Facebook, a troubling pattern has emerged whose ethics are questionable at best. By setting public visibility as a default with every subsequent change, Facebook requires users to exert extra effort in protecting their identities and data. While they proclaim that most users choose not to exercise their option to opt-out, is it because they don't want to, or they don't know how?

An inherent lack of foresight

The cases of Google and Facebook also illustrate how the Internet is built on the decisions of the very few applied to the many. Google had its humble beginnings as the graduate work of founders Larry Page and Sergey Brin. Facebook started in the Harvard dorm room of founder Mark Zuckerberg. At the time, these technologists could not have foreseen

that one day their decisions would impact hundreds of millions of people around the world. By no means is this condition inherent to the Internet, but the pervasive nature of the medium has led to the spread of influence and ideas faster than any intellectual technology before it.

This theory can be seen in design decisions made from the humble beginning of the Internet to current social networking services. In October of 2009, Sir Tim Berners-Lee - the creator of the World Wide Web - apologized for the double-slash ('//') in web addresses. He admitted they were unnecessary, and could have easily designed URLs without them, but "it seemed like a good idea at the time." More importantly, Berners-Lee stated that when he devised the web almost 20 years ago he had no way of knowing the forward slashes would cause "so much hassle." [24] The Internet began as a hypertext-based project to facilitate the sharing and updating of information among researchers. It's design was built around this idea, and had he known how rapidly it would evolve in only twenty years, surely he would have second-guessed some more of his original decisions beyond the double-slash. The unique affordances created by personal computing and the Internet have created a situation that promotes this kind of behavior. Berners-Lee was not alone in making decisions whose consequences he could not hope to foresee.

Around the time Sir Tim Berners-Lee was drafting the specs for what would become the World Wide Web, other technologists were making decisions that would become worldwide standards. In 1982, audio engineer Dave Smith proposed the MIDI format as a way of translating musical notes from a keyboard into a computer. In the almost-30 years since Smith created MIDI, it has become the industry-standard protocol for all electronic music instruments (including computers) to interface with

each other. Smith himself admitted they had no idea how long MIDI would last or the influence it would still wield: “Of course it was impossible to guess how wide the use of MIDI would be in the long run...” [25] In similar fashion to how Smith set the future course of digital audio, Friedhelm Hillebrand did the same with text messaging. In 1985, as chairman of the non-voice services committee within the Global System for Mobile Communications (GSM), Hillebrand devised and pushed through the universal 160-character limit for short message services. He reached this magic number by typing out random sentences and questions on his typewriter, and when he saw the results were generally under 160 characters he deemed it a “perfectly sufficient” number. [26] Few today realize that a global standard for communication was set in a small room in Germany by a communications researcher with the power to influence the process.

While the previous examples focused on far-reaching standards set by researchers and engineers in positions of authority, the last two decades have opened up this influence to designers of all ages and backgrounds. *ChatRoulette* is an online video-based chat client that randomly connects users for one-on-one sessions. Its novel idea and simple interface has led to almost one million new visitors every day from around the world. [27] Given its success, it may come as a surprise that *ChatRoulette* was not built by a Silicon Valley start-up or established technical engineer. It is the invention of 17-year-old Andrey Ternovskiy, a student in Moscow who was bored of chatting with his friends on Skype and looking to meet new people. [28] Unlike Berners-Lee, Smith or Hillebrand, Ternovskiy did not set out to create a system that millions of users would engage with. He wrote the first version in 2 days and 2 nights as a tool for him and his friends, and with minimal promotion it became a worldwide phenomenon. *ChatRoulette* is a prime example of how quickly online technologies

can escape their creator’s intentions.

With great power comes great responsibility

What these stories should ultimately reinforce is Jaron Lanier’s message in his 2009 manifesto *You Are Not A Gadget*: “It takes only a tiny group of engineers to create technology that can shape the entire future of human experience with incredible speed. Therefore, crucial arguments about the human relationship with technology should take place between developers and users before such direct manipulations are designed.” [29] Berners-Lee could not have known that the structure he designed for URL’s would stymie users for years to come and lead them to question how a browser operates. If Dave Smith had realized that MIDI would become a universal protocol for all forms of digital music, perhaps he would not have limited the initial specification to just an electronic keyboard. When Friedhelm Hillebrand set the character limit for text messages, ‘Twitter’ still referred to the light chirping sounds of birds. The social networking service Twitter adopted a 140-character limit in order to fit a username and “tweet” in a single text message. Ternovskiy could not predict the worldwide popularity *ChatRoulette* would gain, or the types of unwanted users (exhibitionists) it would attract.

As a community, our lack of foresight about the consequences of our decisions can have serious implications on the users we are designing for. Whether it’s a browser or a social networking service, it is clear that users are not always in a position to make informed decisions. As a result, these users often put their trust in technology they don’t understand without an awareness of its consequences. A machine-centered model of development is not only ethically questionable, but raises serious cognitive concerns about the future of human experience. Building on Lanier’s plea for “crucial arguments” to

take place between users and developers, I offer a simpler message to online technologists: With great power should come an even greater responsibility to design for our users first.

Part 2.

The Future of the Internet

Shirking responsibility

While architects in the physical world have long embraced the idea that they can actively shape change through design, we – their digital counterparts – have yet to appreciate our impact. For example, LeCorbusier’s manifesto *Towards a New Architecture* recognized that architecture has the potential to fundamentally change how humans interact with buildings. It advocated and explored the concept of modern architecture as a vehicle for societal change. [30] To date, the leaders of Web 2.0 have yet to address their potential and realized impacts directly. Some, like Mark Zuckerberg, project public ignorance of their culpability. Facebook’s claims that its changes to privacy control simply comply to changes in social norms ignore the fact that the company itself has helped shape them. Its gradual trend towards making user information publicly available, starting with ‘Beacon,’ then the ‘News Feed’, and now the ‘Open Graph’ have changed user expectations and assumptions about their interactions online. For Zuckerberg to ignore the effects that Facebook’s biases towards publicly available data have had on influencing 400 million users is grossly irresponsible.

Less offensive but perhaps more troubling are the priorities and mindset of Google founders Sergey Brin and Larry Page. Google’s mission “to organize the world’s information and make it universally accessible and useful” firmly prioritizes information above its users. Page has publicly said that he sees the “ultimate search engine” as something that is smarter than people, and that “for us [Google], working on search is a way to work on artificial intelligence.” In a 2004 interview with *Newsweek*, Brin made statements indicating that if “you had all the world’s information directly attached to your brain... you’d be better off.” [31] As Nicholas Carr discussed in his fiercely-debated essay *Is Google Making Us Stupid?*, Google’s easy assumption that we would all

be “better off” with artificial intelligence is unsettling for several reasons.

In Google’s world, the human brain is seen as “an outdated computer that needs a faster processor and a bigger hard drive.” It adopts a machine-centered view of our cognitive behavior, where “intelligence is the output of a mechanical process, a series of discrete steps that can be isolated, measured, and optimized.” [3] The staggering growth in global data within the last decade threatens to make Google’s idea about our brains a reality. As developers, our fixation on information has long-term implications for our users and society at-large that we can no longer ignore.

The data deluge

The growing emphasis and influence of information has not gone unnoticed by the outside world. In a recent special report, *The Economist* released a series of articles about the superabundance of information and how we are managing it. Within a few weeks of operation a decade ago, the Sloan Digital Sky Survey’s telescope in New Mexico amassed more data than the entire preceding history of astronomy. Wal-Mart handles over 1-million customer transactions an hour, feeding a whopping 2.5 petabytes into its databases – 167 times the books archived in America’s Library of Congress. The potential benefits of this exponential increase in information – disease prevention, business trends, combating crime – are not without a price. Despite the growing number of technologies to capture, process and share all this information, estimates on our global data production already exceed available storage space. [32]

Knowledge has become so specialized and information so abundant that it is becoming physically incapable for people to manage. For example, a study in 2004 suggested that for doctors to stay current with the field of epidemiology, they would have

to work 21 hours a day. And as education improves worldwide, this number will likely go even higher. In China alone, the number of peer-reviewed scientific papers has increased 14-fold since 1990. We are becoming prisoners of the information we are generating. As economist Herbert Simon noted in 1971, “a wealth of information creates a poverty of attention.” The human mind’s capacity for short-term memory and relationship management are miniscule compared to the computing power required to handle these torrents of information. [33] As it is machines who are generating the majority of this data, as technologists our solution has been to allow them to control it without regard for the inherent risks involved.

