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MIXED REALITY: HOW THE LAWS OF VIRTUAL WORLDS GOVERN EVERYDAY LIFE

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ABSTRACT

Just as the Internet linked human knowledge through the simple mechanism of the hyperlink, now reality itself is being hyperlinked, indexed, and augmented with virtual experiences. Imagine being able to check the background of your next date through your cell phone, or experience a hidden world of trolls and goblins while you are out strolling in the park. This is the exploding technology of Mixed Reality, which augments real places, people, and things with rich virtual experiences.

As virtual and real worlds converge, the law that governs virtual experiences will increasingly come to govern everyday life. The problem is that offline and online law have significantly diverged. Consider the simple act of purchasing something. If you purchase a book offline, you are its owner. If you purchase an e-book, you own nothing. As Mixed Reality technologies merge realspace and cyberspace, the question is whether online or offline law will determine consumers' rights over their property and data. There is a very real risk that courts will continue to reason from online analogies rather than turning to offline common law rules to determine consumers' rights.

This Article offers a modest proposal for rebalancing the law. The common law proceeds by reasoned progression based on the closest available analogy. The Article suggests that the common law has long evolved internal checks and balances for rules that govern citizens' everyday lives. The Article proposes rebalancing the law of Mixed Reality by using analogies to real world situations, rather than limiting legal analysis to intellectual property and online licensing law.

> "We have got to stop using the Internet like a typewriter!"
> —Anonymous

TABLE OF CONTENTS

I.   INTRODUCTION

Imagine a museum. The museum has statuary, pictures, and a fountain located in the atrium. As you enter the museum, you adjust your glasses that offer you four different experiences. You select the first channel. A virtual

docent appears and begins to provide a lecture accompanied by multimedia presentations of each of the exhibits.[1] You can also see wiki-style notes and comments on each note written and rated for usefulness by former museum visitors.[2] Curious, you flip to channel two—intended for children. There, you experience conversations with the artworks themselves, which animate and engage you in entertaining banter. The third channel contains entirely virtual exhibits that occupy physical spaces in and around the museum. The fourth and last channel displays an avant-garde mash-up in which artists from across the city have experimented with and built on the exhibits, altering pictures in subtle ways, adding lighting to statues to change the effect, or outright modifying the exhibits so that they are half real, half virtual.[3] Although this type of technology may sound like science fiction, New York's Museum of Modern Art ("MoMA") has already featured such an installation.[4]

Now, let us interject reality. The scene described above will never be the future. In the future rather than four channels there will be thousands of channels offering experiences in the museum from the fantastical to the statistical, and everything in between. The merging of the Internet with the physical world around us—"realspace"—is called Mixed Reality. Mixed Reality technology is already in use and its adoption is only accelerating.[5]

Imagine a world in which your clothes are free but your clothes carry shifting advertisements on smart fabric. Imagine a world in which your communication and interaction with others are so extensively digital that you can choose to edit your ex-husband out of your existence—you won't have to see him, hear him, see anything he has written, hear any phone calls, nothing. The future of Mixed Reality, where virtual world technologies

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1. *See* Alexander Fidel, *Art Gets Unmasked in the Palm of Your Hand*, N.Y. TIMES (Dec. 1, 2010), http://www.nytimes.com/2010/12/02/arts/02iht-rartsmart.html (discussing the use of smartphones, overlaying digital content onto real spaces that effectively connects the content to a realspace anchor, creating "augmented reality"—for example, a museum patron who points his or her smartphone at a sculpture, and the artist appears on the screen ready to be interviewed).

2. *Id.* (discussing the use of Layar, an augmented reality app that can tap into multiple layers of reality tied to realspace locations, like the MoMA).

3. *Id.*

4. *Id.* (identifying the MoMA's application as one of the most popular).

5. *See* Woodrow Barfield, *Commercial Speech, Intellectual Property Rights, and Advertising Using Virtual Images Inserted in TV, Film, and the Real World*, 13 UCLA ENT. L. REV. 153, 158–59 (2006) (discussing the use of a mobile computer that is used in conjunction with a wireless network resulting in the use of information from the Internet to mediate reality, such as virtual advertising on real objects); *see also* 3 JANNA QUITNEY ANDERSON & LEE RAINIE, UBIQUITY, MOBILITY, SECURITY: THE FUTURE OF THE INTERNET 297–99 (2009).

govern our everyday life, is already here.[6] Through mobile technology, computing has finally come out from behind a desk and into the street.[7] As a result, the laws that govern virtual worlds have a greater and greater impact on our everyday lives.[8] However, the law is playing a desperate game of catch-up in order to adapt as disputes and lawsuits over Mixed Reality arise.[9]

Most scholarship to date has assumed that modern society is increasingly virtualized.[10] It is more accurate to note that virtual data is increasingly realized as it becomes tied to realspace features and geography.[11] Yet while virtual experiences are entering real life at an ever-increasing pace, the legal literature on virtualization technologies lags badly. The bulk of virtual worlds research focuses on the impact that real world regulatory regimes have on online spaces and communities.[12] This Article proposes that the traditional

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6. BRIAN X. CHEN, ALWAYS ON 4–7 (2011) (discussing the far-reaching impact of the iPhone and its role in weaving data with physical reality).

7. Sometimes, *literally* into the street, as in the example of augmented reality windows in upcoming Toyota vehicles. *See Toyota's 'Window to the World' Offers a Taste of Driving Technology to Come*, INDEPENDENT (London) (July 28, 2011), http://www.independent.co.uk/life-style/motoring/toyotas-window-to-the-world-offers-a-taste-of-driving-technology-to-come-2327504.html ("In the future . . . drivers can expect windshields to act in a similar manner, able to overlay digital information for practical, rather than educational or entertainment purposes.").

8. *See* Bragg v. Linden Research, Inc., 487 F. Supp. 2d 593 (E.D. Pa. 2007) (detailing the use of a Term of Service, or "TOS"). TOSs—or End User License Agreements ("EULAs") as they are often called—are the dominant form of legal relationship in virtual worlds. *See* Joshua A.T. Fairfield, *Anti-social Contracts: The Contractual Governance of Virtual Worlds*, 53 MCGILL L.J. 427, 429 (2008) (discussing the prevalence of EULAs in virtual worlds). EULAs, as contracts, define the terms of the relationship between the company and the user. Not unlike Linden Research's game Second Life, mobile phone carriers and the creators of mixed reality applications use EULAs and TOSs to control their software. This is already evident in any app downloaded from the Apple Store. *See Legal Information & Notices*, APPLE.COM, http://www.apple.com/legal/terms/site.html (last updated Nov. 20, 2009).

9. *See, e.g.*, Rosenberg v. Harwood, No. 100916536, 2011 WL 3153314 (D. Utah May 27, 2011) (awarding Google's motion to dismiss because Google was found not negligent). The Plaintiff sued Google after she used the Google Maps direction feature and was struck by a car. *See also* Kirit Radia, *Google Nearly Starts a War. Seriously.*, ABC NEWS: NOTE (Nov. 11, 2010, 12:43 PM), http://blogs.abcnews.com/thenote/2010/11/google-nearly-starts-a-war-seriously.html (describing how two nation-states in Central America almost started a war after Google Earth showed a border in the wrong location).

10. *See, e.g.*, Jack M. Balkin, *Virtual Liberty: Freedom To Design and Freedom To Play in Virtual Worlds*, 90 VA. L. REV. 2043 (2004); Gregory Lastowka & Dan Hunter, *The Laws of the Virtual Worlds*, 92 CALIF. L. REV. 1 (2004); Juliet M. Moringiello, *What Virtual Worlds Can Do for Property Law*, 62 FLA. L. REV. 159 (2010).

11. *See* Doug Gross, *New Wave of Location-Based Apps Mark a 'Paradigm Shift,'* CNN TECH (July 29, 2011, 9:46 AM), http://www.cnn.com/2011/TECH/mobile/07/29/discovery.apps/index.html; *see also* Fidel, *supra* note 1.

12. *See* Lastowka & Hunter, *supra* note 10, at 1, 11, 29 (discussing the permeable nature between virtual worlds and the real world and the role of "real-world" law such as property);

focus is backwards—that the legal regimes governing virtual worlds are increasingly coming to govern real world day-to-day life. This trend is accelerating as Mixed Reality applications integrate virtual objects and experiences into the real world.[13]

The growing application of online law to realspace is a problem because offline and online law have significantly diverged. Consider the simple act of purchasing a book. If you purchase a book offline, you own the book. If you purchase an e-book, you own nothing.[14] As Mixed Reality technologies merge real and cyberspace, the critical question is whether online or offline law will determine consumers' rights over property and data. There is a very real risk that courts will continue to reason from online analogies for offline issues, rather than turning to offline common law rules to determine consumers' rights.

This Article proposes rebalancing the law governing Mixed Reality by using analogies to real world situations rather than limiting legal analysis to intellectual property and online licensing law. Because the common law proceeds by reasoned progression based on the closest available analogy, it seems more in line with the American legal tradition to look to "real world" law for Mixed Reality, despite the increasing virtual enhancement enabled by Mixed Reality applications. For example, imagine that a disgruntled neighbor defaces your home with an obscene word that appears when your house is viewed using a Mixed Reality application. The most appropriate analogy may be to the law of property and trespass rather than referring to the online licensing agreements of the application creator.

In proposing a rebalancing, this Article bridges serious gaps in two sets of legal literature. First, there is a gap in the legal literature with respect to the impact of Mixed Reality applications. Over 200 articles have been published on law and virtual worlds or virtual reality in recent years.[15] To date none

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Leandra Lederman, *"Stranger Than Fiction": Taxing Virtual Worlds*, 82 N.Y.U. L. REV. 1620, 1623–24 (2007) (outlining potential frameworks for taxation within virtual worlds).

13. *See* Jason W. Croft, *Antitrust and Communications Policy: There's an App for Just About Anything, Except Google Voice*, 14 SMU SCI. & TECH. L. REV. 1, 1–4 (2010) (discussing the widespread growth in smartphones, in particular the iPhone, and the extensive offerings of the app store); *see also* Dan Fletcher, *10 Tech Trends for 2010*, TIME (Mar. 22, 2010), http://ti.me/ AfOUk4 (detailing the rise in augmented reality particularly among iPhone apps).

14. Gregory K. Laughlin, *Digitization and Democracy: The Conflict Between the Amazon Kindle License Agreement and the Role of Libraries in a Free Society*, 40 U. BALT. L. REV. 3, 5 (2010) ("Amazon . . . retains ownership of the 'Digital Content' (i.e., the e-book) and imposes a number of restrictions that are inconsistent with transfer of ownership to the purchaser, including prohibiting redistribution.").

15. *See, e.g.*, Balkin, *supra* note 10; Bryan T. Camp, *The Play's the Thing: A Theory of Taxing Virtual Worlds*, 59 HASTINGS L.J. 1 (2007); Jack L. Goldsmith, *Against Cyberanarchy*, 65 U.

have focused on the legal impact of Mixed Reality applications[16] even though Mixed Reality is far more common and commercially important than are pure virtual worlds.[17] This gap is all the more important because computing has begun a great migration away from desktop computers and towards laptops, tablets, and most of all, smartphones.[18] Mobile computing has led to the augmentation of real people, places, and things with virtual experiences and data.[19] For example, when you compare prices on eBay or Amazon from your desktop, there is not a pressing need to tie the data to a specific location. But if you use a smartphone barcode scanner to compare prices as you shop in the local supermarket, the actual, physical location of competing products at lower prices matters. Stores that augment their brick-and-mortar

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CHI. L. REV. 1199 (1998); I. Trotter Hardy, *The Proper Legal Regime for "Cyberspace,"* 55 U. PITT. L. REV. 993 (1994); Steven Hetcher, *User-Generated Content and the Future of Copyright: Part Two—Agreements Between Users and Mega-sites*, 24 SANTA CLARA COMPUTER & HIGH TECH. L.J. 829 (2008); Andrew E. Jankowich, *Property and Democracy in Virtual Worlds*, 11 B.U. J. SCI. & TECH. L. 173, (2005); Sarah K. Jezairian, *Lost in the Virtual Mall: Is Traditional Personal Jurisdiction Analysis Applicable to e-Commerce Cases?*, 42 ARIZ. L. REV. 965 (2000); Lastowka & Hunter, *supra* note 10; Juliet M. Moringiello, *What Virtual Worlds Can Do for Property Law*, 62 FLA. L. REV. 159 (2010); Michael H. Passman, *Transactions of Virtual Items in Virtual Worlds*, 18 ALB. L.J. SCI. & TECH. 259 (2008); David G. Post, *Against "Against Cyberanarchy,"* 17 BERKELEY TECH. L.J. 1365 (2002); Steven R. Salbu, *Who Should Govern the Internet?: Monitoring and Supporting a New Frontier*, 11 HARV. J.L. & TECH. 429 (1998); Andrew D. Schwarz & Robert Bullis, *Rivalrous Consumption and the Boundaries of Copyright Law: Intellectual Property Lessons from Online Games*, 10 INTELL. PROP. L. BULL. 13 (2005); Allan R. Stein, *The Unexceptional Problem of Jurisdiction in Cyberspace*, 32 INT'L L. 1167 (1998); Richard S. Zembek, *Jurisdiction and the Internet: Fundamental Fairness in the Networked World of Cyberspace*, 6 ALB. L.J. SCI. & TECH. 339 (1996).

    16. *See* Barfield, *supra* note 5 (discussing the use of augmented reality exclusively in the virtual advertising context).

    17. *Compare* GREG LASTOWKA, VIRTUAL JUSTICE: THE NEW LAWS OF ONLINE WORLDS 9 (1st ed. 2010) ("[I]n 2009, by conservative estimates, about 100 million people were interacting in some sort of virtual world . . . [and] about 10 percent of adults in the United States have participated in some kind of virtual world."), *with* Michael K. Cheng, *iPhone Jailbreaking Under the DMCA: Towards a Functionalist Approach in Anti-circumvention*, 25 BERKELEY TECH. L.J. 215 (2010) (discussing the rapid growth to date, predicted growth, and impact of smartphones along with their associated app stores), *and* Elaine Glusac, *Travel Apps 2.0*, N.Y. TIMES: IN TRANSIT (Jan. 4, 2010, 4:17 PM), http://intransit.blogs.nytimes.com/2010/01/04/travel-apps-20/ (discussing how augmented reality is "the hot new thing" for smartphones, and specifically the targeting of augmented reality travel apps to everyday travelers), *and* Jane L. Levere, *Penney Sells Back-to-School Clothes the Digital Way*, N.Y. TIMES (Aug. 2, 2010), http://nyti.ms/y41xjU (detailing the use of augmented reality to sell clothes to teenage girls).

    18. *See* Evelyn M. Rusli, *Google's Big Bet on the Mobile Future*, N.Y. TIMES: DEALB%K (Aug. 15, 2011, 9:47 PM), http://nyti.ms/z2PB9d ("Google made a $12.5 billion bet on Monday that its future—and the future of big Internet companies—lies in mobile computing, and moved aggressively to take on its arch rival Apple in the mobile market.").

    19. *See* Gross, *supra* note 11.

locations with virtual data to assist tech-savvy shoppers will gain a competitive advantage. [20] With the advent of smartphone technology, the importance and depth of adoption of Mixed Reality applications far outstrips that of pure virtual reality applications.

The second gap lies in the legal literature of pervasive computing ("PerC"). PerC is the predicted future embedding of computer chips into the physical environment. In the future, PerC theorists predict that there will be microprocessors—such as radio frequency identification ("RFID") chips—in credit cards, shoes, toasters, walls, ceilings, and refrigerators. [21] But the PerC literature has missed the mark because data tagging of realspace has preceded PerC by at least twenty years. [22] While implantation of chips into people and the environment is still in its infancy, Yelp, Google Latitude, Hidden Park, Parallel Kingdom, and other mixed reality applications are already here, and from these applications will come the next wave of great internet successes. [23] Thus, the PerC literature assumes a legal environment based on the prevalence of physical objects that transfer information embedded throughout our everyday lives, when the reality is that technology has developed in a different way, and much more quickly. This reality—that of Mixed Reality here and now—has not been addressed in the legal literature discussing PerC.

While the World Wide Web revolutionized human knowledge by linking it together, indexing it, and making it searchable, today a far greater revolution is underway: the real world itself is becoming hyperlinked and indexed. One example of hyperlinking the real world are quick response codes ("QR-codes")—tags in the real world that can either link to a website or contain information about the location or object near which they are

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20. *See* Chris Crum, *Is Augmented Reality the Future of E-Commerce? eBay Lets You Virtually Try On Sunglasses*, WEBPRONEWS / TECH. (Jan. 7, 2011, 2:15 PM), http://www.webpronews. com/is-augmented-reality-the-future-of-e-commerce-2011-01 ("Augmented reality could potentially be the biggest thing in e-commerce since the search engine.").

21. *See* Jerry Kang & Dana Cuff, *Pervasive Computing: Embedding the Public Sphere*, 62 WASH. & LEE L. REV. 93, 98 n.10, 99 (2005) ("What we can expect [if active RFIDs stood in our shoes], then, are networks of miniaturized, wirelessly interconnected, sensing, processing, and actuating computing elements kneaded into the physical world.").

22. *See* Nancy J. King, *When Mobile Phones Are RFID-Equipped—Finding E.U.-U.S. Solutions To Protect Consumer Privacy and Facilitate Mobile Commerce*, 15 MICH. TELECOMM. & TECH. L. REV. 107, 112 (2008) (discussing the use of RFID tags in mobile phones and RFID readers while also discussing location-based services). RFID chips are present but are being used as support tools for mixed reality apps.

23. *Id.*; *see also* Lesley Fair, Fed. Trade Comm'n, *Information Technology Law Institute 2011: Navigating the New Risks in Mobile Technology, Social Media, Electronic Records and Privacy*, 1043 PLI/Pat 417, 483 (Apr.–May 2011) (noting that the FTC convened to explore the emergence of RFID only in 2004).

found. Once a smartphone recognizes the QR-code, it provides the user with access to websites, free e-books, streaming videos, or even three-dimensional ("3-D") overlays onto the physical reality perceived by the smartphone user through the device.

Figure 1: QR-Code Linking to This Article on BTLJ.org

Thus, the Mixed Reality revolution is already happening. The real world is already alive and crawling with attached data. Data is routinely attached to real-world people, places, and things, and mobile devices permit users to experience this local data in the place to which it is attached. Well in advance of the advent of the pervasive computing world, data tagging has already hyperlinked and virtualized the real world—our world today.

The remainder of this Article proceeds in four Parts. Part II explores and defines Mixed Reality technologies and demonstrates the gaps in the legal literature on virtual worlds and the legal literature on pervasive computing. Part III analyzes the legal implications of the ongoing extension of virtual governance regimes into realspace and projects future trends. Part III also anticipates several legal problems including a Mixed Reality land rush[24] similar to the domain name rush of the late 1990s,[25] the advent of new forms of cyberdefamation or reputation poisoning, and dignitary harms based on false information propagated through Mixed Reality applications.[26] Part IV modestly proposes that as real and virtual worlds converge, the best available analogy for governing Mixed Reality are the background principles of the common law, not the law of online intellectual property licensing. Part V offers a brief conclusion.

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24. *See* CHEN, *supra* note 6, at 20, 31 (discussing the mobile app store as a digital gold rush, which is a strong indication that the Apple App Store is still in its infancy and is the sequel to the dot-com boom).

25. *See* Jacqueline D. Lipton, *Bad Faith in Cyberspace: Grounding Domain Theory in Trademark, Property, and Restitution*, 23 HARV. J.L. & TECH. 447, 448–49 (2010) (detailing the origins of the domain name rush and the negatives that ensued such as cybersquatting); *see also* Anupam Chander, *The New, New Property*, 81 TEX. L. REV. 715, 724 (2003) (discussing the domain name "land rush").

26. *See* Reit v. Yelp!, Inc., 907 N.Y.S.2d 411 (Sup. Ct. 2010) (discussing claim by dentist for defamation and deceptive acts and practices against Yelp).

II.   MIXED REALITY

This Part places Mixed Reality experiences on a continuum between virtual and real worlds. It first describes the various technologies and techniques for creating Mixed Reality experiences and then offers a more developed taxonomy for describing the various types of experiences that the technology can create.

