

Oregon
State
Bar

CLE
Seminars

Emerging Technologies— Charting the Future Course of the Law



*Cosponsored by the
Technology Law Section*

**Friday, October 12, 2018
9 a.m.–4:15 p.m.**

6.25 General CLE credits

SECTION PLANNERS

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SCHEDULE

8:00 Registration

8:45 Introduction and Welcome

9:00 An Insider's Perspective on the Internet of Things

- ◆ Overview of Intel's Internet of Things group and initiatives
- ◆ Connected cities, computer vision, industrial IOT
- ◆ Specific legal issues presented by the Internet of Things
- ◆ Data ownership and licensing

Doug Smith, *Intel Corporation, Hillsboro, OR*

10:00 Break

10:15 How Should the Law Think About Robots?

- ◆ What is a robot?
- ◆ How do robots work—and what's going on under the hood?
- ◆ What makes robots tricky from a legal perspective?
- ◆ Legislating robots—pitfalls to avoid and things to think about

Bill Smart, *Oregon State University, Corvallis, OR*

11:15 Virtual Law—Trends and Developments in Altered and Virtual Reality

- ◆ The rise of augmented, mixed, and virtual reality
- ◆ Extended reality (XR) and the legal landscape
- ◆ How XR is impacting enterprise, education, and entertainment

Brian Sommer, *IME Law, Seattle, WA*

12:00 Lunch

12:30 Social Media Privacy Status: It's Complicated

- ◆ Consumers' use of social media and privacy concerns
- ◆ Will social media networks moderate content or support regulation?
- ◆ Hot topics in social media and privacy

Katherine Campbell, *Oregon Department of Justice, Portland, OR*

Eva Novick, *Oregon Department of Justice, Portland, OR*

1:30 Big Data for Lawyers and Their Clients

- ◆ What is big data and how is it impacting the practice of law?
- ◆ What new legal issues are being created by the rise of big data?
- ◆ How can lawyers take advantage of big data to help their clients?

Darin Sands, *Lane Powell PC, Portland, OR*

2:15 Break

2:30 Autonomous Vehicles, the State of Oregon, and Future Mobility

- ◆ Automated vehicle development and testing in Oregon
- ◆ Creation of an ODOT task force to make recommendations to the Oregon legislature
- ◆ Task force initial recommendations

Andrew Dick, *Oregon Department of Transportation Office of Innovations, Salem, OR*

SCHEDULE (Continued)

3:15 Prognostications on the Response of the Law to Technological Advances

- ◆ Legislative
- ◆ Administrative
- ◆ Judicial

Charles Bowers, *Charles R. Bowers PC, Portland, OR*

Barbara Frederiksen-Cross, *Director of Litigation Services, Juris Logic LLC, Portland, OR*

John Grant, *Agile Attorney Network, Portland, OR*

4:15 Adjourn

FACULTY

Charles Bowers, *Charles R. Bowers PC, Portland, OR*. Charles R. Bowers PC is a boutique law firm that advises clients in the areas of business formation and operations, intellectual property protection and licensing, ecommerce and technology law, and data security and privacy law. Mr. Bowers is active in the Oregon State Bar Technology Law Section and has served two terms as the section's chair. Mr. Bowers has published several articles and is a frequent lecturer on topics related to computer and internet law and data security and privacy issues. Mr. Bowers is the founder of IDfra LLC, an organization dedicated to the development of a new identity infrastructure that preserves personal privacy while facilitating the exchange of measurably credible personal data.

Katherine Campbell, *Oregon Department of Justice, Portland, OR*. Ms. Campbell is an Assistant Attorney General at the Oregon Department of Justice, where she enforces the Unlawful Trade Practices Act (UTPA). As part of enforcing the UTPA, commonly known as Oregon's consumer protection law, Ms. Campbell handles privacy matters on various subjects. She regularly educates Oregon businesses and governments about their duty to provide reasonable security for Oregonians' data.

Andrew Dick, *Oregon Department of Transportation Office of Innovations, Salem, OR*. Mr. Dick serves as Connected, Automated, and Electric Vehicle Advisor to the Oregon Department of Transportation. In this role, he helps the agency track emerging transportation technologies and helps to plan for how new mobility options will affect agency responsibilities and the transportation system as a whole. He holds a Bachelor's degree in International Political Economy from Colorado College.

Barbara Frederiksen-Cross, *Director of Litigation Services, Juris Logic LLC, Portland, OR*. Ms. Frederiksen-Cross has over 44 years of experience as a software developer, systems administrator, and forensic software analyst. She has been accepted in state and federal courts as an expert in computer software design and development, the recovery, preservation, and analysis of computer-based evidence, and computer systems' capacity issues. Ms. Frederiksen-Cross provides forensic analysis for intellectual properties litigation and civil or criminal cases that involve computer-based evidence. Her services also include analysis in the context of internal software and data audits, technical due diligence, and internal investigations related to intrusions, employee behavior, and system malfunctions. She has experience with the analysis of event recorder data from computer systems, card key access systems, locomotives, robotic control systems, and flight data systems such as those used by unmanned aircraft. Ms. Frederiksen-Cross is a robotics enthusiast, whose robotics experience started in 1979, as a software developer for software used with fully automated "lights-out" warehousing and distribution systems. She has firsthand experience with building, programming, and testing robots in both commercial and hobbyist applications.

John Grant, *Agile Attorney Network, Portland, OR*. Mr. Grant is the founder of the Agile Attorney Network, a membership group of legal professionals who harness the tools of modern entrepreneurship to build more profitable, scalable, and sustainable practices. He also conducts facilitated strategy and process improvement workshops for law firms and legal teams. Mr. Grant is a member of the Oregon State Bar Board of Governors and cochaired its Futures Task Force. He also serves on the board of the Commons Law Center (a nonprofit law firm).

Eva Novick, *Oregon Department of Justice, Portland, OR*. Ms. Novick is an Assistant Attorney General in the Financial Fraud/Consumer Protection Section of the Oregon Department of Justice. She enforces the Unlawful Trade Practices Act (Oregon's consumer protection statute) against various industries, including the auto industry, marketing/advertising companies, retail stores, door-to-door sellers, debt collectors, and towers. She also works on topics that cross industries, including privacy, data breach, and data security. Ms. Novick has obtained hundreds of resolutions on behalf of the State of Oregon to stop unlawful conduct and return money to consumers in Oregon-only investigations and when working collaboratively with other state attorneys general and federal agencies. Ms. Novick educates businesses, governmental agencies, and state legislators about the Unlawful Trade Practices Act. She also has experience with the legislative process and rulemaking.

FACULTY (Continued)

Darin Sands, *Lane Powell PC, Portland, OR*. Mr. Sands resolves complex commercial disputes and advises clients on maximizing the value of data by helping to formulate efficient and effective data privacy and security strategies. He is a member of the International Association of Privacy Professionals, a member of the Sedona Conference Working Groups on Data Security and Privacy Liability (WG 11) and Electronic Document Retention and Production (WG 1), past chair and current executive committee member of the Oregon State Bar Antitrust, Trade Regulation section, chair-elect of the Federal Bar Association Antitrust Section, a member of the OSB Constitutional Law Section Executive Committee, and a member of the Multnomah Bar Association Judicial Selection Committee. Mr. Sands is admitted to practice law in Oregon, Washington, and California.

Bill Smart, *Oregon State University, Corvallis, OR*. Professor Smart is a professor in the College of Engineering at Oregon State University, associate director of the Collaborative Robotics and Intelligent Systems (CoRIS) Institute, and director of the graduate Robotics Program. He holds a Ph.D. and Sc.M. in Computer Science from Brown University, an M.Sc. in Intelligent Robotics from the University of Edinburgh, and a B.Sc. (hons) in Computer Science from the University of Dundee. His research interests span the areas of human-robot interaction, machine learning, long-term autonomy, and the intersection of robotics, policy, and the law.

Doug Smith, *Intel Corporation, Hillsboro, OR*. Mr. Smith is Managing Counsel to Intel's Internet of Things Group and a member of Intel's Technology Licensing and Data Analytics practice groups with significant experience in patent pools and standard-setting organizations, technology licensing, and business development. Mr. Smith has served in both financial management and in-house counsel roles to multiple Intel business units. He is a former member of the US Navy's Judge Advocate General's Corp. Mr. Smith is licensed to practice in Oregon and New York.

Brian Sommer, *IME Law, Seattle, WA*. Mr. Sommer is an interactive and immersive media attorney focused on the intersection of technology and entertainment at IME, a firm creating future-ready law in film, television, video games, augmented, mixed, and virtual reality, and artificial intelligence. He represents leading talent, creators, influencers, companies, and financiers focused on solutions for enterprise and entertainment. Mr. Sommer has represented immersive media clients in their negotiations with major virtual reality and augmented reality platforms, involving internationally recognized intellectual property assets and franchises. He also represents clients who are defining immersive solutions for entertainment and enterprise, including software developers, producers, directors, and critically acclaimed extended reality filmmakers and content creators.

Chapter 1

Presentation Slides: Internet of Things—An Insider's View

DOUG SMITH
Intel Corporation
Hillsboro, Oregon



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AGENDA

1. What IOT means at Intel
2. Deeper look at:
 - A. Computer Vision
 - B. Smart Cities
3. Specific legal issues
 - A. Publicly sourced data sets
 1. License terms
 2. Privacy
 - B. Private data sets
 - C. Using data
4. Q & A

IOT: TRANSFORMING THE WAY WE LIVE AND WORK



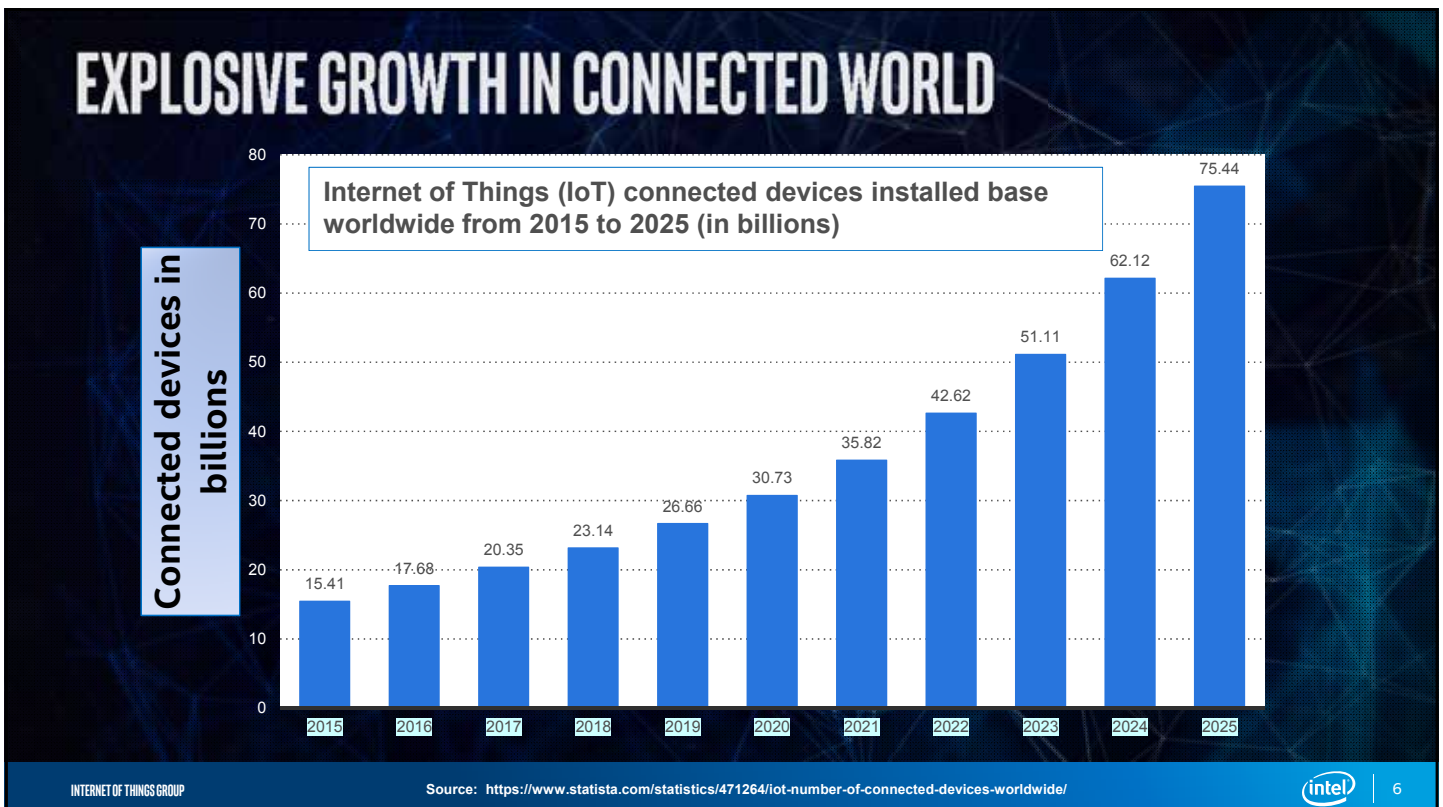
INTEL® TECHNOLOGY FOR THE IOT
IS CHANGING THE WAY PEOPLE LIVE AND WORK.

IOT: TRANSFORMING THE WAY WE LIVE AND WORK

SAVING LIVES IMPROVING QUALITY OF LIFE INCREASING MOBILITY INCREASING SECURITY

OPTIMIZING PRODUCTIVITY DRIVING EFFICIENCY LOWERING COST PROTECTING THE PLANET

INTERNET OF THINGS GROUP intel | 5



THE COMING FLOOD OF DATA AND VIDEO

BY 2020, 30B+ DEVICES AND 212B SENSORS

The average internet user will generate
~1.5 GB OF TRAFFIC PER DAY

Smart hospitals will generate over
3,000 GB PER DAY

Self driving cars will generate over
4,000 GB PER DAY... EACH

A connected plane will generate over
40,000 GB PER DAY

A connected factory will generate over
1,000,000 GB PER DAY



RADAR	~10-100 KB	PER SECOND
SONAR	~10-100 KB	PER SECOND
GPS	~50 KB	PER SECOND
LIDAR	~10-70 MB	PER SECOND
CAMERAS	~20-40 MB	PER SECOND
TOTAL	~4,000 GB	PER DAY

All numbers are approximated
<http://www.cisco.com/c/en/us/solutions/service-provider/vni-network-traffic-forecast/infographic.html>
http://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/Cloud_Index_White_Paper.html
<https://data100.com/news/self-driving-cars-cities-2-petabytes-per-minute/172>
http://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/Cloud_Index_White_Paper.html
http://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/Cloud_Index_White_Paper.html