Trusting machined systems to store and process our data breeds complacency in their machine-centered designers. By viewing the machine as a perfect, efficient system and humans as the unreliable element prone to error, designers of online technologies become blind to its dangers. The TSA’s (Transportation Security Administration) databases are a perfect example of how a blind faith in “big data” can be problematic. Michael (“Mikey”) Hicks is an 8-year old from New Jersey who has the unfortunate distinction of sharing a name with someone on the Department of Homeland Security’s watch list. Since his first flight at the age of 2, Mikey has been subject to security screenings and pat-downs with no action being taken to remove him from the list. [34] Contrast his story with that of Umar Farouk Abdulmutallab, a Nigerian who attempted to detonate a bomb as his plane was landing in Detroit. His father had informed American officials long before his son’s flight that he posed a security risk, and even though his name was entered into a database of around 550,000 people he was still able to board his flight. [33] As Mrs. Hicks frustratingly recounted for *The New York Times*, “A terrorist can blow his underwear up and they don’t catch him. But my 8-year-old

can’t walk through security without being frisked.” [34]

The TSA’s response to Mikey’s situation demonstrates the stubborn faith most companies employ in their systems when confronted by user concerns. Their initial reaction was a post on the official TSA blog titled “There Are No Children on the No Fly or Selectee Lists.” The author provides the obvious explanation that there are no children on the TSA’s lists, and that their names may match actual individuals on the No Fly or Selectee Watch List. As a representative of the TSA, what he fails to explain or apologize for are the errors in the system, instead adopting a defensive stance that shifts blame to the airlines for not automatically de-selecting children. [35] Mikey is hardly alone in his frustration with a clearly broken system; over the past three years over 80,000 frustrated travelers have formally asked to be removed from the list.

Unquestionably, the TSA’s lists are an important part of national security that help keep travelers safe from harm. However, its problems illustrate the dangers a machine-centric approach can have. The stories of Mikey and Umar Farouk Abdulmutallab illustrate the lack of human-centered context and flexibility in the TSA’s databases. It’s bloated size simultaneously meant that Mikey could be stopped while Abdulmutallab slipped through the cracks. Problems over wrongful watch-list screenings have caused some users to take matters into their own hands, either by intentionally misspelling their names or rerouting their travel plans. When we implicitly ask users to trust their data to our systems, we must ensure their concerns are addressed before those of the machine. Otherwise, we risk alienating them and potentially exposing them to unforeseen dangers. As New Jersey Representative William J. Pascrell Jr. said, “We can’t just throw a bunch of names on these lists and call it security. If we can’t get an 8-year-old

off the list, the whole list becomes suspect.” [34]

The rise of the real-time web

In the context of a world of increasing information with increasingly complex problems, it is important to realize that mankind did not arrive here by accident. I believe Marshall McLuhan’s thesis that “the medium is the message” is truer today than when it was published almost 50 years ago. He postulated that all media are active channels of information that serve as extensions of the human experience. Back then, he could already see media advancing to a stage where as designers of online technology, we are predominantly responsible for shaping the ever-changing medium of the Internet. Our infatuation with the real-time web has truly realized McLuhan’s concern that “the action and reaction occur almost at the same time.” [36]

The emerging model of the web being embraced by the development community seeks to leverage the digital trail users leave behind as they navigate the Internet. This “data exhaust” has become a mainstay of the Web 2.0 economy. The more links users click on and the more pages they view mean more opportunities companies like Google, Amazon, Ebay and Facebook have to collect information about them and deliver targeted advertisements. By designing for “data exhaust,” we inherently prioritize information ahead of the users who generate it. Technologist Dominiek ter Hiede equates the invention micro-blogging service Twitter with the discovery of oil: “Activity is the new oil and Twitter will be the new ExxonMobil. Now it’s time to invent the appliances that run off of it.”

So how do we design the “appliances” that Hiede speaks of to turn a user’s activity into a digital resource? He believes that the more data that services can collect about users, the better off they will be. Real-time systems encourage users to constantly

produce and consume information to stay relevant. The efficacy of the attention economy relies on its expansion – explicitly through real-time updates and implicitly via analytics. Similar to the issues of scale faced with other large data sets, Hiede argues that this information should be structured as machine-readable metadata, creating a “semantic web.” [37] Thus, the “success” of the real-time web reinforces my belief that in the eyes of developers, users are increasingly being seen as products and not customers. It promotes a machine-centric positive feedback loop: for a user’s data to be effective they need to keep generating more of it.

The Synaptic Web and Internet of Things

Emerging from the real-time web has been the idea of a ‘Synaptic’ Web of electronic connections. Its supporters see it as the evolution of the Internet from a document delivery platform (1.0), to one of communication (2.0) and now towards a “dynamic” web of adaptive connections. Instead of relying on destination websites connected by links, the Synaptic Web promotes the development of widgets – lightweight software that connect countless sites and data sets. [38] An example of its effect can be seen in emerging standards such as OpenID and OAuth, which allow users to use a single authentication protocol across sites and services. [39] As the Synaptic Web seeks to leverage a user’s data across the web, it comes as no surprise its biggest impact has been felt in the evolution of social networks.

In the future envisioned by the Synaptic Web, a user’s personal information is the glue that holds the Internet together. Their “social graph” – public data – is the prized commodity that services are fighting for control of. Without the social graph, the benefits of linking sites and services would be diminished and the model – along with the data it produces – would vanish. Our current infatuation with the

machine's perpetual need for more information has given developers sufficient incentive to buy into this system. However, as earlier examples have noted, in pursuit of "big data" and "data exhaust" technologists are eschewing user privacy without regard for its consequences.

Facebook's Open Graph protocol for spreading its services across the web is the most troubling sign of this yet. Three years of reversals to user privacy appear to have been in support of building an environment conducive to Open Graph. By automatically embedding a user's social graph into third-party sites and services, Facebook substantially increases the area it can mine for "data exhaust" while making itself indispensable to the Internet at-large. [40] While criticism over Open Graph and Facebook's changes to privacy control have been growing within the community, the principles behind them remain embedded within the community at large. By embracing the Synaptic Web, it is only logical to assume that services – whether they be "open" (OpenID) or "closed" (Facebook, Twitter) – will attempt to seize control over a growing facet of online user experience. For whoever seizes control of the social graph, the rise of the Synaptic Web will likely be accompanied by the fall of user privacy. For both the machine and the model, it is an irrelevant factor to their survival.

The rising popularity of "smartphones" and Internet-enabled devices indicate that the reach of the Synaptic Web is extending outside of digital spaces. Commonly referred to as the "Internet of Things," we are entering an era where the cost of sensors, processors and transmitters are so low that it's becoming cost effective to put them inside everything. We are living in a world where people can text message Twitter updates ("tweets") from their mobile phones, check Facebook from their televisions, and upload video directly to YouTube from their

cameras. While the potential gains from the Synaptic Web and Internet of Things are high – cars that don't crash, vacuum cleaners that automatically clean up messes, groceries that order themselves – the ethics of these pervasive platforms remain unclear.