A.   THE TECHNOLOGY

Mixed Reality is exactly what it sounds like—the mixing of "virtual" and "actual" reality.[27] The core of Mixed Reality is not new. The central element of Mixed Reality is the tying of data to an anchor in the real world, be it a person, geographic location, or structure. Some early examples of data tying are gossip circles in medieval villages or land records that indicated property ownership. In gossip circles, the act of gossiping "tagged" a person with information about that person. Land records—although much less accessible in medieval times—similarly linked a person to an ownership interest in property. Today the same type of data can be tied to a person or property through virtual technology. For example, circles in Google+[28] now give information about a person, much like a medieval gossip circle.[29] Mobile applications that list land ownership and property values when the user snaps a photo of a house with a smartphone now link that information to the property.[30] In both of these examples, information that had always been tied to an object (a person's reputation through gossip, or real estate ownership through land records) is now being made available seamlessly through technology. What makes Mixed Reality significant is the scale of this new data-enriched realspace.

One new aspect that Mixed Reality introduces is the combination of mobile computers with geotagged data and the extent to which this

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27. *See* Paul Milgram & Fumio Kishino, *Taxonomy of Mixed Reality Visual Displays*, E77-D IEICE TRANSACTIONS ON INFO. & SYS. 1321, 1322–29 (1994), *available at* http://ci.nii.ac.jp/naid/110003209335.

28. *See A Quick Look at Google+*, GOOGLE, http://www.google.com/+/learnmore/ (last visited Feb. 18, 2012).

29. Google+ profiles show other users whom the profile owner has placed in his "circles" and facilitates the sharing of the owner's daily life (depending on how frequently he uses Google+). Medieval gossip circles would have similarly indicated whom someone knew, and would have also revealed the goings-on of the person's life. Thus, both have the same fundamental function; the difference now is that this information is readily accessible through a smartphone, whereas one would have to actually sit in a gossip circle to gain this information.

30. *See, e.g.*, ZipRealty, *ZipRealty Real Estate*, APPLE ITUNES, http://itunes.apple.com/us/app/ziprealty-real-estate/id340513671 (last updated Jan. 30, 2012).

combination is a part of our everyday lives. Through mobile devices, users see data that is tied to particular places, objects, or people that they encounter.[31] Smartphone technology and other miniaturized computers permit a more mobile and interactive experience with our surroundings.[32] Coupled with the growth in mobile computing is the growth in Mixed Reality applications. Now, a husband who goes shopping can peer through his smartphone camera at a product and immediately see tagged locations of local competing stores with better prices.[33] A lost tourist in London can look through her smartphone and see virtual arrows overlaid on top of the real world that guide her to the nearest Underground station.[34] A potential Boston bar-crawler can use his cell-phone to examine the virtual tags that other patrons have left behind describing the best drinks served at a given hotspot.[35] Parents can install geolocation devices in cars that mentor overzealous teenage drivers and provide parents with instant information about their teen's driving.[36] In short, Mixed Reality takes computing out from behind the desk and into the real world.[37]

As we do so, what matters is not that computers are everywhere, but that they are with people. Given that a person can carry a smartphone in her pocket and access data that other people have tied to a given location, object, or person, people now move through a world augmented with data tags.[38] In the same way that people can click the "like" button on a Facebook

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31. *See In re* Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 (*Data Traffic Growth*), 25 FCC Rcd. 11407, 11412–25 (2010); *id.* ¶ 4 ("Data traffic has grown significantly, due to the increased adoption of smartphones and data consumption per device."); *see also The State of Mobile Apps*, NIELSENWIRE (June 1, 2010), http://blog.nielsen.com/nielsenwire/online_mobile/the-state-of-mobile-apps/ ("21% of American wireless subscribers have a smartphone at Q4 2009, up from 19% in the previous quarter and significantly higher than the 14% at the end of 2008.").

32. *See Data Traffic Growth*, 25 FCC Rcd. 11407, ¶ 4 ("As of the end of 2008, 90 percent of Americans had a mobile wireless device.").

33. *See, e.g.*, SHAPE Servs., *Barcode Reader*, APPLE ITUNES, http://itunes.apple.com/us/app/barcode-reader/id340825499 (last updated June 9, 2011).

34. *See* acrossair, *Nearest Tube*, APPLE ITUNES, http://itunes.apple.com/app/nearest-tube/id322436683 (last updated July 16, 2010).

35. *See* GoTime, *Happy Hours*, APPLE ITUNES, http://itunes.apple.com/us/app/happy-hours/id303814652 (last updated Oct. 17, 2011).

36. *See In-Car Teen Mentoring Device*, AM. NAT'L PROP. & CAS. CO., http://www.anpac.com/DriveSmart/WhatIsDriveSmart/Mentoring/default.aspx (last visited Feb. 18, 2012).

37. *See Data Traffic Growth*, 25 FCC Rcd. 11407, ¶ 4 ("Data traffic has grown significantly, due to the increased adoption of smartphones and data consumption per device.").

38. *See* CHEN, *supra* note 6, at 4 ("Data has become so intimately woven into our lives that it's enhancing the way we engage with physical reality."); *see also, e.g.*, SHAPE Servs., *supra* note 33 (describing the *Barcode Reader* app as permitting the user to instantly compare prices by scanning items in a physical store).

comment, they can now click the "like" button for a restaurant, or a colleague, or a neighborhood. Popular apps like Yelp and Foursquare have already turned this practice into a runaway business model.

Thus, data tagging—the tying of information to a specific geographical location or realspace anchor—not embedded computing, is driving the virtualization of realspace.[39] Data tagging can be done in a number of different ways. Global Positioning System ("GPS") tagging, other Location Based Services, tagging through what will be called Identification Services ("IDS"), mobile tagging, and Near Field Communication ("NFC") are all forms of data tagging. Each of these data tagging methods adds to Mixed Reality in a unique way.

By far the most common data tagging method is GPS data tagging (colloquially, "geotagging").[40] A GPS-enabled smartphone knows to overlay a given reputation bar on top of the local eatery because a global positioning system has identified the location of the restaurant.[41] When the smartphone knows its longitude and latitude, it can display information relevant to that location. A simple example and common application of GPS tagging comes from the world of outdoor hiking.[42] Geocaching has become an international phenomenon.[43] A geocacher is a hiker who hides a small object for other hikers to find by using a GPS tag left by the original geocacher. With their smartphones or GPS device, hikers find these objects in the real world by relying on the data that is tagged to the physical location of the geocache. They can then log their visits online with the rest of the tech-savvy hikers that located the geocache before. Geocaching takes a simple activity like

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39. *See* Kang & Cuff, *supra* note 21; *see also* Mark Weiser, *The Computer for the Twenty-First Century*, 265 SCI. AM. 94, 104 (1991) ("Already computers in light switches, thermostats, stereos and ovens help to activate the world. These machines and more will be interconnected in a ubiquitous network."). This literature is either behind the times, or has managed to identify the new trend, that data tagging is driving the virtualization of realspace.

40. *See* Ian Austen, *Pictures, with Map and Pushpin Included,* N.Y. TIMES (Nov. 2, 2006), http://www.nytimes.com/2006/11/02/technology/02basics.html (defining geotagging in the photography context as a technology "which, broadly speaking, is the practice of posting photos online that are linked to Web-based maps, showing just where in the world the shutter was pressed"); *see also* Andrew Adam Newman, *Appearing Virtually at a Store Near You . . .* , N.Y. TIMES, Jan. 19, 2011, at B9.

41. *See* AB InBev, *Stella Artois—Le Bar Guide*, APPLE ITUNES, http://itunes.apple.com/us/app/id335624129 (last updated June 29, 2010).

42. *See* Groundspeak, Inc., *Geocaching—The Official Global GPS Cache Hunt Site*, GEOCHACHING, http://www.geocaching.com/ (last visited Feb. 18, 2012) (detailing the user base at "1,648,021 active geocaches and over 5 million geocachers worldwide").

43. *See* Mark Couhig, *Geocaching Is Catching On*, SEQUIM GAZETTE (Dec. 15, 2010), http://www.sequimgazette.com/news/article.exm/2010-12-15_geocaching_is_catching_on.

hiking, augments it with data tagged to real-world physical locations, and transforms it into a hidden world of treasure hunting.[44]

Due in part to the success of GPS, it has been coupled recently with another type of data tagging, sometimes called Identification Services.[45] The difference between GPS and IDS is that, while GPS relies on GPS coordinates, IDS relies on some visual or audio cue within the local environment, be it a corporate logo, a face (for facial recognition software), or even a fragment of a musical tune (as in the case of the popular Shazam music-identification app). The real and virtual worlds connect through the smartphone's lens or audio pickup.[46] This requires the user to be in front of the real world cue. For instance, a user must be in front of a Starbucks and view the Starbucks logo through the camera lens before the application will "check in" using an IDS.

Mobile tagging also hyperlinks reality. While closely related to IDS it relies on barcodes or other machine-readable codes to retrieve virtual information. Mobile tagging, such as QR-codes, is more involved than IDS because information is not tagged to a visual or audio cue but rather embedded within the barcode or image itself. The mobile tag contains the code that creates the virtual experience, whereas IDS merely identifies the point where information is tagged. Mobile tag data can be a web address, a connection to a wireless network, a free e-book, a Sudoku puzzle, or even an animated graphic of a tank bursting through the wall.[47] The most prevalent examples of mobile tagging are QR-codes that act as a link to an online web presence, but there are numerous other applications.[48]

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44. *See* Groundspeak, Inc., *supra* note 42; *see also* bulpadok, *The Hidden Park*, APPLE ITUNES, http://itunes.apple.com/us/app/the-hidden-park/id314518306 (last updated Mar. 5, 2010).

45. *See* Bryan Pardo, *Finding Structure in Audio for Music Information Retrieval*, 23 SIGNAL PROCESSING MAG., May 2006, at 126, 127 (referring to Shazam and similar products as "identification services"); Chris Crum, *Augmented Reality + Location = The Holy Grail for Marketers?*, WEBPRONEWS (Feb. 28, 2011), http://www.webpronews.com/augmented-reality-plus-location-the-holy-grail-for-marketers-2011-02 (discussing how adding a visual element to GPS-based services makes consumer engagement much stronger than simple GPS-based applications).

46. *See* SHAZAM, http://www.shazam.com (last visited Dec. 8, 2011) (featuring a music identification service).

47. *See* Andy Vuong, *Wanna Read That QR Code, Get the Smart Phone App*, DENVER POST (Apr. 18, 2011), http://www.denverpost.com/business/ci_17868932.

48. Other types of two-dimensional barcodes developed include DataMatrix, Cool-Data-Matrix, Aztec, Upcode, Trillcode, Quickmark, Shotcode, mCode, Beetagg, and Microsoft's new Microsoft tag.

Near Field Communication[49] is yet another form of data tagging. With NFC, the application is closer to the vision of the pervasive computing literature. NFC relies on computer chips embedded in the environment or objects that are able to communicate information to one another via extremely short range radio fields (separated by mere meters). An example of NFC technology might be an application that allows a mobile device to function as a credit card and that could be waved near a receptor in a store in order to be "swiped." However, because NFC requires two sets of embedded chips in order to function, it is a far less commonly used method of geolocating data than GPS, IDS, or mobile tagging.

B.   A TAXONOMY OF EXPERIENCES ALONG THE REALITY-VIRTUALITY
        CONTINUUM

As will be seen, *infra*, understanding where a given communication lies on the continuum between virtual and real will be of some help in understanding what legal analogy should apply to a given phenomenon. This Section provides a practical set of terms for discussing the technology. As a baseline, the Article uses Milgram's Reality-Virtuality continuum ("RV continuum") as one potentially useful scheme for measuring out the steps from the virtual to the real.[50] As can be seen below, the term "Mixed Reality" sometimes refers to the various experiences between fully virtual and fully real. This Section therefore builds out the continuum to provide a more complete picture of the range of experiences offered by virtualization technologies and explains how Mixed Reality—as used in this Article—is used much more narrowly than the broad concept of Mixed Reality as a description of experiences on the RV continuum.

Figure 2: Milgram's Reality-Virtuality (RV) Continuum[51]

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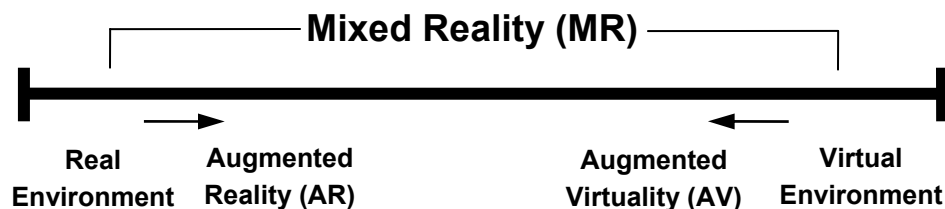
49. *See About NFC*, NFC FORUM, http://www.nfc-forum.org/aboutnfc/ (last visited Aug. 15, 2011).

50. *See* Fumio Kishino et al., *Augmented Reality: A Class of Displays on the Reality-Virtuality Continuum*, 2351 PROC. SPIE 282, 283 (1994), *available at* http://spiedigitallibrary.org/procee dings/resource/2/psisdg/2351/1/282_1 (identifying Milgram's Reality-Virtuality Continuum).

51. Milgram & Kishino, *supra* note 27, at 1321.

Mixed Reality occupies the space between virtual worlds and realspace.[52] Like any in-between technology, Mixed Reality is defined both by what it is and what it is not. The first problem in defining mixed reality is how to keep a definition from spilling over into generalized network technologies. Overuse of the word "virtual" exacerbates this challenge.[53] Virtual has come to mean anything electronic.[54] Thus, without care, it is easy to expand the definition of Mixed Reality to include almost all data used by people in the real world—that is, all data. A definition that broad is unlikely to be of much use.

A more accurate definition characterizes a virtual object or experience as a digital representation of something that we would typically expect to find in the real world.[55] Mixed Reality then re-injects or repositions that virtual object back into our real world experience. For example, consider a table. One can build a virtual table in a video game or virtual world, but it does not appear in the real world. But with Mixed Reality technologies, one can experience a virtual table in the real world; one can see an image of it manifested in the real world through mobile computing technologies and perhaps decorate it with virtual flowers as well. A table is an overly simple example but the point remains clear: Mixed Reality involves the injection of virtual places, objects, experiences, or other data into real-world contexts.

The second problem with defining Mixed Reality is how to locate Mixed Reality in the range of technologies from virtual worlds to pervasive computing. Over-breadth is again a real risk. Simply defining Mixed Reality as any application of mobile or pervasive computing, when coupled with the "virtual" fallacy above, would mean that one might classify nearly any mobile phone app as a Mixed Reality experience. In fact, the term means something quite specific: it means the projection of virtual objects and experiences into our physical lives.[56]

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52. *See* Robin Fretwell Wilson, *Sex Play in Virtual Worlds*, 66 WASH. & LEE L. REV. 1127, 1131–32 (2009) ("These 'augmented reality' technologies push virtual experiences and object down into real space, erasing the boundary between the virtual world and the real world."); *see also* Marc Jonathan Blitz, *The Freedom of 3D Thought: The First Amendment in Virtual Reality*, 30 CARDOZO L. REV. 1141, 1144 (2008) (noting that engineers "erase the perceptual barriers" with mixed reality by "mak[ing] illusory three-dimensional people and objects spring up in the more familiar settings in front of us").

53. *See* M. Scott Boone, *Ubiquitous Computing, Virtual Worlds, and the Displacement of Property Rights*, 4 I/S: J.L. & POL'Y INFO. SOC'Y 91, 108–09 (2008).

54. *Id.*

55. *See* Milgram & Kishino, *supra* note 27, at 1324–25; *see also* Boone, *supra* note 53, at 109.

56. *See* Milgram & Kishino, *supra* note 27, at 1322 ("[T]he most straightforward way to view a Mixed Reality environment, therefore, is one in which real world and virtual world objects are presented together within a single display . . . .").

Mixed Reality and PerC fundamentally differ with respect to where data is stored and processed.[57] Pervasive computing implies that the processing power is embedded in objects all around the user. Instead of tagging data on the cloud to virtual points in the real world, PerC stores and processes this information in computers in the physical environment around you. Unlike PerC, Mixed Reality utilizes data stored on the cloud globally but accessed locally; it is tied to real places, people, or objects through wireless connectivity and location based services. Mixed Reality and cloud computing go hand-in-hand.[58] With these definitions in mind, the following Sections explore the broader range of experiences that virtualization technologies offer and attempt to locate Mixed Reality technologies within that spectrum.

1. *Virtual Reality*

One end of the virtualization spectrum is marked by pure virtual reality. Virtual reality is virtualization at its most profound because the goal is to immerse the user in a virtual environment as completely as possible.[59] Virtual reality is the "goggles and gloves" technology that attempts to capture every sensation possible.[60] Due to bandwidth and processor constraints, as well as the required gear that tends to be expensive, cumbersome, and complex, the technology has not progressed far past the experimental stage or the occasional appearance in movies like *Tron*, *The Matrix*, or *Lawnmower Man*.[61] The technology is visually interesting and full virtual reality is often the first thing to spring to the layman's mind when contemplating virtual experiences.

Yet full goggles-and-gloves reality does not capture the current flowering of virtual experiences—known in somewhat passé technological parlance as "Web 2.0." The reason is simple: the current digital revolution is social, not

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57. *See* Eric Taub, *Storing Your Files Inside the Cloud*, N.Y. TIMES (Mar. 2, 2011), http://www.nytimes.com/2011/03/03/technology/personaltech/03basics.html ("Cloud backups are appealing for another reason: as computing becomes more mobile—on laptops, tablets and smartphones—you need to have reliable access to the data anywhere over an Internet connection.").

58. *See id*; *see also* Edward Lee, *Warming Up to User-Generated Content*, 2008 U. ILL. L. REV. 1459, 1500–01 (discussing that cloud computing is a major component of Web 3.0 in which the Internet converts traditional desktop-based applications into web-based applications that run off of massive amounts of data on remote servers).

59. *See* Milgram & Kishino, *supra* note 27, at 1321 ("The conventionally held view of a *Virtual Reality* . . . environment is one in which the participant-observer is totally immersed in, and able to interact with, a completely synthetic world.").

60. *See* Jonathon W. Penney, *Privacy and the New Virtualism*, 10 YALE J.L. & TECH. 194, 220 (2008) (discussing virtual reality and the two-way interaction between virtual technology and the user).

61. *See id.* at 220 ("The amount of information processing power necessary for such seamless interaction has not been developed and might never be.").

technological.[62] Virtual experiences matter because they are shared,[63] not because they utilize exceptionally rendered 3-D computer graphics.[64] There exists a sweet spot where the technology is simple enough to be widely adopted, yet complex enough to offer a compelling virtual experience.[65] This explains why smartphones—not virtual reality goggles and gloves—are the current carriers of Mixed Reality experiences. The reality is that more people will have these shared experiences if they are enabled by readily available and relatively inexpensive mobile devices. Shared experiences, not completely immersive experiences, are driving the current push into the most successful mobile apps.[66]

Consumers have clearly indicated that they seek socially rich virtual experiences. But mobile computing depends on smaller computers.[67] Thus, virtual worlds have become simpler, isometric social spaces that can be effectively accessed through a smartphone, rather than the fully-rendered immersive 3-D spaces that require bleeding edge (and large) computers.[68] Mobile means smaller, and smaller means more social and less graphically intensive.[69] Thus, in considering virtual worlds technologies in the following

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62. *See* Jacqueline D. Lipton, *Mapping Online Privacy*, 104 NW. U. L. REV. 477, 480–81 (2010) (referencing the social nature of Web 2.0, for example the expanded options for people to magnify their voice through blogs, wikis, social networks, and MMOGs).

63. *See* BENJAMIN DURANSKE, VIRTUAL LAW: NAVIGATING THE LEGAL LANDSCAPE OF VIRTUAL WORLDS 12 (2008) ("Most people who enter virtual worlds do so to interact with other users. This makes virtual worlds highly social spaces . . . .").

64. *See* Edward Castronova, *Virtual Worlds: A First-Hand Account of Market and Society on the Cyberian Frontier* 6 (CESifo, Working Paper Series No. 618, 2001), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=294828 (noting that successful virtual worlds combine 3D computer graphics with "chat-based social interaction systems"). The graphics in the games mentioned are not part of complex, full-immersion virtual reality experience, but rather they are experienced merely through one's computer.