3 PHASES OF IOT



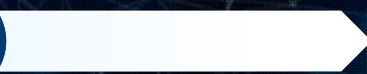
CONNECTED

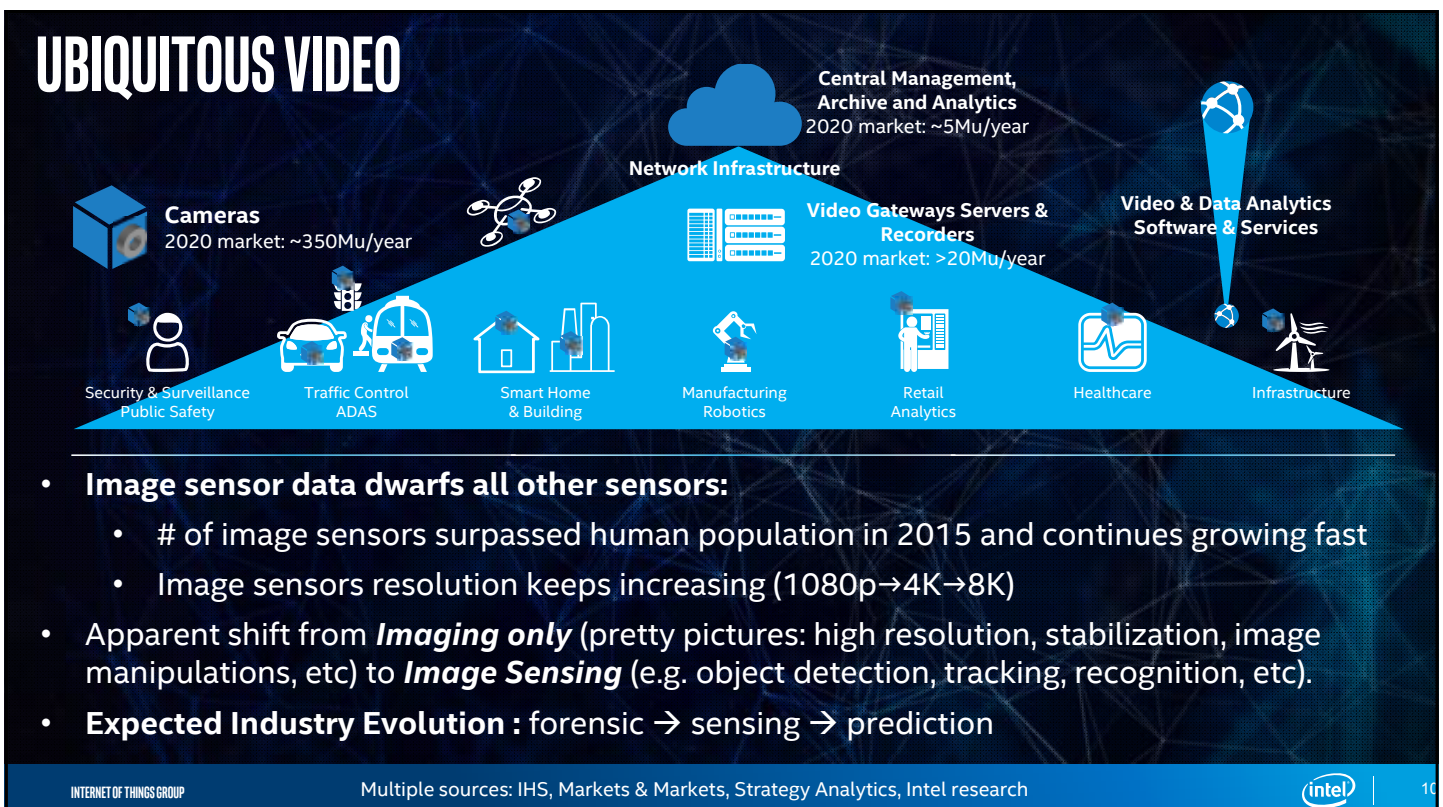
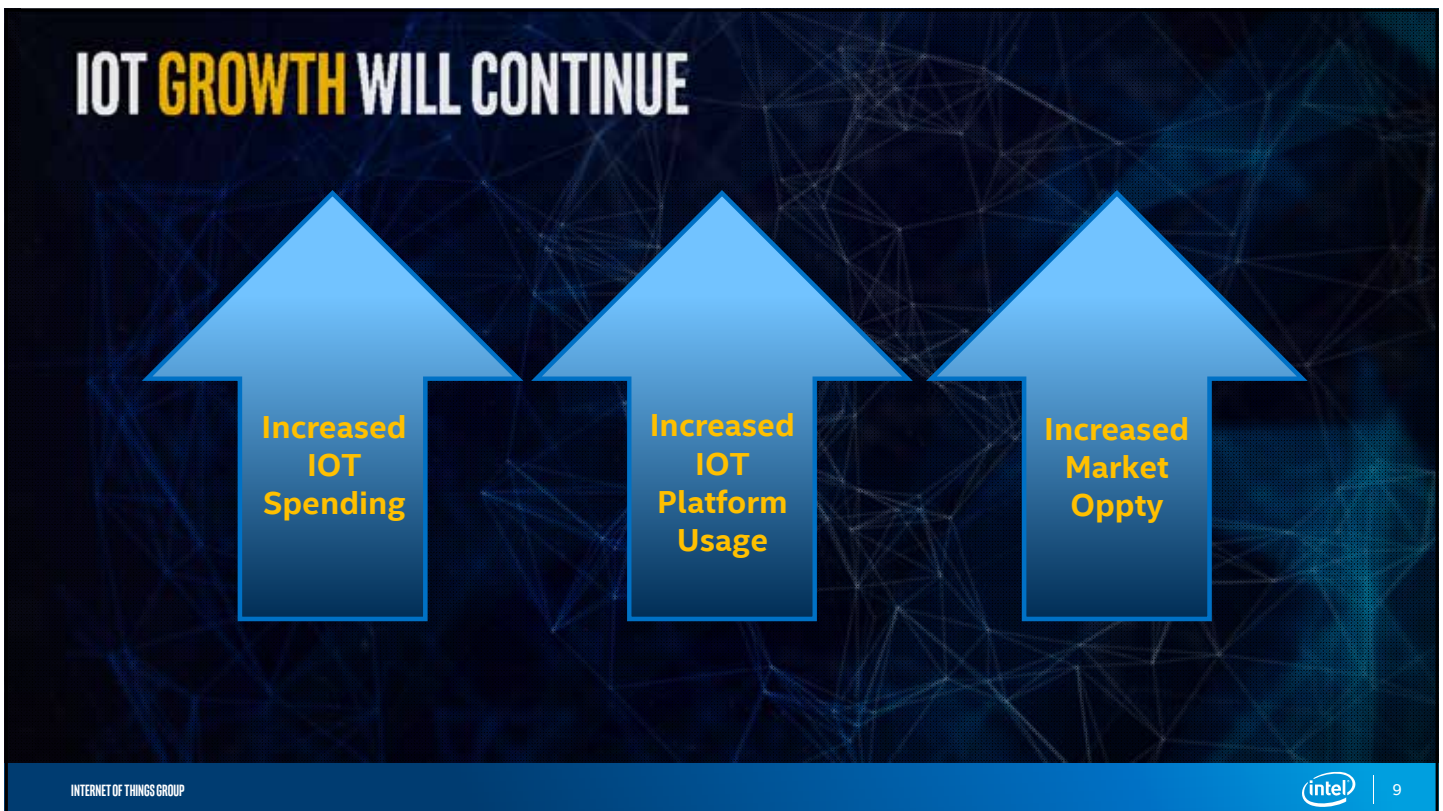


SMART



AUTONOMOUS





PRACTICAL COMPUTER VISION APPLICATIONS

Image Recognition:

- Face attributes (glasses, hair type/color, etc)
- People attributes (age, gender, cloth, etc)
- Car attributes (type, color, etc)

Object Detection:

- faces, people, cars, bicycles/motocycles, etc

Semantic/instance segmentation

Activity recognition



Gender	Male
Long Hair	-
Long Sleeves	+
Long Pants	+
Hat	-
Coat Jacket	-
Top color	Gray
Bottom color	Dark blue



Gender	Female
Long Hair	+
Long Sleeves	+
Long Pants	+
Hat	-
Coat Jacket	-
Top color	Black
Bottom color	Gray



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SMART CITIES - CUSTOMERS AND USE CASES BEYOND THE MUNICIPALITY



MUNICIPALITIES

Smart & connected outdoor lighting (+ video)
Safety, crowd management & people counting
Smart digital signage & smart kiosks
Air quality monitoring (PPB)



TRANSPORTATION

License plate recognition
Traffic density & counting analytics
Car collision & glass break audio solutions
Smart parking & charging stations



THEME PARKS & RESORTS

Improved customer experiences
Visitor analytics & interactive kiosks
Crowd management & facial recognition
Noise level and glass break detection
Smart parking & license plate recognition



STADIUMS

Visitor analytics & interactive kiosk
Crowd management & facial recognition
Noise level, glass break & gun shot detection
Smart parking & license plate recognition



Safety and Security

LAW ENFORCEMENT

Security & surveillance with CV and DL
Real time license plate & facial recognition
Noise level, glass break & gun shot detection
Portable video wearables for field agents



UNIVERSITY CAMPUS

Smart & connected outdoor lighting (+Video)
Smart digital signage & smart kiosks (interactive)
Smart parking solutions
Air quality monitoring (PPM)



AIRPORTS

Security & surveillance with CV and DL
Improved customer experiences
Glass break & gun shot detection
Smart traffic & parking solutions
Crowd management & facial recognition

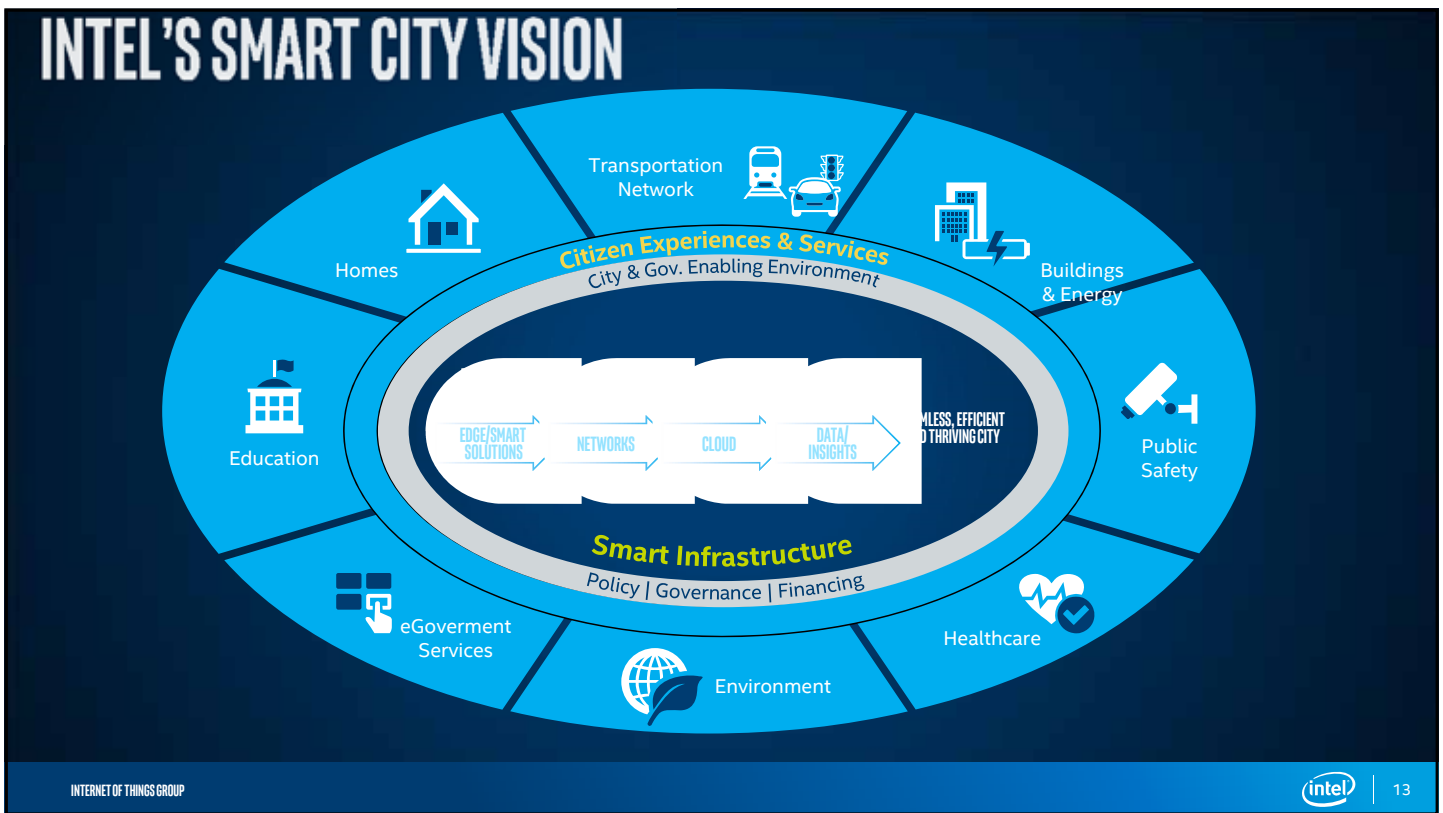


UTILITIES

Smart & connected outdoor lighting (+ video)
Traffic density & counting analytics
Air quality monitoring (PPB)
Smart Parking solutions

INTERNET OF THINGS GROUP

intel |



Inside Portland's Plan to Battle Traffic Deaths by Hanging 'Smartphones' on Street Lights

By [GLENN FLEISHMAN](#) June 18, 2018

The city announced today that a consortium under the City IQ banner of AT&T, Intel, and Current by GE will work with Portland General Electric to hang 200 “smartphones for municipalities,” as AT&T vice president of Internet of Things (IoT) Michael Zeto describes them.

This “Traffic Sensor Safety Project,” as the city dubs it, is part of [Smart City PDX](#). The same consortium is also at work deploying thousands of sensing devices in San Diego.

Zeto, the general manager of the company’s Smart Cities program, says that the devices combine cameras, microphones, and environmental sensors, which can identify pedestrians, cars, and cyclists, help pinpoint the location of gunshots, and sniff for pollutants. In Portland’s case, the focus in this pilot deployment focuses on traffic safety to help move towards the city’s Vision Zero goal, a global name for changes in traffic flow and management intended to reduce traffic impacts, accidents, and fatalities dramatically

With privacy a paramount concern, especially in a city like Portland—known for liberal policies and regular protests against government intrusion—the City IQ devices will retain no video. In fact, they won’t even pass video over a network. Instead, AT&T’s Zeto notes, they use onboard computer-vision software to identify objects and pass just that resulting analysis on.



A bicycle commuter rides past a Stumptown Coffee location on SE Division Street on October 6, 2015 in Portland, Oregon. Craig Mitchell/Dyer—Getty Images

It's hop harvest time: Here's how Rogue Farms, Intel keep fresh hops fresh on their journey

Safeguarding the freshness of perishable products is one of the primary benefits of Intel's Connected Logistics Platform, which uses smart sensors to monitor key environmental variables. An estimated 30 percent of all perishable products spoil before they complete the journey from farm to table. But now, shippers can check-on the health of their cargo at any step in the process, such as on board a trailer or in a warehouse. Companies like Rogue, who ship large quantities of perishable products, can now control storage conditions, as well as track shipments, in real-time.



<https://www.craftbrewingbusiness.com/ingredients-supplies/heres-how-rogue-farms-keeps-fresh-hops-fresh-on-their-journey/>

WHAT WE'RE LEARNING - COMPLEX LEGAL LANDSCAPE - INTELLECTUAL PROPERTY & PRIVACY

Many Questions

- Who owns?
- How and where acquired?
- License rights?
- Is there consent?
- Is there personal identifiable information?
- What is our intended usage?

Evolving Legal Landscape

- No clear case law on IP rights
- Potential trade secrets issues
- Possible clouds on ownership
- Currently evolving privacy law
- Technology localization laws

SOURCING DATA – PUBLICLY AVAILABLE DATA

Web crawling / web scraping

- Computer Fraud and Abuse Act
- Recent Case Law – HiQ v. LinkedIn, QVC v. Resultly LLC., Fidar Technologies v. LPS Real Estate Data Solutions, Inc.
- Copyright
 - Non commercial research?
 - Fair use?

Publicly available data sets

- Cloudy ownership
- Vague license terms
- Copyright

PUBLICLY AVAILABLE DATA – LICENSE EXAMPLE #1

CK and CK+ DATABASE USER AGREEMENT

I agree with following items.

- to cite Kanade, Cohn, & Tian (2000) and Lucey et al. (2010) in any paper of mine or my collaborators that makes any use of the database. The references are:
- to use the images for research purposes only.
- not to provide the images to second parties.
- if I reproduce images in electronic or print media, to use only those from the following subjects and include notice of copyright (©Jeffrey Cohn).

S52, S55, S74, S106, ... S124, S125, S130, S132 <http://www.consortium.ri.cmu.edu/ckagree/>

Citation

If you find this dataset useful, please cite this paper (and refer the data as SUN397, SUN2012, or SUN):

- "SUN Database: Large-scale Scene Recognition from Abbey to Zoo". J. Xiao, J. Hays, K. Ehinger, A. Oliva, and A. Torralba. IEEE Conference on Computer Vision and Pattern Recognition, 2010.

To know more about the object annotation process (and the annotator), check this technical note:

- "Notes on image annotation". A. Barriuso and A. Torralba. arXiv:1210.3448 [cs.CV] (unreferred).

<http://groups.csail.mit.edu/vision/SUN/>

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1. **Researcher shall use the Database only for non-commercial research and educational purposes.**
2. Princeton University and Stanford University make no representations or warranties regarding the Database, including but not limited to warranties of non-infringement or fitness for a particular purpose.
3. Researcher accepts full responsibility for his or her use of the Database and shall defend and indemnify the ImageNet team, Princeton University, and Stanford University, including their employees, Trustees, officers and agents, against any and all claims arising from Researcher's use of the Database, including but not limited to Researcher's use of any copies of copyrighted images that he or she may create from the Database.
6. **If Researcher is employed by a for-profit, commercial entity, Researcher's employer shall also be bound by these terms and conditions,** and Researcher hereby represents that he or she is fully authorized to enter into this agreement on behalf of such employer.

PRIVACY CONSIDERATIONS

- The General Data Protection Regulation 2016/679
- China Cybersecurity Law (2016) Criminal Law (Revised August 2015)
- (740 ILCS § 14) Biometric Information Privacy Act
- BUS & COM § 503.001. Capture or Use of Biometric Identifier
- The California Consumer Privacy Act of 2018
- Oregon??



California Consumer Privacy Act

Mark Zuckerberg spent more than \$30 million buying up four neighboring houses in an effort to protect HIS privacy. Ask Mark why he's spending money to fight the Privacy Act when he obviously wants to protect his own!

SOURCING DATA - PRIVATE DATA

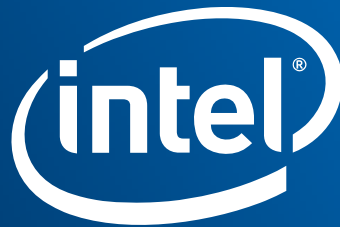
Private sourcing

- Data aggregators
 - Personal Information
 - Consent
 - Local laws
- Self generated
 - Privacy and Consent
 - Ethical and reputational risk
- Partnerships

USING DATA

- Data ownership and protection
- Collaborations – trade secret licensing and usage issues
- Export Control – Russia, China
- Reputational risk
- **Privacy**

Q&A



Chapter 2

How Should the Law Think About Robots?

BILL SMART

Oregon State University
Corvallis, Oregon

Contents

Presentation Slides: How Should the Law Think About Robots?	2-1
Neil M. Richards and William D. Smart, "How Should the Law Think About Robots?" (Preliminary Draft).	2-23

How Should the Law Think About Robots?

Bill Smart
Oregon State University



Disclaimer

I am Not a Lawyer

This Talk

How New Laws are Formed

Analogies, Metaphors, and Robots

The Robots are Here!