Returning to McLuhan's thesis that "the medium is the message", what is the message of the real-time web? As information across all industries – science, medicine, business, government – continue to rise unchecked, what does our increasing reliance on the machine to mediate them mean? As technologists, we're quick to see the potential of these large data sets but slow to realize their danger to users. Our pursuit for control of the "social graph" raises several important questions that are only starting to be discussed: What will happen to user privacy in a networked world built on publicity? Where is user motivation for engaging these platforms coming from?

User motivation in a data-driven world

At DICE 2010, game designer Jesse Schell attempted to answer these questions and illustrate the potential benefits of a data-driven life. His talk, entitled "Design Outside the Box," focused on the popularity of social gaming and the integration of game-like systems into everyday life. He begins with an analysis of FarmVille, the popular Facebook-based casual game that currently has more users than Twitter. Schell believes FarmVille's success arose from its marriage of external motivators – virtual points – with our social circles on Facebook. He sees this formula as the key to navigating a future where every soda can and every cereal box "is going to have a CPU...and a wi-fi connector so that it can be connected to the Internet." When the "Internet of Things" has sufficiently saturated our everyday reality, how will our soda cans and cereal boxes be put to work? Schell's vision of the future is one where the social

gaming principles of FarmVille have been applied to reality in order to enrich the quality of our everyday lives. External motivators are seen as the primary impetus for user behavior; we'll brush our teeth longer in order to earn tooth-brushing points, walk to work to earn health insurance points, and take public transit to earn commuting points. Schell admits uncertainty over specific outcomes but remains certain about this future: "I do know this stuff is coming. Man it's got to come! What's going to stop it?" [41]

Before an analysis of Schell's hypothesis and the implications of the future he envisions, it is important to note that his message does not apply to game designers alone. The application of game mechanics to the "Internet of Things" is already thriving in social networks. Industry leaders Foursquare and Gowalla see themselves primarily as social networks, but their success has been driven by their game-like feedback systems. [42] Both are built around users constantly providing their current locations to the service via mobile applications – with a combination of abstract points, badges or objects serving as their primary rewards. Twitter's motivation takes the form of a single question asked of its users - "What's happening?" [43] This question coupled with Twitter's timeline interface place visual and hierarchical priority on whatever the most current information is. Technologists have already begun embracing Schell's vision of external motivators to encourage user engagement. As such, there is plenty we can learn from the subsequent discussions and criticisms of the rosy picture Schell painted of the future.

For designers of online technologies, the important takeaways from Jesse Schell's speech at DICE are the things that he did not discuss. Schell's major unspoken premise is twofold; people are prisoners to external reward systems, and these systems are effective motivators. Independent game designer Chris Hecker's talk at GDC – likely a reaction to

Schell's DICE speech – views the same situation as a "nightmare self-fulfilling scenario." Hecker recognizes that gamers reliance on external reward systems stems from game designers' growing obsession with metrics. Games were not spared from the effects of "big data", and as Hecker notes, "We're [game designers] addicted to metrics. If I change a value of my purple hat, fourteen more people buy it, and we think we're totally in that zone." [44]

Secondly, Schell's assumption that external rewards are a strong psychological motivators ignores their scientifically-proven effect as de-motivators. A famous 1973 experiment demonstrated that when nursery school children consistently received external rewards for drawing, they lost interest in drawing and began drawing less. In addition, the quality of the pictures in the expected-award group were lower than the other test groups. [45] Hecker mentions similar research involving the ineffectiveness of commissions and bonuses at encouraging better work: "Because of the idea that, if you do this, you'll get that, you end up hating the 'this' and focusing on the 'that.'" [44] Scientific and psychological evidence does not support Schell's optimism that external rewards can be meaningful motivators for social change.

In light of this evidence, as our societal obsession with big data and metrics grows, how will we avoid Schell's future? Our machine-centered thinking as developers is producing systems that are built about extrinsic motivation and abstract rewards. Facebook's 'Like' button, Foursquare's points system, Amazon's 5-star rating system are all examples of our growing addiction to metrics. They represent attempts at reducing human experience into semantic, quantifiable terms a machine can understand. In doing so, as designers we are ignoring the intrinsic motivation that is paramount to creating the meaningful and personal change Schell envisioned. The Synaptic

Web and “Internet of Things” encourage us to stay connected and constantly update from wherever we are, but for whose benefit? Schell naively believes that skilled designers will use these technologies for good, but where are the indications this will happen? His own example of a current success story – FarmVille – manipulates user behavior into a commercial vehicle with no meaningful outcomes. The expansion of the social graph and “Internet of Things” required to make his future possible are prone to unethical manipulations. In a recent talk at his MySQL Conference & Expo, Tim O’Reilly touched upon their inherent dangers: “You see increasingly the giants of the internet are trading for their own account, they are building a platform in which all roads lead back to themselves.” [46] Facebook’s Open Graph, the early leader in this field, can only be considered ‘open’ if you are a Facebook user and don’t mind publicly broadcasting your data.

The industrial revolution of data we are experiencing, the rise of social networks and the movement towards a real-time web all carry important consequences. Users who unable to cope with this deluge of data rely on us, as designers of these technologies, to look out for their best interests. Instead, our obsession with “big data” and the metrics of the attention economy prioritize machines before our users. What are the consequences of this growing model of development? In establishing the context for our machine-centric thinking and the resulting direction of the Internet, I have focused on user privacy because its abuse has become increasingly evident. However, encouraging users to mediate their online and real-life experiences through machine-centric systems carries important cognitive consequences. What are these cognitive effects wrought by a shift towards the real-time web?

Part 3.

Cognitive Assault

The effects of media multitasking

As Renny Gleeson noted in his 2009 TED talk, the “Internet of Things” has given rise to a “culture of availability” and expectations of access whose effects have been transformative. While he adopts a funny tone – showing examples of antisocial tricks people use to engage their mobile devices in public settings – his message is quite serious. When we filter reality through these technologies – be it mobile phones or Schell’s sentient cereal boxes – it becomes “less interesting than the story we are going to tell about it later.” As technologists we’re building multitasking into the fabric of human experience – people can check the weather on their phones, update Facebook from their televisions while having multiple websites open in their browser. Gleeson’s examples humorously demonstrate that the resulting “culture of availability” could be negatively affecting our perceptions of reality: “What’s happening here, now, isn’t as important to me as what could be happening anywhere else.” [47] While Gleeson’s arguments were anecdotal and qualitative, recent scientific research into the “culture of availability” and its effects lend credence to his claims.

A recent study commissioned by the University of California, San Diego suggests that in 2008, the average American consumed 34 gigabytes of data a day. While this figure included over 20 different mediums of information (newspapers, television, etc.), the effects of the computer are given special attention, with the report noting “a full third of words and more than half of bytes are now received interactively.” [48] While UCSD’s study did not research media consumption habits or its effects, a group of Stanford researchers did in their 2009 study Cognitive control in media multitaskers.

In their study, cognitive scientist Clifford Nass and psychologists Anthony Wagner and Eyal Ophir surveyed 262 students on their media

consumption habits. Afterwards, students at opposite ends of the multitasking spectrum then took two computer-based tests, each completed while concentrating only on the task at hand. What the researchers discovered was that in every test, the students who spent less time multitasking – reading email, surfing the web, watching TV, and talking on the phone – performed best. [49] While their study provided some of the first quantitative evidence of the effects of media multitasking on cognition, Wagner was more interested in the question of causality: “There’s a lot of social pressure to multitask. You’re getting tweets, e-mails, IMs from multiple people at once, and the web offers unbelievable opportunities for text and video. It may be thrust upon you.” [50]

In a 2009 interview with Wired Science, author and journalist Maggie Jackson discussed the effects of “our high-speed, overloaded, split-focus and even cybercentric society” on attention. She says studies have shown that on average, information workers switch tasks every three minutes during the work day. Jackson attributes this to the priorities of the typical workplace, where “the image of success is the frenetic multitasker who doesn’t have time and is constantly interrupted.” By striving towards this model of inattention, Jackson argues, we are undermining our abilities to problem-solve and be creative – things that require stillness and reflection. The technologies we design – everything from browsers to websites to mobile applications – have helped create this “institutionalized culture of interruption.” [51] The real-time web is built on user distraction, encouraging users to constantly shift their attention to current information at the expense of their cognitive abilities.