65. To see how simple graphics interfaces in highly social games can be more appealing than less socially-oriented games with high end graphics, compare Zynga, *Farmville*, FACEBOOK, http://www.facebook.com/FarmVille (last visited Aug. 3, 2011) (identifying 34,070,983 monthly active users), with Press Release, Blizzard Entm't, World of Warcraft Subscriber Base Reaches 12 Million Worldwide (Oct. 7, 2010), http://us.blizzard.com/en-us/company/press/pressreleases.html?id=2847881 (stating a 12 million subscriber population).

66. *See The State of Mobile Apps*, *supra* note 31 (highlighting that Facebook is the most popular app on the iPhone and BlackBerry, and the second most popular on the Android platform).

67. *See* REZA B'FAR, MOBILE COMPUTING PRINCIPLES: DESIGNING AND DEVELOPING MOBILE APPLICATIONS WITH UML AND XML 5, 12–13 (1st ed. 2005) (describing the evolution of mobile computing).

68. *See* Zynga, *supra* note 65 (describing a popular virtual world game, *Farmville*, which is browser-based and does not require high-performance graphics hardware and computing power).

69. *See* B'FAR, *supra* note 67, at 6, 13.

Section, this analysis includes those highly social but graphically simple virtual worlds that are based on mobile and browser technology.

2. *Virtual Worlds*

A virtual world is a persistent, interactive, avatar-mediated, simulated 3-D space (much like virtual reality), but with more social and fewer immersive features than pure virtual reality.[70] Virtual worlds facilitate social interaction and enrich it with a shared graphical context.[71] At the nexus between social networking technology and 3-D game environments, virtual worlds follow a very different aesthetic from virtual reality. Virtual worlds do not place the user directly "inside" a virtual environment. Rather, virtual worlds often make use of avatars—characters viewed in the third person that represent the players in the virtual world. Avatars permit an increased range of interaction within the world by indicating a user's focus of attention and that of other players.[72] Judge Posner illustrated the unique ability for avatars to convey user focus when he conducted an interview in the virtual world of Second Life entirely through his virtual avatar.[73]

Although graphically engaging and immersive, virtual worlds continue to utilize the lower end of graphics capabilities in order to capture as many users as possible. Some virtual worlds remain graphically rich and only run on high-end computers, but the number of players in such worlds has been rapidly outstripped by browser-based games, such as those running on Adobe's Flash platform. Thus tension exists between the immersiveness of the environment and accessibility to large numbers of users, many of whom may not have high-end computers.[74]

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70. *See* Castronova, *supra* note 64, at 5–6; *see also* DURANSKE, *supra* note 63, at 2.

71. *See* DURANSKE, *supra* note 63, at 12.

72. *See* Penney, *supra* note 60, at 221 (detailing that avatars are not only a visual representation of the user in the virtual world where the user has full control over the avatar's appearance and actions, but often, the avatar becomes the person in the virtual world). An example is a recent lecture given by Professor Lastowka and this author at the Governance in Virtual Worlds Conference at the ASU Sandra Day O'Connor Law School. Participants attended with their own avatars and were able to interact with the professors' avatars. The avatars served as a means to convey social information: social focus, gaze, proximity, experience, and engagement are all conveyed via the avatar. Although avatar-mediated discourse is not as immediate as person-to-person conversation, the use of avatars as markers for social discourse permits a feeling of increased social engagement despite the limitations of the virtual environment.

73. *See* UChicagoLaw, *Judge Posner (or at Least His Avatar) Talks to Second Life*, U. CHI L. SCH.: FACULTY BLOG (Nov. 29, 2006, 10:38 AM), http://uchicagolaw.typepad.com/faculty/2006/11/judge_posner_or.html.

74. *See* Joshua A.T. Fairfield, *The Magic Circle*, 11 VAND. J. ENT. & TECH. L. 823, 838 (2009).

The trend towards ease of access has led to the popularity of several flash games, in particular, Zynga Networks' Cityville and Farmville, which run on Facebook.[75] These games have exploded both in the traditional computer setting and in mobile computing with smartphones and tablet PCs. These games demonstrate the principles outlined in the following Sections: they are graphically simple and run over social networks.

>   *3.   Augmented Virtuality*

Augmented virtuality is the point at which realspace begins to enter virtual worlds. Virtual worlds—such as Second Life—include the capacity to import real events into the virtual space for virtual world denizens to view. A real-world presidential debate can be imported and streamed live to those virtual world denizens.[76] Avatars can sit in an auditorium within an entirely virtual environment and watch events unfolding in the real world.

Google Maps and Microsoft's Bing Maps provide other examples. Both now include a "drill down to reality" function.[77] Whereas before a Google Maps or Bing Maps user might have ended her journey with a real world photograph of her destination (taken by the Google Streetview cars or geographically tagged photos taken by passers-by), the currently evolving functionality augments the virtual world with a drill down to a live camera view. Thus the drill down of a motorist using Bing Maps might be to a traffic camera, or the drill down of a remote viewer might be to a handheld camera that is currently active in the location. One example of this technology is the subject of Blaise Agüera y Arcas's TED talk, in which he demonstrated the ability to drill down all the way from a virtual world into realspace real-time live handheld cameras.[78] These technologies permit users of virtual worlds access to the real world. In so doing, they begin to mix even more reality into the virtual environment.

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75. *See* Douglas Macmillan, *Zynga and Facebook. It's Complicated*, BLOOMBERG BUSINESSWEEK (Apr. 22, 2010, 5:00 PM), http://www.businessweek.com/magazine/content/10_18/b4176047938855.htm (detailing the close relationship between Zynga and Facebook).

76. *See Presidential Debate Festivities in Second Life*, GAME POL. (Sep. 29, 2008), http://www.gamepolitics.com/2008/09/29/presidential-debate-festivities-second-life.

77. *See* John D. Sutter, *Bing Wows Crowd with Live-Video Maps*, CNN SCITECHBLOG (Feb. 12, 2010, 4:50 PM), http://scitech.blogs.cnn.com/2010/02/12/bing-wows-crowd-with-live-video-maps/ (discussing the live-feed feature in Bing Maps); *Viewing Layers—Maps Help*, GOOGLE, http://support.google.com/maps/bin/answer.py?hl=en&answer=144359 (last visited Feb. 18, 2012) (stating that one of Google Map's viewing layers contains live images from webcams around the world).

78. *See Blaise Aguera y Arcas Demos Augmented-Reality Maps*, TED (Feb. 2010), http://www.ted.com/talks/blaise_aguera.html (discussing the work of Microsoft with Bing Maps, the integration of cartography, imagery, and user content to augment realspace).

4. *Mixed* / *Augmented Reality*

This leads to the narrow definition of Mixed Reality within the RV continuum. Although the term "Mixed Reality" can broadly encompass all stages of data-enriched real or virtual environments (i.e., the entire RV continuum), for purposes of this Article Mixed Reality represents a narrow point in the spectrum where near-field technology,[79] geolocation services,[80] identification services, mobile tagging, and other data tagging techniques enrich the real world with virtual data through the use of technology. This technology is also sometimes called "Augmented Reality."

The November 2009 issue of Esquire Magazine contains one example of Mixed Reality. It contained Mixed Reality tags such that the magazine cover and several internal advertisements contained virtual elements that only appeared when the magazine was viewed through a computer or smartphone camera.[81] Another Mixed Reality application called Hidden Park permits children to see fantastic dragons, trolls, and fairies when specific areas of the park are viewed through a smartphone.[82] A child might look at a tree through the smartphone camera and see a goblin face peering out, or a child might look over a field to see elves dancing. Beyond opening up fantastical opportunities for play, these Mixed Reality apps have tremendous potential as educational tools.[83] The combination of an app like wikitude[84]—one of the most popular augmented reality applications—and Hidden Park may fulfill a goal of many parents and teachers: getting kids to enjoy learning. With technology that provides an interactive experience, otherwise boring topics like math or history may become more social, fun, and educational. Children might be more likely to learn math if it involved counting virtual dinosaurs in the park and might be more likely to learn American history with a virtual

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79. *See* King, *supra* note 22, at 211 (discussing Near Field Communications ("NFC") technologies and how they rely on RFID chips in mobile handsets, the software on the mobile handsets, and how NFC will deliver mobile advertising and other location-based services).

80. *See* Wendy A. Adams, *Intellectual Property Infringement in Global Networks: The Implications of Protection Ahead of the Curve*, 10 INT'L J.L. & INFO. TECH. 71, 89 (2002) (identifying geolocation services as referential databases that are arguably inferior to GPS technologies).

81. *See* Shira Ovide, *Esquire Tries Out Digital Reality*, WALL ST. J., Oct. 29, 2009, at B10.

82. *See* bulpadok, *supra* note 44.

83. *See* Mark Sutton, *Soar Valley College: Augmented Reality in the Classroom*, GUARDIAN (London) (Dec. 2, 2010), http://www.guardian.co.uk/classroom-innovation/video/soar-valley-college (discussing a professor's successful effort to interact with underachieving students by using an augmented reality experience to engage students with the solar system).

84. *See* Mobilizy GmbH, *Wikitude*, APPLE ITUNES, http://itunes.apple.com/us/app/wikitude/id329731243 (last updated June 29, 2011).

world overlay of revolutionary-era Boston life.[85] This blending of education with fun using technology is not new. The difference now is that mobile computing combined with data tagging and the resulting virtually enriched realspaces are far more social and dynamic than these earlier media.

Mixed Reality applications sit at the midpoint of the RV continuum. They are grounded in real objects and space but augment those objects or places with computer-generated data. For example, some greeting cards now contain a virtual enhancement.[86] The card includes a code that the sender can customize with an animated message and the receiver can scan it with a cell phone or web-cam and see the cartoon. The computer layers the 3-D representation onto the object. Often identifying which image to display does not even rely on server architecture. Rather, in many cases, the augmented reality object contains a mobile tag that provides sufficient data for the computer to render a three dimensional image.[87] In these instances the real world mobile tag provides the data for the virtual application; the mobile tag augments realspace with data that links directly to that physical printed code.

5. "Reality+"

The final point on this continuum is Reality+. I borrow and use the term reality plus—rather than simple reality—because realspace has always been enriched by information ever since the first fisherman told the second which fishing holes were especially good.[88] What is worth noting about realspace is that we have always augmented reality with crude data tagging. Maps and charts have served as crude data tagging devices tied to latitude and longitude. The revolution is in the accuracy, availability, and accessibility of such markers[89] and of the propagation of information on a global scale.

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85. *See, e.g.*, *Dinosaur Games*, PBS KIDS, http://pbskids.org/games/dinosaurs.html (last visited Oct. 15, 2011) (providing dinosaur-themed games for children to learn various skills and subjects).

86. *See Webcam Greetings*, HALLMARK, http://www.hallmark.com/online/webcam-greet ings.aspx (last visited Aug. 8, 2011).

87. *See id.* The example above includes a feature where you can print out a free sample from Hallmark complete with the mobile tag. If you simply hold the card up to a webcam, your image pops to life.

88. *See* Mark Burdon, *Privacy Invasive Geo-mashups: Privacy 2.0 and the Limits of First Generation Information Privacy Laws*, 2010 U. ILL. J.L. TECH. & POL'Y 1, 4 n.62 (explaining *Fishing Lake Map*, an app that provides geotagged updates on fishing holes).

89. *See* Nick Bilton, *Augmented Reality on Your Phone*, N.Y. TIMES BITS (Dec. 20, 2010, 3:40 PM), http://bits.blogs.nytimes.com/2010/12/20/augmented-reality-on-your-phone/ (identifying, based on a recent report from Forrester research, that augmented reality apps will become an integral, and common, part of using a mobile phone); *see also* Thomas Husson, *Mobile Augmented Reality: Beyond the Hype, a Glimpse into the Mobile Future*, FORRESTER: THOMAS HUSSON'S BLOG (Dec. 20, 2010), http://blogs.forrester.com/thomas_husson/10-12-

It is important to remark on what reality has always shared with information-enriched environments because of how law works. Much of law is a primitive form of augmenting real spaces and objects with data tags. Think about the title recording system for land. Land is not naturally divided into three-acre parcels. An entry in a paper or (increasingly) an electronic database tags specific land as "yours." Property is, therefore, a form of information-enriched geotagging.[90] Like all of law, property is a consensual fiction based on information-enriched reality.

C.   THE GAP BETWEEN THE LEGAL LITERATURES OF VIRTUAL WORLDS AND PERVASIVE COMPUTING

Having discussed the technology and terminology of Mixed Reality, the Article now turns to the two closest legal literatures: virtual worlds and pervasive computing. There is an extensive legal literature on virtual worlds and a less extensive, but still fascinating, legal literature on pervasive computing. This Section examines the gaps within and between these literatures and then demonstrates that a developed legal theory of Mixed Reality fills those gaps.

1.   The Legal Literature of Virtual Worlds

Legal academics have written several hundred articles focusing on virtual worlds in past years.[91] This rich literature has addressed issues including virtual property,[92] democracy,[93] control over land,[94] the use of contracts to govern virtual worlds,[95] the impact of policing and surveillance in virtual worlds,[96] the taxation of virtual currency,[97] and the sales of virtual goods.[98]

20-mobile_augmented_reality_beyond_the_hype_a_glimpse_into_the_mobile_future (stating that while augmented reality is not new, it is moving to mobile platforms). Although augmented reality is currently overhyped due to unrealistic expectations, it is growing rapidly and drivers for growth are in place.

90. *See id.*; Burdon, *supra* note 88, at 7–9 (discussing the expanded use of GPS, location-oriented, and function-oriented geo-mashups which overlay information onto a map of the real world). This use of software to tag information, such as a new cycling or running route, is substantially the same as the overlay of property boundaries upon realspace.

91. For a nonexhaustive list of virtual worlds literature, see sources cited *supra* note 15.

92. *See* Joshua A.T. Fairfield, *Virtual Property*, 85 B.U. L. REV. 1048 (2005).

93. *See* Beth Simone Novek, *Introduction: The State of Play*, 49 N.Y.L. SCH. L. REV. 1 (2005); *see also* Jankowich, *supra* note 15.

94. *See* Jankowich, *supra* note 15, at 207–08 (discussing the use of licensing by Linden Labs and Sony to control property in virtual worlds).

95. *See* Fairfield, *supra* note 8.

96. Joshua A.T. Fairfield, *Escape into the Panopticon: Virtual Worlds and the Surveillance Society*, 118 YALE L.J. POCKET PART 131 (2009).

97. *See* Camp, *supra* note 15.

98. *See* Michael H. Passman, *supra* note 15.

The articles share an intuition that virtual worlds are not only an interesting and novel technology, but that they also represent a compelling example of the law's development through the common law process.[99] As new communities encounter new technologies, they first develop norms, then they develop practices that are adopted by courts and eventually the practices are codified by statute.[100] The way that communities respond to emerging technologies drives, in significant part, the development of the law.[101]

However, one notable lack of the otherwise extremely successful virtual worlds literature is the failure to address issues of mobile computing and Mixed Reality.[102] There are several reasons for this. First, virtual worlds have been traditionally defined as graphically rich 3-D persistent spaces in which social groups can gather. But a hidden criterion of virtual worlds is that they be both synchronous[103] (interaction within the world occurs among users who are logged in continuously and at the same time) and persistent[104] (the world exists without the user's presence). Most Mixed Reality applications do not seem at first blush to map to the synchronous or persistent nature of virtual worlds and they use many fewer processor-intensive graphics.

The failure to fully address Mixed Reality leaves a significant gap in the virtual worlds literature. Synchronicity and persistence are, in fact, traits of Mixed Reality experiences, although the "world" that provides the experience in Mixed Reality is the real one. Thus, although the technology itself may not create synchronicity or persistence, Mixed Reality does share these

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99. *See* Jankowich, *supra* note 15, at 189 nn.85–86 (discussing open source virtual worlds and the norms generated in them and how this is comparable to the common law process).

100. *See* Joshua A.T. Fairfield, *Castles in the Air: Greg Lastowka's Virtual Justice*, 51 JURIMETRICS J. 89, 90 (2010) ("In so doing, Lastowka frees the field of virtual law from niche status and demonstrates that virtual worlds are participating in the core processes of the common law—they are jurisgenerative spaces. When courts apply law to the new technologies of virtual worlds, they incrementally adapt traditional concepts to a burgeoning technological world. In short, Lastowka demonstrates that virtual law is common law.").

101. *See id.*

102. *See, e.g.*, Barfield, *supra* note 5, at 159–60 (discussing virtually-enriched advertising but failing to address issues surrounding mobile applications of such advertising); Burdon, *supra* note 88, at 8 (discussing GPS and RFID technologies and their use in mobile phones to record a new wealth of geographic information and turning humans into geographical sensors but not delving deeper into mixed reality); King, *supra* note 22, at 125–27 (detailing the growth of mobile advertising but only in the context of RFID chipped mobile phones); *see also* Kang & Cuff, *supra* note 21, at 109 (discussing augmented reality in the context of embedded computing, not mobile computing, and arguing that augmented realities will occur through pervasive computing).

103. *See* Mark W. Bell, *Toward a Definition of "Virtual Worlds,"* 1 VIRTUAL WORLDS RES. 1, 2–3 (2008) (requiring synchronous communication in the definition of a virtual world).

104. *See* Castronova, *supra* note 64, at 5–6.

characteristics of a virtual world. This is unsurprising; a virtual world draws its characteristics from the real one.[105] But what has eluded commentators to date is that virtualized applications, even though they themselves are asynchronous or impermanent, or do not include avatar-based interaction, in fact do form part of a virtual world experience—one that straddles the divide between the virtual and the real.

This Article broadens the virtual worlds literature by examining a new use of virtualization technologies: the augmentation of the real world with rich sets of virtual objects and data. This immeasurably widens the subject matter. Virtual worlds articles are most often about games. Mixed or augmented reality applications can be games, but they are just as commonly shopping, travel, health, or fitness apps. This results in an enormous number of applications. The offerings in the Apple App Store are growing by leaps and bounds and Mixed Reality applications are among the most popular offerings.[106] Services like Foursquare and Yelp, which offer game-like rewards for providing information about locations, goods, and services, have transformed nightlife and fine dining.[107]

Finally, it is possible that Mixed Reality applications may realize certain goals of virtualization technologies before virtual worlds or virtual reality do. For example, although many elements of virtual worlds—including badges, ranks, experience points, and layered fantasy elements—have entered the real world through Mixed Reality, the real world sense of touch has struggled to enter the virtual. Because it is difficult to import touch into virtual worlds, it may be possible to build fantasy worlds on top of real world physicality long before we will import kinetics (i.e., the sensation of touch and balance) into a virtual world. The former is cheap and just beginning to proliferate; the latter is still the stuff of science fiction—imagine the Star Trek holodeck, which provides kinesthetic sensation through force fields. A more practical approach would be to take real objects, such as a blank-faced robot or a moving floor panel (both of which have already been the subject of fascinating demonstrations) and use them as the underlying surface on which to layer augmented reality experiences.[108] So the blank-faced robot becomes

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105. *See* Milgram & Kishino, *supra* note 27, at 1324–25; *see also* Boone, *supra* note 53.

106. *See* Shan Li, *Businesses Quickly Adopting Augmented Reality Apps for Consumers*, L.A. TIMES (Oct. 13, 2011), http://lat.ms/GSPDEh (describing the current proliferation of augmented reality apps).

107. *See Yelp for Mobile*, YELP, http://www.yelp.com/yelpmobile (last visited Aug. 4, 2011); FOURSQUARE, https://foursquare.com/ (last visited Feb. 18, 2012).

108. *See* Utsushiomi, *U-Tsu-Shi-O-Mi at Asiagraph 2007*, YOUTUBE (Oct. 16, 2007), http://www.youtube.com/watch?v=htkVlCfCV2M (demonstrating virtual reality overlays on robotic substrates); Joseph L. Flatley, *CirculaFloor Robot Floor Tiles Keep You Moving in*

the kinetic element of a knight or fair maiden; a larger robot provides the kinetic surfaces for a dragon, and in fact whole different landscapes could be layered onto the real one.[109] Or, another example: one company has explored a Mixed Reality "floor" consisting of tiles that constantly move under the user's feet, giving the user the perception that she can keep walking infinitely in any given direction.[110] Mechanical malfunctions of such kinetic interfaces will lead to broken limbs. From the legal perspective, one simple reason to care that kinetics will come sooner to augmented reality than previously thought is that kinetics lead to personal injury lawsuits.