A Battle Plan

How New Laws are Formed



[imdb.com]

[carstuffshow.com] [autoblog.com]

Metaphors Matter

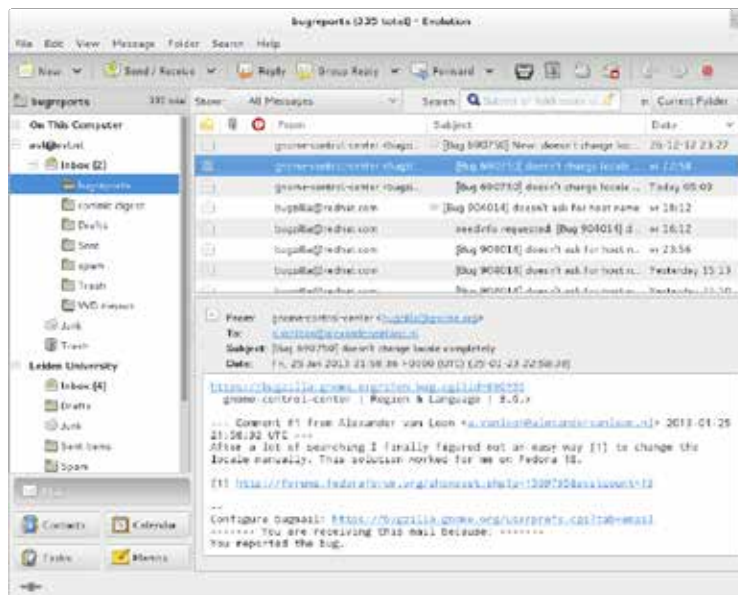


“music library”

or

“record store”

“Internet Messages”



[wikipedia.org]

“Internet Messages”

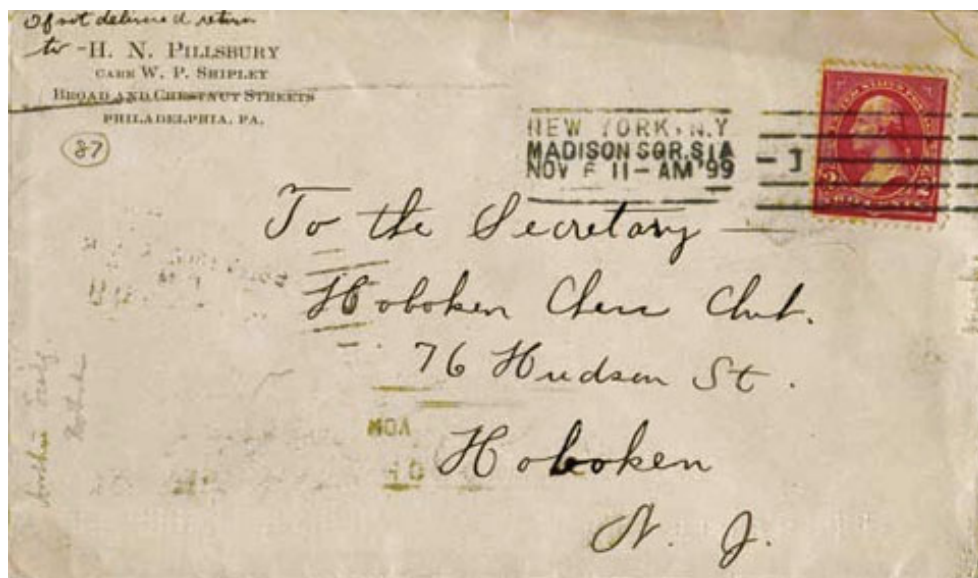


[pixgood.com]



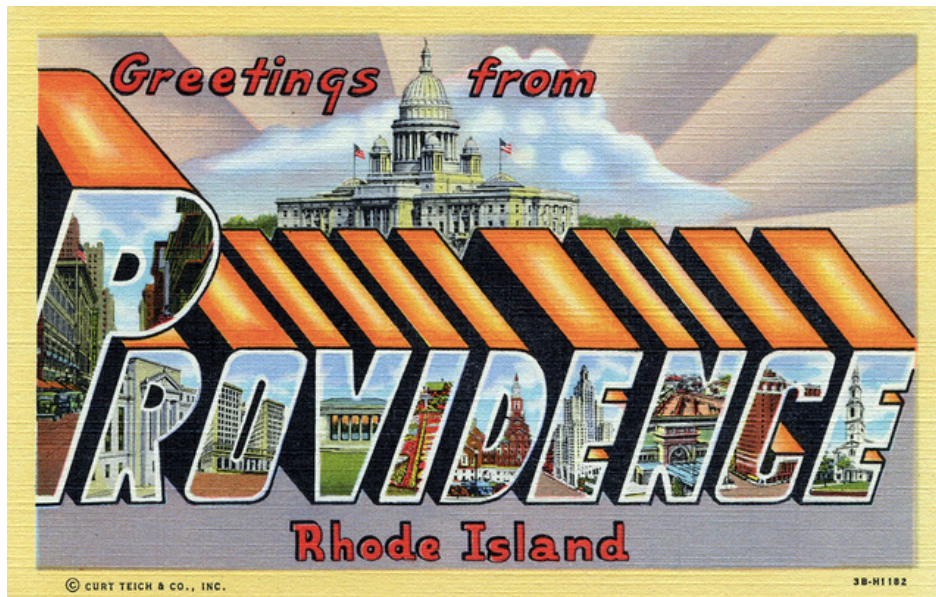
[Bettman/CORBIS]

Analogy 1: A Letter



[m.chessbase.com]

Analogy 2: A Postcard



[rutgersclassic.com]

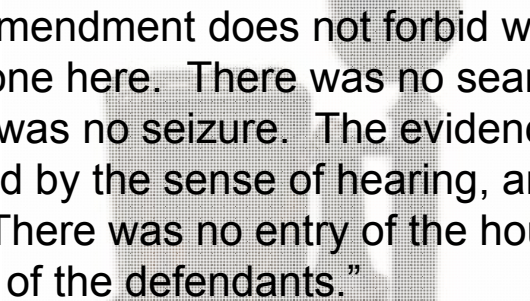
Privacy Expectations in Email



[cywalter.com]

[feld.com]

Breaking Implicit Assumptions



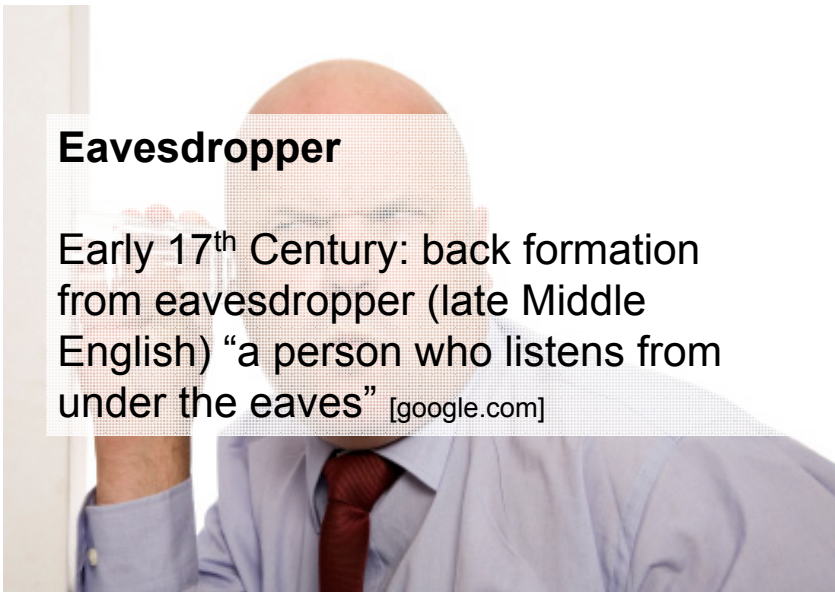
“The amendment does not forbid what was done here. There was no searching. There was no seizure. The evidence was secured by the sense of hearing, and that only. There was no entry of the houses or offices of the defendants.”

Chief Justice Taft, writing for the court

[neh.gov]

Technology Breaks Assumptions

Eavesdropper



Early 17th Century: back formation from eavesdropper (late Middle English) “a person who listens from under the eaves” [google.com]

[pathwaysinternational.com]

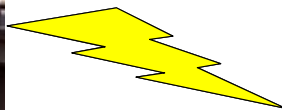
Analogy, Metaphor, and Robots



dreamstime.com

[dreamstime.com]

Robots Shatter Assumptions



[about-salary.com]

[hri.informatik.uni-freiburg.de]

An Example



[asme.org]



bad metaphors

bad analogies

bad laws

robotics and society
harmed

Robots Invite Anthropomorphism



[Disney/Pixar]

And, We Want to Believe

<https://www.youtube.com/watch?v=VTNmLt7QX8E>

[Heider & Simmel, 1944]

We Really, Really Want to Believe

How Should the Law Think About Robots?

Bill Smart
Oregon State University

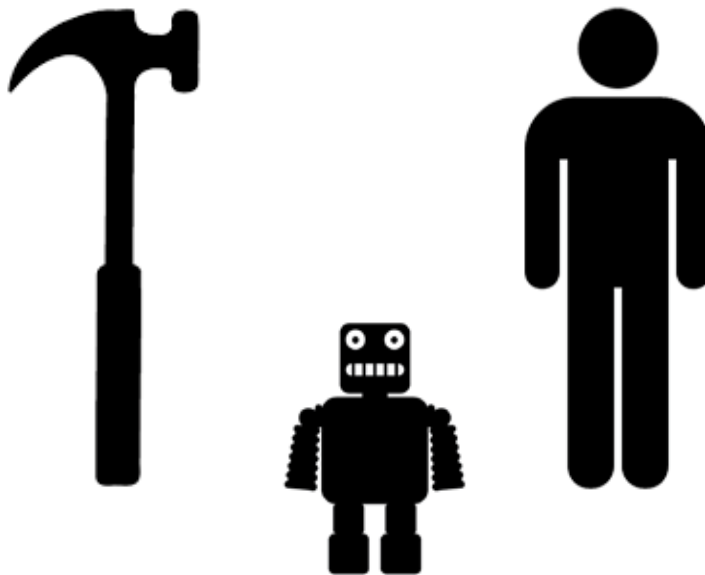


Robots Are Weird

“Any sufficiently advanced robot technology is indistinguishable from anima.”

(with apologies to Arthur C. Clarke)

The Old Models Don't Fit



[clker.com]

[41orchard.com]

[austinclean.com]

Casual Metaphors

“The robot saw the table and
didn't want to hit it,
but it wasn't able to avoid it.”

Tool or Accomplice?

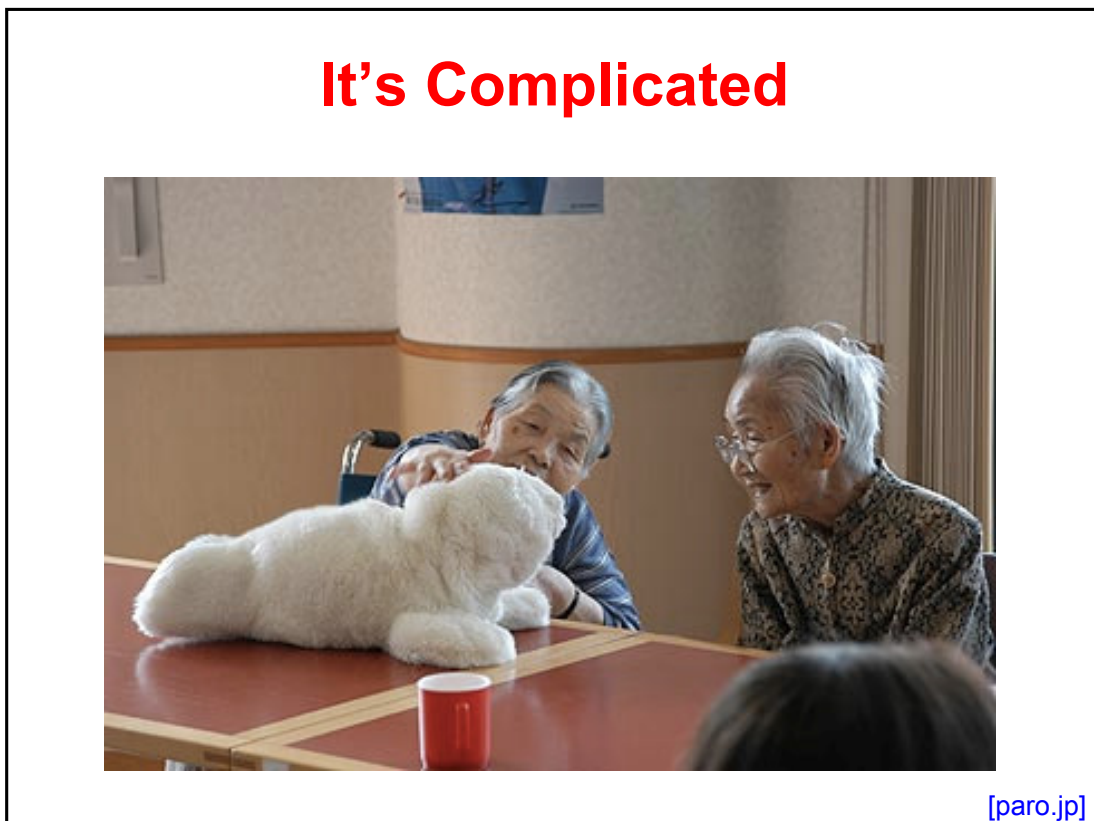
The robot didn't want to crush him,
but he got in the way.

The hammer didn't want to crush him,
but he got in the way.

It's Alive!



[\[rockpapershotgun.com\]](http://rockpapershotgun.com)



It's Complicated



The Android Fallacy



ceci n'est pas un marteau

[with Neil Richards]

Self-Driving or Autonomous?

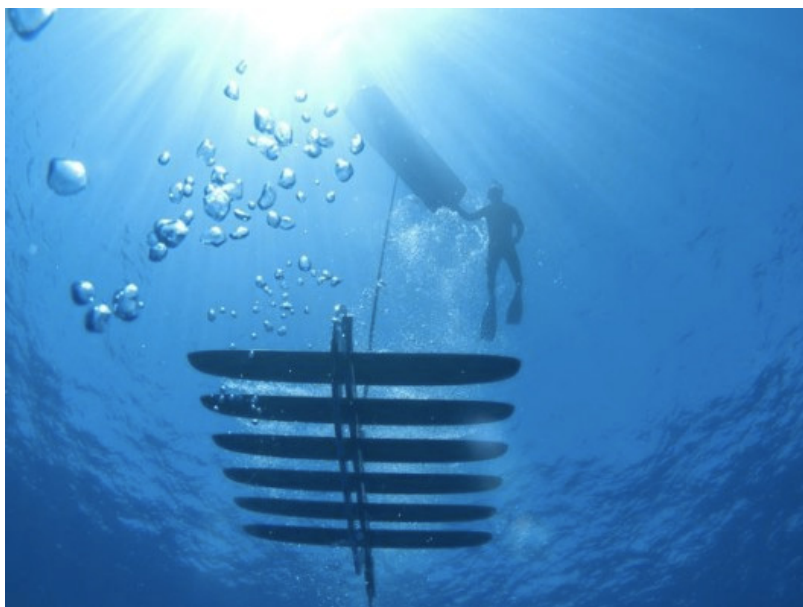


[thedrive.com]



[theregister.co.uk]

Tethered Ocean Gliders



[gizmag.com]

Shooting Down Drones

[Self Defence Against Drones, Froomkin & Colangelo, We Robot 2014]



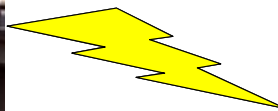
[Game of Drones Aerial Sports League]

The Robot Uprising



[yahoo.com]

Remote Physical Work



[about-salary.com]

[hri.informatik.uni-freiburg.de]

Automating Law Enforcement

[A Conservation Theory of Governance for Automated Law Enforcement, Hartzog, Shay, & Franks, We Robot 2014]



[thecarconnection.com]

Automating Crime



[Mediengruppe Bitnik]

Trying to Avoid Bad Laws: A Battle Plan



[comicbookcovers.tumblr.com]

Think About it Now

Learn from cyberlaw [\[Robotics and the Lessons of Cyberlaw, Calo, California Law Review, 2015\]](#)

Propose new, appropriate bodies

- A Federal Robotics Commission? [\[Calo, 2014\]](#)

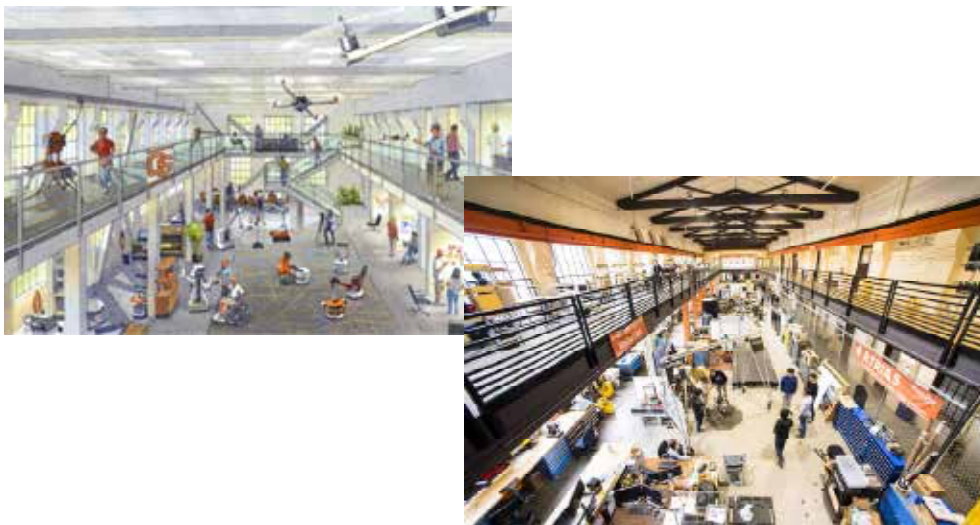
Have technologists talk to stakeholders

- like this

Avoid the Android Fallacy

Be clear about the technology, its limitations,
and the surrounding context

Think of OSU as a Resource



<http://robotics.oregonstate.edu>

Come to We Robot 2019



WE ROBOT!