The cost of connection

The effects of our cultures of availability and interruption are clearly seen in those who are engaging with it the most. Teenagers around the world are falling victim to the emerging mental illness known as Internet addiction. In 2008, Chinese doctors issued their first definition of Internet addiction based on a study of more than 1,300 problematic computer users. They classified addicts as those who spend at least six hours online a day and show at least one specified symptom – yearning to get back online, mental or physical distress, irritation and difficulty concentrating or sleeping. [52] At the time of the survey, about 13 percent – 2.6 million – of China’s Internet users under the age of 18 were estimated to fit this classification. The Chinese government has been aggressive in dealing with these problems after Internet and gaming-related deaths forced them to action, opening up treatment centers and summer camps geared towards young adults aged 14-22. [53]

Online gaming has been the primary culprit of Internet addiction in South Korea, and the government recently instituted automatic nighttime shutdowns after a series of fatal incidents. [54] In 2005 a 28-year old man died after a 50-hour marathon gaming session at an Internet cafe. Local police said that the man had not slept or eaten properly during the session, and presumed the cause of death was “heart failure stemming from exhaustion.” [55] This past March, a South Korean couple who were addicted to the Internet tragically let their three-month-old baby starve to death while raising a virtual daughter online. They only fed their actual child once a day between 12-hour sessions at a local Internet cafe, where they cared for a virtual character in a popular Korean role-playing game. [56] While the West has been slower to respond to this growing problem, the opening of

clinics in London and the United States within the last year demonstrate that Internet addiction has become a global and serious concern. [57] Earlier this year, the International Center for Media & the Public Agenda (ICMPA) asked 200 students at the University of Maryland, College Park to abstain from using all media for 24 hours. After their 24 hours of abstinence, the students were then asked to blog on private class websites about their experiences: to report their successes and admit to any failures. The researchers reported that many students described their reactions in “literally the same terms associated with drug and alcohol addictions: In withdrawal, Frantically craving, Very anxious, Extremely antsy, Miserable, Jittery, Crazy.” [58] Their troubles with disconnecting are also seen in those who feel compelled to stay connected online for job security.

According to a recent survey by web conferencing firm InterCall, almost one third (30 percent) of American workers who use technology to do their jobs feel the need to stay connected to work all the time, even during weekends, breaks and holidays. [59] This survey falls in line with a 2008 article by The New York Times which explored the demanding lifestyles of online bloggers. The real-time web, and it’s round-the-clock attention economy demand a constant stream of news, where the margin between success and failure can be seconds. As most professional bloggers get paid by the story or viewing benchmarks, speed is always of the essence. Even those who are self-employed and have become successful from it, like TechCrunch founder Michael Arrington, feel the physical and emotional stress the job demands: “There’s no time ever – including when you’re sleeping – when you’re not worried about missing a story,” [60]

As the designers and developers shaping the Internet, these stories about Internet addiction and its consequences should give us serious pause. When

we focus on computer-driven metrics like page-views and metadata, we lose sight of their implications in the real world on real users. Technology rarely makes it harder to produce more of itself, and the machine's endless thirst for data may be encouraging users to stay connected no matter the physical or psychological costs. In addition, our emphasis on real-time streams of information has serious implications on our long-range cognitive abilities. While daydreaming, introspection and reflection are not priorities of the machine – and therefore its developers – they form an important part of the human experience that we are beginning to lose.

The importance of disconnection

In a machine-driven culture obsessed with speed and efficiency, daydreaming is derided as a lazy habit or a lack of discipline; the kind of thinking we rely on when we don't really want to think. However, recent research suggests there is a connection between resting state activity – the performance of the brain when it's lying still in a brain scanner, doing nothing but daydreaming – and general intelligence. Researchers at the Chinese Academy of Sciences recently examined how resting brain networks differ between people who have superior versus average IQ scores. What they found was that the strength of long-distance connections in the resting brain can be related to performance on IQ tests. The takeaway, as Wired editor and author Jonah Lehrer indicates, is that “cultivating an active idle mind, or teaching yourself how to daydream effectively, might actually encourage the sort of long-range neural connections that make us smart.” [61]

As designers, the idea of daydreaming and disconnection may seem counterproductive to the technologies we create. By mediating our conceptions of reality through machine-centric concerns of speed, efficiency and logic, we flatten

user experience into what the machine can understand. In doing so, we adopt extrinsic reward systems that are bound to miss the intrinsic value inherent in something like daydreaming. There are also signs that the real-time web and data deluge have fundamentally changed how we read and process information, with equally important effects that our machine-centric priorities are ignoring.

Learning to think in a digital world

A popular assumption amongst technologists about “digital natives” is that their early access to online technologies creates an innate web literacy. However, a 2008 study commissioned by the British Library and JISC overturned this common assumption that the ‘Google Generation’ - youngsters born or brought up in the Internet age - is the most web-literate. The primary aim of the study was to determine how this generation are likely to access and interact with digital resources in five to ten years' time. In their study of young people's information behavior, some surprising themes emerged. Of primary importance was their finding that widening access to technology has not improved the information literacy of young people. Their apparent facility with computers hides worrying problems about their impatience in searching for information and zero tolerance for delay in its retrieval. Their research showed that the speed of web searching by young people meant that little time was spent in evaluating information, either for relevance, accuracy or authority. Faced with long lists of results, they found it difficult to assess the relevance of materials presented and simply printed off pages “with no more than a perfunctory glance at them.” [62]

The speed of web searches and lack of analysis of their results found in the British Library's study would trouble Socrates. In Plato's Phaedrus,

Socrates argues against the acquisition of literacy out of cognitive concerns for future generations. He worries that the seeming permanence of the printed word would delude them into thinking they had accessed the heart of knowledge, rather than merely decoding it. While Socrates could not foresee the impact the written word would have in spreading information and debate, the Internet may be turning his fears into a reality centuries as later. Neuroscientist and author Maryanne Wolf shares these concerns, as she believes that literacy has become so intertwined in our lives that we forget the act of reading is evolutionary. She cautions that the acceleration of thought processes caused by the Internet may have serious implications on the young: “How many children today are becoming Socrates’ nightmare, decoders of information who have neither the time nor the motivation to think beneath or beyond their googled [sp] universes? [63]

What is troubling about this study is that it suggests that the “Google generation” is growing up with a diminished capacity for long-term information processing. In *Proust and the Squid: The Story and Science of the Reading Brain*, Wolf argues that children need to have the time and intrinsic motivation to think for themselves – to develop an “expert reading brain” capable of analysis and reflection. As developers we focus so much on speed and efficiency that we assume the acceleration of thought processes is beneficial to our cognition, but Wolf disagrees: “In music, in poetry, and in life, the rest, the pause, the slow movements are essential to comprehending the whole.” [64] How can we incorporate these slow movements into the future of the web? Why is it important that we do so?

What we can learn from Wall-E

The cognitive havoc wrought by the Internet we have designed should be a clear warning of the

future we are building. While the intentions of previous and current technologists may start in the right place – designing rational systems that leverage information – our obsession with the machine has spiraled out of control. While machines may be able to stay constantly connected and updated to the Internet, people do so to the detriment of their physical and mental health. Processors and servers may be able to handle the information overload of the real-time web, but people cannot and this is not a bad thing. Overemphasizing the immediate leaves no room for the deep thinking and reflection that are critical to creativity. Since machines can’t interpret the value of intrinsic motivation, we design systems based on extrinsic motivators to coerce users into generating data. In doing so, we are inherently beginning to flatten human experience so it can be mediated from a machine’s perspective. If this model of design continues unchecked, what will the consequences be?