Even today's Mixed Reality applications have implications for physical harm and personal injury suits. By integrating virtuality into the real world, Mixed Reality applications create the threat that people will inevitably ignore some of the real-life aspects of Mixed Reality experiences. Consider the recent unsuccessful case against Google for harm to a pedestrian who followed Google Maps' driving directions and was struck by a car.[111] The information provided was accessible on the Internet and the directions came up in other services as well. The cause was the driver and not the directions themselves. Google did not interact with the end user in a one-to-one manner.[112] Neither realspace nor virtual reality caused the harm.[113] Rather, it was the underlying reality of the car and the road that impacted the pedestrian. While the court rejected the claim in this instance, it is clear that Mixed Reality can have very real legal consequences if users sue for physical harm caused while using these Mixed Reality applications. For this reason alone, a developed legal literature of Mixed Reality will have serious salutary effects for law that is currently in the process of being developed in the courts.

Virtual Reality, ENGADGET (Feb. 26, 2009), http://www.engadget.com/2009/02/26/circula floor-robot-floor-tiles-keep-you-moving-in-virtual-realit/ (demonstrating interactive mobile flooring technology); *see also* Cliff Kuang, *Augmented Reality Floor Simulates Walking on Snow, Pebbles, and Grass*, FAST CO. (Apr. 29, 2010), http://www.fastcompany.com/1633386/aug mented-reality-flooring-simulates-sensation-of-walking-on-snow-pebbles-and-grass; *Moving Floor!*, YOUTUBE (Nov. 6, 2006), http://www.youtube.com/watch?v=DnNWfJveZDI.

    109. *See* VERNOR VINGE, RAINBOWS END (2006) (exploring a possible future in which mixed reality would layer 3D virtual experiences on the real world).

    110. *See* Flatley, *supra* note 108.

    111. *See* Rosenberg v. Harwood, No. 100916536, 2011 WL 3153314 (D. Utah May 27, 2011) (granting Google's motion to dismiss because Google was not negligent).

    112. *Id.*

    113. *Id.*

2. *Pervasive Computing*

The fewer than five legal articles that have discussed augmented or Mixed Reality have done so in the context of discussions of pervasive or ubiquitous computing.[114] The literature on law and PerC is limited to a few articles that share a common definition. PerC envisions the virtualization of realspace through the actual embedding of small computer processors placed ubiquitously throughout the environment.[115] Computers would be embedded in walls, floors, ceilings, and toasters. Your refrigerator would automatically update your shopping list, which would be sent to the supermarket for just-in-time delivery to your house. This embedded pervasive computing presence would run constantly and invisibly, providing computing everywhere. Objects would be linked to the network.[116] RFID technology would permit objects to communicate with the rest of the embedded and pervasive computing environment to form the "Internet of things."[117]

But pervasive computing is developing unevenly.[118] Some elements of pervasive computing have advanced rapidly, others not at all, or only slightly.[119] The processors that support mobile phones and the growing

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114. *See* Kang & Cuff, *supra* note 21; King, *supra* note 22; *see also* Boone, *supra* note 53, at 104–05 (discussing two traits of pervasive computing: embeddedness and mobility). The first trait has not come to pass but the second characteristic is closer to the mark.

115. *See* E. Casey Lide, *Balancing Benefits and Privacy Concerns of Municipal Broadband Applications*, 11 N.Y.U. J. LEGIS. & PUB. POL'Y 467, 472 (" '[T]he Internet of Things,' in which tiny, inexpensive radio transceivers are installed in various everyday items, 'enabling new forms of communication between people and things, and between things themselves.' ").

116. *See* Kang & Cuff, *supra* note 21, at 112 (detailing that PerC is a digital nervous system grafted into the real world space around us, resulting in a networked system).

117. *See* King, *supra* note 22, at 109 n.1 (discussing an International Telecommunications Union report on different technologies, in particular RFID chips, that will lead to an "Internet of things").

118. *See* Justin M. Schmidt, *RFID and Privacy: Living in Perfect Harmony*, 34 RUTGERS COMPUTER & TECH. L.J. 247, 250–52 (2007) (discussing the disparity between active and passive RFID tags: passive tags are small and cheap but have fewer applications while active tags are significantly larger and more expensive and have different uses).

119. *Compare* Derek E. Bambauer & Oliver Day, *The Hacker's Aegis*, 60 EMORY L.J. 1051, 1069–71 (2011) (discussing the use of RFID chips ranging from access cards to buildings, toll payment systems, and passport readers), *with* Adam Powell, *Benchmark Legislation: A Measured Approach in the Fight Against Counterfeit Pharmaceuticals*, 61 HASTINGS L.J. 749, 759–60 (2010) (discussing the use of RFID chips in drugs that are counterfeited and varied benefits such as being written on and the speed of scanning, but also the lack of widespread use due to high and variable costs along with privacy and accuracy concerns), *and* Boone, *supra* note 53, at 10 (identifying ubiquitous computing as "still relatively new and still developing" and the mix of terminology which can include "mobile computing"). Boone's article continues with other terminology that is often included in the ubiquitous computing literature, specifically, "wearable computing, augmented reality" and "near-field communications." *Id.*

stream of user data are in the cloud; they are not present ubiquitously in the local environment.[120] Actual computer processors are more remote than ever, rather than ubiquitous and embedded all around.[121]

On the other hand, the ability to richly augment the real world with data has grown quickly.[122] Information is accessed locally but stored remotely. The phenomenon of hyperlocal data has gone hand-in-hand with the development of remote cloud computing. Thus, there is a non-trivial gap in the pervasive and ubiquitous computing literature: computer processors must not necessarily be located locally in order to provide rich hyperlocal data.[123] Examples are easy to provide: Google Maps augments realspace with significant virtual data and pushes that data out to mobile phones. But the Google Maps data itself is managed and maintained remotely. And this is necessarily so. Massive data sets still require massive amounts of computing power somewhere. The consumer carries the light client program on a mobile device while remote servers perform the heavy computational lifting elsewhere. Pervasive wireless connectivity replaces pervasive computing power.

Conversely, the nanotechnology or micro-microprocessing technology envisioned by pervasive computing has not, largely speaking, come to pass.[124]

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at 101; *see also* King, *supra* note 22. RFID chips are largely an industry tool for tracking. *See* Schmidt, *supra* note 118. They are present to an extent in mobile computing and in other tools that are consumer driven, for example credit cards, but they act more as a support system for the more widespread and commercially viable mixed reality systems in smartphones. *See* King*, supra* note 22.

120. *See* Kevin Werbach, *The Network Utility*, 60 DUKE L.J. 1761, 1812–13 (2011) ("Most experts participating in a 2010 Pew Foundation Future of the Internet Survey expected that within a decade, remote servers would be the primary means of accessing applications and sharing information, rather than local applications."). Mobile phones also continue to grow and aid in the growth of cloud computing. *Id.* at 1814.

121. *See* Konstantinos K. Stylianou, *An Evolutionary Study of Cloud Computing Services Privacy Terms*, 27 J. MARSHALL J. COMPUTER & INFO. L. 593, 604 (2010) ("Web 2.0 may have made the Internet more interactive, but it is cloud computing that signifies the transition to ubiquitous always-on networking which has the potentials to substitute part of the desktop computer.").

122. *See* Croft, *supra* note 13; Fletcher, *supra* note 13.

123. *See* Werbach, *supra* note 120.

124. *See* Kang & Cuff, *supra* note 21, at 109–12 (presenting the idea of computing in the air, walls, and in our sunglasses, but later identifying the augmentation of experiences with realspace with layers of contextually relevant information). *But see* Jesse Hicks, *DARPA's Next-Gen Wearable Display: Augmented Reality, Holographic Sunglasses*, ENGADGET (Apr. 12, 2011, 11:39 PM), http://www.engadget.com/2011/04/12/darpas-next-gen-wearable-display-augmented-reality-holographi/ (reporting that sunglasses are driven by AR technologies, meaning they are not driven by embedded chips). Kang & Cuff envision "software [that] will manage our datasense and constantly seek out and filter information . . . ." Kang & Cuff, *supra* note 21, at 110; *see also* CHEN, *supra* note 6, at 20, 35 (writing that "[t]he iPhone took Apple's core belief—that software is the key ingredient to hardware's success—and

Computing surrounds us today because it is mobile and moves with users, not because it is ubiquitous, already waiting for users wherever they may go. The difference between mobile and ubiquitous computing carries non-trivial legal implications.

Property law would likely govern a hardware-focused regime like PerC, with the property owner as dominant legal entity.[125] An example would be a PerC-enabled mall, in which RFID chips embedded throughout the mall communicate to the shopper.[126] In contrast, intellectual property and attendant licenses govern software-focused regimes like Mixed Reality,[127] and the application provider or developer maintains control over the servers. The current mobile computing regime is closer to the latter structure. The remote servers that produce Mixed Reality experiences are owned and controlled by the corporate entities[128] that also own the intellectual property rights in the virtual objects or experiences.[129] Use of developers' networks, apps, or programs subjects the users to a license regime that can severely restrict users' rights.[130]

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expanded it" and, further, that software is now pervasive). Smartphones are not just one device, but literally hundreds of thousands of things due to apps. CHEN, *supra* note 6, at 9–10. Software is what has become truly pervasive and not computing; instead, computing has become mobile.

125. *See* eBay, Inc. v. Bidder's Edge, Inc., 100 F. Supp. 2d 1058, 1067 (N.D. Cal. 2000) (analyzing an intrusion of hardware under a property regime with the finding that an owner of a computer system has a property right and can exclude others from it); CompuServe Inc. v. Cyber Promotions, Inc., 962 F. Supp. 1015, 1021 (S.D. Ohio 1997) (finding that an owner of a computer system has a possessory interest and that electronic signals are "sufficiently physically tangible to support a trespass cause of action"); *see also* Richard A. Epstein, *Cybertrespass*, 70 U. CHI. L. REV. 73, 79–80 (2003) (identifying servers as physical property thereby allowing for a trespass to chattels as the server can functionally be touched).

126. *See generally* Kang & Cuff, *supra* note 21 (discussing the idea of a mall that makes full use of embedded PerC technologies).

127. *See generally* Bradford L. Smith & Susan O Mann, *Innovation and Intellectual Property Protection in the Software industry: An Emerging Role for Patents?*, 71 U. CHI. L. REV. 241 (2004) (finding a strong link between software, its emergence as a vital part of the U.S. economy, and the protections provided by intellectual property laws).

128. *See* John Markoff, *Data Center's Power Use Less Than Was Expected*, N.Y. TIMES (July 31, 2011), http://nyti.ms/wilXuU (identifying that Google not only rents servers but also "generally builds custom computer servers for its data centers").

129. *See Google Terms of Service*, GOOGLE (Apr. 16, 2007), http://www.google.com/accounts/TOS (outlining the relationship between Google and the user with regards to "Google's products, software, services, and websites"). Google is overhauling its terms of service as of March 1, 2012. *Id.*

130. *Id.*; *see also* Vernor v. Autodesk, Inc., 621 F.3d 1102, 1111 (9th Cir. 2010) (outlining how a software vendor can phrase its license agreement to avoid characterization of the transaction as a sale).

In short, the literature on pervasive computing has discussed two distinct topics: the first Mixed Reality,[131] and the second nanotechnology and infrastructure.[132] The literature has focused overwhelmingly on the latter. As such, the current phenomenon of data tagging and hyperlinking realspace (Mixed Reality) remains under-examined. This Article fills this significant gap and provides a legal foundation for a world dominated not by PerC, but by Mixed Reality.

3. *Mixed Reality: Patching the Gap*

In place of the converging trends predicted by PerC—that both processors and the data processed will become hyperlocal—Mixed Reality is characterized by divergent trends in the location and access of data. As data becomes available hyperlocally, information is increasingly processed and maintained globally. Data is and will progressively be accessed locally from remote and distributed networks. Whether nanotechnology or pervasive computing ever takes off is of secondary importance. Currently, it is clear that a migration to remote computing, with increased reliance on broadband wireless connectivity, is what lies on the computing horizon. Since developers will continue to create tools that permit consumers to use data maintained and processed on the cloud in hyperlocal applications, this Article focuses on the legal significance and implications of this technology virtualizing realspace.[133]

This different approach requires attention to different technologies.[134] Prior discussions of pervasive computing have focused heavily on RFID technology: short-range radio that will permit objects to interact with the

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131. *See* Kang & Cuff, *supra* note 21, at 110 ("Preliminary implementations of such augmented reality already exist. For instance, contractors can walk through construction sites with a visor that paints a digital overlay of the approved architectural drawings on the building in progress.").

132. *Id.* at 98–99 n.14 (detailing the use of micromotors, and the reliance on nanotechnology, in addition to varying sizes and forms of devices for pervasive computing). Kang and Cuff detail the infrastructure of pervasive computing under the idea of embeddedness, where computers are embedded everywhere and are capable of wireless communications. *Id.* at 97.

133. *See also* Jamais Cascio, *Filtering Reality, How an Emerging Technology Could Threaten Civility*, ATLANTIC MAG. (Nov. 2009), http://www.theatlantic.com/magazine/archive/2009/11/filtering-reality/7713/ (detailing augmented reality and current apps, such as Layar, that allow users to "see location-specific data superimposed over their surroundings" in addition to upcoming technologies planned by Sony, for example wearable AR devices like sunglasses).

134. *See* CHEN, *supra* note 6, at 194–99 (detailing different AR technologies, such as smartphones, headwear, eyewear, and sensory specific options that go beyond just visual, such as audio cues from earpieces).

environment. RFID will play a role, as it currently does, but only in a support role for Mixed Reality apps.[135] The relevant technology is the expanding reach of mobile telecommunications broadband networks—Evolution Data Optimized ("EVDO" or "3G") and Long-Term Evolution ("LTE" or "4G")—that deliver broadband technology to smartphones and tablets.[136]

This Article also fills an important gap in the virtual worlds literature. The virtual worlds literature has not addressed Mixed Reality technologies. This is a significant oversight given that browser and mobile delivery are the fastest growing methods of delivery of virtual experiences. Further, the virtual worlds literature has been characterized by a willingness to treat virtual worlds as a separate reality governed by distinct rules separate from realspace (i.e., the rules of intellectual property).[137] Mixed Reality necessarily puts an end to that distinction. Virtual worlds cannot be regulated independently from realspace when virtual objects and places increasingly are a part of realspace itself.

In the Part that follows, this Article grapples with some of the problems that Mixed Reality applications raise for law, both broadly and as a matter of specific challenges that will arise within individual legal contexts. In so doing, this Article highlights that the law that governs virtual worlds—mostly intellectual property and licensing law—increasingly supplants or subverts the legal regimes that traditionally govern everyday life.[138] What we once owned, we will in the future only license.[139] What was once a simple breach

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135. *See* King, *supra* note 22.

136. *See* Jeffrey Paul Jarosch, *Reassessing Tying Arrangements at the End of AT&T's iPhone Exclusivity*, 2011 COLUM. BUS. L. REV. 297, 330–31 (detailing the growth in wireless networks from 2000 to 2009).

137. *See, e.g.*, Jack M. Balkin, *Law and Liberty in Virtual Worlds*, *in* STATE OF PLAY: LAW, GAMES, AND VIRTUAL WORLDS 86, 94 (Jack M. Balkin & Beth Simone Noveck eds., 2006) (arguing that real world laws and legal bodies should allow virtual worlds to construct their own standards for internal needs); Edward Castronova, *The Right To Play*, 49 N.Y.L. SCH. L. REV. 185, 204 (2005) (arguing for a law of iteration where, for example, virtual economies would be governed by a body of law that was completely separate from real world economies).

138. *See* Vernor v. Autodesk, Inc., 621 F.3d 1102, 1111–12 (9th Cir. 2010) (finding that the software owner was not the owner and therefore could not sell it to other users); *see also* Bowers v. Baystate Techs., Inc., 320 F.3d 1317, 1325–26 (Fed. Cir. 2003) (detailing that private parties are able to contract out of the limited ability to reverse engineer software, a fair use under the exemptions of the Copyright Act); Davidson & Associates, Inc. v. Internet Gateway, Inc., 334 F. Supp. 2d 1164, 1181 (E.D. Mo. 2004), *aff'd sub nom.* Davidson & Associates v. Jung, 422 F.3d 630 (8th Cir. 2005) ("The defendants in this case waived their 'fair use' right to reverse engineer by agreeing to the licensing agreement.").

139. *See Vernor*, 621 F.3d at 1111; *see also* Mark A. Lemley, *Terms of Use*, 91 MINN. L. REV. 459 (2006) (finding that contracts, such as license agreements, "clickwrap" and

of contract may now be a hacking crime or potential copyright infringement.[140] The following Sections chronicle the replacement of legal systems designed to secure citizens' reputational, property, and privacy interests with intellectual property licenses that endanger all of these interests.[141]

III.   THE LAW OF MIXED REALITY

The technological revolution of Mixed Reality is well underway. Reality is being hyperlinked, data tagged, indexed, and made searchable in the same way that the bulk of human knowledge was made accessible suddenly and surprisingly through the hyperlinked Internet. The coming legal revolution in response to Mixed Reality will both resolve existing legal debates and raise new, and potentially troubling, questions. For example, a developed theory of Mixed Reality finally puts an end to the enduring and erroneous theoretical idea of the Magic Circle, a metaphorical legal boundary that commentators have supposed separates the real world from virtual ones.[142] Virtual worlds cannot be deemed legally separate from the real one.[143] All virtual worlds are to some extent mixed: they are experienced by real world people, who interject elements of reality into the virtual world.[144] The world may be virtual, but the economic, artistic, and even romantic lives of the participants are quite real.[145]

"browsewrap", and Terms of Use, have grown in popularity and, critically, are increasingly enforced by courts).

140. *See* MDY Indus., LLC v. Blizzard Entm't, Inc., 629 F.3d 928, 939 (9th Cir. 2010) (setting out the contractual terms that limit the scope of a license as a "condition" and all other license terms as "covenants"). A user can still violate a covenant and thereby breach a contractual term. If a user were to violate a condition of a license agreement, copyright would be implicated. *See also* Digital Millennium Copyright Act (DMCA), Pub. L. No. 105-304, 112 Stat. 2860 (1998) (codified as amended in scattered sections of 17 U.S.C.). The DMCA contains three provisions that create a framework to address circumvention of technological measures that protect copyrighted works. *See* 17 U.S.C. § 1201(a)(1)–(2), (b)(1) (2006); ProCD, Inc. v. Zeidenberg, 86 F.3d 1447, 1452 (7th Cir. 1996) (describing that UCC § 2-204(1) provides for different formations of contracts, such as a prompt on a computer screen, which can prevent access). ProCD proposed a contract that a buyer would accept by *using* the software after having an opportunity to read the license at leisure.

141. *See MDY*, 629 F.3d at 938 (detailing a particular Term of Use and the prohibition of cheats, hacks, or other third party software, essentially requiring fair play).

142. *See* Castronova, *supra* note 137, at 200–05.

143. *See* Fairfield, *supra* note 74.

144. *Id.* at 825.

145. *See* Bragg v. Linden Research, Inc., 487 F. Supp. 2d 593 (E.D. Pa. 2007) ("While the property and the world where it is found are 'virtual,' the dispute is real.").

Although the Magic Circle is now broken, the legal effects of the Mixed Reality revolution are uncertain. Laws that govern the real world will apply to both elements of the Mixed Reality experience: intellectual property and e-commercial contracts will continue to govern the software and firmware in the devices; real-world property and tort law will continue to govern where users can go and what they can do in the real world. However, the principal issue between these two spheres is the encroachment of IP and e-commercial contracts into realspace via the virtualization of realspace. Will intellectual property law come to govern the extent to which consumers can use their own real and chattel property,[146] just as it now governs what applications consumers may use on their own devices? Without a developed theory of Mixed Reality, IP and e-commercial contracts will overtake property and torts in realspace.