April 11 – 13, 2019
UNIVERSITY OF MIAMI SCHOOL OF LAW

<https://robots.law.miami.edu/2019/>

Thanks

Neil Richards
Washington University School of Law

Everyone from the We Robot conferences

Questions?

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How should the law think about robots?

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The robots are coming. We don't mean this in a scary, apocalyptic way, like in *The Terminator* or *Battlestar Galactica*, or in a tongue-in-cheek way, like in the Flight of the Conchords song "The Humans are Dead."¹ What we mean is this: Robots and robotic technologies are now mature enough to leave the research lab and come to the consumer market in large numbers. Some of them are already among us, like Rumbas, robotic carers in hospitals, drones used by military and law enforcement, and the prototype self-driving cars that have

¹ Flight of the Conchords, The Humans Are Dead ("It is the distant future, the year 2000. The world is very different ever since the robot uprising of the late 90s. There have been some major changes....All human life has been eradicated. Finally, robotic beings rule the world.").

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started to appear on our roads.² These early technologies are just the start, and we might soon be witnessing a personal robotics revolution. These systems have the potential to revolutionize our daily lives and to transform our world in ways even more profound than broad access to the Internet and mobile phones have done over the past two decades. We need to be ready for them and, in particular, we need to think about them in the right way so that the lawmakers can craft better rules for them, and engineers can design them in ways that protect the values our society holds dear. But how should we do this?

This essay is an attempt to think through some of the conceptual issues surrounding law, robots and robotics, to sketch out some of their implications. It draws on our experience as a cyberlaw scholar and a roboticist to attempt an interdisciplinary first cut at some of the legal and technological issues we will face. Our paper is thus analogous to some of the first generation cyberlaw scholarship that sketched out many of the basics of the field, even before the field itself was a recognized one.³ Our work (as well as the larger project of law

² Tom Vanderbilt, *Let the Robot Drive: The Autonomous Car of the Future is Here*, *Wired* Jan. 20, 2012..

³ E.g., M. Ethan Katsh, *Software Worlds and the First Amendment: Virtual Doorkeepers in Cyberspace*, 1996 U. Chi. L. F. 335, 348–54 (1996); Joel R. Reidenberg, *Governing Networks and Rule-Making in Cyberspace*, 45 *Emory L.J.* 911, 917–20; David R. Johnson & David Post, *Law and Borders — The Rise of Law in Cyberspace*, 48 *Stan. L. Rev.* 1367, 1375 (1996); David Kushner, *The Communications Decency Act and the Indecent Indecency Spectacle*, 19 *Hast. Comm. & Ent. L.J.* 87, 131 (1996); David G. Post, *Anarchy, State, and the Internet: An Essay on Law-Making in Cyberspace*, 1995 *J. Online L.* art. 3, 12–17 (1995); Lawrence Lessig, *The Zones of Cyberspace*, 48 *Stan. L. Rev.* 1403, 1403 (1996); Frank H. Easterbrook, *Cyberspace and the Law of the Horse*, 1996 *U. Chi. L. Forum* 207; Lawrence Lessig, *The Law of the Horse: What Cyberlaw Might Teach*, 113 *Harv. L. Rev.* 501, 1999; Jerry Kang, *Information Privacy in Cyberspace Transactions*, 50 *STAN. L. REV.* 1193, 1198–99 (1998); Lawrence Lessig, *Code and Other Laws of Cyberspace* (2000); , For an overview of more of this scholarship, along with a history of the development of the Internet, See Raphael Cohen-Almogor, *Internet History*, 2 *Int'l J. Technoethics*, Apr.-June 2011, available at <http://www.hull.ac.uk/rca/docs/articles/internet-history.pdf>.

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and robotics that is just getting started) has one great advantage over that earlier cyberlaw work: it has the benefit of the cyberlaw project's wisdom of two decades of thoughtful analysis of the relationship between legal and technological norms in a period of revolutionary change. Cyberlaw can provide the blueprint for law and robotics, in both its successes and its challenges.

In this essay, we would like to advance four claims about the ways we, as scholars and as a society, should approach this problem. First, we offer a definition of robots as *non-biological autonomous agents* that we think captures the essence of the regulatory and technological challenges that robots present, and which could usefully be the basis of regulation. Second, we briefly explore the sometimes surprisingly advanced capabilities of robots today, and project what robots might be able to do over the next decade or so. Third, we argue that the nascent project of law and robotics should look to the experience of cyber-law, which has struggled instructively of the problems of new digital technologies for almost two decades. This experience has revealed one particularly important lesson: when thinking about new technologies in legal terms, the metaphors we use to understand them are crucially important. Lawyers are used to understanding legal subjects metaphorically, especially in developing areas of the law like new technologies. If we get the metaphors wrong for robots, the lessons of cyber-law reveal that it could have potentially disastrous consequences. Finally, we argue that one particularly seductive metaphor for robots should be rejected at all costs, the idea that robots are “just like people” and that there is a meaningful difference between humanoid and non-humanoid robots. We call this idea “the Android Fallacy.”

1. What is a Robot?

Before we can think about these systems, we need to have a clear understanding of what we mean by “robot”. The word itself comes from a Czech play from the 1920s, entitled

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“R.U.R. (Rossum’s Universal Robots)”, by Karel Čapek.⁴ In the play, the “robots” are artificial humans used as slave labor in a factory (“roboti” in Czech translates to “serf labor,” with the associated connotations of servitude and drudgery). The term “roboticist”, one who studies or creates robots, was coined by Isaac Asimov in 1941.⁵ Even the etymology of the word suggests a device that is well-suited for work that is too dull, dirty, or dangerous for (real) humans.

So what is a robot? For the vast majority of the general public (and we include most legal scholars in this category), the answer to this question is inescapably informed by what they see in movies and, to a lesser extent, in literature and the popular science press. When asked what a robot is, they will generally give an example from a movie: Wall-E, R2-D2, and C-3PO are popular choices. Older respondents might also mention The Terminator or Johnny-5. Movie buffs will often mention Huey, Louie, and Dewie (from *Silent Running*), the false Maria (from *Metropolis*), the gunslinger (from *Westworld*), and an increasingly esoteric list of others. These are all clearly robots: they are all mechanisms, built from mechanical parts by humans (or other robots) to perform a specific dull, dirty, or dangerous job. They are all also anthropomorphic, or easy to anthropomorphize. R2-D2 is not human-like, but it is clear when “he” is “happy” or “irritated.” Movie robots are plot devices, and work best when we can project human-like qualities (or the lack of them, in the case of *The Terminator*)⁶ on them.

What about the less clear cases? HAL 9000 (from *2001: A Space Odyssey*) was an intelligent computer that controlled a large spaceship. In many senses, the ship was HAL’s “body”. Was HAL a robot? It could certainly move about and manipulate things in its world, two features that we expect of a

⁴ “R.U.R. (Rossum’s Universal Robots)”, Karel Čapek, 1920. Translated by Paul Selver and Nigel Playfair, 2001. Dover Publications.

⁵ “Liar!”, Isaac Asimov. In *Astounding Science Fiction*, May 1941. Reprinted in “I, Robot” (1950).

⁶ Of course, later Terminator movies explore the humanity of even these machines. The conclusion of *Terminator 2: Judgment Day* revolves around a copy of Arnold Schwarzenegger’s now-obsolete model from the first film consciously sacrificing himself in order to save humanity.

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robot. What about the replicants from *Blade Runner*, Cylons from *Battlestar Galactica* (2005), and Bishop the “synthetic person” from *Aliens*? They are human in appearance, but constructed from organic material, not metal. Do they meet our criteria for being a robot?

Even professional roboticists do not have a single clear definition. Arms that assemble cars, tele-operated submarines that explore the ocean depths, space probes hurtling through the void, remote-control cars augmented with little computers and sensors, and human-like androids all fall under the definition of “robot”, depending on who you ask.

So how do we usefully define a “robot” for the purposes of this paper? In most of the examples above, the robots can move about their world and affect it, often by manipulating objects. They behave intelligently when interacting with the world. They are also constructed by humans. These traits are, to us, the hallmarks of a robot. We propose the following working definition:

A robot is a constructed system that displays both physical and mental agency, but is not alive in the biological sense.

That is to say, a robot is something manufactured that moves about the world, seems to make rational decisions about what to do, and is a machine. It is important to note that the ascription of agency is subjective: the system must only *appear* to have agency to an external observer to meet our criteria.⁷ In addition, our definition excludes wholly software-based artificial intelligences that exert no agency in the physical world.

Our definition intentionally leaves open the mechanism that causes the apparent agency. The system can be controlled

⁷ This external ascription of agency is similar in spirit to the classic Turing test, where an external observer tries to identify a conversational partner, using what amounts to an Instant Messaging system, as either a human or a computer. A computer is said to have passed the Turing test if it causes the observer to reliably classify it as another human. While this is often seen as an intelligent test and a measure of artificial intelligence, it is more correctly thought of as a test of human-ness.

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by clever computer software, or teleoperated by a remote human operator. While both of these systems are robots by our definition, the legislative implications for each of them are quite different, as we argue below.

2. What Can Robots Do?

Now that we have a definition of what robot is, we turn to what robots can do today. Since many of us are informed by movies, sound-bite media, and other unreliable sources, we are often poorly-informed about what state-of-the-art robots look like and what they can do right now. Robots have not yet reached the levels of capability the public associates with science fiction, but they are surprisingly close.

Until recently, the majority of "robots" in the world, over a million by some counts,⁸ were the industrial automatons that assemble cars, move heavy parts, and otherwise make factory workers' jobs easier. These are, for the purposes of this paper and by our definition above not really robots; although they certainly have physical agency, they have no mental agency. Most of these systems perform set motions over and over, without regard for what is happening in the world. Spot-welding robots will continue to spot-weld even if there is no car chassis in front of them.

But "robots" within our definition do exist today. The most common robot in the world is now the iRobot Roomba (*see Fig. 1*), a small robot that can autonomously vacuum-clean your house. iRobot claims to have sold over 6 million of Roombas as of the end of 2010.⁹ The number is certainly larger now, a year and a half later. These little critters *are* robots by our definition; they have both physical and mental agency. The computer algorithms that control them are simple, but they appear to make rational decisions as the scoot around the floor avoiding objects and entertaining your cat. The Roomba is fully autonomous, and needs no human assistance, despite operating in a cluttered real-world environment (your house); this is a more impressive

⁸ International Federation of Robotics web site,
<http://www.ifr.org/industrial-robots/statistics/>

⁹ Transcript of iRobot Q4 2010 Earnings Call,
<http://seekingalpha.com/article/252090-irobot-ceo-discusses-q4-2010-results-earnings-call-transcript>

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achievement than one might think, especially given these inexpensive robots are available to consumers for only a few hundred dollars, depending on model.



Fig. 1: iRobot Roomba [iRobot Corporation].

Other more expensive robots are seeing heavy use in military settings all over the world. Cruise missiles, which meet our definition of robot,¹⁰ have been used for many years by the United States military, and by other countries. More recently, remote-controlled drone aircraft, many of which we classify as robots, have seen heavy use in intelligence-gathering and offensive roles. Ground-based tele-operated robots, such as the Packbot (iRobot) (*see Fig. 2*) and the Talon (Foster-Miller) are becoming ubiquitous in modern military settings. These systems can replace human soldiers in dangerous situations: disabling a bomb, performing reconnaissance under fire, or leading the assault on a building. Based on extrapolations of earlier sales figures¹¹ for a single type of these ground robots, it is reasonable to estimate that

¹⁰ The cruise missile clearly has physical agency, since it moves. It also has mental agency, to an external observer, since it can avoid terrain features while flying close to the ground. While this is done using a detailed map and a GPS device in modern missiles, the mechanism is unimportant to our definition. It is, of course, not capable of avoiding obstacles not in its map. However, it will rarely encounter such obstacles, to the external observer will not get to see this failure of apparent agency.

¹¹ “iRobot Delivers 3,000th Packbot”, Robotics Trends, <http://www.webcitation.org/5xPANQOLV>

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there are 10,000 such systems currently in use worldwide, in both military and civilian roles. These robots can drive around under remote control, often have an arm that can pick up and manipulate objects, and have a suite of sensors that relay data back to the operator. While they are completely controlled by a human operator, and currently have no autonomous capabilities, they often look intelligent to an external observer (who might be unaware that there is a human pulling the strings).



Fig. 2: iRobot Packbot [iRobot Corporation].

NASA has a long history of sending robots into space and to other worlds. The most successful recent examples are probably the Mars Exploration Rovers, Spirit and Opportunity (*see Fig. 3*). These were sent to Mars in 2003, and although no communication has been received from Spirit since March 2010, Opportunity is still operational after nine years on the surface. The rovers are *mixed initiative* or *shared autonomy* systems; they receive high-level instructions from human operators (“go over to that boulder”), but are responsible for their own low-level behavior (avoiding obstacles, for instance).

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Fig. 3: A Mars Exploration Rover [NASA].

Finally, autonomous warehouse robots, designed by Kiva Systems, now help humans fulfill orders for several on-line retailers, including Zappos and Amazon.com (who recently acquired Kiva Systems for \$775 million¹²). These robots bring whole racks of merchandise to a human who selects the appropriate items for a given order, and puts them in a shipping box. The robots are centrally-coordinated by the inventory system, and operate autonomously. The robots have no on-board sensors, and rely on wires embedded in the factory floor to determine their location. However, they certainly seem to have their own mental agency as they avoid each other and reconfigure the storage locations of items in the warehouse based on customer demand. (See Fig. 4).



Fig. 4: The Kiva Automated warehouse system [Kiva Systems].

While not an exhaustive list of robots currently being used in the world, the above examples are representative of

¹² <http://www.reuters.com/article/2012/03/19/us-amazoncom-idUSBRE82111720120319>

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how robots are being used today. There are several common threads that run through each of these examples. In the cases where the robots are autonomous, the task is very well-constrained and the autonomy is at a relatively low level (avoiding things, as opposed to deciding who is an enemy on the battlefield). In several cases, there is no autonomy, and the robots are physical and perceptual extensions of remote operators. In the military setting, this is partly to the chain-of-command is respected and that responsibility for any given action rests with a human within this chain. However, it is also partly because, for many of the complex problems we encounter in the real world, we cannot yet build autonomous systems that can perform well. Finally, none of these systems interact directly with humans, other than their operator.¹³ In fact, humans are often intentionally kept away from the robots, as has been the norm with industrial automation for over 60 years. The only exception in our list is the Roomba. However, when it interacts with you, it does so in the same way that it interacts with a table; the robot does not differentiate a human obstacle from a non-human one.

So much for robots that are actually in use. What can robots do in the research lab today? This is a more interesting list, since it suggests what robots will be doing in the real world in the coming years. A Google search for “cool robot video” uncovers over 31 million hits: robots dancing, climbing, swimming, jumping, folding towels, and fetching beer. Robots interacting with people, asking them questions and guiding them through shopping malls. Flying robot quadcopters¹⁴ performing breathtaking acrobatics. Robots making cakes, cookies, pancakes, and full Bavarian breakfasts. Robots building maps and models of the world. The list seems almost endless. The vast majority of these videos come from research labs, either in academia or industry, and generally showcase some interesting new technical advance. For example, endowing a robot with the dexterity to control a tool with precision and to apply just the right amount of force is an important problem. Stirring a cake mixture with a wooden spoon until it is just the right consistency is a great test and

¹³ At least they do not interact with humans who are likely to care about the legislative and consumer protections that apply to the robots.

¹⁴ Small robot helicopters with 4 rotors, favored for their stability.

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demonstration of this dexterity. Plus, it results in cakes that the graduate students can eat.

While it is impossible for us to briefly survey all of the current research going on worldwide, we can highlight some common themes that seem to be emerging. First, many research robots are now multi-purpose, rather than being designed for a single task in the way that many of the systems above are. For example, the PR2 robot from Willow Garage¹⁵ appears in many videos, performing a variety of tasks. (See Fig. 5). Second, robots are starting to interact with people who do not know anything about robots. They no longer need to be accompanied by a graduate student escort, who has traditionally acted as a minder, interpreter, mechanic, and bodyguard. People with no experience of robots are now encountering and collaborating with them directly. While this is necessary if we are to fulfil the long-term potential of the technology, it also complicates matters hugely. Humans are unpredictable, easy to damage, and hard to please; a lot of research is currently aimed at allowing robots to deal with them gracefully and safely. Third, they are becoming more and more autonomous, as we solve the underlying technical challenges of perception and reasoning. Finally, there is an increasing focus on robots that work in the real world, not just in the lab. This requires us to deal with all of the uncertainty and unpredictability inherent in world in which we live.