Designers of online technologies may be able to understand and mitigate the effects of the Internet, but what about our users – a.k.a. the rest of the growing Internet-enabled global population? They fundamentally do not understand the medium they are engaging with, a problem that continues to grow as information becomes superabundant and requires machine mediation. As a result, they only become aware of the consequences when they are directly affected – by rogue privacy controls, physical burnout or worse, Internet addiction. They have no choice but to largely trust in us – the architects of the digital world – and the structures we have built for them.

In many ways, that trust has bred laziness and false expectations amongst users. Users from the youngest generations onwards are demonstrating a heavy reliance on search engines, viewing rather than reading results because they lack the critical

and analytical skills to assess the information they've encountered; Did you find what you were looking for, or simply convince yourself that you did? Why do consumers need to research products any more, when they can rely on user-generated reviews for guidance. As Don Martelli asks, "Do we [users] expect every tid bit of information to magically flow to us in our online life stream?" [65] When users have finally lost all intrinsic motivation and rely solely on external motivators, what will the human experience be like? How will we challenge our views when we're all connected and consuming the same content? Where will progress and creativity come from if we lose our capacity for deeper thinking and reflection?

The answer to the questions may be found in a Disney movie about a robot in a dystopian future. The protagonist of Wall-E is a robot who emotes like a human, instantly capturing the audience's attention and empathy. By contrast, humans in the world of Wall-E mismanaged the Earth's resources so profoundly that they now live in outer space, their every whim catered to by machines. They have become purely passive consumers, content to live out their days watching TV and eating junk food, blissfully unaware that their lives could have any more meaning. The audience feels no such compassion towards the humans, and why should they? In this future of machine dependency, people are little more than automatons themselves, barely recognizable as leading what we'd consider a meaningful existence. Ironically, it is Wall-E – the robot – who teaches the humans how to rediscover their humanity by the end of the film.

There is no emotive robot on the horizon that will save us from the narrowing of human experience the Internet is currently causing. As people empowered to engender change, we should have an intrinsic motivation to make technologies that are more human, not less. Otherwise, we run the

risk that people will slowly become flattened into caricatures defined by our social networking profiles and activity trails. To avoid that future, we need to consider what "human-centered" technologies will value and how they will be built.

Part 4.

The Value of Irrational Thinking

Going the wrong way

Last month in Germany, a 45-year-old Bavarian man followed the directions of his GPS device onto the wrong end of a highway off-ramp, lightly injuring an 11-year-old boy. Newspaper *Die Welt* called it a case of “blind trust” in his gadget and the easy assumption is that the man must have been “a complete dolt.” [66] However, there are countless stories every year of drivers who are led astray by their GPS devices – driving the wrong way down a one-way street, arriving at a misspelled destinations or taking illogical turns off highway ramps. How is their behavior any different from users who don’t understand what a browser is, yet use the Internet anyway? GPS devices are a great technology for demonstrating our dependence on machines and how they reprograms us. People often wind up relying on them in spite of common sense or their better judgment – we trust the machine more than we trust ourselves.

In November of last year, without a GPS device, 81-year-old Australian Eric Steward left the home of friends to buy a newspaper. After taking a wrong turn on a highway, he stopped to ask Victoria state police for help – after he had driven for over eight hours and 370 miles from his starting point. Armed with just that information, one might assume given his age that Mr. Steward was simply forgetful and could have avoided his dilemma by using technology. As technologists, it would be an easy assumption to make – the error-prone human screwed up where logical, reliable technology could have saved them. Mr. Steward’s comments, however, reveal that he never needed nor wanted to be “saved” by technology. When it was suggested he buy a satellite navigation system to avoid such situations, he rejected the advice: “Why would you want one of those? You can’t get lost. There is no fun in that.” [67]

In an online world based increasingly on

logical and efficient systems, there is increasingly little room for users like Mr. Steward. There is a critical difference between the technology malfunctioning – as in the case of the Bavarian man – and Mr. Steward’s decision to forgo it entirely. What is missing in a world where we can always find our way thanks to GPS? Online technologies breed complacency because of their speed and complexity, and in doing so ask users trust the machine over their own instincts. Our assumption as designers is that what is easier and faster for our users is always better, but in doing so we ignore the fun of the challenge. Mr. Steward simply liked to drive, and free from concerns about his route or destination, he was able to experience a range of emotions and stimulus that will forever be outside the scope of programmed directions. Why has the Internet made us so quick to dismiss the value of irrational behavior?

The power of irrational behavior

Web designers and developers create experiences based on the assumption that users will make logical decisions, even when confronted with things they don’t understand. The earlier example of the ReadWriteWeb – Facebook login fiasco, and countless others on Gumbaby should prove that this is often not the case. So why do users willingly engage with technologies they don’t understand and whose outcomes may carry significant consequences? If we are to believe philosopher William James, then this kind of behavior is innate to the human psyche. In his 1879 essay *The Sentiment of Rationality*, James argues that in the average man, “the power to trust, to risk a little beyond the literal evidence, is an essential function.” [68] Every kind of action requires faith – not necessarily in the religious sense, but in a broad sense – a readiness to act beyond what is scientifically certain.

James' argument implies that we are innately programmed to make these "leaps of faith" in order to understand the world around us. In his 1948 experiments in reinforcement with pigeons, B.F. Skinner provided the first scientific evidence that this kind of irrational behavior may be biological. In one experiment, Skinner presented caged pigeons with food at random intervals from a timed feeder. He noted their ritualistic behaviors – turning 2-3 times in the cage, swinging head in a pendulum motion --- and hypothesized that these actions were the pigeons' attempts at influencing their feeding schedule. Skinner extended his observations as a means of explaining superstitious behavior: "The experiment might be said to demonstrate a sort of superstition. The bird behaves as if there were a causal relation between its behavior and the presentation of food, although such a relation is lacking." [69]

While subsequent subsequent replications and extensions of Skinner's experiment invalidated his superstition hypothesis, his findings are still noteworthy for several reasons. [70] He recognized that superstition – and by extension, irrationality – may be behavioral and not psychologically-based. This premise served as the foundation for recent research by Kevin Foster and Hanna Kokko, who were interested in determining why innate tendencies towards such irrational behavior may evolve in all organisms, including people. Adopting a scientific model that views superstitious behaviors as those that incorrectly assign cause and effect, their results indicated "that natural selection can favor strategies that lead to frequent errors in assessment, as long as the occasional correct response carries a large fitness benefit." [71] Taken in a broader context outside of superstition, their Foster and Kokko's findings suggest that irrational behavior is an inevitable feature of adaptive behavior in all

organisms, including ourselves.

This idea that irrational behavior is an innate and important factor in our decision-making was the subject of Ori and Rom Brafman's book *Sway: The Irresistible Pull of Irrational Behavior*. The brothers – a psychologist and a businessman – draw on current research from social psychology, economics and organizational behavior to prove a simple point: "People are not rational." Through a series of real-life examples and subsequent analysis, they reveal how psychological forces such as loss aversion, commitment, value attribution and diagnosis bias can "sway" our thinking. [72] While *Sway* presents the dangers of irrational thinking – ignoring safety warnings, incorrectly diagnosing patients, flawed hiring practices – I believe this kind of behavior is increasingly important in the digital world of logic and reason we are building.

In the context of these philosophies and ongoing research, I would argue that to be human is to be irrational. In all its forms, including superstitious and religious experiences, our capacity for irrational behavior has helped mediate our understanding of the world around us. However, as the "Internet of Things" begins to blur the boundaries between the physical and virtual worlds, will the biases of the machine undermine our capacity for irrational behavior? We have already begun seeing the effects of the real-time web on other parts of our psyche. As the priorities of the machine become increasingly pervasive in our lives, our "leaps of faith" threaten to be permanently replaced by a faith in the machine. If this happens, will we view our irrational behavior – the very thing that makes us human – as a disruption to our exceedingly rational lives? When everyone relies on the Internet for navigation, how will we appreciate the value of getting lost?