To supplement these basic conclusions about the current trajectory of the law, the following Sections analyze the biggest areas of shift by category: contract law, tort law, property law, and privacy law. There are of course other important legal shifts that this Article must necessarily leave out, if only for space reasons. An example would be free speech: a shift will occur here too, when most of human discourse switches from telephone or email to corporate-controlled social networks, like Twitter, Google+, or Facebook.[147] However, the Article presents selected examples that highlight a pattern in the legal shift: an accelerating trend away from private property and consumer choice in a free market,[148] and toward corporate hegemonic

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146. *See* Bowers v. Baystate Techs., Inc., 320 F.3d 1317, 1323–34 (Fed. Cir. 2003) (evaluating the issues using copyright and patent law); Davidson & Associates, Inc. v. Internet Gateway, Inc., 334 F. Supp. 2d 1164, 1187 (E.D. Mo. 2004), *aff'd sub nom.* Davidson & Associates v. Jung, 422 F.3d 630 (8th Cir. 2005) (finding in favor of licensor); *see also MDY*, 629 F.3d at 938–43 (framing the claim of improper use of software in copyright); Lemley, *supra* note 139, at 460 (placing shrinkwrap, clickwrap, and browsewrap licenses under the umbrella "terms of use" because they all seek to control the extent to which buyers of software, or visitors to a site, can use that software or site).

147. *See* Miguel Helft, *Facebook Wrestles with Free Speech and Civility*, N.Y. TIMES (Dec. 12, 2010), http://www.nytimes.com/2010/12/13/technology/13facebook.html (" 'Facebook has more power in determining who can speak and who can be heard around the globe than any Supreme Court justice, any king or any president,' said Jeffrey Rosen, a law professor at George Washington University who has written about free speech on the Internet. 'It is important that Facebook is exercising its power carefully and protecting more speech rather than less.' "); Ashlee Vance & Miguel Helft, *Hackers Give Web Companies a Test of Free Speech*, N.Y. TIMES (Dec. 8, 2010), http://www.nytimes.com/2010/12/09/technology/09net.html (detailing the tension between the high praise received by Twitter and Facebook as outlets of free speech and their corporate aspirations of both because both rely so heavily on advertising).

148. *See* CHEN, *supra* note 6, at 92 (discussing the negative feedback to Apple's App Store and its legal agreements with developers). "[I]f a person makes an app for the iPhone,

control over consumers,[149] exercised by the threat of intellectual property lawsuits based on mass-market consumer application End User License Agreements ("EULAs") or website Terms of Use ("TOUs").[150]

A.   CONTRACT LAW: EULAS AND INTELLECTUAL PROPERTY LICENSING WILL GOVERN EVERYDAY LIFE

Mixed Reality technologies on mobile computing devices augment our daily lives with rich data. But these technologies also bring the dangerously flawed law of copyright to the real world. The laws governing the licensing of intellectual property were intended to govern intangibles, not the tangible world.[151] The basic economic assumption underlying intellectual property law is that expression is costly to produce and cheap to copy.[152] This is the foundation of the copyright system.[153] Since expressions are so cheap to copy, fewer people would invest time and money in creation. And indeed,

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he has to make it Apple's way or it won't be offered in the App Store. He has to play by Apple's strict rules." *Id.* "Apple must approve every iPhone app before it goes up for sale in the App Store, and this means that the corporation can regulate and censor content however it wishes." *Id.*; *see also* Lemley, *supra* note 139, at 470–72 ("The problem is that the shift from property law to contract law takes the job of defining the Web site owner's rights out of the hands of the law and into the hands of the site owner.").

149. *See* Brian X. Chen, *Programmer Raises Concerns About Phone-Monitoring Software*, N.Y. TIMES BITS (Dec. 1, 2011 4:58 PM), http://bits.blogs.nytimes.com/2011/12/01/programmer-raises-concerns-about-phone-monitoring-software/ (discussing the newly discovered data-collection software, Carrier IQ, that major cellular phone carriers have installed and that collects data such as users' locations and telephone activity).

150. *See* Lemley, *supra* note 139, at 470–72; *see also MDY*, 629 F.3d at 938–39 (discussing the ability of a company to write a contract such that the buyer owns or licenses the software and further that restrictions can be placed within such a license agreement that would allow a company to later sue for violations of that agreement based on a breach of its terms resulting in a contract breach or even copyright infringement); Lemley, *supra* note 139, at 466–68 (discussing the rise in enforcement of license agreements and TOSs by courts).

151. Michael Grynberg, *The Judicial Role in Trademark Law*, 52 B.C. L. REV. 1283, 1335 (2011) ("Intellectual property gives functional property rights to the creators of intangible goods.").

152. *See* Gideon Parchomovsky & Peter Siegelman, *Towards an Integrated Theory of Intellectual Property,* 88 VA. L. REV. 1455, 1466–67 (2002) (stating that absent legal protections, competitors would be able to copy expressive works and inventions without incurring the initial costs of production which, in turn, would drive down the market price leaving original authors and inventors without the ability to recover their initial production costs).

153. *See* Smith & Mann, *supra* note 127, at 241–42 (discussing the role of IP protection in incentivizing developers to invest in their programming as it prevents copying by protecting the original expression and aids in preventing copies that diminish the return on development costs).

many of the early internet fights were about copying.[154] The Recording Industry Association of America ("RIAA") famously sued teens and grandmothers across the nation for copying MP3 files.[155]

Copying—the driving concern of copyright law—turned out to be a bad paradigm for internet technologies. Internet technologies incentivize users to stream content rather than copy content because it is more expensive to maintain a local copy of a file on your own computer than it is to stream it.[156] As a result, the copyright system does little to inform the circumstances surrounding internet technologies. Copyright also serves as a bad paradigm because copyright holders wanted to do far more than restrict their customers from rote copying of copyrighted materials—they wanted control over their customers.[157] Beyond the right to control copying, copyright holders often asserted the ability to prevent customers from doing business with the copyright holder's competitors.[158]

Unfortunately, copyright law has indulged copyright holders in this regard.[159] Early case law in the Ninth Circuit (a critical circuit for online

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154. *See, e.g.*, Recording Indus. Ass'n of Am., Inc. v. Verizon Internet Servs., Inc., 351 F.3d 1229, 1231 (D.C. Cir. 2003); Recording Indus. Ass'n of Am. v. Diamond Multimedia Sys., Inc., 180 F.3d 1072 (9th Cir. 1999).

155. *See* John Schwartz, *Record Industry May Not Subpoena Online Providers*, N.Y. TIMES (Dec. 19, 2003), http://nyti.ms/GSNpVq.

156. *See* Kier Thomas, *Cloud Computing: The Executive Summary*, PC WORLD (Dec. 29, 2010), http://www.pcworld.com/businesscenter/article/215134/cloud_computing_the_executive_summary.html (noting that cloud computing is cheaper than maintaining local files for businesses).

157. *See* Chamberlain Grp., Inc. v. Skylink Techs., Inc., 381 F.3d 1178, 1201 (Fed. Cir. 2004) (discussing The Chamberlain Group's arguments as seeking to control consumers options); Walter S. Mossberg, *Media Companies Go Too Far in Curbing Consumers' Activities*, WALL ST. J., Oct. 20, 2005, at B1, *available at* http://on.wsj.com/yiv0Sv (explaining that DRM comes in several forms, is widely used, and controls not just whether something can be copied, but also whether it can even be accessed, such as with TiVo and a given TV program expiring after a certain period of time).

158. Aaron Perzanowski & Jason Schultz, *Digital Exhaustion*, 58 UCLA L. REV. 889, 901 (2011) ("Today, device makers and content distributors can easily introduce barriers to compatibility . . . . [S]hifting legal and technological landscapes, marked by the introduction of digital works and technological measures designed to restrict lawful access, have created serious concerns over lock-in."); *see also Chamberlain*, 381 F.3d at 1201 (finding that the copyright holder, Chamberlain, sought "to leverage its sales into aftermarket monopolies—a practice that both the antitrust laws . . . and the doctrine of copyright misuse . . . normally prohibit"); CHEN, *supra* note 6, at 6 (discussing the emerging use of app stores by TV makers and car companies such as Ford, "all with the common goal of trapping consumers inside their product lines").

159. *See, e.g.*, Phillip A. Harris Jr., *Mod Chips and Homebrew: A Recipe for Their Continued Use in the Wake of* Sony v. Divineo, 9 N.C. J.L. & TECH. 113, 134 (2007) ("Prior to the DMCA, courts took a very liberal view on reverse engineering of video game protections and allowed

technologies) held that copyright could be used to control behavior in an entirely new set of cases to which it had been previously inapplicable.[160] According to these cases, merely loading a computer program for a purpose outside of the software license agreement may constitute copyright infringement.[161] Thus, while flipping through a book at a bookstore never implicated copyright law (because no copy was being made), accessing the same material on a Kindle or iPad does implicate copyright law due to the Ninth Circuit's reading of the copyright statute.[162]

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it for 'intermediate copying.' After the creation and implementation of the DMCA, however, courts showed a stricter approach to copying and held that the interest in protecting copyright holders' security measures is greater than the interest of fair users that may attempt to use the functional components of intellectual property to create new platforms and software." (citation omitted)); Joseph E. Van Tassel, *Remote Deletion Technology, License Agreements, and the Distribution of Copyrighted Works*, 97 VA. L. REV. 1223, 1236 (2011) ("Furthermore, [the] balance of intellectual property rights arguably already skews in favor of the copyright holder, so courts should be wary of further curtailment of users' rights through the use of license agreements.").

160. *See* Wall Data, Inc. v. Los Angeles Cnty. Sheriff's Dep't, 447 F.3d 769 (9th Cir. 2006) (finding that because defendant was a licensee and not an owner, it therefore infringed the plaintiff's copyright by copying the software and installing it on multiple computers in violation of the license agreement); Triad Sys. Corp. v. Se. Express Co., 64 F.3d 1330 (9th Cir. 1995); MAI Sys. Corp. v. Peak Computer, Inc., 991 F.2d 511, 519 (9th Cir. 1993) (creating the random access memory ("RAM") copy doctrine: "[S]ince we find that the copy created in the RAM can be 'perceived, reproduced, or otherwise communicated,' we hold that the loading of software into the RAM creates a copy under the Copyright Act.").

161. The RAM copy doctrine makes it a copyright violation to violate any term of a license agreement where the software is copied into the computer's RAM. *See* MDY Indus., LLC v. Blizzard Entm't, Inc., 629 F.3d 928, 941 (9th Cir. 2010) ("The rationale would be that because the conduct occurs while the player's computer is copying the software code into RAM in order for it to run, the violation is copyright infringement.").

162. *See MAI*, 991 F.2d at 519–20; *MDY*, 629 F.3d at 941. *But see* Cartoon Network LP v. CSC Holding, Inc., 536 F.3d 121 (2d Cir. 2008) (finding that an embodiment and a durational requirement needed to be met in order for a data stream to be "fixed"). *MAI* did not require a durational requirement, only an embodiment. *See MAI*, 991 F.2d at 519–20 (finding temporary storage on RAM to constitute a copyright violation). Circuits have varied in their adoption of the *MAI* holding, and the Second Circuit's decision presented a circuit split concerning, for example, whether streaming data results in a momentary copy. This apparent split caused the parties to *Cartoon Network* to seek further review. *See* KATE M. MANUEL, CONG. RESEARCH SERV., RL34719, CARTOON NETWORK LP V. CSC HOLDINGS, INC.: REMOTE-STORAGE DIGITAL VIDEO RECORDERS AND COPYRIGHT LAW 10 n.90 (2009), *available at* http://ipmall.info/hosted_resources/crs/RL34719_090706.pdf (noting that in June 2009 the Supreme Court denied certiorari for review of the apparent circuit split created by the Second Circuit's ruling). The Supreme Court's denial of certiorari suggests that the circuit split is not significant enough to justify review. The circuit split has not affected the large bulk of client-server architecture applications, in which there is undoubtedly a copy of the creator's content made on the local client.

Shifting a simple breach of contract claim into a claim for intellectual property infringement has several immediate effects. Breach of contract generally generates expectation damages. Copyright infringement, however, entails a statutory remedy system as detailed in 17 U.S.C. § 504(c).[163] This statutory regime is the mechanism through which the RIAA can seek millions of dollars in damages from teenagers.[164] Each download of a separate registered work constitutes a separate infraction.[165] This shift alone significantly increases corporate control over consumer behavior. And the shift from the traditional remedy of expectation damages to statutory damages also changes consumers' incentives to breach abusive and overreaching online contracts. Where the company's expectation damages from a consumer's breach of an EULA are vanishingly small, the statutory damages regime of copyright can turn litigation against one's own customers from a losing strategy to a profit center.[166]

The shift away from consumer rights and toward corporate control over consumers' daily lives via EULAs and TOUs is one of the largest unheralded shifts in law of our generation. Threats of copyright infringement suits[167] require consumers to comply with a wide range of restrictions utterly

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163. *See* 17 U.S.C. § 504(c) (2010) (creating a framework of awards for infringements of one particular work, instead of multiple copies of one work, no less than $750 and no more than $30,000 based on the court's determination). Where the infringement was committed willfully, and the copyright owner sustains the burden of proving as such, the damage award jumps to no more than $150,000 but where the infringer is able to demonstrate they were not aware and had no reason to believe they were infringing a copyright, the damage is reduced to no less than $200 at the court's discretion. *Id.*

164. *See* Pamela Samuelson & Tara Wheatland, *Statutory Damages in Copyright Law: A Remedy in Need of Reform*, 51 WM. & MARY L. REV. 439, 441 nn.4–5 (2009) ("Although Congress intended this designation to apply only in 'exceptional cases,' courts have interpreted willfulness so broadly that those who merely should have known their conduct was infringing are often treated as willful infringers."). There have been several cases in which courts awarded amounts as large as $80,000 per infringed song and a final award as large as $1.92 million, even where the actual damages determined were near $50. *Id.* at 442–43 nn.13–14.

165. *See* § 504(c) (providing for an award of "statutory damages for all infringements involved in the action, with respect to any one work").

166. *See id.* (outlining statutory damages for copyright infringement).

167. *See* Viva R. Moffat, *Super-Copyright: Contracts, Preemption, and the Structure of Copyright Policymaking*, 41 U.C. DAVIS L. REV. 45, 64 (2007) ("Although these terms may rarely be enforced, at least for now, their consistent inclusion and their consistent, but not uniform, language indicates that the lawyers or website developers who are including these terms seek to reserve their rights to bring breach of contract actions (or to send cease-and-desist letters), possibly coupled with copyright infringement claims seeking copyright's statutory damages.").

unrelated to the making of copies.[168] Facebook provides one example of how copyright law significantly shifts the balance of power to producers from consumers of internet technology. Facebook asserts a perpetual license in all of its users' private information.[169] Facebook also ferociously limits what users can say. For example, a recent academic conference focusing on the use of internet kill switches in stifling speech was itself ironically stifled when it tried to advertise via a Facebook page because Facebook does not permit use of the term "Internet kill switch."[170] One might not be bothered by such decisions were it not that Facebook surpasses email as the means preferred for communication by many Americans.[171] Threats of copyright liability—like the threat by Facebook—attach any time someone purchases software, visits a website, or uses a social media site.

As intrusive as copyright licensing is for purely online computing, it is far more so for the next generation of internet technologies—Mixed Reality and mobile computing. Now, there exists the danger that the copyright law dominating online interactions will flow into Mixed Reality and govern its users in realspace. This new breed of online contracts impacts legal regimes across the board because our current system of law permits parties to alter almost any background legal arrangement via consent.[172] To enter a digital store a consumer must agree to the store's terms.[173] By remaining on a website, a consumer ostensibly signs a contract. Engaging in online

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168. *See, e.g.*, MDY Indus., LLC v. Blizzard Entm't, Inc., 629 F.3d 928, 938 (9th Cir. 2010) (requiring users to use software only in the ways allowed by the agreement).

169. *See Statement of Rights and Responsibilities*, FACEBOOK, § 2(1), http://www.face book.com/terms.php (last updated Apr. 26, 2011) ("[Y]ou specifically give us the following permission, subject to your privacy and application settings: you grant us a non-exclusive, transferable, sub-licensable, royalty-free, worldwide license to use any IP content that you post on or in connection with Facebook (IP License). This IP License ends when you delete your IP content or your account unless your content has been shared with others, and they have not deleted it.").

170. *See CLIP Roundtable: Internet Switch—National Security or Public Repression?*, FACEBOOK (Feb. 10, 2011), http://www.facebook.com/event.php?eid=194151337269200 (missing the "kill" in the title after being edited).

171. *See* Matt Richtel, *Email Gets an Instant Makeover*, N.Y. TIMES (Dec. 20, 2010), http://www.nytimes.com/2010/12/21/technology/21email.html (noting how many people in the younger generations prefer other communications media, such as Facebook, to email).

172. *See* Davidson & Associates, Inc. v. Internet Gateway, Inc., 334 F. Supp. 2d 1164, 1184 (E.D. Mo. 2004), *aff'd sub nom.* Davidson & Associates v. Jung, 422 F.3d 630 (8th Cir. 2005) (finding consent to the software agreement); *see also* Fairfield, *supra* note 74, at 831–35 (noting how games allow individuals to alter even the rules of society with regards to one another through consent).

173. One of the most notable examples of this is the iTunes splash screen, displaying the iTunes terms of service. *See Terms and Conditions*, APPLE, http://www.apple.com/legal/ itunes/us/terms.html#SALE (last updated Oct. 12, 2011).

transactions also requires a consumer to agree to the contractual terms and conditions of the site.

For example, on smartphones Google Maps is an indispensable application that permits use of the telephone as a GPS device. But Google Maps, like other Mixed Reality apps, also utilizes GPS technology to track,[174] collect, package, and resell the real world physical location of smartphone users to a broad array of third parties.[175] To use Google Maps, consumers must consent to Google's terms, which also effectuates consent to the tracking process just mentioned.[176] Under the current legal regime, these tracking activities are protected under the law governing online contracts (EULAs and TOUs) because users have given their consent in order to use the services. But this is a poor legal framework for Mixed Reality because it fails to recognize the "reality" aspect of Mixed Reality and, most importantly, how Mixed Reality applications are coming to affect the real world.

A comparison may clarify: consider the different reactions that Google's surveillance of its customers received online and offline. Online, Google retains all of its users' searches, ties them to specific user profiles, and further ties all users' online browsing habits (whether tracked by Google cookies on the company's own sites, or tracked through the Google advertising service on third-party sites, or some combination of the two).[177] While the practice is

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174. There are multiple layers of tracking. Even if app providers did not collect real-world location information, telephone companies themselves record the browsing habits and IP addresses assigned to their smartphone customers, as well as cell-site location information, which is the information on where the telephone user has traveled in real life as indicated by the cell towers that the mobile phone contacts. And even if mobile phone companies did not record this information, internet advertising giants leverage their vast consumer information databases to track wherever their customers browse online, all without anything more than the figleaf of consent of a buried clause in an electronic contract that no consumer ever sees or reads. (And what would consumers do if they did read it and objected? Use the Internet without Google?) The confluence of these technologies means that all of a user's activity—online and off—is tracked and recorded.

175. *See* Julia Angwin & Jennifer Valentino-Devries, *Apple, Google Collect User Data*, WALL ST. J. (Apr. 22, 2011), http://on.wsj.com/zp2Euo ("Google and Apple are gathering location information as part of their race to build massive databases capable of pinpointing people's locations via their cellphones. These databases could help them tap the $2.9 billion market for location-based services—expected to rise to $8.3 billion in 2014."). "[S]ome of the most popular smartphone apps use location data and other personal information even more aggressively than this—in some cases sharing it with third-party companies without the user's consent or knowledge." *Id.*

176. *See Privacy Center—Privacy Policy*, GOOGLE, http://www.google.com/intl/en/privacy/privacy-policy.html (last modified Oct. 20, 2011) (outlining Google's use of personal information, which includes using location data to "improve" its services for users).

177. *See* Anne Klinefelter, *When To Research Is To Reveal: The Growing Threat to Attorney and Client Confidentiality from Online Tracking*, 16 VA. J.L. & TECH. 1, 6–9 (2011) (detailing how web

met with some criticism, it is generally accepted that users of their services consent to these practices. But a similar practice of data collection, when injected into the real world, got Google into serious legal trouble. Google Streetview cars accessed individuals' open home wireless networks as the cars roamed around taking pictures for Google Maps, collecting data from those networks.[178] Even though the result was basically the same—collection of user data—the fact that the activity took place in a tangible way made a significant difference in the way the practice was perceived. As a result, lawsuits were filed across the United States, and state attorneys general began to investigate the search giant for possible illegal wiretapping and invasions of communication privacy.[179] The real difference in this comparison is not between "online" and "offline" collection of data—after all, the Streetview cars tapped into wifi connections—but whether there was the barest figleaf of contractual consent in place. Google ostensibly secures consent for an enormous amount of intrusive surveillance on its customers as soon as users surf to its web page.[180] Streetview cars did not have any such contractual figleaf.