*Fig. 5: The PR2 research robot
[Willow Garage, Inc.].*

¹⁵ <http://www.willowgarage.com/pr2/>

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These research robots are starting to make the transition into the real (or, at least, commercial) world. Google has a fleet of self-driving cars that have traveled more than 150,000 miles on the US road system without incident. (See *Fig. 6*). Robots used as therapeutic aids are available, and quickly becoming more widespread.¹⁶ Robots are being evaluated as assistants in the homes of individuals with severe motor disabilities.¹⁷ These trends will only accelerate in the coming years. More and more robots will enter our daily lives in the coming decade, and it is likely that many people will own a (useful) personal robot by 2022. This appearance of robots will drive a number of legislative challenges.



Fig. 6: A Google driverless car [Google].

As robots become more and more multi-purpose, it will be harder to imagine *a priori* how they will be used and, thus, harder to create comprehensive legislative and consumer protections for them. In the extreme (and very far-future) case of a robot that can do everything a human can, there are few practical boundaries on what the robot can be used for. How does one legislate such a system? No other devices are like it, meaning we must come up with suitable analogies and metaphors, which, we claim, will be tricky.

As robots enter public life and our private homes,, the protections associated with them must be more comprehensive and robust than those currently in place for research robots. Most research robots come with many warnings and disclaimers, and rely on the users (who are trained professionals) not to do anything stupid. This is simply

¹⁶ Paro therapeutic robot, <http://www.parorobots.com/>

¹⁷ Robots for Humanity Project,
<http://www.willowgarage.com/blog/2011/07/13/robots-humanity>

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not practical for the general public, since they have to technical training, and cannot be relied on to exercise good judgement and caution.

As robots become more autonomous, the question of where liability rests when something goes wrong is complicated. Is it the manufacturer, the programmer, the user (who gave a bad instruction), or some combination of them all? The matter will be complicated in systems that are autonomous some of the time and tele-operated at other times, since this introduces a remote operator who might be controlling the robot in good faith, but with limited sensory information.

As robots enter the real world, our ability to predict what will happen decreases dramatically. Uneven floor surfaces, unexpected obstacles, small children, and a host of other factors make controlling the robot safely hard, and designing legislation that is comprehensive but does not overly constrain the use of the systems will be challenging.

3. Robo-Law and Cyber-Law

The sheer variety of applications that robots can and will be used for will thus put pressure on the legal system in a wide variety of substantive areas, including tort, contract consumer protection, privacy, and constitutional law, among others. Although robotic technologies will inevitably raise multiple novel legal questions, legal understandings of robots and how to think of them are in their infancy. There is currently very little scholarship on the intersection of law and robotics, though a few scholars have begun the task of beginning to think about the issues involving law and robotics in a systematic way.¹⁸ Similarly, we are starting to see the first robot-specific laws being enacted, but such laws are currently rare enough to bring a sense of novelty. In June 2011, Nevada became the first state to pass a law regulating driverless

¹⁸ E.g., Ian Kerr. *Bots, Babes, and Californication of Commerce*, 1 Univ. Ottawa L. & Tech. J. 285 (2004); M. Ryan Calo, *Open Robotics*, 70 Md. L. Rev. 571 (2011); M. Ryan Calo, *Robots and Privacy*, in *Robot Ethics: The Ethical and Social Implications of Robotics*, (Patrick Lin, George Bekey, and Keith Abney, eds., Cambridge: MIT Press, Forthcoming).

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robotic cars.¹⁹ The law granted rulemaking authority to the Nevada Department of Transportation to regulate the testing, safety, and ultimately the presence on its roads of “autonomous vehicles” using artificial intelligence and sensors such as GPS sensors and lasers. Under the law, an autonomous vehicle is “a motor vehicle that uses artificial intelligence, sensors and global positioning system coordinates to drive itself without the active intervention of a human operator.”²⁰ “Artificial intelligence,” in turn, was defined as “the use of computers and related equipment to enable a machine to duplicate or mimic the behavior of human beings.”²¹ The law was the product of consultation with automakers, Google, insurance companies, and consumer groups, and has been generally well received, with regulations implementing the statute unveiled on February 12, 2012.²²

Such academic and legislative interventions remain outliers. As a society we lack an awareness of the impending revolution in robotics, much less any concrete understandings about how the law should regulate or even understand robots. This is a problem because uncertainty about (for example) liability caused by robots could hamper innovation and the widespread consumer adoption of these useful and potentially transformative technologies. How could we develop such an understanding? We would suggest that the law and robotics project should look to the lessons of other bodies of law, which have grappled with varying degrees of success with the problem of regulating new digital technologies for decades.²³ The experience of cyberlaw and other areas of technology-influenced jurisprudence has revealed one particularly important lesson for technologically-sophisticated applications of law - when it comes to new technologies, applying the right metaphor for the new technology is especially important. How we regulate robots will depend on the metaphors we use to

¹⁹ Nev. Rev. Stat. Ch. 482A (effective March 1, 2012), available at http://www.leg.state.nv.us/Session/76th2011/Bills/AB/AB511_EN.pdf.

²⁰ Nev. Rev. Stat. Ch. 428A.020.

²¹ Nev. Rev. Stat. Ch. 428A.030.

²² Nev. Adopted Reg. Regulation R084-11, LCB File No. R084-11, Effective March 1, 2012, available at [http://www.leg.state.nv.us/register/RegsReviewed/\\$R084-11_ADOPTED.pdf](http://www.leg.state.nv.us/register/RegsReviewed/$R084-11_ADOPTED.pdf).

²³ See sources cited supra note 3.

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think about them. There are multiple competing metaphors for different kinds of robots, and getting the metaphors right will have tremendously important consequences for the success or failure of the inevitable law (or laws) of robotics.

A classic example from the twentieth century illustrates the importance of getting the metaphors for new technologies right. It concerns how Fourth Amendment law came to understand the nature of government wiretapping under the Fourth Amendment, which requires the government to obtain a warrant before it searches its citizens' "persons, houses, papers, and effects."²⁴ In the 1928 case of *Olmstead v. United States*,²⁵ the Supreme Court was called upon to determine whether the police's warrantless wiretapping of a phone line leading into the home of notorious bootlegger Roy Olmstead constituted a "search" that would have required a warrant. Chief Justice Taft's opinion for the Court used a physical conception of a search rather than a broader understanding of the emerging capabilities of electronic technologies. The Court accordingly held that because wiretaps required neither physical trespass into the home nor the seizure of "tangible material effects," the Fourth Amendment was inapplicable to wiretapping.

By contrast, Justice Brandeis's dissent in *Olmstead* viewed the issue more broadly, and would not have required a physical intrusion from new technologies for the Fourth Amendment's protections to apply. Brandeis viewed existing law as establishing the principle that the Fourth Amendment protected against "invasion of the sanctities of a man's home and the privacies of life."²⁶ However, Brandeis warned that these protections were being threatened by emerging technologies like wiretaps that had enabled "[s]ubtler and more far-reaching means of invading privacy Discovery and invention have made it possible for the government, by means far more effective than stretching upon the rack, to obtain disclosure in court of what is whispered in the closet."²⁷ Brandeis also suggested that science was likely to provide governments in the future with even more invasive and secret methods of surveillance beyond wiretapping. He warned that

²⁴ U.S. Const. Amd. IV.

²⁵ 277 U.S. at 466 (1928).

²⁶ *Id.* at 465 (Brandeis, J., dissenting).

²⁷ *Id.* at 473-74 (Brandeis, J., dissenting).

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[w]ays may some day be developed by which the government, without removing papers from secret drawers, can reproduce them in court, and by which it will be enabled to expose to a jury the most intimate occurrences of the home. Advances in the psychic and related sciences may bring means of exploring unexpressed beliefs, thoughts and emotions.”²⁸

Brandeis conceded that the Court’s position was a straightforward reading of the text of the Fourth Amendment. But this reading, he maintained, was deeply flawed because it clung to a narrow and outmoded view of the Fourth Amendment as protecting only tangible property, and thus failed to grasp the nature of the threat that the new technology posed. By failing to understand the nature of the new technology -- by applying only a physical metaphor focused on trespass rather than a broader one rooted in conceptions of privacy -- the Court’s position failed to protect important values in the face of new technologies.

The subsequent course of search and seizure law has vindicated Brandeis’s position about the right metaphor by which to understand wiretapping technologies. Soon after the case was decided, Congress enacted section 605 of the Federal Communications Act, which made wiretapping a federal crime. In 1937, the Supreme Court held that federal agents could not introduce evidence obtained as a result of an illegal wiretap in federal court.²⁹ And in the 1967 case of *Katz v. United States*, after a series of cases chipping away at the *Olmstead* trespass metaphor, the Supreme Court finally changed course and adopted the Brandeis position that the Fourth Amendment applied to wiretaps.³⁰ This was the case because the Fourth Amendment was not limited merely to physical invasions, but rather protected people rather than places against unreasonable searches and seizures.³¹ In a famous concurrence in the same case that later became the blueprint for modern Fourth Amendment law, Justice Harlan suggested that the applicability of the Fourth Amendment should turn on “a twofold requirement, first that a person have exhibited an actual (subjective) expectation of privacy and, second, that the

²⁸ Id. at 474 (Brandeis, J., dissenting).

²⁹ *Nardone v. United States*, 302 U.S. 379 (1937).

³⁰ 389 U.S. 347 (1967).

³¹ Id. at 351.

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expectation be one that society is prepared to recognize as 'reasonable.'"³²

The *Olmstead-Katz* example is a helpful one for several reasons. It shows quite clearly how different understandings of how emergent technologies apply to human activity can have profound legal consequences. And it shows how misunderstanding a new technology -- either how it works or what values it threatens -- can have pernicious effects. The *Olmstead* court failed to recognize the threat to privacy that unregulated government wiretapping presented. It clung to outmoded physical-world metaphors for the ways police could search without a physical trespass. By contrast, Justice Brandeis understood the threat that the new technology presented to established values, and asked not whether the new police technology constituted a physical trespass, but a threat to the broader value of citizen privacy against the state. He asked a better question of the new technology, was willing to adapt the law to fit changed technological circumstances while preserving its old normative values, and generated a better legal answer as a result.

Interestingly, the trespass/privacy issue of Fourth Amendment law that produced the *Olmstead/Katz* line of cases remains vital today. In its recent *Jones* decision, the Supreme Court held that a GPS transponder placed on a criminal's car that was unsupported by a search warrant violated the Fourth Amendment. While the entire court agreed that the Fourth Amendment was violated, it splintered about why this was the case. Justice Scalia's bare majority invalidated the law on the old trespass theory from *Olmstead*, while Justice Alito and three other Justices would have adopted a broader privacy justification that would have prevented non-trespassory GPS monitoring. Justice Sotomayor seemed caught between both camps.³³ Like *Olmstead* and *Katz*, *Jones* illustrates that the metaphors we use to understand the technology and the law matter a great deal, and can have profound consequences to which new practices the law limits, and which it allows.

4. The Importance of Metaphors

³² Id. at 361 (Harlan, J., concurring).

³³ United States v. Jones X U.S. Y (2012).

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This example illustrates the importance of metaphors when law confronts new technologies. In designing and implementing new technologies, we must be mindful of the metaphors we use to understand the technologies. As these cases suggest, metaphors matter at several levels. At the conceptual design level, designers of cutting-edge technologies frequently understand the problem or the solution in terms of something else. The metaphorical choice (either implicit or explicit) to design a technology as a new version of an existing thing has real effects on how research questions are framed and pursued, expanding or limiting the range of possible results that can be tested and engineered. For example, a video streaming service might understand itself as a movie theatre, a bookstore, a library, or a television network. These understandings shape both the ways technologies are designed and the sorts of potential problems that engineers try to anticipate. In this regard, consider the differences between a software download service like iTunes, which designed itself as a bookstore with initially heavy digital rights management protections, and streaming services like Netflix, which allows users to “rent” videos for a limited time like a video store, or Spotify, which allows access to unlimited music like a radio station that charges a fee. Similarly, when technologies leave the laboratory and enter the outside world, both consumers and the legal system will use metaphors to try to understand the technology. To stay with the example of digital music, many early users of music on .mp3 files shared them freely in the tradition of the mix tape. By contrast, copyright holders (and increasingly the legal system) have viewed such sharing as theft, asserting that it is more akin to “piracy,” with all the metaphorical baggage that term entails.

In the context of robots, these considerations are particularly important. How we think about, understand, and conceptualize robots will have real consequences at the concept, engineering, legal, and consumer stages. At the concept stage, how we think about robots (and their human operators) will affect their design. Do we want them to be virtual butlers? Virtual pets? Virtual children? The answers to such questions will affect not only how the robots are configured to solve particular problems, but also how they are physically presented. Butlers and children typically don’t have offensive capability; some pets (like dogs) do. Children and pets are less autonomous than butlers, while children and butlers (but not pets) are anthropomorphic. Nor is the

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butler/children/pet an exhaustive list of possibilities; we could conceive of robots as personal computers or gaming systems with wheels, as housekeepers, roommates, sexual partners, or even spouses.

The importance of metaphor continues at the legal level. Lawyers are trained from the first day of law school in “thinking like a lawyer”: essentially the act of reasoning by analogy from one case to another.³⁴ Particularly in the context of changing technologies, the law almost always considers new technology as merely a new form of something else. Wiretaps, as we saw earlier, were first analogized to physical searches, and only later to broader invasions of an interest in “privacy.” Websites were thought of as property (rather than, for instance, unclaimed land, or trademarks or telephone numbers, or something entirely new altogether), and subjected to a regime of anti-“cyber-squatting, wherein companies with existing trademarks similar to the Universal Resource Locators (URLs) of people who had claimed them already.³⁵ Electronic messages were analogized as “e-mail” and given heightened protection from snooping, even though the underlying packet-switching technology could have been viewed as more akin to postcards, whose contents receive much lower protection from surveillance under pre-existing law. For autonomous robots, the importance of metaphors extends not only to how the legal system will understand (and regulate) the robots themselves, but also how it will understand (and regulate) human operators of semi-autonomous robots which could come to market first to fill the gap in our current technical ability to produce fully autonomous robots.

Finally, the importance of metaphors matters at the consumer level. Numerous studies have shown that the way people react to technology in different ways depending upon how it is presented (or marketed). For example, previous studies have shown that people react differently to technology that is anthropomorphic in shape (or isn’t), has visible eyes like a human (or doesn’t), or speaks with a human voice (rather than text). These behavioral reactions appear to be hard-wired, but even if there is a social construction at work,

³⁴ E.g. Karl Llewellyn, *The Bramble Bush* (1930); Frederick Schauer, *Thinking Like a Lawyer* (2009).

³⁵ The Anticybersquatting Consumer Protection Act (ACPA), 15 U.S.C. § 1125(d) (1999).

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the demonstrable effects of human-like versus non-human-like technology will have a real effect on how consumers react to, accept, and trust robots in their homes.³⁶

Metaphors can constrain thinking, sometimes in an unnecessarily limiting way (if they rest on old social norms or technical limitations that are no longer applicable), and sometimes in a way that reflects the enduring wisdom of the past. One of our goals in the law and robotics project will be to see the big picture – the way that metaphors operate to show how people understand and react to public and domestic robotics, and to design the robots in ways that take advantage of good phenomena while avoiding undesirable outcomes.

5. The Android Fallacy

We must also beware seductive but dangerous metaphors. When we think of robots, we often picture them as anthropomorphic; C-3PO from Star Wars is a good example. Even when a particular robot is not shaped like a human, we find it hard not to project human-like features, intentions, and motivations onto it. Even in research labs, cameras are described as “eyes”, robots are “scared” of obstacles, and they need to “think” about what to do next. This projection of human attributes is dangerous when trying to design legislation for robots. Robots are, and for many years will remain, tools. They are sophisticated tools that use complex software, to be sure, but no different in essence than a hammer, a power drill, a word processor, a web browser, or the braking system in your car. As the autonomy of the system increases, it becomes harder and harder to form the connection between the inputs (your commands) and the outputs (the robot’s behavior), but it exists, and is deterministic. The same set of inputs will generate the same set of outputs every time. The problem, however, is that the robot will never see exactly the same input twice. No two camera images are ever the same, because of subtle lighting

³⁶ See M. Ryan Calo, *Against Notice Skepticism in Privacy* (And Elsewhere), 87 *Notre Dame L. Rev.* (Issue #2) (forthcoming Feb. 2012); M. Ryan Calo, *People Can Be So Fake: A New Dimension to Privacy and Technology Scholarship*, 114 *Penn St. L. Rev.* 809, 849 (2010) (collecting such studies).

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changes and measurement errors in the camera itself. Humans might not be able to see the differences, but the robot's software does.

The problem is that this different behavior in apparently similar situations can be interpreted as “free will” or agency on the part of the robot. While this mental agency is part of our definition of a robot, it is vital for us to remember what is *causing* this agency. Members of the general public might not know, or even care, but we must always keep it in mind when designing legislation. Failure to do so might lead us to design legislation based on the *form* of a robot, and not the *function*. This would be a grave mistake.

For example, if we fall into the trap of overly anthropomorphizing a human-shaped android, we might hold the designers less responsible for its actions than a more robotic robot. After all, it seems to have some limited form of free will, so how can we expect the designers to cover every eventuality? On the other hand, we hold car manufacturers to very high standards. If an automobile fails while on the highway due to a design oversight, it is the manufacturer's fault. A car is just a mechanism, and the designer should be able to predict what it will do in a given situation.³⁷

Under these assumptions, if we are driving our car down the freeway and it fails to respond when we turn the steering wheel, it is unambiguously the manufacturer's fault. If an android is driving the car, and its hands slip on the wheel while trying to make a turn, can we hold the robot-maker as accountable? Probably not. This means that the same outcome (the car leaving the freeway unexpectedly) is legislated differently, depending on who or what is driving the car.