What we can learn from kids

At TED 2010, child prodigy Adora Svitak made a persuasive case for the value of “childish” thinking. While her message is aimed at getting adults to embrace “childish” thinking, many of her points easily translate into timely and relevant messages for technologists. She begins by taking issue with the word “childish” and its connotations of irrational and irresponsible behavior, especially in the damning context of what adults are responsible for – namely imperialism, colonization and world wars. A machine-centered view of technology adopts the same “childish” assumptions of people, yet has led to services that undermine privacy and encourage information overload. Svitak then launches into the critical question of her talk, one of growing significance in our increasingly digital lives: “Who’s to say that certain types of irrational thinking aren’t exactly what the world needs?”

Unlike the restrictions we place on ourselves as developers to design logical and efficient systems, Svitak says that kids are not weighed down by reasons of why not to do things. As such, they are still full of inspiring aspirations and hopeful thinking – “Our [kids’] audacity to imagine helps push the boundaries of possibilities.” This is a critical statement, especially in light of the aforementioned research on media multitasking and the benefits of daydreaming. The real-time web and the distraction it breeds inherently hamper the kind of deep thinking and reflection that may be critical to creative thinking. When people are being suffocated by media, how will they have the time and capacity to innovate?

As an example of the innovative thinking kids can provide when given the opportunity, Svitak references the ‘Kids Design Glass’ program at the Museum of Glass in Tacoma, Washington. The resident artist said some of their best glass art came

from the program because kids were not concerned about the limitations of the medium; they just think of good ideas. If the recent war of words between over Flash development for Apple’s suite of mobile devices has shown, it’s that developers are often fiercely loyal to the mediums they work in. When we become so concerned about the affordances of a medium, we fail to see the possibilities that exist outside of it. In turn, our reward systems become extrinsic and thus inherently inferior as Svitak notes “when expectations are low, trust me, we [kids] will sink to them.” [73]

Given the myriad problems that our “adult” mindset has wrought online, what can we learn from “childish” behavior? As technologists, our machine-centered thinking has blinded us from the value of certain kinds of irrational thinking. We’re building systems that discourage irrational, unpredictable and irresponsible behavior while ignoring the possibilities they open up. This kind of thinking lets an 81-year-old go on an adventure caused by a wrong turn. It allows kids to design glass art that pushes the boundaries of the medium in unexpected ways. Irrational thinking allows us to challenge assumptions, develop active imaginations, and removes our reliance on extrinsic motivators. How can we design technologies that promote these valuable kinds of behavior rather than blindly assuming they are without merit?

Change through disruptive technologies

In a presentation about government transparency at IBM’s Transparent Text conference, IBM Fellow Alex Morrow suggested that “if we want to affect change it will be in the control systems, not the data.” [74] Morrow’s message is that change cannot be a passive solution, we must attack the source and change the systems themselves. While research and academic criticism of the effects of

the Internet continue to mount, they have not led to meaningful changes in the control systems. This is not to imply that discussions by leading media critics and technologists has been any more effective. The problem with these approaches is that they are generally reactionary, criticizing the effects of the previous control systems without offering viable new models of technology to replace them.

In his 1997 book *The Innovator's Dilemma*, Harvard Business School professor Clayton Christensen offers insight into how such changes actually occur in the real world. He segregates new technology into two categories: sustaining and disruptive. 'Sustaining' technology relies on incremental improvements to an already established technology. [75] It falls under the purview of Kevin Kelly's belief that "technology tends to create an environment that favors the growth of yet more technology." [12] The rise of "big data" is evidence of this fact; the growing amount of machine-generated data can only be handled by machines that can process this information. Sustaining technologies do not create change in control systems – they upgrade and reinforce them.

On the other hand, 'disruptive' technology is new and unexpectedly displaces an established technology. They almost always arise from the margins of an industry, where they began as insignificant or toy-like solutions. By their very nature disruptive technologies lack refinement, often have performance problems because they are new, appeal to a rather limited audience, and may not yet have a proven practical application. For example, cheap, low-quality dot-matrix printers were not a threat to offset printing until dot-matrix became ink-jet and ink-jet printing became the HP Indigo 5000 on-demand printers. In all the case studies Christensen presents, the initial solutions were ignored by their respective industries because they

were marginal and barely-working. [10]

Disruptive technologies eventually break away from the margins to achieve mainstream industry success because they enable us to think in new dimensions. Through their innovation they help us expand our knowledge base as a society and solve problems we were unaware of. [75] In the context of the current state of the Internet, we've built systems that overemphasize what they can measure. Anything outside these quantifiable metrics – privacy, motivation, reflection – are ignored at the expense of its users. Given that the Internet is a collection of online technologies, many of which suffer from these problems, a single disruptive technology is not likely to fix them. Change to these control systems will have to come from a model of disruptive innovation that allows for the production of many technologies. What factors may constitute a positive (human-centered) model of disruptive innovation online?

Part 5.

Not For Bots

Overview

In the rational and logical machine-driven world of the Internet, our own humanity has become the disruption in the system. As technologists we have force-fed a logical, rational and predictable model of development onto people who are innately illogical, irrational and unpredictable. We know that users have a hard time understanding the technologies they engage with or their cognitive effects. It is because we have been designing for machines, whose accelerating rates of information delivery are overwhelming users. Online experiences are designed around shallow extrinsic motivators geared towards producing semantic data to be scraped by bots. How much longer will we as a community be content to watch our technologies narrow the scope of human experience? Are we so enthralled with the machine and its concerns that we're ignoring increasingly clear warning signs of the future we are shaping? If we are going to assume responsibility and leverage our abilities to shape change, then we must do so now while we can still appreciate what we stand to lose. When we stop designing for bots, we can begin designing for people.

Based on the provided overview and analysis of the real-time web and its cognitive effects, I believe any human-centered model for change will need to consider the following:

1. How can user expectations about the Internet be challenged in ways that raise awareness of its negative effects?
2. Can these methods illustrate the inherent value in disrupting the machine-centric priorities of technologists?

If emerging models do not address these concerns, then they are bound to become 'sustaining' rather than 'disruptive' technologies. Creating disruption – and therefore inspiring change – will require informed users and reformed technologists.

Not For Bots represents my efforts at addressing the aforementioned concerns about the future of the Internet while offering technologists a blueprint for change. It is:

1. An ongoing series of online software that playfully demonstrate how the Internet is shaping human behavior.
2. A disruptive model of web design that emphasizes the psychological values of the irrational and unpredictable in our increasingly digital lives.

Not For Bots offers a "human-centered" view of technology that seeks to create experiences that machine-centered philosophies are inherently poor at producing, such as self-reflection, deep communication and real relationship-building. It achieves disruption by willingly embracing what is missing on the Internet – designs that stimulate our capacity for irrational, illogical and unpredictable behavior. The ongoing series of software promote this disruptive model while following a three-part methodology that unifies the work.

Design for delight

Early on in the process of designing the philosophy and branding behind Not For Bots, I realized the all-around importance of maintaining a playful approach. As Adora Svitak discussed in her TED talk, there is much we can learn from "childish" behavior about challenging expectations and keeping an open mind. As such, the 'mascot' for all Not For Bots projects is a simple anthropomorphic browser window named 'Browsy.' Browsy's design was inspired by the illustrations of San Francisco-based clothing company Loyal Army. Their hand-drawn illustrations revolve around anthropomorphizing everything from produce to clouds to televisions, creating designs that appeal to kids and adults alike. [76]

To mitigate the ‘cuteness’ of the Loyal Army aesthetic, I turned to the work of illustrators Ben Newman and Hylton Warburton. Both strike a successful balance between creative designs and limited color palettes. Newman is especially adept at this in his work, usually employing two to three subdued colors and then varying their shades to achieve deeper ranges of visual expression. [77] Warburton employs minimal, fluid strokes in order to create wildly expressive creatures and imaginative scenes. [78] Their work was instrumental in helping me to discover an aesthetic for Not For Bots that could successfully marry playful designs with serious undertones.