The fighting question for Mixed Reality applications will be whether such online contracts of adhesion will finally be pushed down into the real world, such that courts will protect intrusions—like those of the Streetview car—under the theory that consumers have consented to the surveillance.[181] Google already engages in online surveillance operations gathering data far more comprehensive than any of the data gathered by Streetview, but it is privileged to do so under a strained reading of contract law.[182]

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browsing, searching, and online activities in general—including the use of Google—give rise to attorney-client confidentiality concerns due to the data being saved and indexed).

178. *See* Elec. Privacy Info. Ctr. (EPIC), *Investigations of Google Street View*, EPIC.ORG, http://epic.org/privacy/streetview/ (last visited Oct. 31, 2011) (summarizing the various investigations around the world into Google's practice of collecting data from unencrypted wireless networks).

179. *Id.*

180. *See Google Terms of Service*, *supra* note 129.

181. *See* Elinor Mills, *Carrier IQ Faces Lawsuits, Lawmaker Seeks FTC Probe*, CNET (Dec. 2, 2011, 1:09 PM), http://cnet.co/xgWjcX (describing the lawsuit filed against Carrier IQ as performing surveillance without consumer consent). Carrier IQ responded to the criticisms by claiming that it was assisting carriers in gathering data, and at least one carrier stated that its practices of using Carrier IQ did not violate its privacy policy. David Sarno & Tiffany Hsu, *Carrier IQ Defends Itself in Furor over Smartphone Users' Privacy*, L.A. TIMES (Dec. 2, 2011), http://lat.ms/GSNVmp. At the time of this writing, Carrier IQ has not issued a formal response to the suits.

182. *See* Lemley, *supra* note 139, at 468–70 (citing *ProCD*'s questionable legal reasoning based on incomplete reliance upon the UCC, in particular §§ 2-204, -207, and -209, with the subsequent legal reality that these rigid contracts are typically upheld in favor of their corporate authors).

We have come full circle. The special set of rules that were originally intended to govern intangible, intellectual property now govern the everyday, walkabout lives of U.S. citizens. American citizens do not functionally own their private information and cannot stop the indiscriminate recording of data about their everyday lives short of refusing to use cell phones and the Internet. What is needed is a robust path forward based on existing, established contract, tort, property, and privacy law. A legal regime not muddled by a strained reading of intellectual property law will protect consumers, scale back untrammeled corporate control of consumer information, and return copyright to its original role of protecting copying of creativity, rather than controlling the economic and intimate lives of citizens. The following Sections explore the issues in other areas of law, before offering proposals for re-balancing the law in Part IV.

B.   TORT LAW: CYBERDEFAMATION AND MIXED REALITY
        REPUTATION SYSTEMS

The Mixed Reality future will include facial recognition software that is able to access reputational ratings of people the user runs across in her everyday life.[183] Tagging real people with data raises obvious issues relating to the law of reputational interests, which acts to protect individuals against the publication of false statements made against their image.[184] Where employers now Google applicants, in the future they will merely check the person's online reputation with a range of online reputation providers and social networks. Once personally-tagged reputation and personal information becomes ubiquitously available to everyone with a smartphone, the temptation to manipulate or poison that information to cause reputational harms will inevitably arise.

Such reputational harms can already be found in the purely online context.[185] For example, an early Google bomb—using search engine

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183.   *See* John Biggs, *iOS 5 To Have Powerful Face Detection*, TECHCRUNCH (July 27, 2011), http://techcrunch.com/2011/07/27/ios-5-to-have-powerful-face-detection/ (reporting on Apple's purchase of a facial recognition software company, Polar Rose, and the plan to incorporate it into Apple's iPhone operating system); Ben Parr, *Top 6 Augmented Reality Mobile Apps*, MASHABLE (Aug. 19, 2009), http://mashable.com/2009/08/19/augmented-reality-apps/ (describing a mobile app called Augmented ID that recognizes a person's face and pulls up information about that person).

184.   *See* RESTATEMENT (SECOND) OF TORTS § 569 (1977) ("One who falsely publishes matter defamatory of another in such a manner as to make the publication a libel is subject to liability to the other although no special harm results from the publication.").

185.   Kai Ma, *Dan Savage Threatens To 'Google Bomb' Rick Santorum, Yet Again*, TIME NEWSFEED (July 28, 2011), http://newsfeed.time.com/2011/07/28/dan-savage-threatens-to-google-bomb-rick-santorum-yet-again/.

optimization to prioritize the results of the "bomber" on Google—targeted Senator Rick Santorum.[186] Political detractors of the senator created an off-color definition of the senator's name and then raised the search rank of the alternative result by crosslinking and referencing the neologism.[187] The end result was that searches on Google for the senator's name would find the alternative definition in the first page of results.[188]

Because the Internet has become the primary purveyor of both personal and professional reputational information, the risk of harm is magnified. Employers Google prospective applicants.[189] Social networks like LinkedIn manage professional connections.[190] eBay maintains reputation systems for third party vendors, facilitating transactions between parties that otherwise would not trust one another.[191]

Under the current legal and statutory regime, however, companies that create and maintain reputational networks lack incentive to keep reputational data accurate. This is because § 230 of the Communications Decency Act ("CDA")[192] generally immunizes interactive computing services providers from tort lawsuits stemming from inaccurate data supplied by users of the service.[193] Defamation law governs reputational harm offline—where there is no corresponding immunity for providers of reputational information. Thus,

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186. Tom McNichol, *Your Message Here*, N.Y. TIMES (Jan. 22, 2004), http://www.ny times.com/2004/01/22/technology/your-message-here.html (explaining the phenomenon of "google bombing").

187. *See* Marziah Karch, *Google Bombs Explained*, ABOUT.COM, http://google.about. com/od/socialtoolsfromgoogle/a/googlebombatcl.htm (last visited Dec. 12, 2011) (noting that Santorum's name was linked to the definition of a lewd phrase through a Google bomb).

188. *See id.*

189. *See Employers Google Applicants*, ABC NEWS (Apr. 28, 2007), http://abcnews.go. com/Business/video?id=3083837.

190. *See What Is LinkedIn?*, LINKEDIN, http://www.linkedin.com/static?key=what_is_ linkedin&trk=hb_what (last visited Oct. 31, 2011) (describing the professional networking qualities of LinkedIn).

191. *See Detailed Seller Ratings*, EBAY, http://pages.ebay.com/help/feedback/detailed-seller-ratings.html (last visited Oct. 31, 2011) (describing eBay's seller rating system and how it is used to determine seller quality).

192. 47 U.S.C. § 230 (2010).

193. *See* Barnes v. Yahoo!, Inc., 570 F.3d 1096 (9th Cir. 2009); Doe v. MySpace, Inc., 528 F.3d 413 (5th Cir. 2008); Fair Hous. Council v. Roommates.com, LLC, 521 F.3d 1157 (9th Cir. 2008); Chi. Lawyers' Comm. for Civil Rights v. Craigslist, 519 F.3d 666 (7th Cir. 2008); Mazur v. eBay, No. C 07-03967 MHP, 2008 WL 618988, at *1 (N.D. Cal. Mar. 3, 2008); Doe v. SexSearch.com, 502 F. Supp. 2d 719 (N.D. Ohio 2007) (dismissing claim against online site SexSearch on grounds that plaintiff's claim based on SexSearch's promise that all users were over 18 was barred by CDA § 230 when a minor entered false data as to age), *aff'd*, 551 F.3d 412 (6th Cir. 2008) (affirming on grounds of failure to state a claim, but declining to adopt district court's reading of CDA § 230).

online service providers generally avoid liability where offline providers incur liability. This duality makes the existence and proliferation of false or misleading reputational information that much more appealing on the Internet. This Section will explore these problems with online reputation in turn.

An example may help to clarify the current state of the law and the problems Mixed Reality raises. Imagine an online dating website that assures users that its users are unmarried and have not committed a felony. User A lies about her marriage status and criminal record. User B dates user A, and is harmed as a result. Let us also assume that the site knowingly or willfully failed to implement measures that would easily have detected A's falsehoods. On these facts, the caselaw as to the website's liability is split.[194] Section 230 clearly seems to bar any lawsuit based on the false information that user A entered.[195] However, courts are split over whether the site can be held liable for its failure to live up to promises regarding the data added by users.[196] Some courts seem to lean toward immunity: since the inaccuracy in the site's representation was caused by the third party's false data entry, the site would be immune to any lawsuits for failing to remove false data.[197] Other interpretive approaches might lean in the opposite direction, reasoning that the claim that the dates were "safe" was itself a representation by the company, not a representation by a third party user of the site.[198]

This system of online content management leads to very strange incentives. The corporate curator of a reputation network has immunity from

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194. Joshua Dubnow, *Ensuring Innovation as the Internet Matures: Competing Interpretations of the Intellectual Property Exception to the Communications Decency Act Immunity*, 9 Nw. J. Tech. & Intell. Prop. 297, 307 (2010) ("While the courts have reached two competing interpretations of § 230(c)(1) and (e)(2) of the Communications Decency Act, this split must ultimately be resolved because of the vastly different outcomes to which each interpretation leads.").

195. *See* § 230(c)(1) ("No provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider.").

196. *See Barnes*, 570 F.3d at 1109 (denying Yahoo! § 230 liability where a Yahoo! associate made a direct promise to remove nude pictures of plaintiff posted by a third party); *Fair Hous. Council*, 521 F.3d at 1176–77 (denying Roommates.com § 230 immunity where it exercised such control over the statements of the users that it functionally became the source of their illegal housing advertisements); *Mazur*, 2008 WL 618988, at *14 (denying eBay § 230 immunity where eBay itself made representations about the nature of certain auctions).

197. *See SexSearch.com*, 502 F. Supp. 2d at 727–28.

198. *See* David S. Ardia, *Free Speech Savior or Shield for Scoundrels: An Empirical Study of Intermediary Immunity Under Section 230 of the Communications Decency Act*, 43 Loy. L.A. L. Rev. 373, 397, 411, 479 (2010) (explaining that the first empirical study of § 230 reveals that the statute has been haphazardly applied by courts and has led to mixed—but generally positive—outcomes for providers).

suit based on third party false representations of trustworthiness,[199] but also directly profits from a high overall reputation average within the network. For example, new apps in the Android app market appear to receive a five-star rating at the outset.[200] This rating is then modified by third party reviews of the software. The overall sense that this generates is that Android apps are high quality and safe, when the reality is that many are merely new. In fact, due to Android's popularity, dangerous and fraudulent apps are at an all-time high[201] and benefit disproportionately from the appearance of trustworthiness that the Android market creates. Legal precedent appears to incentivize the network to make untrue statements about the high level of trustworthiness of the network. This exacerbates the tension between the network's financial stake in a good reputation and the very point of such a network (to help users detect bad actors). Even if a bad actor's false inputs into the reputation network render the reputation provider's statements untrue, there is a high likelihood that network provider will be immune from liability.[202]

This leads back to the problem of online licensing and increasing control over consumers. At the same time that copyright law has given online service providers unprecedented power over consumers, courts have also granted providers unprecedented immunity against even claims based on the companies' own promises. Consider a standard online EULA or Terms of Use contract. That contract can impose strict controls on the consumer, on pain of copyright infringement and statutory damages. But the return promises of the company to keep the network safe or to provide accurate reputational information regarding other users of the network may well be largely unenforceable under CDA § 230.[203]

The advent of Mixed Reality technologies will aggravate this liability imbalance significantly. Again, the core example is mobile technology that can recognize another person and then report reputational data to the user.

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199. *Id.* at 379 (citing § 230(c)(1) and stating that it effectively grants "operators of Web sites and other interactive computer services broad protection from claims based on the speech of third parties").

200. Android's application programming interface ("API") allows developers to use a code feature called RatingBar which allows them to assign a default star rating for an app. *See RatingBar*, ANDROID DEVELOPERS, http://developer.android.com/reference/android/widget/ RatingBar.html (last updated Oct. 27, 2011).

201. *See, e.g., Google Moves To Delete 'RuFraud' Scam Android Apps*, BBC NEWS (Dec. 14, 2011), http://bbc.in/GSOqNl.

202. *See* Ardia, *supra* note 198, at 481 (analyzing statistics of decisions under § 230, concluding that "overall, defendants won dismissal in 76% of the cases studied").

203. *Id.* at 493 ("[D]efendants won dismissal on section 230 or other grounds in more than three-quarters of the cases studied.").

Facial recognition technology is already being built into mobile devices.[204] And such technology does not merely recognize the device's user, but it can also recognize people in photographs that the user takes. Technologies like Face.com's facial recognition software are already combing online photo albums and identifying anyone who appears in the photographs.[205] Google+'s picture and video uploads are particularly aggressive—if the user is not cautious with permissions, Google+ will automatically upload pictures and movies from the user's telephone, and all future pictures and videos will be auto-uploaded.[206] Facial recognition is a standard mixed reality application, in that it takes indicia from the environment (here, the target face) and augments it with data (here, the person's reputation). The confluence of facial recognition, reputation, and mobile technologies will push problems of online reputation down to the personal level. Where once an employer had to be at a desk to Google your online reputation or check your social networking sites, now facial recognition will seamlessly integrate the process of online reputation into real life. Without progress in the law, the current legal framework governing reputation networks will replicate the same perverse incentives for Mixed Reality reputation systems that it has generated for online reputation networks. Consumers will bear a disproportionate amount of liability pursuant to the EULAs and TOUs of Mixed Reality applications, while their creators will largely be immune from liability.

C.   PROPERTY LAW: THE DIGITAL LAND WARS

Mixed Reality augments real world objects, places, and people with virtual experiences. The augmentation of objects and places necessarily implicates property law. Imagine that someone "augments" your house with a virtual tag that contains an obscene word viewable through a Mixed Reality application. Can you assert rights as a property owner to remove the offensive virtual sign?[207] This Section tracks property shifts in response to technology and predicts shifts based on emerging Mixed Reality applications.

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204. Biggs, *supra* note 183; Nick Bilton, *Facebook Changes Privacy Settings To Enable Facial Recognition*, N.Y. TIMES BITS (June 7, 2011, 4:30 PM), http://bits.blogs.nytimes.com/2011/06/07/facebook-changes-privacy-settings-to-enable-facial-recognition/.

205. *See* FACE.COM, http://face.com/ (last visited Feb. 19, 2012); *see also The Facial Recognition Software That Will Put a Name to Every Photograph in the Internet*, DAILY MAIL REP. (Aug. 23, 2010), http://www.dailymail.co.uk/sciencetech/article-1305191/Facial-recognition-software-allow-ability-identify-people-photographs-internet.html.

206. *Instant Upload Settings*, GOOGLE, http://www.google.com/support/mobile/bin/answer.py?answer=1304820 (last visited Aug. 14, 2011).

207. *See* John C. Havens, *Who Owns the Advertising Space in an Augmented Reality World?*, MASHABLE (June 6, 2011), http://mashable.com/2011/06/06/virtual-air-rights-augmented-

One perennial feature of the digital landscape is that of the digital land war.[208] The cycle goes as follows. First a range of options for the location of information is proposed. There is a divergence, and many different locations, applications, or networks are considered candidates for the "best" piece of internet real estate. There is then convergence once one address, application, or network becomes the "best," and people shift attention to it. Once attention shifts to only one address, application, or network, legal battles then follow as the owners of pre-existing property rights try to take the prime pieces of internet real estate away from the people who bet on the right technology.[209]

For example, early in the Internet's development, there were a few different top-level domain names. Some of these were restricted, like .mil and .edu. Some were general, like .net, .org, and .com. It was not immediately apparent that a .com domain name would become the most valuable piece of land on the Internet. It was only after the cycle of divergence—multiple top-level domain names existed—and convergence—to the .com domain name as the first choice of the searching consumer—that the legal wars over the .com domain names began. When they did, they did so in earnest, with Congress enacting legislation in support of the rights of trademark owners,[210] allowing them to take domain names from people who had registered them. The Anticybersquatting Consumer Protection Act permits the owner of a registered trademark to take a domain name that references the mark away from the registering party.[211] This permits trademark owners to wipe out free riding by parties who wish to use the trademark to sell goods, but it also gives the trademark owner another tool to quell critics of the trademark owner, or critics of the goods and services that the owner sells.[212]

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reality/ (noting that "[m]ultiple apps feature the ability for ads to appear on your mobile screen as miniature virtual billboards assigned to GPS coordinates").

208.   *See supra* note 25.

209.   *See* Lipton, *supra* note 25, at 448.

210.   *See* Trademark Act of 1946, Pub. L. No. 79-489, 60 Stat. 427 (codified as amended in scattered sections of 15 U.S.C.).

211.   Pub. L. No. 106-113, § 1000(a)(9), 113 Stat. 1501, 1536 (1999) (enacting into law § 3002 of the Intellectual Property and Communications Omnibus Reform Act of 1999, S. 1948, 106th Cong., reprinted at 113 Stat. 1501A-545 to -548 (1999) and codified as amended at 15 U.S.C. § 1125(d)).

212.   *See* Susan Thomas Johnson, *Internet Domain Name and Trademark Disputes: Shifting Paradigms in Intellectual Property*, 43 ARIZ. L. REV. 465, 476 (2001) (listing various types of cybersquatters, including one "who registers a domain name using the same or a *very* similar version of another entity's name to harass or criticize that entity" and "one who *intentionally* appropriates a famous trademark or tradename as a domain name for financial gain").

These land wars are far from settled. Another wave of land battles occurred over the use of metadata—mechanisms to drive customers to one site or another via search engine optimization.[213] Another modern-day wave is "Twitterjacking."[214] As Twitter became a social networking phenomenon, certain Twitter handles became valuable property. Immediately following the BP Gulf oil spill in 2010, some enterprising individual registered the handle "BPGlobalPR" and began a series of sardonic, self-involved, and hilarious tweets supposedly on behalf of BP.[215] It is not immediately clear that BP has the right to any Twitter handle that contains its name, especially ones that are being used for parody, or to convey truthful critical consumer information to the market.

The land wars continue in the sphere of Mixed Reality. For example, land wars are currently being waged over geolocated data tags. Yelp, a company that places GPS-located tags on businesses, includes reviews from ostensible customers. Litigation is now pending in New York against Yelp. The plaintiffs' goal is to force Yelp to remove negative reviews and stop removing positive reviews that are geotagged to the plaintiffs' businesses.[216] Furthermore, some European countries have voiced unrest because of the lack of control over the virtual representations of houses and property in Google Earth and through Google Maps.[217]

A coming wave of digital land wars will likely involve mirror worlds. Mirror worlds are virtual worlds that mirror the real world. The full 3-D version of Google Earth is a good example. With the latest software, consumers can see 3-D representations of buildings and view real-time relays

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213. *See* Eric Goldman, *Search Engine Bias and the Demise of Search Engine Utopianism*, 9 YALE J.L. & TECH. 111 (2006); *see also* David Segal, *The Dirty Little Secrets of Search*, N.Y. TIMES (Feb. 12, 2011), http://www.nytimes.com/2011/02/13/business/13search.html.

214. *See* William Sloan Coats & Jennifer L. Co, Kaye Scholer LLP, *The Right of Publicity & Celebrity Licensing*, 1065 PLI/PAT 277, 298 (2011) (describing Twitterjacking as the phenomenon of someone creating a Twitter feed and pretending to be a famous individual).

215. *See* Noam Cohen, *For Dueling BP Feeds on Twitter, Biting Trumps Earnest*, N.Y. TIMES (June 7, 2010), http://www.nytimes.com/2010/06/07/business/media/07link.html.

216. *See* Reit v. Yelp!, Inc., 907 N.Y.S.2d 411 (Sup. Ct. 2010).

217. *See, e.g.*, Catherine Bolsover, *German Foreign Minister Joins Criticism of Google's Mapping Program*, DEUTSCHE WELLE (Aug. 14, 2010), http://www.dw.de/dw/article/0,,5910738,00. html (describing complaints against Google Maps in Germany); *Google Street View Blacked Out in Greece*, CNN (May 13, 2009), http://articles.cnn.com/2009-05-13/world/greece.google. street.view.blocked_1_google-earth-search-giant-google-maps (describing the same in Greece); *Call To 'Shut Down' Street View*, BBC NEWS (Mar. 24, 2009), http://news.bbc.co.uk/ 2/hi/7959362.stm (describing the same in the United Kingdom).

from cameras at specific locations.[218] Fights over data tagged mirror worlds will be intense. Imagine if a global anarchist protest movement grabbed the mirror world location of local Wal-Mart stores and targeted them for mirror world protests by tagging the GPS location with anti-Wal-Mart facts and slogans; or imagine if members of the Occupy Wall Street movement tagged the locations of Wall Street firms with accusations and criticisms.[219] Consider the virtual defacing of a political headquarters in lieu of the more traditional brick through the window.