This becomes problematic when we take the perception and reasoning technology in the android and embed it in the car itself, in a box under the hood. Now, since the technology is part of the car, it is legislated as a car. While it physically

³⁷ For example, we might be witnessing the first robotic wrongful death lawsuit right now, brought by a man whose daughter was allegedly killed by a negligent surgical robot. See http://robotland.blogspot.com/2012/04/did-da-vinci-robot-kill-24-year-old.html?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A

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resides in the body of the android, it is legislated as an android. We have legislated the form, not the function. The same sensors and the same software generate the same result, but we have split it into two different cases from a legal perspective.³⁸

Of course, this example is absurd. How could we be so easily misled? The android is clearly a machine, despite the anthropomorphic language we use to describe and think about it. We can expect people, even those with no technical background, to realize this and design legislation appropriately. Or can we? A recent study³⁹ has shown that people treat androids more like humans than machines. In an experiment where the android acted to deprive the human subject of a \$20 reward, 65% of test subjects ascribed moral accountability to the android. This does not happen with vending machines that fail.⁴⁰ They are just machines that can fail. However, the android is something different and special, and is held to a different standard. While this experiment does not directly support our example above, it does show that humans are wired to anthropomorphize, ascribe, and project.

We must avoid the Android Fallacy. Robots, even sophisticated ones, are just machines. They will be no more than machines for the foreseeable future, and we should design our legislation accordingly. Falling into the trap of anthropomorphism will lead to contradictory situations, such as the one described above.

6. Complications: Deus Ex Machina

Figuring out how to think about and analogize robots is hard enough for systems that are clearly autonomous or

³⁸ There will be a small difference in the mechanical arrangement. The android will use its arms to turn the wheel, while the in-car system will probably use an electric motor. However, we claim that this difference is not relevant to our argument.

³⁹ “Do People Hold a Humanoid Robot Morally Accountable for the Harm It Causes?” Peter H. Kahn, et al. Proceedings of the 7th ACM/IEEE International Conference on Human-Robot Interaction, 2012.

⁴⁰ Or at least substantially not as often.

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clearly tele-operated. Things get harder when we start to consider the new generation of shared autonomy systems. In these, a human operator (often at a remote location) collaborates with the autonomous software on the robot to control the system. The robot is neither fully autonomous nor fully teleoperated, and it will be difficult for an external observer to determine which mode (autonomous or remote-controlled) the system is in at any given time. This greatly complicates our choice of metaphors used to understand the system. We must also carefully choose the metaphors that we use to understand the operator's role, operating a system over which they have only partial control.⁴¹

Is the robot a portal or avatar for a remote expert (like a plumber), or is the human-robot system the “expert”? Where does liability lie if the human teleoperator issues the correct command, but the autonomous software on the robot carries it out poorly? What are the privacy implications of not really knowing if there is a remote human “inhabiting” your household robot? How can we provide effective privacy metaphors and safeguards for both the owner of the robot and the remote operator?

7. Conclusions and Final Thoughts

In this essay, we have advanced four basic claims about how the legal community should think about robots. Each of these claims is closely tied to the others, and we must consider all of them, and their interactions, if we are to design effective legislation and consumer protections for the coming generation of robots.

The first claim is that that we need to **think carefully about our definition of a robot**. While we are influenced by depictions of “traditional” robots in the popular media, this

⁴¹ The remote operator is unlikely to directly control all of the joints of a sophisticated robot, because it is simply too hard to do so. Instead, they will give higher-level directions, such as selecting an object to grasp, and rely on lower-level autonomous software to carry out these commands. Thus, although that have good control over *what* the robot does, they have only loose control over *how* it does it.

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definition is too narrow to be useful. Robots and robotic technology will creep into our lives in other forms, and our legislation must be uniform across these forms, and address the *function* of the system, rather than its *form*.

We also need to **understand the technical capabilities of current robots**, both in the world and in the laboratory. While most real robots fall far short of their fictional cousins, many research robots can do truly astonishing things and display a remarkable amount of intelligence. In order to create effective legislation, we must understand what robots are capable of, what they cannot do yet, and what they will never⁴² be able to do. It is, of course, hard to say what is impossible, and we are forced to play a game of probabilities. However, a good working knowledge of the technology involved, and its limitations, allows us to make high-probability predictions. These predictions allow us to focus our (limited) effort on legislating for systems and problems that are more likely to occur in the coming years.

We should **draw on our considerable experience with cyber-law**, looking at how it drew analogies to existing technologies and legislation, where it succeeded, and where it failed. This will help to inform our choice of metaphor and analogy for robots and robotic technologies, along with the choice of regulatory tools where appropriate.

Finally, we should **avoid the Android Fallacy** at all costs. Not all robots are androids, and framing our analogies in highly anthropomorphized terms is dangerous. It will lead us into making false assumptions about the capabilities of robots, and to think of them as something more than the machines that they are, even if we try our best not to. This, in turn will lead us to use inappropriate analogies, and to design poor legislation.

The robots *are* coming, and they're coming soon. We need to be ready for them, and prepared to design appropriate, effective legislation and consumer protections for them. We

⁴² Never is, of course, a long time. We adopt the pragmatic definition of “long after I’m dead”. For example, robots will “never” (by our working definition) be able to read a human’s thoughts without consent.

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believe that we can only do this by understanding the technology, drawing on our recent experience with other disruptive technologies, and by avoiding seductive anthropomorphizations of our new metallic overlords.



Chapter 3

Presentation Slides: Virtual Law: A New Mindset for a New Reality

BRIAN SOMMER
IME Law
Seattle, Washington

VIRTUAL LAW: A NEW MINDSET FOR A NEW REALITY





TODAY'S TOPICS:

- The future is now: The rise of augmented, mixed, and virtual reality (“XR”)
- XR & the legal landscape: New challenges and possibilities
- A new reality: How XR is impacting enterprise, education and entertainment



THE FUTURE IS NOW: THE RISE OF XR

VR	AR	MR
 <p>htc SONY SAMSUNG oculus G</p>	 <p>Apple NIANTIC Snapchat</p>	 <p>Microsoft HoloLens magic leap</p>
 <p>VIVE PRO</p>		

THE FUTURE IS NOW: THE RISE OF AR



Video courtesy of HypeVR

THE FUTURE IS NOW: THE RISE OF MR



Video courtesy of Microsoft HoloLens

THE FUTURE IS NOW: THE RISE OF AR/VR

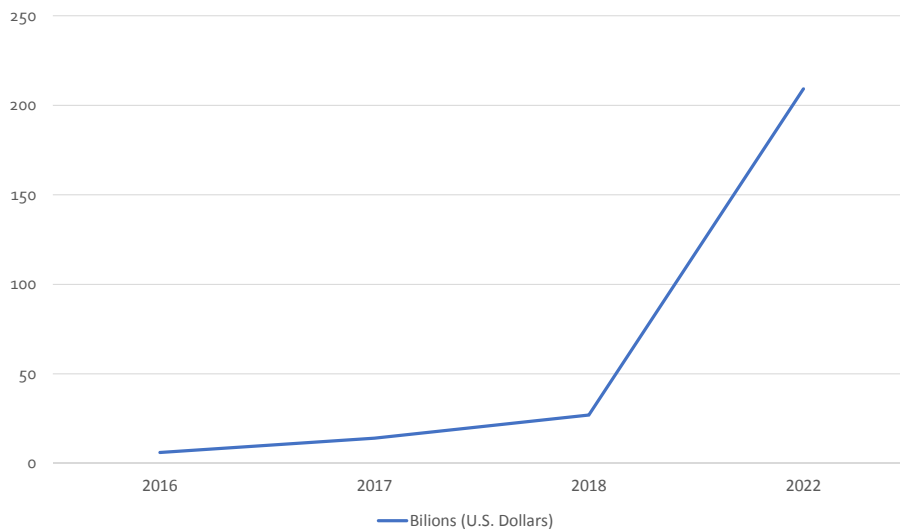
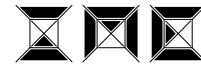


Figure 1: Forecast augmented (AR) and virtual reality (VR) market size worldwide from 2016 to 2022 (in billion U.S. dollars). Statista (2018). Worldwide Spending on Augmented and Virtual Reality to Achieve a Five-Year CAGR of 71.6% by 2022. International Data Corporation (2018).



THE FUTURE IS NOW: THE RISE OF XR & ENTERTAINMENT

- The Wall Street Journal, *Virtual-Reality Movies: Get Ready for the VR Revolution* (2016)
- BusinessWire, *Nickelodeon Brings Augmented Reality to Number-One Mobile Game App 'Sky Whale' and Brand-New 'Do Not Touch' App* (2018)
- VRFocus, *Global Beat Saber Tournament Announced* (2018)
- Recode, *Magic Leap is partnering with the NBA to change the way you watch basketball* (2018)



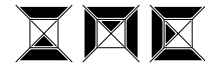
THE FUTURE IS NOW: THE RISE OF XR & ENTERPRISE

- Forbes, *Are You Ready to Use Augmented Reality Or Virtual Reality To Train Your Workforce?* (2018)
- Digiday, *Lowe's is using VR and AR to get people into stores* (2018)
- Wired, *Ikea's New App Flaunts What You'll Love Most About AR* (2017)
- Next Reality, *Thyssenkrupp Claims Up to 4x Faster Workflow with HoloLens* (2017)



THE FUTURE IS NOW: THE RISE OF XR & EDUCATION

- The Washington Post, *The future of education is virtual* (2018)
- Fortune, *Facebook Debuts Big Oculus Educational VR Push in Seattle, Taiwan, and Japan* (2018)
- The Journal, *Google Expeditions Adds Augmented Reality for Classrooms* (2017)
- VRFocus, *Full Sail University Announces VR Learning Software for Classrooms* (2018)



THE FUTURE IS NOW: THE RISE OF VR



Video courtesy of Doghead Simulations

XR & THE LEGAL LANDSCAPE: REALITY CAUCUS

Congressional Caucus on Virtual, Augmented and Mixed Reality Technologies for the 115th Congress



Representative
Suzan DelBene
(D-WA)



Representative
Darrell Issa
(R-CA)
Co-Chair



Representative
Ted Lieu
(D-CA)
Co-Chair



Representative
Yvette Clarke
(D-NY)



Representative
Bill Flores
(R-TX)



XR & THE LEGAL LANDSCAPE: FEDERAL TRADE COMMISSION

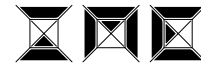
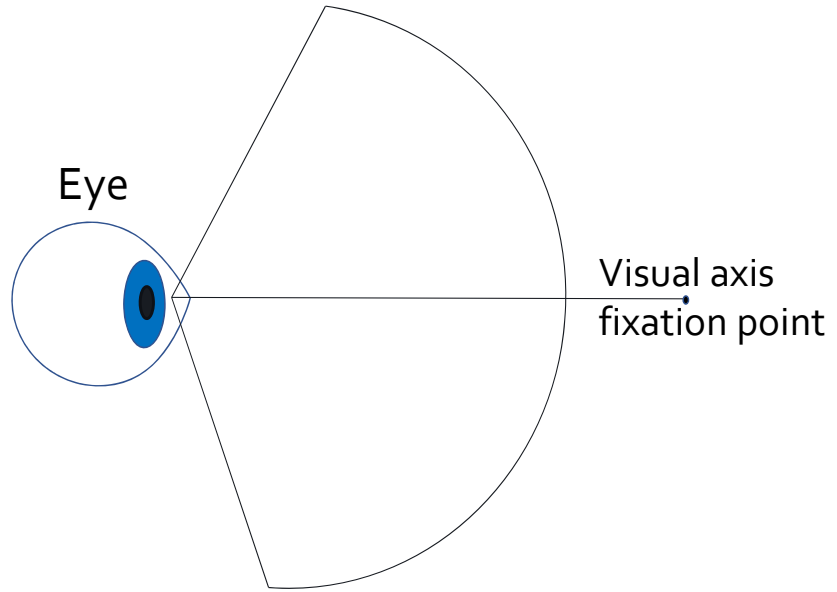


The FTC has been the chief federal agency on privacy policy and enforcement since the 1970s, when it began enforcing one of the first federal privacy laws – the Fair Credit Reporting Act.



XR & THE LEGAL LANDSCAPE: FOVEATED RENDERING AND IRIS BIOMETRIC DATA

Sharpest part of our field of view, the “foveal system,” is only about 5 degrees from the center of our vision



XR & THE LEGAL LANDSCAPE: BIOMETRIC REGULATIONS



XR & THE LEGAL LANDSCAPE: HEAT MAP ANALYTICS

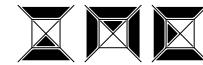


Image courtesy of IME Law & Technicolor Experience Center



Image © zapp2photo/Adobe Stock

Important to ensure end user license agreements and privacy policies adequately disclose such usage



XR & THE LEGAL LANDSCAPE: WORKS MADE FOR HIRE

Section 101 of the Copyright Act (Title 17 of the U.S. Code):

A work is a "work made for hire" only if: (1) it is prepared by an employee within the scope of his or her employment; or (2) it is specially ordered or commissioned from an independent contractor in a written agreement and the work falls within one of nine statutorily defined categories.



XR & THE LEGAL LANDSCAPE: WORKS MADE FOR HIRE CONTINUED

Section 101 of the Copyright Act (Title 17 of the U.S. Code) continued:

1 as a contribution to a collective work,

2 as a part of a motion picture or other audiovisual work,

3 as a translation,

4 as a supplementary work,

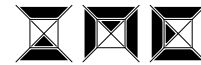
5 as a compilation,

6 as an instructional text,

7 as a test,

8 as answer material for a test, or

9 as an atlas



XR & THE LEGAL LANDSCAPE: WORKS MADE FOR HIRE CONTINUED

17 U.S.C. § 203:

Termination of transfers and licenses
granted by the author



XR & THE LEGAL LANDSCAPE: CIIAAs

Confidential Information and Invention Assignment Agreement (CIIAA)

Signed CIIAAs allow companies to:

- Mitigate risk of certain employment disputes
- Secure IP rights to employee or independent contractor inventions and copyrightable works



XR & THE LEGAL LANDSCAPE: RETAINING BACKGROUND TECHNOLOGY



Image courtesy of IME Law & Technicolor Experience Center

- Third party work for hire requests
- Proprietary technology
- Patents and trade secrets



XR & THE LEGAL LANDSCAPE: LICENSING

Common license terms to consider in the XR sector include:

- Perpetual or for a term
- Revocable or irrevocable
- Worldwide or for a territory
- Royalty-free
- Assignable
- Sub-licensable
- Media-specific (e.g. AR or VR use only)



XR & THE LEGAL LANDSCAPE: PERSONAL INJURY AND PRODUCT LIABILITY

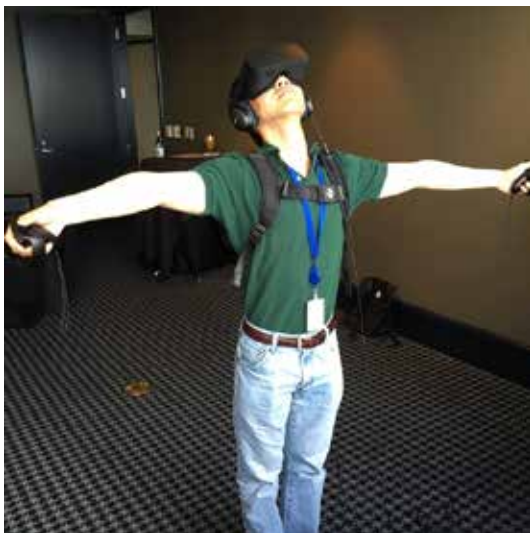


Image courtesy of IME Law

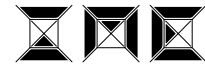
New technology means new hazards.