The playful visual nature of Not For Bots was designed to generate user interest and make them amenable to new experiences. By humanizing the browser window, Browsy implies a ‘warmer’ connection to technology than exists in our machine-centric experiences. Conceptually, the projects adopt a similar tone, creating experiences that are designed to be whimsical and encourage exploration. A conceptual precedent for this idea was produced at Rhizome’s recent Seven on Seven event. WordPress co-founder Matt Mullenweg was paired with Evan Roth, an artist, researcher and co-founder of the Graffiti Research Lab. Their one-day collaboration resulted in an “emotional plug-in” for WordPress meant to “humanize” the platform. Surprise Me adds recreational outcomes to WordPress stats and publishing behaviors for the sole purposes of author’s own awareness and enjoyment. [79]

Be critical through subversion

Since Not For Bots is meant to raise user awareness about the software and services they are engaging with, subversion provides an effective method of delivering those messages. By allowing projects to be situated in the constructs

that spawned them, Not For Bots utilizes a user’s understanding of the platform as a basis for comparison. Subversion has long been a valid model of producing work in the critical design and net art. An excellent example of the latter can be found in project.ARNOLFINI’s online exhibition *antisocial_notworking*. It is a repository of projects that explore the “pseudo-agency” of online platforms. Specifically, the collection is concerned with the Internet’s characterization as a “social” platform while the nature and definition of this participation remains unclear. Subversion is used as a means of commentary about specific platforms such as Facebook, YouTube and Twitter. [80] For example, seppuko transforms the act of deleting your Facebook account – virtual suicide – into a social network itself where users are encouraged to get others to commit account suicide. [81] Thus, Not For Bots seeks to build on the established success of subversive software art to create engaging commentaries about the platforms in question.

Encourage discourse and experimentation

While the projects of Not For Bots are meant to be stand-alone experiences that comment on specific situations, collectively they are meant to promote discourse and experimentation within the web development community. In order to create an environment conducive for other technologists to design similar disruptive technologies, Not For Bots is built using entirely open-source languages and tools. By embracing the open-source community, the barriers of entry for experiment are significantly reduced and the projects serve as a showcase for the human-centered possibilities hidden within our existing tools. Where existing open-sources could not be leveraged, I constructed my own frameworks and documented the methodology behind their production. The source code and process behind Not

For Bots are documented in detailed case studies available in this document and on the Not For Bots site. [82]

My decision to take Not For Bots open-source was two-fold. First, for Not For Bots to engender a shift away from machine-centric development will require the discourse, support, and production of the development community at-large. I am willing to undertake any steps necessary – open-source development, releasing source code, thorough documentation – to encourage this process. Second, developers have shown a willingness to embrace open-source platforms when they see its value. Linux, the open-source Unix-type operating system originally created by Linus Torvalds has seen worldwide adoption and support from computing giants such as IBM and Hewlett-Packard. [83] The Mozilla Foundation’s Firefox web browser has built its identity and user base thanks to the third-party developers who have built thousands of unique “add-ons” for the software. [84]

Part 6.

Case Studies

TRANSITO.US (<http://transito.us>)*Overview*

Transito.us is a unique “real-time” URL-sharing service designed to keep pace with Twitter. Every time you visit your Transito.us URL, you are automatically directed to one of the latest links your friends have posted. Think of it as like a perpetually wrapped present; ideally it’s from someone you know and will be worth opening. When you connect your Twitter account to Transito.us, you’re provided with a unique permanent URL (transito.us/user_name) that has no permanent address. Simply bookmark the URL you receive and check it at your convenience. As long as your friends keep sharing new links, your Transito.us URL will keep updating.

Use Case

Transito.us is designed for the active Twitter user with a large network of people they are following. If you find yourself struggling to keep up with the content your Twitter friends are sharing, Transito.us may be right for you. Instead of trying to curate the rising tide of data we face, Transito.us is content to ride the wave. It embraces our shortening attention spans to deliver content solely on the basis of its posted time, and in the process ignores the original address, author and context of its posting.

Concept

Twitter’s emphasis on real-time communication is noticeable in the single question it asks of users: “What’s happening?” While this fixation on immediacy has proven useful during times of crisis – natural disasters, terrorist attacks – on a daily basis the amount of content generated can be overwhelming for active users. Twitter’s website and 3rd-party clients do little to stem the rising tide of information threatening to drown users. Transito.us seeks to raise user awareness of

the effects of “over-sharing” encouraged by the real-time web. Instead of having permanent addresses, every Transito.us URL is temporal – redirecting to a currently shared link each time the user accesses it. In doing so, it demonstrates the accelerating speed at which content loses relevance in real-time networks. By maintaining a single URL that constantly changes location, the original context of its posting is lost, implicitly leaving users to question its value in the real-time web.

Precedents

Existing third-party services that leverage Twitter links try to affect change at the level of data and not in the control system itself. For example, Packrati.us automatically adds any links a user has shared on their Twitter feed to their account on bookmarking site Delicious. [85] An increasing number of services, such as BurnURL utilize a ‘share bar’ that adds contextual information to the shortened link you are currently viewing. [86] In both cases, the issue of information overload is not addressed and the focus is solely on making the data itself more functional. Twitter Times, however, does attempt to solve this problem by generating real-time personalized newspapers from a user’s Twitter account. [87]

Methodology

Transito.us is a PHP library that leverages Twitter’s OAuth API to connect to the service and obtain a user’s information. [88] It uses Jaisen Mathei’s Twitter-async library for PHP in order to easily integrate OAuth using Twitter’s REST API. [89] After a user provides access to Transito.us once, their authentication token and secret are saved in a SQL database for future reference.

When they access their Transito.us URL, their credentials are used to retrieve the latest posts

from their Twitter home timeline – which includes posts by friends, ‘@’ replies, and any ‘re-tweets’. Unfortunately, the home timeline also contains a user’s own tweets which are manually parsed out. Once their most recent tweets are retrieved, any URL’s from the tweets are stored in a temporary array, where one is randomly selected and the page redirection occurs. To maintain the Transito.us URL during the redirection or refreshing process, I employed the jQuery UI.Layout plug-in, which easily generates custom iFrame layouts. [90]

PENULTIM.IT (<http://penultim.it>)

Overview

Penultim.it is a URL-shortening service with something to hide. Instead of providing a shortened link for a user’s submission, it challenges our expectations to help us discover something new and unexpected. When a user submits a link to Penultim.it, they are given back a shortened link to whatever the previous user submitted.

Use Case

As URL-shortening services are becoming a more ubiquitous part of the social and real-time web, choosing a default service for personal use can be quite difficult. Many content providers such as The New York Times and YouTube employ their own, but for users who want to share outside content the number of options continues to grow. Essentially, all these services provide the same basic user experience and their attempts to be unique – analytics, bookmarking, sharing – are all focused on the data and not the standard control system. Penultim.it provides a unique experience for those tired of the monotony of other services.