The land wars leave open a number of legal questions. The first question is whether owners of intellectual property rights—here, generally trademark owners—should be permitted to take prime internet locations away from first movers. Second, and more significantly, the land wars leave open the question of whether intellectual property law is itself the correct legal framework to apply.

The law of intellectual property tends here, as elsewhere, to exacerbate the trend towards increasing corporate control at the expense of protecting individuals. For example, imagine that a user Twitterjacks @Fairfield and begins to tweet as this Article's author. The author does not have the kind of celebrity that would give rise to a misappropriation of likeness claim, nor trademark or other IP ground on which to assert a claim to ownership of this new internet real estate. Yet Fairfield Inn & Suites would have a reasonable expectation of success in seizing the Twitter designation from a new registrant if someone were to register @Fairfield and begin tweeting hotel deals.[220] Thus, while I must register @Fairfield preemptively to protect my online persona, intellectual property owners often have the luxury of waiting to see which emergent technologies become dominant and then moving to secure the most valuable digital real estate. This gives IP holders a significant advantage.

Mixed Reality will only intensify the trend towards corporate control. As Mixed Reality causes real and virtual experiences to converge, there is a serious risk that the "virtual" rights holders (IP owners) will prevail and that "real" rights holders (real people and owners of physical property) will lose

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218. *See Google Maps*, GOOGLE, http://maps.google.com (last visited Oct. 31, 2011) (containing a drop-down menu that enables the viewing of various live camera feeds in areas all over the world).

219. *See Occupy Movement (Occupy Wall Street)*, N.Y. TIMES, http://nyti.ms/AmZh25 (last updated Feb. 13, 2012) (containing articles chronicling the anti-Wall Street movement and the accompanying protests).

220. *See Trademark Policy*, TWITTER, https://support.twitter.com/groups/33-report-a-violation/topics/148-policy-information/articles/18367-trademark-policy (last visited Aug. 14, 2011).

out. Further, Mixed Reality is inherently a multi-channel exercise: which applications and which channels within those applications will become dominant is anyone's guess.[221] However, once an application or channel does become dominant, those users who first adopted a technology run the risk of being sidelined in favor of IP holders. And interestingly enough, real property owners—the owner of the hypothetical defaced house in the example above, for instance—do not have any such strengthened rights regarding their real world property.[222]

D. PRIVACY LAW: PRIVACY'S DEATH AND RESURRECTION

The advent of mobile computing has enabled the totalitarian dream (or nightmare) of tracking citizens at all times. For the most part, however, it is not the government that tracks citizens. Tracking is largely accomplished through the technology consumers themselves use.[223] Tracking technology is rampant and widespread. Google Streetview cars captured unencrypted personal data as the cars passed private homes.[224] Facebook initiated an open architecture for its developers that permits almost anyone to capture large amounts of information through an app installed by a friend of a friend.[225] GPS-enabled cell phones constantly record the real-world locations of their users.[226] Internet service providers do the same, tracking their customers across the digital landscape.[227] It follows that mobile broadband providers can not only track users' physical locations, but also correlate those locations with the users' online browsing habits.

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221. *See* Havens, *supra* note 207 (suggesting that Google Goggles will be a dominant player given Google's current dominant market position).

222. *See id.* ("Google will own the virtual air rights within Goggles.").

223. *See* CHEN, *supra* note 6, at 47 ("[A]rmed with a camera-equipped smartphone and live streaming-video software, every citizen will have the power to broadcast anything to the world in real time, thus creating a collectively omniscient society of watching eyes.").

224. *See* Kevin J. O'Brien, *Germany Asks Apple About iPhone's Data Gathering*, N.Y. TIMES (June 28, 2010), http://www.nytimes.com/2010/06/29/technology/29apple.html ("[I]t had improperly collected 600 gigabytes of personal data, including fragments of e-mail messages and unencrypted passwords, on individuals around the world as it scanned home Wi-Fi networks while it gathered information for its Street View map archive.").

225. *See* Emily Steel & Geoffrey A. Fowler, *Facebook in Privacy Breach*, WALL ST. J. (Oct. 18, 2010), http://on.wsj.com/xVVPKF (describing how Facebook apps violate user privacy).

226. Noam Cohen, *It's Tracking Your Every Move and You May Not Even Know*, N.Y. TIMES (Mar. 26, 2011), http://www.nytimes.com/2011/03/26/business/media/26privacy.html (discussing the practice of how cell phone providers track users' latitude and longitude).

227. *See* Peter Whoriskey, *Every Click You Make*, WASH. POST (Apr. 4, 2008), http://wapo.st/xpbudQ (describing the growing phenomenon of internet service providers tracking individuals' online activity).

Likewise, even our friends and family can track us using widely available technology. As soon as one person takes a photograph and uploads it to Facebook, facial recognition technology can recognize and tag the people in the photograph with metadata (often including date and real-world physical location).[228] The government need not do much more than ask for this information from the mass of third parties who have already collected and indexed it.[229]

A discussion of online privacy is necessary in the context of Mixed Reality because Mixed Reality technology permits companies and governments to know not only a person's digital profile, but also his real-world habits.[230] There is nowhere to hide. Offline, real-world activity is now coded and recorded, parsed, and re-sold—thanks to the integration of Mixed Reality applications in our everyday lives—just as online activity has been. Where I drive every day can be cross-compared to my web surfing habits.[231] Where a consumer walks during the day is as marketable as which websites she has visited—and a combination of the two is more potent still.

Mixed Reality makes privacy increasingly elusive and unattainable. In fact, some urge that those who care about privacy should give up networked technologies. Former Google CEO Eric Schmidt implied that users who do not want to be tracked by Google all across the Internet, including any site that serves Google ads reporting back to Google, should simply not use the Internet.[232] Thus, in more recent years the move by privacy advocates has

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228. *See* Lauren Effron, *Facebook in Your Face: New Facial Recognition Feature Raises a Few Eyebrows*, ABC NEWS (June 10, 2011), http://abcn.ws/wFWrBG (describing Facebook's facial recognition feature).

229. *Cf.* Kevin Werbach, *Sensors and Sensibilities*, 28 CARDOZO L. REV. 2321, 2325 (2008) (explaining the massive surveillance power of individuals resulting from the proliferation of cameraphones coupled with widespread mobile phone usage, and noting that cameraphones function as "sensors hooked into end-user devices"); *see* Mark Milian*, U.S. Sent Google 8,888 Requests for User-Data in 2010*, CNN TECH (June 27, 2011, 6:49 PM), http://www.cnn.com/2011/TECH/web/06/27/google.data.requests/index.html.

230. *See* Cohen, *supra* note 226 ("One product, CitySense, makes recommendations about local nightlife to customers who choose to participate based on their cellphone usage. Many smartphone apps already on the market are based on location but that's with the consent of the user and through GPS, not the cellphone company's records.").

231. *See* Andrew Munchbach, *Apple Sued over iPhone Location Tracking Scandal*, BGR (Apr. 25, 2011), http://www.bgr.com/2011/04/25/apple-sued-over-iphone-location-tracking-scandal/.

232. *See* Jared Newman, *Google's Schmidt Roasted for Privacy Comments*, PCWORLD (Dec. 11, 2009), http://www.pcworld.com/article/184446/googles_schmidt_roasted_for_privacy_comments.html (quoting Schmidt as stating, "[i]f you have something that you don't want anyone to know, maybe you shouldn't be doing it in the first place, but if you really need that kind of privacy, the reality is that search engines including Google do retain this information for some time . . . .").

been to move some activity off the grid, or at least out of the reach of datamining corporations.[233] The advent of Mixed Reality technologies forecloses even this option.

1. Privacy Is Dead, Long Live Privacy

The ubiquity of technology that constantly tracks consumers' realspace movements and cross-references them with online activity has caused government and corporate actors to declare that "privacy is dead."[234] This Section explores the questions of whether privacy is in fact dead, whether Mixed Reality and mobile computing killed it, and what can be done about the current bleak situation. This Article takes the position that privacy is not an end state, but rather a point on a sliding continuum between secrecy and disclosure. Because privacy is a tension point, rather than an absolute category, it is inaccurate to state that privacy is dead.[235] Rather, the effects of mobile computing on privacy are a side effect of the nature of information systems used to locate, retain, and distribute information.

Since people will always seek to keep some information confidential and other people will always seek to discover or disclose it, we can quickly dispense with the "privacy is dead" paradigm. "Privacy is dead" is simply the battle cry of consumer disempowerment. To the extent privacy is dead, it is dead because the law has prevented consumers from getting and using the tools necessary to protect their personal privacy.[236] For example, it still is nearly impossible to surf the Internet securely,[237] or to make use of a cell phone without constantly revealing physical location or personal and

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233. *See* Helen A.S. Popkin, *Privacy Is Dead on Facebook. Get Over It.*, MSNBC (Jan. 13, 2010), http://on.msnbc.com/xUnaGG.

234. *See* Newman, *supra* note 232; *see also* O'Brien, *supra* note 224 ("60 percent of households in Germany use a retail bonus card . . . . By participating, consumers give the company the right to collect and market data on their purchasing habits, as well as send them advertising."); Popkin, *supra* note 233.

235. *See* CHEN, *supra* note 6, at 188 (discussing how the conception of privacy has been forced to change and how the focus should be on developing new technologies to combat privacy concerns rather than simply decrying the existing framework); *see also* Nick Bilton, *Privacy Isn't Dead. Just Ask Google+*, N.Y. TIMES BITS (July 18, 2011, 12:59 PM), http://nyti.ms/ GSOUTE (outlining how Google benefited by learning from privacy issues on Facebook and focusing on privacy concerns in Google+).

236. *See* Tanzina Vega, *Industry Tries To Streamline Privacy Policies for Mobile Users*, N.Y. TIMES MOBILE (Aug. 15, 2011), http://nyti.ms/yPYIj7 (describing positive developments on the privacy front as including "one company [that] is trying to make privacy policies that are both easy for consumers to read and easy for mobile application developers to create").

237. *See* John Markoff, *Do We Need a New Internet?*, N.Y. TIMES (Feb. 14, 2009), http://nyti.ms/GSOVHg; Kate Murphy, *New Hacking Tools Pose Bigger Threats to Wi-Fi Users*, N.Y. TIMES (Feb. 17, 2011), http://nyti.ms/GSOY5D.

financial information.[238] The goal, then, should be to provide consumers with the simple, built-in tools necessary to protect privacy.

2. *Privacy by Design*

The FTC has made much of "privacy by design."[239] This is an important meme to explore because it is both widespread and ineffective in securing privacy. Technologies that have been designed from the ground up to collect, package, and sell information cannot "by design" keep that information private. This Section explores the privacy by design meme, critiques it, and then discusses some more viable alternatives in the following Sections.

Privacy by design is an incorrect approach for two reasons.[240] First, the idea that privacy needs to be designed complicates a very simple problem. Corporations do not need to design for privacy because corporations do not need to record their customers' information in the first place. The need for privacy design arises only because the existing technologies have already been designed to gather and sell customers' information. Once one rephrases "privacy by design" as "designing systems and services with the purpose of collecting and disseminating information to not collect or disseminate information,"[241] the futility of the approach becomes apparent.[242] Thus, the first reason that privacy by design has not produced privacy online is because the technologies have been designed not to allow for privacy.

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238. Angwin & Valentino-Devries, *supra* note 175; Susan Freiwald, *Cell Phone Location Data and the Fourth Amendment: A Question of Law, Not Fact*, 70 MD. L. REV. 681, 705–06 (2011) (stating that if cell phone data of one individual were recorded, "it could create a . . . virtual map of all the places the person went and how much time he spent at each place along the way"); Ki Mae Heussner, *Apple Tracks Location with iPhone, iPad Data*, ABC NEWS (Apr. 20, 2011), http://abcn.ws/wghaeh (noting that the "Apple iPhone and iPad 3G record the device's geographic position and corresponding time stamp in a hidden file").

239. *See* FED. TRADE COMM'N, PROTECTING CONSUMER PRIVACY IN AN ERA OF RAPID CHANGE (2010), *available at* http://www.ftc.gov/os/2010/12/101201privacyreport.pdf (advocating that companies adopt "privacy by design" as a means of protecting consumer privacy by limiting disclosure of consumer data through product design).

240. For background on privacy by design, see generally Ira S. Rubinstein, *Regulating Privacy by Design*, 26 BERKELEY TECH. L.J. 1409, 1431–43 (2011) (describing various reasons why privacy by design has not enjoyed the amount of success anticipated).

241. Simply put, the technology today has been developed with collection of user data in mind. The privacy by design concept is seemingly contradictory because it would be used to enhance privacy in systems that have been designed specifically to gather consumer information.

242. *See* Klinefelter, *supra* note 177, at 18 (identifying major concerns, in particular for the legal community stemming from confidentiality, and the concerns raised by viruses, third parties, and other bad actors with regard to online research and data saved by third party tracking).

The second, and related, reason is that the privacy options that consumers do have are designed to be too expensive in terms of the time and attention required to use them.[243] For example, industry advocates continue to argue against regulatory enforcement of a browser "do not track" flag that would follow the model of the quite successful federal "do not call" list.[244] Instead, consumers must navigate a different privacy architecture for each application provider, online service provider, and software developer. Drawing an analogy to the telephone context is instructive. Prior to the do-not-call list, each telemarketer was required to maintain and honor lists of people who did not wish to be contacted. Yet the sheer weight of informing each telemarketer (never mind the telemarketers who ignored the rules) made it such that telemarketing was hardly impacted. A unified, simple do-not-call list permitted consumers to express their preferences just once, rather than serially on the phone serially with each one of a thousand different callers.

Privacy by design is to some degree contradictory because the current commercial data architectures are in fact mechanisms for collecting, packaging, and reselling consumers' private and personally identifiable data.[245] Further, the privacy options that online users do have are designed to exhaust and confuse the user by requiring them to understand and address their privacy concerns with each vendor separately.[246] Privacy by design is a system designed not to work.

3. *Privacy as Control*

The solution to the privacy problem is simple, default, universal, and legally enforceable consumer controls for privacy. Consumer control is not only necessary; it is an effective solution in light of changing consumer conceptions with regard to privacy. Consumers are coming to treat privacy as a matter of control rather than an absolute prohibition on disclosure.[247] A consumer control regime would, as it should, allow consumers to sell their

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243. *See* Vega, *supra* note 236 (discussing the difficulty with online privacy policies, the importance of privacy policies on data collection, and the growing concern over data collection).

244. *See* David Goldman, *FTC 'Do Not Track' Plan Would Cripple Some Web Giants*, CNN MONEY (Dec. 3, 2010), http://money.cnn.com/2010/12/02/technology/ftc_do_not_track/index.htm (identifying several industry leaders, such as Google, who are against "do not track" due to unforeseen security problems and loss in e-commerce and advertising revenues).

245. *See* Rubinstein*, supra* note 240, at 1412 (noting that the profits derived from online advertising make firms reluctant to voluntarily impose systems that will increase consumer privacy to the detriment of their ability to collect consumer information).

246. *See* Vega, *supra* note 236.

247. *See* CHEN, *supra* note 6, at 188; Bilton, *supra* note 235 (praising Google+ for its default privacy settings).

personal information and allow internet companies to use it.[248] If implemented, effective consumer-side privacy controls can provide a true market in information.

Additionally, the decision as to whether or not to permit online or offline tracking can more easily and effectively reside in the customer's hands. This is clear in light of the unworkable alternatives to consumer control of privacy. The current regime of privacy policies (that contain no privacy protections) and EULAs (that bury invasive privacy terms twenty pages deep in electronic documents) has proved unworkable. Similarly, leaving privacy controls in individual companies' hands has proven to be a longstanding fox-in-the-henhouse type failure.

Implementing a consumer control regime would be relatively easy. A simple, expedient solution such as legally enforcing the "do not track" flag already available in browsers would do the trick. A consumer-side "do not track" option would test the economic arguments of privacy naysayers. These naysayers argue that there is no privacy because consumers do not want it, or at least that consumers want products more than privacy.[249] For example, Eric Schmidt has stated in relation to Google Streetview that "[i]f you have something that you don't want anyone to know, maybe you shouldn't be doing it in the first place."[250] Milder versions of the same strange argument include the assertion that consumers who do not wish to be tracked are free to not use Google, or are free not to use the Internet, or are free not to use the telephone. And with the advent of mobile computing technology, we might say that a consumer who does not wish to be tracked and recorded is free not to leave her house.

The market for consumer privacy has yet to be tested because "privacy by design" policies shift all of the transaction costs of privacy onto consumers. To discover what consumers make of privacy online, the transaction costs of privacy should be shifted from consumers to the owners of internet technology. Shifting the transaction costs from consumers and

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248. *See* Vega, *supra* note 236 (harmonizing the needs of users with the needs of companies to create a balance on the privacy front, but noting how online advertising reduces the costs of mobile applications). Mobile apps are free or cheap largely because of mobile advertising. *See also* Jim Harper, *The Great Privacy Debate—It's Modern Trade: Web Users Get as Much as They Give*, WALL ST. J. (Aug. 7, 2010), http://on.wsj.com/ArHG25 ("The reason why a company like Google can spend millions and millions of dollars on free services like its search engine, Gmail, mapping tools, Google Groups and more is because of online advertising that trades in personal information.").

249. *See* Harper, *supra* note 248 (arguing the same point on behalf of consumers in that protections for consumers would invite them to abandon personal responsibility).

250. *See* Newman, *supra* note 232.

offering consumers simple and legally enforceable control over online and offline privacy would also test the argument advanced by some in the internet technology industry that citizens do not want privacy.[251] And if internet technology companies like Google refuse to respect consumers' privacy settings, companies will have the choice to not offer service to those consumers.

A true market for privacy requires customers to have market choices that are not overwhelmingly burdened by transaction costs. The self-regulating approach to the private information market in the United States characterized by decentralized, complex, and unenforceable privacy controls has resulted in full market failure. Simple, legally enforceable, default consumer-side browser-level protections for consumers will remedy this problem by centralizing decision-making in consumers, rather than in corporations or the government.

Privacy as control represents an alternative to privacy by design.[252] Privacy as control assumes that consumers have effective, unitary, and legally enforceable controls in their own hands,[253] rather than scattered, complex controls that vary according to each service provider.[254] This vision of true consumer control over privacy is particularly important in the Mixed Reality context. Without real control over information, consumers will be every bit as subject to constant tracking in their real lives as they are now in their online habits.

IV.   BALANCED LAW FOR MIXED REALITY

Mixed Reality merges the real world and cyberspace. It presents exciting opportunities for consumers to augment realspace with rich virtual experiences. But the merging of real and virtual worlds also presents a basic legal problem. Law online has ventured far away from its offline roots. There is a very real risk that as virtual and real merge, the law intended to govern

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251. *See* Rubinstein, *supra* note 240, at 1412 (listing various reasons why consumers may not want privacy, such as lack of knowledge, behavioral biases, or simply not caring about the issue).

252. *See* CHEN, *supra* note 6, at 188–89 ("Perhaps we have already given up our digital privacy, but we still have control over boundaries . . . . In a modern online context a violation of privacy may only occur when we are manipulated into sharing more than we were told we would be sharing.").

253. *See* LAWRENCE LESSIG, CODE VERSION 2.0, at 88–111, 228–30 (2006) (arguing for a property model to protect privacy).

254. *See* CHEN, *supra* note 6, at 189 ("Online privacy advocates criticize online services when they are unclear or dishonest about what they are doing with our data, not when they are using our data—because, of course, they are.").

intangible assets will come to govern everyday life.[255] The law governing intangible assets was not designed to apply to the real world. If and when it is applied to the real world, the result will be extremely problematic. The specialized law of intellectual property and online contracting is not the best rule set from which to draw rules about everyday human life. Real world analogies, not online analogies, are the best source for legal rules governing the convergent technology of Mixed Reality.[256]

Solutions that have proven useful in law historically should be applied to the emerging legal problems generated by Mixed Reality.[257] The law has long-evolved internal checks and balances. For example, the common law has long imposed restrictions on how much control an intellectual property owner may assert once she has sold a product.[258] Similarly, the law has long set basic limits on contracts—limits that should be given new life in the online context generally, but also particularly in the context of Mixed Reality. Very little is needed to solve one of the major problems, that of protecting consumers' data. Here the law need only enforce consumers' expressed preferences to maintain their privacy and reject the pernicious myth of consent to the sale of personal information. Simple, unitary, default, and legally enforceable privacy controls will generate a much better market in consumer information.[259] The following Sections demonstrate through three examples that the law of intangible assets applied online should not be applied to Mixed Reality applications.