Important to consider:

- Cords & handheld controls
- Nausea
- Multi-player
- Training & spacial awareness
- Location-based entertainment (LBE)



VIRTUAL LAW: A NEW MINDSET FOR A NEW REALITY



Chapter 4

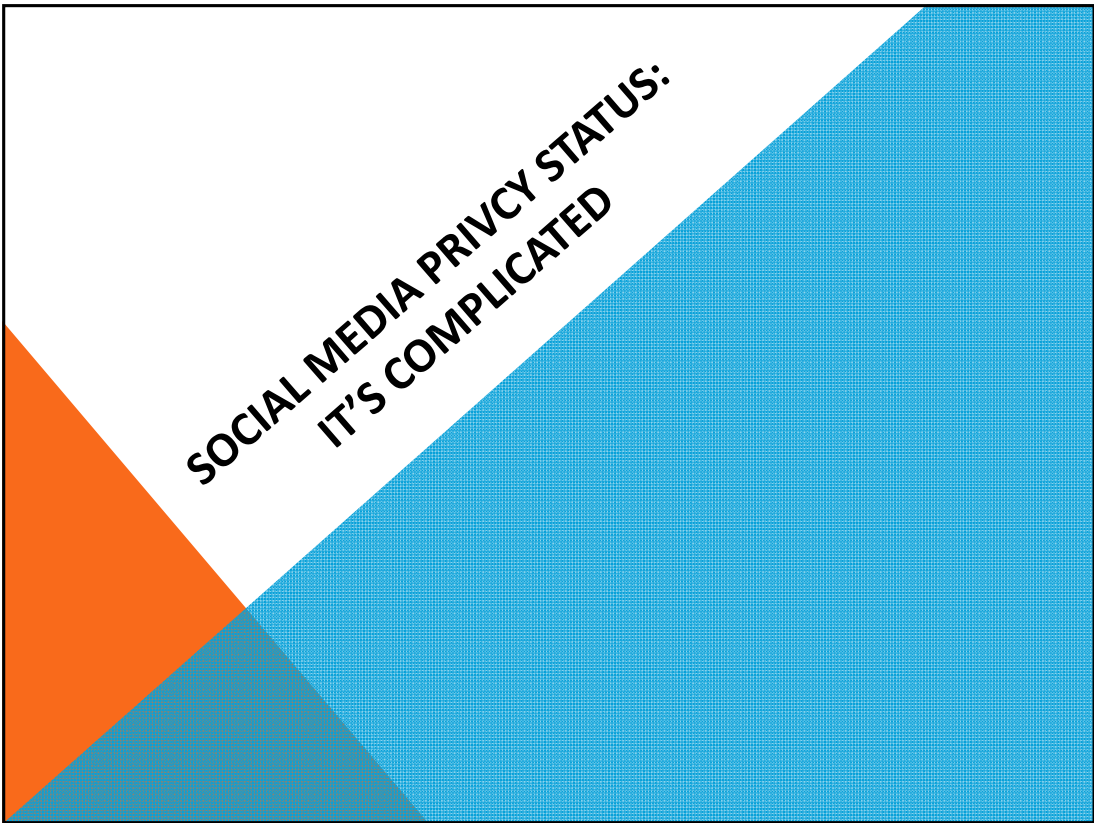
Presentation Slides: Social Media Privacy Status: It's Complicated

KATHERINE CAMPBELL

Oregon Department of Justice
Portland, Oregon

EVA NOVICK

Oregon Department of Justice
Portland, Oregon



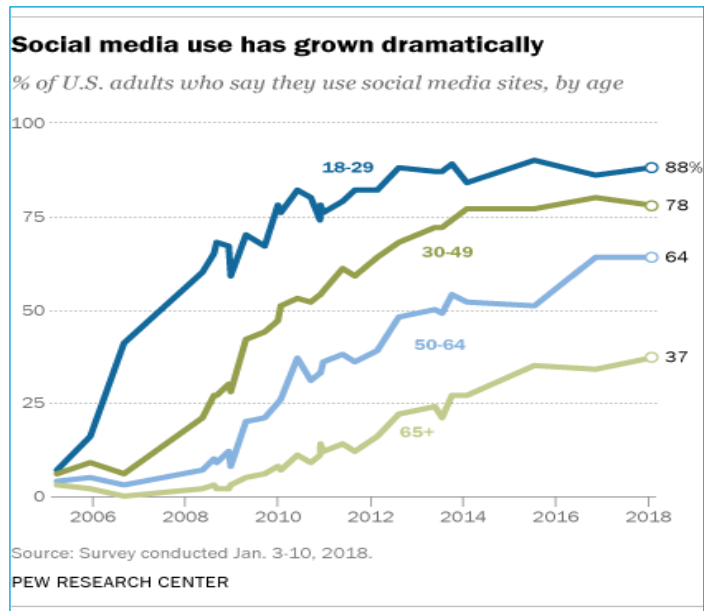
SOCIAL MEDIA AND PRIVACY

- **How Americans Feel about It**
- **Risks**
- **How to Protect Privacy**
- **Hot Topics**
- **The Networks—Content Regulators or Supporters of Legislation?**

**“Data is the
new currency”**



PEOPLE LIKE AND USE SOCIAL MEDIA



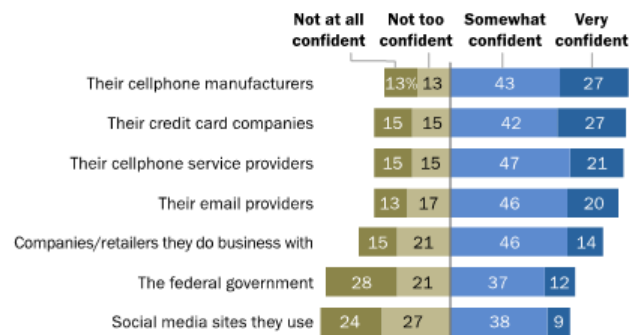
WHY DO PEOPLE USE SOCIAL MEDIA

- Staying in Touch with Family and Friends
- Reconnecting with Old Acquaintances
- Civil Participation
- Political Activities
- Launch and Sustain Protests
- Get and Share Health Information
- Gather Scientific Information
- Engage in Family Matters
- Perform Job-Related Activities
- Get News

PEOPLE WORRY ABOUT PRIVACY

Roughly half of Americans do not trust the federal government or social media sites to protect their data

% of U.S. adults/tech users (see note below) who are ___ in the ability of the following institutions to protect their data



Note: Data on cellphone manufacturers and service providers based on cellphone owners; data on email providers based on internet users; data on social media sites based on social media users. Data for credit card companies recalculated to exclude “does not apply” responses. Otherwise, refusals and “does not apply” responses not included in this chart. Source: Survey conducted March 30-May 3, 2016. “Americans and Cybersecurity”

PEW RESEARCH CENTER

WHY DO PEOPLE LEAVE OR STAY?

LEAVE

- Too Busy
- Lost Interest
- Waste of Time
- Too Much Drama

STAY

- Modern Life
- Convenient
- Efficient
- Connected to People and Organizations

WHAT IS PRIVACY?

- Privacy settings?
- Private from an employer?
- Private from acquaintances?
- Private from the government?
- How do you maintain privacy if the point of social media is to share?

WHO READS PRIVACY POLICIES?

LOL

This slide features a white background with a blue gradient bar at the top containing the text 'WHO READS PRIVACY POLICIES?'. Below this bar is a large blue rectangle with the text 'LOL' in white. The bottom of the slide is decorated with a blue gradient bar and a triangular orange and grey pattern on the left side.

WHO READS PRIVACY POLICIES?

Value of PII v. Convenience	Value of Our Data v. Friends' Data
--	---

This slide features a white background with a blue gradient bar at the top containing the text 'WHO READS PRIVACY POLICIES?'. Below this bar are two blue rectangular boxes. The left box contains the text 'Value of PII v. Convenience' and the right box contains the text 'Value of Our Data v. Friends' Data'. The bottom of the slide is decorated with a blue gradient bar and a triangular orange and grey pattern on the left side.



SHARING WITH THE WORLD

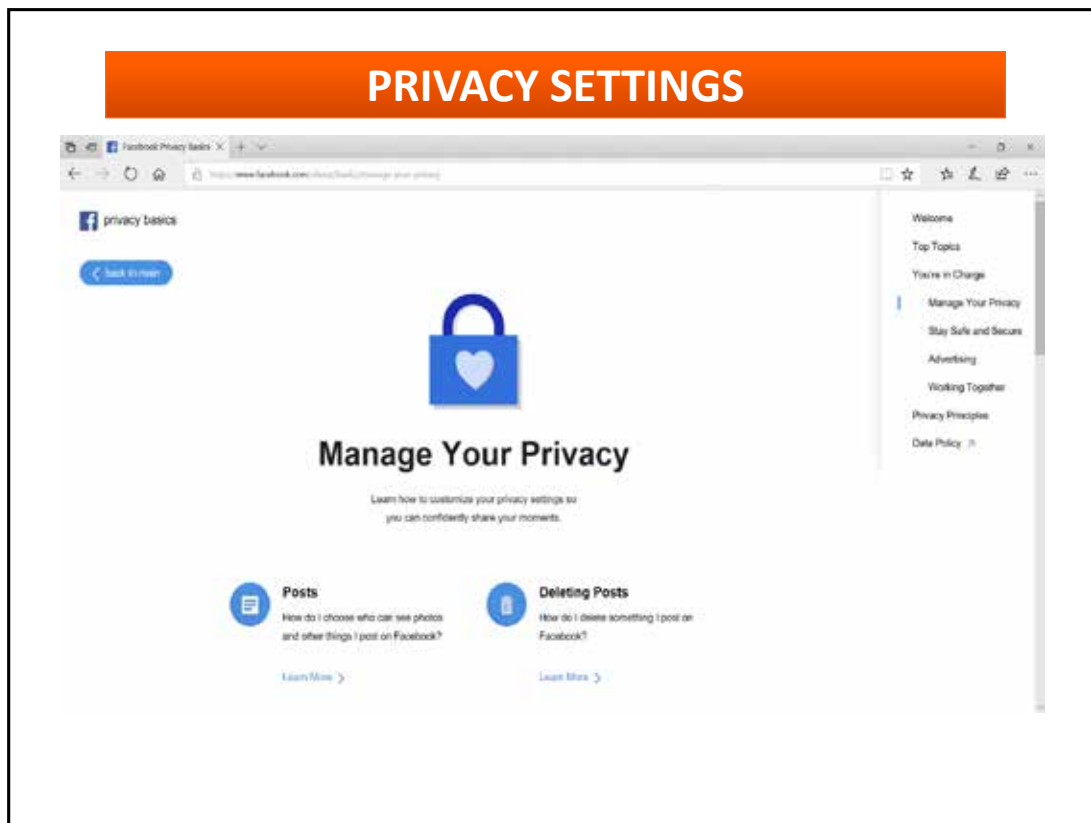
- You share with your friends, but also with criminals.
- Social engineering
- Pretexting
- Doxing
- Pharming
- Spear phishing

MAINTAINING PRIVACY CREATES RISKS?

Fake Accounts

Onavo Protect

PROTECTING PRIVACY



PRACTICAL TIPS

- Never accept a friend or follower request from someone you don't know, even if they know a friend of yours.
- Don't share information that you don't want to become public. Someone might target you for where you work, so be cautious when listing your job, organization, education and contact information.
- Providing too much information in your profile can leave you exposed to people who want to steal your identity or sensitive information.



GEOLOCATION

- **Children Tracking**
- **Dating Apps**
- **Stalker Apps**

FACIAL RECOGNITION TECHNOLOGY

- Amazon Selling Facial Recognition Technology to Law Enforcement
- How Common—and How Accurate—is Facial Recognition Technology?
- Why Biometric Privacy Laws?
- Testing the Law

DISCRIMINATORY AD TARGETING

The image shows a screenshot of a legal document, likely a complaint or a statement of interest, related to a case involving Facebook. The document is displayed on a computer screen with a browser window visible in the background.

Case Caption:
Case 1:18-cv-02089-JGM Document 48 Filed 08/07/18 Page 1 of 32

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK**

Plaintiffs:
NATIONAL FAIR HOUSING ALLIANCE,
FAIR HOUSING INSTITUTE CENTER, INC.,
HOUSING OPPORTUNITIES PROJECT FOR
EQUITY, INC., FAIR HOUSING
COUNCIL OF GREATER SAN ANTONIO,

Defendant:
FACEBOOK, INC.

**STATEMENT OF INTEREST
OF THE UNITED STATES OF AMERICA**

GEORGE S. BERMAN
United States Attorney for the
Southern District of New York
96 Chambers Street, Third Floor
New York, New York 10007
Tel: (212) 437-2733
Tel: (212) 437-8003
Email: david.kennedy@usdoj.gov

ELLEN BLAIN
DAVID J. KENNEDY
JACOB L. LYWITE
CHRISTINE FORCABLO
Assistant United States Attorneys
OF Counsel

HOUSING DISCRIMINATION COMPLAINT

CASE NAME: Assistant Secretary for Fair Housing & Equal Opportunity v. Facebook, Inc.
CASE NUMBER:

- 1. Complaint:**
Assistant Secretary for Fair Housing & Equal Opportunity
U.S. Department of Housing and Urban Development
410 Seventh Street, SW, Suite 1100
Washington, DC 20410
- 2. Other Aggrieved Parties:**
Undetermined at this time.
- 3. The following is alleged to have occurred or is about to occur:**
Discriminatory advertising, statement and notices.
- 4. The alleged violation occurred because of:**
Race
Color
Religion
Sex
Familial Status
National Origin
Disability
- 5. Address and location of the property in question (or if no property is involved, the city and state where the discrimination occurred):**
Throughout the United States.
- 6. Respondents:**
Facebook, Inc.
Mark Zuckerberg, CEO
380 Willow Road
Menlo Park, CA 94025
- 7. The following is a brief and concise statement of the facts regarding the alleged violation:**
The Assistant Secretary for Fair Housing and Equal Opportunity, on behalf of the Secretary of the U.S. Department of Housing and Urban Development, files this

DISCRIMINATORY AD TARGETING

- Facebook's ad tools leaving out certain criteria
- Facebook says that it is a platform, and *not* a publisher.
- US DOJ: Facebook can be a publisher and a platform

DISCRIMINATORY AD TARGETING

Facebook Accused of Allowing Bias Against Women in Job Ads

Be One Nebraska Furniture Mart Family
Sponsored · 🌐

Nebraska Furniture Mart of Texas is currently hiring full-time, second shift staff to assemble and prepare merchandise for delivery to our valued customers.

Now Hiring Full-Time Delivery Prep Specialist
nr21.ultipro.com

LIKE PAGE

APPLY NOW

Facebook users who clicked on "Why am I seeing this ad?" were told that the employer wanted to reach users 18 to 30 who live in or were recently near Fort Worth.

ELECTIONS

- Cambridge Analytica
- Facebook removes 652 fake accounts and pages meant to influence world politics
- The Guardian Aug. 22, 2018

WHO OWNS YOUR DATA?

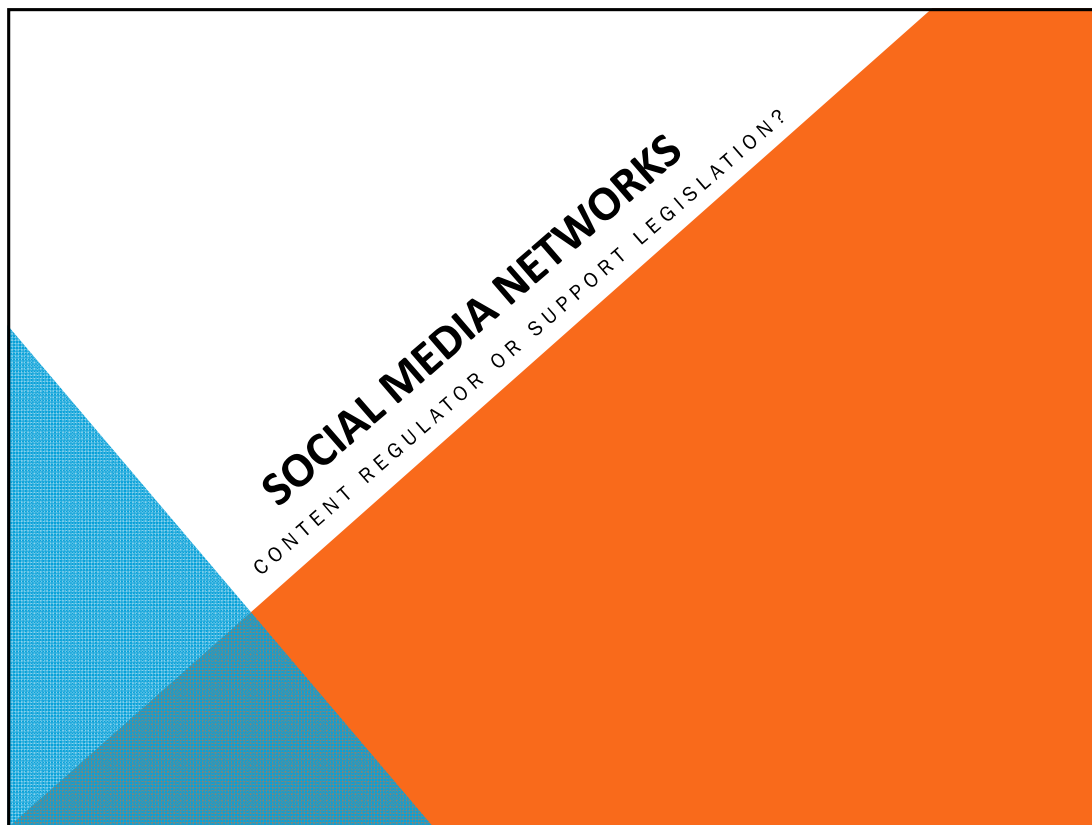
Facebook: “...you grant us a non-exclusive, transferable, sub-licensable, royalty-free, and worldwide license to host, use, distribute, modify, run, copy, publicly perform or display, translate, and create derivative works of your content” (Section 3, Part 3)

WHO OWNS YOUR DATA?

Twitter: By submitting, posting or displaying Content on or through the Services, you grant us a worldwide, non exclusive, royalty-free license (with the right to sublicense) to use, copy, reproduce, process, adapt, modify, publish, transmit, display and distribute such Content in any and all media or distribution methods (now known or later developed). This license authorizes us to make your Content available to the rest of the world and to let others do the same.