Concept

Amongst recent social media technologies,

URL shorteners perhaps best reflect the dangers inherent in adopting a machine-oriented view of technology. Users cede control of links that are somewhat-human-legible with the expected return of machine-readable, encrypted links. Their encrypted nature mean that shortened URLs are prime targets for malware addresses amongst other spamming measures. [91] They are asked to place their faith in the machine’s system, but the history of these services has not shown they deserve it. After Twitter declared a partnership with bit.ly to be it’s official URL-shortening service, competitor Tr.im had to initiate a shutdown that will take effect later this year. [92] With Twitter’s backing, Bit.ly went on to become the market leader, but now finds its longevity tenuous with Twitter’s announcement they would be launching their own service. [93]

Statistical metrics and bookmarking functionality aside, URL-shortening services as a social interaction are only beginning to be explored, with StumbleUpon’s toolbar and Hoot Suite’s similar offering. Penultim.it subverts the intended interaction of URL shorteners in order to encourage accidental information encountering. It takes advantage of the obfuscation inherent to URL-shortening services to return back an unexpected link to its user. In doing so, Penultim.it reveals how easily these services can be manipulated while offering an indirect yet potentially meaningful form of interaction.

Precedents

Penultim.it was inspired by the “controlled serendipity” of the Ogori Café and the now-defunct Mystery Google. The Ogori Café is located at the Urban Design Center in Kashiwa, Japan and serves customers with a unique business model. At this café, you receive what the person before you ordered, and the next person receives whatever you ordered.

[94] Mystery Google applied this same philosophy to Google's search engine, allowing a user to enter a query but then be taken to a results page for the previous user's query. [95]

Methodology

Penultim.it was built as an extension of the YOURLS (Your Own URL Shortener) library. It is a loose set of PHP scripts that allow developers to quickly set up and run their own URL shortening services. In order to achieve the intended effect of returning a previous link, I added some additional functions to the YOURLS library. While I could have replaced the existing functionality of the service, it would have compromised the core functionality of the library. [96] This method allows for experimentation to occur on top of or around my custom functions; for example, a user could get back the 5th previous link, or the 10th, with a change to few lines of code.

INTERREGNU.MS (<http://interregnu.ms>)

Overview

Interregnu.ms turns the Internet into a battle field where your social graph is your only weapon against the other content-hungry online users. Users can join the battle by connecting their Facebook account with Interregnu.ms. Once they do, they are eligible to become the "king" – assuming they have more Facebook friends than whoever the current king is. The "king" has access to all of the site's content and gains points for 'defeating' challengers to the throne. It translates the growing popularity of location-based services to the virtual world in a novel social experience.

Use Case

Interregnu.ms is designed for the active social networking user who is constantly on the prowl for more friends and places to explore.

Until now, a reward for amassing a high friend/follower count and making your data public has not existed. Interregnu.ms uses the social graph of Facebook users to determine the 'royalty' of the social web and appropriately reward them with control over content. It's meant for the networked and competitive user; if you're on Foursquare and obsessed with mayor-ships, Interregnu.ms may be for you.

Concept

Facebook's recent launch of their Open Graph Protocol and "instant personalization" features are the culmination of a troubling reversal in privacy control. For a social networking service that built its reputation on being a closed network – originally only for college students – their about-face has come as a surprise to the development community. Facebook founder and CEO Mark Zuckerberg believes that people want to be open and share themselves online, but there is growing concern over the "public by default, private by effort" model they have employed. It is a clear move at increasing the power of a Facebook user's social graph, but at what price? [97]

An interregnum is a period of upheaval between the reign of two monarchs, and this project is an exploration of a perpetual battle for control in the social web. Interregnu.ms explores the increasing power being given to our social graph (profile information) and its consequences in an increasingly public realm. When a user visits the site, they are encouraged to connect to Facebook in order to enjoy any content. Once they do, they enter a virtual battle for 'ownership' and the content that comes with it. Ownership is assigned to the user with the most Facebook friends, and that user is publicly declared the "king." As the "king," if a user defeats challengers (other users with less friends), they are awarded

‘points’ which are tracked on a publicly visible scoreboard.

By adopting the extrinsic motivators of location-based services such as Facebook, Interregnu.ms demonstrates the types of methods social networks employ to encourage us to broadcast our data. In addition, by publicly broadcasting the information – real name and profile photo – of the “king,” the dangers of Facebook’s pervasion across the web become readily apparent to the user in control. Interregnu.ms should serve as a cautionary warning against the increasing pervasion of the social graph and Facebook’s troubling “public by default” model.

Precedents

Jonah Brucker-Cohen and Mike Bennet’s BumpList (2003) employs similar means of determining access in a controlled online setting. It is a mailing list that only allows for a minimum amount of subscribers; when a new person subscribes, the first person is “bumped” or unsubscribed from the list. Just as Interregnu.ms allows users to amass more Facebook friends and fight again for control, BumpList actively encourages users to continually subscribe after they have been bumped. In essence it is an experiment in communication, as its creators wanted to see if by assigning simple rules they could affect the “method and manner of correspondences that occur.” [98]

For his latest web film *I’m Here*, Spike Jonze also took an interesting approach to establishing access through the context of a virtual theater. Users who wish to view the film must navigate to the site and attempt to acquire a ticket at the virtual box office they encounter. However, *I’m Here* can only be seen by 5,000 viewers a day in a virtual theater with limited space. Jonze subverts our expectations of availability online with a novel approach that

generates interest and appreciation in the work itself. [99]

Methodology

Interregnu.ms is a PHP framework that connects to Facebook via the Graph API. When a user connects to Facebook from the Interregnu.ms site, their Facebook ID and friends count are stored in a temporary database along with other current users. For each user, Interregnu.ms is programmed to run on a timer so that it can make calls to the current user database and determine who is the “king.” Whichever current user has the most Facebook friends is made king and given access to the full site’s content. The other users – “peasants” – see only a limited page that contains the name and photo of the current “king.”

As the “king” successfully defends his crown against the other users, he improves his session score which is saved to a database table. Saving the session scores of “kings” allows for the inclusion of a publicly visible scoreboard which denotes the top kings by their full name and the total number of “peasants” they “conquered.” Session times are also saved and updated each time the page automatically refreshes. This way, if a “king” leaves Interregnu.ms they will lose control, freeing up availability to the remaining online users.

Since Interregnu.ms is built in PHP, the transfer of ownership between kings is currently an asynchronous process. There may be situations between the timed page refreshes – currently set at 15 seconds – that two users are both granted ‘ownership’ of the site. Future versions of the framework may be built using AJAX to achieve synchronous communication with the database and allow for instant notification of user status.

Part 7.

A Challenge

In the end, Not For Bots is a challenge to you, my fellow technologists concerned about the future of the Internet. The machine-centric behavior of our past and present brethren have given birth to an accelerating real-time web that threatens to have profound consequences on the human experience. While the acceleration of culture is an inevitable side effect of technology, that doesn't mean we have to embrace the demise of our privacy, productivity, attention spans and thoughtful inquiry. We are in a position to affect change in the control systems that govern these outcomes, and what Not For Bots hopefully demonstrates is that these outcomes can be changed. There is room on the Internet, with the tools we have to work with, to design thoughtful experiences that inform users and encourage reflection about their use. When we stop designing and evaluating experiences around the abstract desires of the machine – speed, logic, and reliability – we open new doors to countless worthwhile experiences waiting to be discovered. When we stop designing for bots, we can start designing for people – in all their unpredictable and irrational glory.

If you believe that the culpability I place at our feet, the warning signs I have indicated, or the solutions I offer are too radical, then I would like to leave you with a request. Next time you are designing or developing for the web, try the following:

1. **Take your time:** Design an interaction that can be slowly savored rather than quickly gulped. The appreciation that comes from reflection and contemplation can't be readily quantified, but it is an important part of our creativity and intelligence.
2. **Be forgetful:** When we are concerned with the restrictions of a platform, our ideas will never be escape them. Forget about the software – think of a good idea first and worry about the tools for implementing it later.

3. **Try something illogical:** Logic is an artificial construct of our minds that is never set in stone. If you don't take a "wrong turn" every once in a while, you stand to miss out on the potential value the unexpected can have.
4. **Be human:** It's only a flaw if we allow ourselves to be programmed to think it is.

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