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255.   *See* Boone, *supra* note 53, at 114–15 (detailing that underlying code is what controls a virtual world). *See generally* CHEN, *supra* note 6 (describing how the iPhone collapsed the physical and virtual world); Barfield, *supra* note 5, at 161 (describing advertising in augmented reality); Gross, *supra* note 11 (describing an augmented reality mobile application); Wilson, *supra* note 52, at 1133 (describing the potential of near field communications).

256.   *See* Lyria Bennet Moses, *Recurring Dilemmas: The Law's Race To Keep Up with Technological Change*, 7 U. ILL. J.L. TECH. & POL'Y 239, 279–80 (2007); *see also* Perzanowski & Schultz, *supra* note 158, at 892.

257.   *See* Fairfield, *supra* note 8, at 475–76 ("For online communities to thrive, courts must recognize that private property, torts, and other community-critical rights and obligations can be adapted from the familiar rules that already govern communities in the real world to suit the realities of the virtual world.").

258.   *See* Perzanowski & Schultz, *supra* note 158, at 892 ("[C]opyright exhaustion, like many principles recognized in the Copyright Act, was created by and should continue to develop through common law judicial reasoning.").

259.   *Cf.* Eric J. Feigin, *Architecture of Consent: Internet Protocols and Their Legal Implications*, 56 STAN. L. REV. 901, 902 (2004) ("Higher-level protocols, such as those utilized in most web interactions, involve exchanges that should be considered express consent: the formation of a legally binding contract.").

A.   CONSTRAINING INTELLECTUAL PROPERTY

The first and largest problem that this Article has identified is that as virtual and real legal interests merge, the law appears set to grant far greater rights to intellectual property holders than it does to holders of other legal rights, like personal dignity or real property.[260] Copyright law is the main culprit, but other areas of intellectual property are also at fault. For example, as seen in Section III.C, *supra*, owners of trademarks have a decided advantage in the race for prime online real estate.[261]

The law has already developed checks on the ability of an intellectual property holder to exert continuing control over its customers once it has sold its product, but courts have not applied these checks to online law.[262] Copyright is meant to prevent copying. Once a copy is sold however, a copyright owner no longer has the power to control the copy. This is the common law doctrine of "first sale," which has been enshrined in the Copyright Act.[263] The doctrine hinges on whether a copyrighted work has been "sold" or merely "licensed." The answer to this question is complex, and courts rarely get it right. Again, online law has diverged strongly from offline law. For example, although Netflix can buy a physical DVD and rent it out to any customer (thus ensuring that almost any program or movie is available through Netflix's mail service), Netflix must seek individual license deals on a per-provider basis in order to stream the very same content. Thus, while Netflix's ability to use the physical copy of the same movie is not restricted, its ability to utilize an online copy is curbed by licensing and copyright law—in this case, the IP holder has much more power over the online version.

There is, however, one interesting development. Courts seem to draw a distinction between electronic data that is recorded or embedded in a physical medium, and data that is merely free flowing.[264] This is an improper

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260.   *See* Lemley, *supra* note 139; *see also* sources cited *supra* note 255.
261.   *See* text accompanying *supra* notes 211–12.
262.   *See* 17 U.S.C. § 106(1) (2010) (giving the exclusive right to reproduce work that is copyrighted). *But see id.* § 117(a)(1) (providing for the essential step defense for the software context where an owner of a lawful copy does not infringe the reproduction right of the copyright owner if the reproduction is an essential step in the utilization of the software); *id.* § 109(a) (providing for the first sale doctrine where a lawful owner of a copy of a copyrighted work is able to sell or otherwise dispose of the possession of the relevant copy at the owner's discretion). Both of these affirmative defenses are limited to owners of lawful copies of copyrighted works.
263.   § 109(a).
264.   *See* RealNetworks, Inc. v. Streambox, Inc., No. C99-2070P, 2000 U.S. Dist. LEXIS 1889, at *1, *3 (W.D. Wash. Jan. 18, 2000) ("Streaming is to be contrasted with 'downloading.' ").

distinction from a functional point of view: there is no relevant distinction between a song encoded on a CD and a song downloaded as an MP3. Yet courts continue to apply real world physical analogies to digital goods embedded in physical objects and apply the law of intangible assets to digital goods that are not so embedded. Thus, while a consumer may record movies on her TiVo, there is a serious question as to whether she may record a streaming movie with a virtual VCR.[265] Similarly, recent cases in the Ninth Circuit indicate that although a seller may not resell copies of a computer program on e-Bay (since the original license agreement purported to prohibit such resale),[266] she would be free to sell music CDs that purported to have the self-same restriction.[267] The presence of some physical element—here the TiVo physical box or the music CD—seems to provide courts with some comfort that analogies to the law of the sale of physical objects is a better analogy than the law of licensing of intellectual property.

These cases may provide a ray of hope for Mixed Reality. Although the data is tied and not embedded, there is hope that the link to the real world may make courts more likely to use analogies drawn from the full range of law, rather than analogies drawn solely from online intellectual property law.[268]

B.   LIMITING ONLINE CONTRACTUAL CONTROL

The second step to returning balance to the law as cyberspace and realspace merge is to restore balance to online contract. Reducing the application of intellectual property law and increasing the application of traditional principals of contract and property law can largely restore balance in online contracts.[269] This will return contract law to its normal place within the constellation of legal tools as the tool of bargained-for exchange and expectation damages.

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265. *Id.* at *34–35 (halting Streambox's continuance of its product, a virtual VCR). *But see* Cartoon Network LP v. CSC Holdings, Inc., 536 F.3d 121, 128 (2d Cir. 2008) ("Accordingly, we construe *MAI Systems* and its progeny as holding that loading a program into a computer's RAM *can* result in copying that program. We do not read *MAI Systems* as holding that, as a matter of law, loading a program into a form of RAM *always* results in copying.").

266. *See* Vernor v. Autodesk, Inc., 621 F.3d 1102, 1110–12 (9th Cir. 2010) (establishing a three point framework to determine if a purchaser of software is an owner or licensee).

267. *See* UMG Recordings, Inc. v. Augusto, 628 F.3d 1175, 1183 (9th Cir. 2011) (finding resale of a music CD not to constitute copyright infringement despite a label claiming a license limitation restricting such a sale).

268. *See* Moses, *supra* note 256.

269. *See* Lyria Bennet Moses, *Toward a General Theory of Law and Technology: Why Have a Theory of Law and Technological Change?*, 8 MINN. J.L. SCI. & TECH. 589, 595–96 (2007) ("Over-emphasis on the technological angle in discussing legal and social problems is evident in various contexts. . . . Judges occasionally fall into the same trap of assuming that because events took place on the Internet, the law must be different.").

As things stand, online contracts often implicate intellectual property statutory damages that have no relation to actual damages. For example, when a user modifies her physical gaming console in violation of an EULA, the console seller can pursue statutory damages for direct and vicarious copyright infringement. However, if traditional principles of contract law applied, the console seller would be limited to contract damages. The latter approach follows logically because the gamer owns her console and should be able to do with it what she will.

A return to basic principles of contract law has also generated promising trends elsewhere in the law. A related area in which intellectual property control over contracts is being scaled back is in circuit courts' interpretations of the Digital Millennium Copyright Act ("DMCA").[270] Here, the intersection between contract and copyright occurs in the anti-circumvention systems used to protect the copyrighted materials. A click-through contract (the classic "click *I Agree* or exit") can serve as both a binding contract and as a technological protection measure,[271] since the content governed by the contract cannot be accessed without going through the contract.

If the DMCA's prohibition on circumvention of such protective measures is relaxed, users can make use of their programs on their own devices despite overreaching contract terms. Interestingly, here too courts have been persuaded by analogies to physicality to relax the prohibitions of the DMCA.[272] Whereas hacking into a purely electronic software program seems to be a clear violation of the DMCA,[273] bypassing protections embedded into physical objects receives more lenient treatment. Indeed, the Library of Congress recently added anti-circumvention exceptions to the DMCA that would allow users to alter their smartphones to use unofficial but legally-obtained software.[274] The Court of Appeals for the Sixth Circuit

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270. DMCA, Pub. L. No. 105-304, 112 Stat. 2860 (1998) (codified as amended in scattered sections of 17 U.S.C.). The DMCA contains three provisions that create a framework to address circumvention of technological measures that protect copyrighted works. *See* 17 U.S.C. § 1201(a)(1)–(2), (b)(1) (2010).

271. *See* ProCD, Inc. v. Zeidenberg, 86 F.3d 1447, 1452 (7th Cir. 1996); *see also* 17 U.S.C. § 1201(a)(1)(A) ("No person shall circumvent a technological measure that effectively controls access to a work protected under this title.").

272. *See* Lexmark Int'l, Inc. v. Static Control Components, Inc., 387 F.3d 522, 529 (6th Cir. 2004); Chamberlain Grp., Inc. v. Skylink Techs., Inc., 381 F.3d 1178, 1203–04 (Fed. Cir. 2004).

273. § 1201(a)(1)(A).

274. *See* Paul Miller, *Library of Congress Adds DMCA Exception for Jailbreaking or Rooting Your Phone*, ENGADGET (July 26, 2010, 11:33 AM), http://www.engadget.com/2010/07/26/library-of-congress-adds-dmca-exception-for-jailbreaking-or-root/ (noting the Library of Congress's exception to the DMCA).

held that circumventing controls that limited the number of times that a user could refill printer cartridges that she had purchased was not a violation of the DMCA.[275] Similarly, the Federal Circuit held that a universal garage door opener that bypassed the garage door manufacturer's rolling numeric access code did not trigger the sanctions of the DMCA.[276] It may seem obvious that universal remotes do not violate anti-hacking laws, but legally speaking the issue is an extraordinarily close one, since software is embedded in the remote. Courts' willingness to give weight to the consumer's expectation that a garage door would be compatible with universal remotes over the strict letter of the DMCA affirms the importance of consumers' property rights and expectations with respect to their own property.

Two ancient but basic limits on overreaching contractual control are slowly coming back into fashion online: consideration and its cousin, illusoriness. The common law has long declined to look into the value of a particular bargained-for exchange, but has instead used the doctrines of consideration and illusoriness to ensure that some bargain was indeed struck—that promises were made on both sides.[277] But in the online context it is not clear that enforceable promises are being made on both sides. EULAs and TOUs are lists of promises that the user makes. Ostensibly, the return promise by the corporation is that it will permit the user to access a valued service. But courts are increasingly questioning contracts that contain unlimited modification clauses.[278] These are a staple of online contracts, but they are becoming more and more dangerous for companies. Judges have begun to reason that if a company is free to change the EULA or TOU at any time and in any way, then the company has not made any true return promise.[279] This is an important legal development since it increases the odds that the contract to which a consumer agrees will state the actual responsibilities that may eventually be enforced against the consumer. Similarly, such legal rulings increase consumers' confidence that the return promises of the company are equally enforceable.

Constraining overreaching contracts—especially those contracts that forbid the user to customize or accessorize her own property—is essential for Mixed Reality. Mixed Reality devices will increasingly control how users

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275. *Lexmark*, 387 F.3d at 529.
276. *Chamberlain*, 381 F.3d at 1182.
277. *See* Harris v. Blockbuster Inc., 622 F. Supp. 2d 396, 397–400 (N.D. Tex. 2009) (holding that an arbitration clause was illusory because the drafter could alter it at will).
278. *See, e.g.*, Bragg v. Linden Research, Inc., 487 F. Supp. 2d 593, 611 (E.D. Pa. 2007) (finding that a unilateral modification provision was unconscionable).
279. *See* Morrison v. Amway Corp., 517 F.3d 248 (5th Cir. 2008).

view the world around them. They are the access point for users' ability to see the data-enriched experiences that augment real places, people, and things.[280] The devices that control Mixed Reality experiences must be firmly in citizens' hands. Owners of Mixed Reality devices must be able to modify those devices in order to control the reality that they experience. The alternative is imaginable but unthinkable: just as Sony now claims that it has the sole right to control what players experience via its gaming console, on pain of criminal sanction and intellectual property infringement, so Mixed Reality providers would claim the ability to control the very reality that citizens experience and share.

C. RETURNING CONTROL OVER PRIVACY TO CONSUMERS

In the privacy context, a very simple but fundamental rebalancing of contract law as applied online will resolve many problems. Privacy is handled as a matter of contract under U.S. law.[281] That is not the problem. The problem is that the law of contract as applied online has denied consumers the power to draft contracts. Even in the strangest circumstances, courts enforce contracts written by corporations, including legal language contained on pages that the user has not even seen.

Yet that reasoning ought to cut both ways. Citizens—as parties to a contract—have as much of a right to add binding terms to a contract as corporations do.[282] If a consumer sets a "do not track" flag in her browser, courts should enforce it as a matter of contract law. Courts have long held that consumers "agree" to online contracts by continuing to use a website or online service.[283] It would be nonsensical not to apply the same logic to a

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280. *See* CHEN, *supra* note 6; Bilton, *supra* note 89; Glusac, *supra* note 17; Husson, *supra* note 89; King, *supra* note 22.

281. *See* News Release, Fed. Trade Comm'n, FTC Announces Settlement with Bankrupt Website, Toysmart.com, Regarding Alleged Privacy Policy Violations (July 21, 2000), http://www.ftc.gov/opa/2000/07/toysmart2.shtm (discussing the FTC's suit against Toysmart and the company's attempt to take action directly in violation of its privacy policy). Cases that have found otherwise only serve to emphasize the problem that lies in interpreting privacy as non-contractual. *See, e.g., In re* Jet Blue Airways Corp. Privacy Litigation, 379 F. Supp. 2d 299 (E.D.N.Y. 2005); Dyer v. Nw. Airlines Corp., 334 F. Supp. 2d 1196 (D.N.D. 2004). This does not, however, undermine the notion that the FTC still enforces privacy policies as promises to consumers.

282. *See* LESSIG, *supra* note 253; Feigin, *supra* note 259.

283. *See* Yen-Shyang Tseng, *Governing Virtual Worlds: Interration 2.0*, 35 WASH. U. J.L. & POL'Y 547, 556 (2011) ("Generally speaking, courts have tended to enforce all of these forms of licenses, even though the licenses may unilaterally impose one-sided terms with little to no room for negotiation.").

corporation: by continuing to provide service to a customer who has set a "do not track" flag, the corporation should be legally bound by that term.[284]

This proposal is of course not uncontroversial, but it exposes the poor reasoning underlying the law of online contracting.[285] Functionally speaking, under current law only corporations are allowed to draft online contracts. Citizens are only granted the pro-forma right to agree to pre-set corporate terms. Citizens are denied a voice in setting the terms under which their information is gathered.[286] It is this perverse state of affairs that we must correct before the law of online contracting can govern everyday life.

Giving consumers control does not mean that control should be complicated. To impose all of the transaction costs of privacy protection on consumers—the current state of affairs—is planned failure. In order for consumers to be able to express their preferences effectively, privacy controls must be simple, unitary (in one place, applicable to all counterparties), default, and legally enforceable.[287] Only under these circumstances will the transaction costs of private agreement over privacy be manageable for consumers. The alternatives are significantly less attractive: outright paternalistic government regulation on the one hand, or the current wild west of data protection on the other.

The advent of Mixed Reality technology makes this return to consumer control over personal data of significant importance. Consider the average smartphone, which comes pre-loaded with numerous apps, each of which has different permissions to track the consumer's real-world location, social network interactions, and even tap into the basic reality that the consumer is experiencing—what she is hearing and seeing.[288] Consumers must have control over their own reality, and this includes the ability to control their own information as it is propagated through these networks.

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284. *See* LESSIG, *supra* note 253; Feigin, *supra* 259.

285. *See, e.g.*, Woodrow Hartzog, *Website Design as Contract*, 60 AM. U. L. REV. 1635, 1662 (2011) (noting various problems with trying to achieve privacy by consumer contracting).

286. *See* Newman, *supra* note 232; Popkin, *supra* note 233.

287. *See* LESSIG, *supra* note 253; Feigin, *supra* note 259; *see also* Séverine Dusollier, *The Master's Tools v. The Master's House: Creative Commons v. Copyright*, 29 COLUM. J.L. & ARTS 271, 272 (2006) (discussing the purpose of Creative Commons to address the "recent expansion of copyright" and how it is "overreaching and detrimental both for future creators and for the users of copyrighted works"); *About the Licenses*, CREATIVE COMMONS, http://creative commons.org/licenses/ (last visited Feb. 19, 2012) (providing for a standard option set of contractual licenses that have revolutionized online exchanges).

288. *See* Yukari Iwatani Kane & Scott Thurm, *Your Apps Are Watching You*, WALL ST. J. (Dec. 17, 2010), http://on.wsj.com/wq7Wiw (describing how iPhone and Android transmit various data about the phone without the user's knowledge).

V. CONCLUSION

The proposals here are not exhaustive. Rather, they are examples of potential benefits to be gained through application of a method. That method involves applying the common law approach—reasoned, careful, limited, and iterative decision-making based on the closest legal analogy—in order to find potential solutions to emerging technological problems.[289]

Mixed reality tools are pushing intellectual property regimes into realspace. In some senses, this is nothing new. Books are real, and intellectual property governs our ability to copy them. But the law of intellectual property licensing online has drifted from its moorings. Offline, the law of copyright has generally been limited to restricting the ability of a buyer to make copies, perform unlicensed performances or screenings, or create non-parody derivative works. Not so online, where copyright law has the ability to control the social rules of multiple-million member online communities. Mixed Reality technology brings this online over-extension of copyright licensing back into everyday life.

As Mixed Reality merges virtual experiences with everyday life, there is a very real risk that courts will continue to draw on the law of online intellectual property licensing. The confluence of the judicial acceptance of pro forma corporate contracts coupled with the strength of contracts backed by out-of-proportion copyright infringement damages means that the law of online contracting and intellectual property licensing is a terrible fit for offline, everyday life.

In everyday life, when a consumer buys a car, the consumer expects to be able to paint it any color. Yet when a consumer buys a garage door, there is a non-trivial question of law as to whether the manufacturer of the garage door may force the consumer to buy new remote controls from only the garage door manufacturer. And when a consumer buys a Playstation 3, there are very real legal threats from Sony when the consumer modifies her own property and teaches others how to do the same.

This overextension of copyright licensing and online contracting law is undermining property rights in the real world, providing perverse incentives for online reputation purveyors to whitewash the reputations of network users, and burying consumers under thousands of differing privacy policies, many of which are not enforceable or which may be changed at any time by the software provider.

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289. *See* Perzanowski & Schultz, *supra* note 158; *see also* Moses, *supra* note 256, at 241.

But there is hope. This Article proposes applying simple rules evolved in the full context of real-world situations to merged virtual and real experiences. A consumer's property interest in her goods should permit her to make aftermarket modifications of her own property. A copyright holder's rights in a given copy should be exhausted when the copyright holder sells a given copy away, never mind that the transaction is spuriously characterized as a license. And history has shown that consumers not only want privacy but can enforce their preferences quite effectively. However, consumers must be granted simple, unitary, and default tools that permit them to have an active say in the information gathering regimes to which they are subject, rather than the option to pick which one of a set of corporate-drafted terms they may agree to.

As Mixed Reality merges virtual and real space, it provides serious challenges to law, but also offers serious hope. The law of intellectual property as applied to the real world is subject to traditional constraints that render it much less problematic than the unconstrained law of intellectual property as applied to Mixed Reality. The law of contracting in the real world grants both parties, not just corporations, the ability to contribute terms to the contract. Consumers actually can police their privacy quite effectively, if given simple, opt-in, and default options to do so. Mixed Reality opens the door to the application of common sense rules that have very effectively mediated the tensions between corporation and consumer, citizen and state. Mixed Reality need not be a dystopian vision. It may be the method by which we can restore balance to the law.