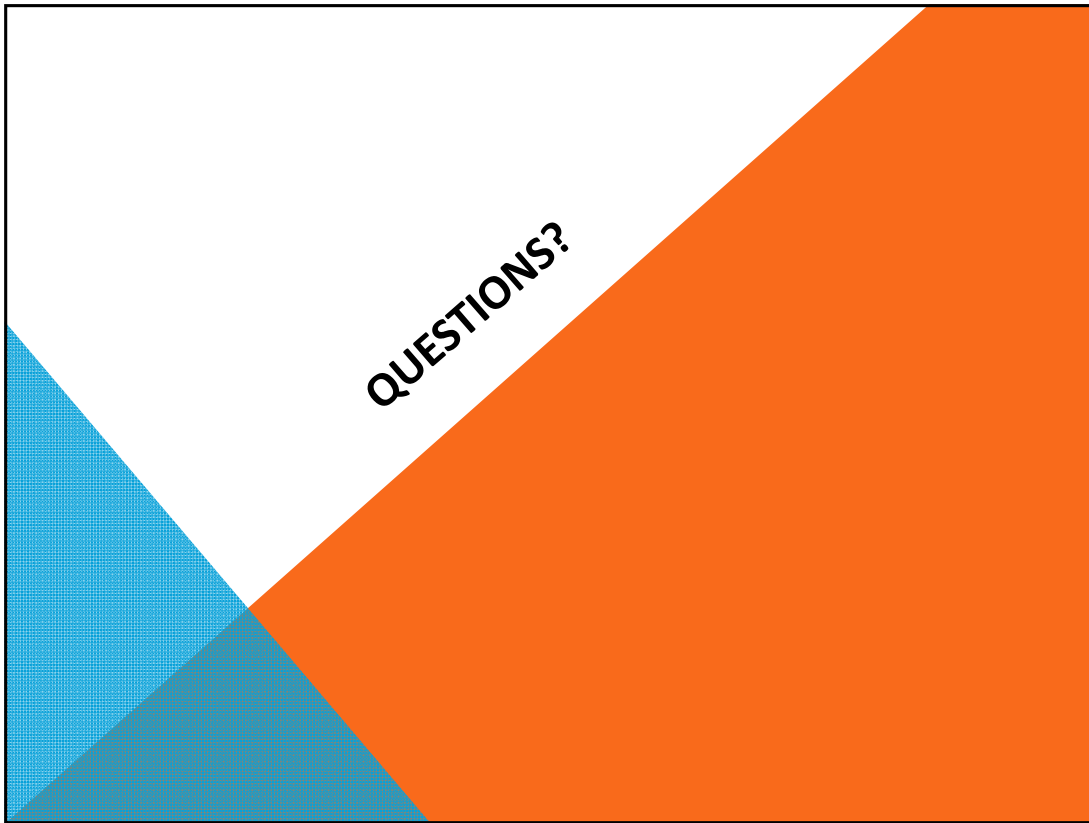
WHO OWNS YOUR DATA?

Instagram: We do not claim ownership of your content that you post on or through the Service. Instead, when you share, post, or upload content that is covered by intellectual property rights (like photos or videos) on or in connection with our Service, you hereby grant to us a non-exclusive, royalty free, transferable, sub-licensable, worldwide license to host, use, distribute, modify, run, copy, publicly perform or display, translate, and create derivative works of your content (consistent with your privacy and application settings).



SOCIAL MEDIA: CONTENT REGULATOR?

- “Free” products in exchange for personal information
- What is the product? What is the content?
- Facebook and Google control more than half of the worldwide market in online advertising
- No regulation for emerging innovative industry
- Regulating speech? Blocking content? Who can and who should?
- Lobbyists!
- Communications Decency Act



HOW TO FIND US


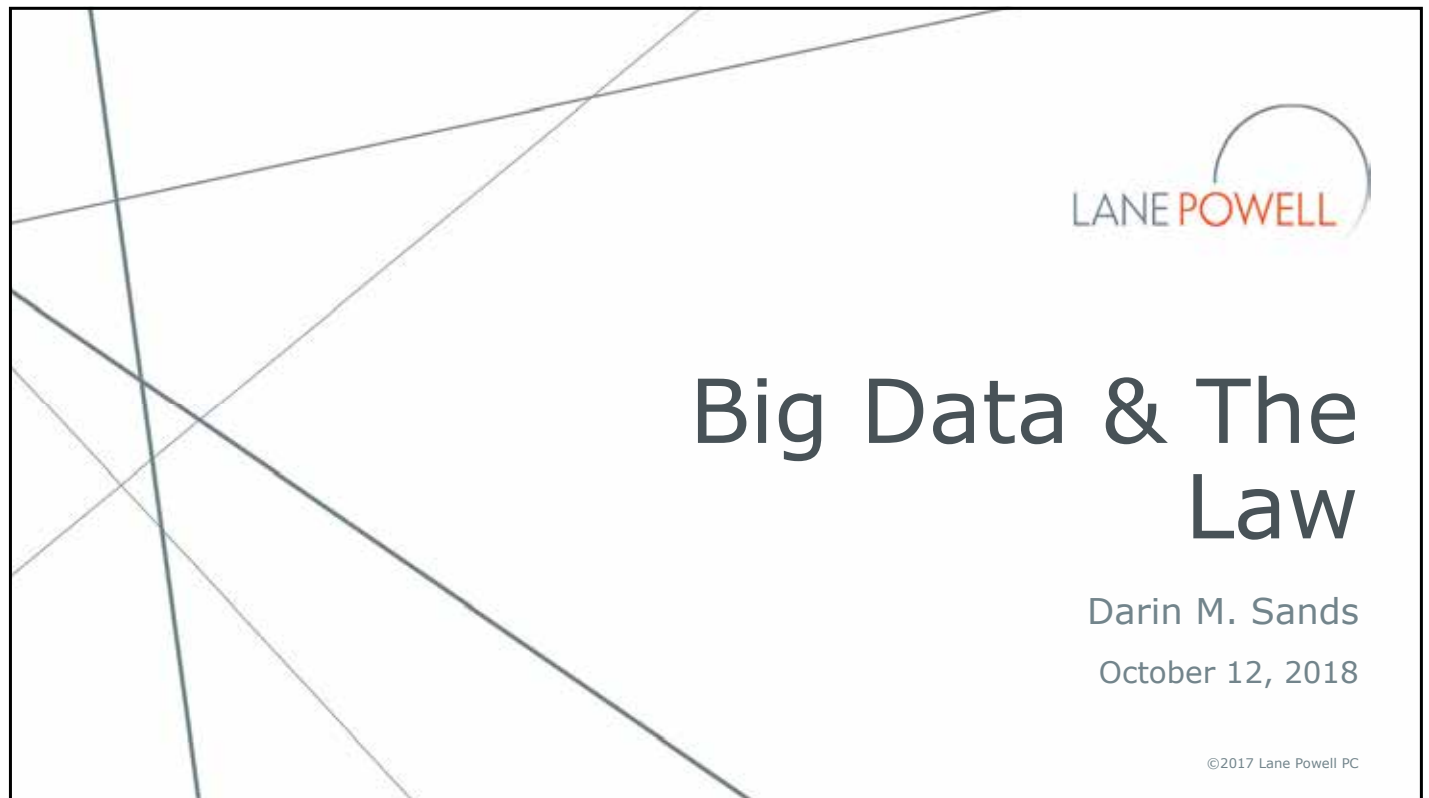
<p>Kate Campbell Assistant Attorney General Consumer Protection Section Oregon Department of Justice 100 SW Market Street Portland, Oregon 97201 (971) 673-1880 Katherine.campbell@doj.state. or.us</p>	<p>Eva Novick Assistant Attorney General Consumer Protection Section Oregon Department of Justice 100 SW Market Street Portland, Oregon 97201 (971) 673-1880 eva.h.novick@doj.state.or.us</p>
--	--



Chapter 5

Presentation Slides: Big Data and the Law

DARIN SANDS
Lane Powell PC
Portland, Oregon



Big Data & The Law

Darin M. Sands
October 12, 2018

©2017 Lane Powell PC



What is big data?



Data is now the
single fastest
source of legal
risk

Historical Technology Silos in the Law

- Intellectual Property
- Ediscovery
- Data Security & Privacy
- Information Governance
- “Legal Tech”



Privacy & Data Security

Data Growth

- Data growing exponentially (4.4 ZB in 2013 to 44ZB in 2020 to 140ZB in 2025)
- By 2025, nearly 20% of the data in the global data sphere will be critical to people's daily lives and nearly 10% of that will be hypercritical.
- By 2025, an average connected person anywhere in the world will interact with connected devices nearly 4,800 times per day – basically one interaction every 18 seconds.
- The amount of the global data sphere subject to data analysis will grow by a factor of 50 to 5.2 ZB in 2025.
- By 2025, more than a quarter of data created will be real-time in nature, and IoT real-time data will constitute over 95% of it.

*Source IDC

Impact on the Law

- Compliance
 - Privacy and data security is now a number one priority of C-Suite executives across the world.
 - GDPR/California Privacy Legislation
- Contractual and common law risk shifting
- Attacks
 - Nation states
 - Criminal actors
 - Insider attacks
- Key Question: Can the law keep up with the exponential growth and diffusion of critical personal information across the globe?

The Rise of Data-Related Legal Risk





The Rise of the Objective Algorithm

Algorithms & Bias

- Employment & Job Performance
 - Evaluating employee performance, engagement, hiring.
 - Job targeting (Facebook/Amazon/T-Mobile lawsuit)
- Criminal Justice
 - California's new bail system
 - Facial Recognition
- Targeting Consumers
 - Credit worthiness
 - Advertising
- Key Question: Can the law gain enough transparency into how the algorithms are constructed and even if it could, could it understand how they work?



Analytics and “Precrime”





Predictive Coding



Predictive Lawyering

Predictive Legal Technology

- The law is well suited and not well suited for predictive technologies
- The traditional way of predicting court action: the gut
- The new way -- analytics
- Lex Machina
- Ravel Law
 - Extension of Westlaw and Lexis

Daniel Katz, "A general approach for predicting the behavior of the Supreme Court of the United States" (2017)

Building on developments in machine learning and prior work in the science of judicial prediction, we construct a model designed to predict the behavior of the Supreme Court of the United States in a generalized, out-of-sample context. To do so, we develop a time-evolving random forest classifier that leverages unique feature engineering to predict more than 240,000 justice votes and 28,000 cases outcomes over nearly two centuries (1816-2015). Using only data available prior to decision, our model outperforms null (baseline) models at both the justice and case level under both parametric and non-parametric tests. **Over nearly two centuries, we achieve 70.2% accuracy at the case outcome level and 71.9% at the justice vote level.** More recently, over the past century, we outperform an *in-sample optimized* null model by nearly 5%.



Automation of the Law

Automation

- Contract Analysis
- Due Diligence
- Legal Bots (DoNotPay has overturned over 200,000 parking tickets in New York, London and Seattle)

Chapter 6

Presentation Slides: Autonomous Vehicles and Future Mobility

ANDREW DICK

Oregon Department of Transportation Office of Innovations
Salem, Oregon



Autonomous Vehicles and Future Mobility

Emerging Technologies
Oregon State Bar
October 12, 2018



10/1/2018

Andrew Dick
Oregon Department of Transportation

1

What is an automated vehicle?



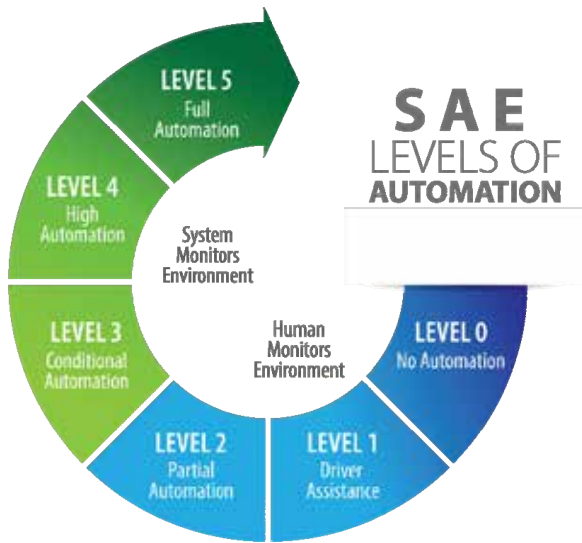
- An automated vehicle is a vehicle where some aspects of the driving task may be performed by an automated system
- The Society of Automotive Engineers (SAE) has designated six levels of vehicle automation, depending on system capabilities



10/1/2018

2

Levels of automation



10/1/2018

- Lower levels of automation may be called “advanced driver-assistance systems” (ADAS) where a human is always required to monitor the driving environment.
- Higher levels of automation may be called “automated driving systems,” which are capable of monitoring the driving environment. Vehicles with this capability may be called *autonomous*, not just automated, vehicles.
- More information can be found [here](#).

3

Levels of automation

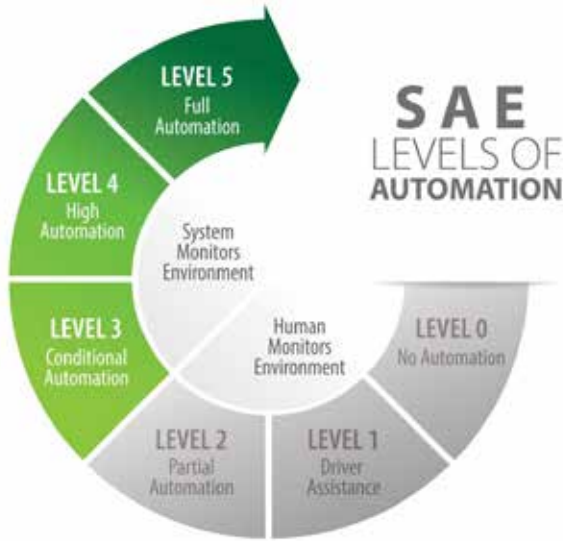


10/1/2018

- A Level 1 vehicle might be equipped with adaptive cruise control or lane keeping assist.
- A Level 2 Vehicle might combine these types of driver-assistance systems to accelerate, brake, and steer the vehicle in certain traffic situations.
- However, these are *driver assistance systems*. The driver must always remain attentive and in control of the vehicle.

4

Levels of automation



- A Level 3 vehicle might allow a vehicle to travel without human oversight under certain circumstances, but requires a human backup driver to take over in conditions it cannot handle.
- A Level 4 vehicle may be able to travel without human oversight at all times, only limited by geographic or other conditions. They may not have manual controls.
- A Level 5 vehicle can navigate any circumstances that a human driver can, and may or may not have manual controls.



10/1/2018

5

A Range of Use Cases for Automated Vehicles



Automated Regional
Public Transit



Passenger Vehicle with
Full Automation



Automated Freight Truck



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6

Use Cases for Automated Vehicles



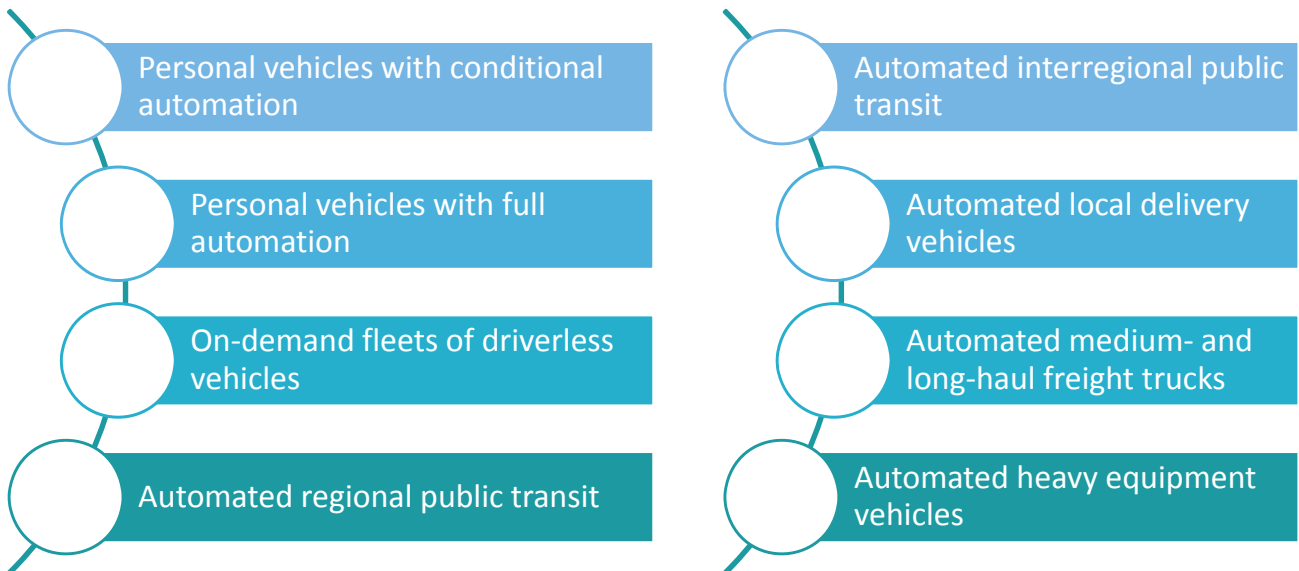
- Many visible automated vehicles are targeted for taxi or ride-hailing applications
- But automated vehicles have a range of use cases across transportation applications
- ODOT has developed informational materials on AV use cases, [published in May 2018](#)



10/1/2018

7

A Range of Use Cases for Automated Vehicles



10/1/2018

8

Public Transit: Automated low-speed shuttles



- Automated low-speed shuttles are already deployed in dozens of pilot projects worldwide
- In deployment, these vehicles may provide last-mile service that links to existing transit services
- Automated shuttles may also provide transportation around university or corporate campuses



10/1/2018

9

Automated truck mounted attenuator



- Automated attenuator trucks have been piloted in Colorado and Florida
- These vehicles travel behind maintenance crews to protect them while they work
- Removing the driver from this vehicle keeps them from harm's way if the vehicle is struck



10/1/2018

10

House Bill 4063: Why we are here today



10/1/2018

11

Why is House Bill 4063 important?



Oregon needs a robust, statewide dialogue to address the many changes AVs will bring to the transportation system.



10/1/2018

12

Task Force on Autonomous Vehicles Membership

Lt. Timothy Tannenbaum (Wash. County Sherriff's Office),
Law enforcement

Sen. Fred Girod

Sen. Rod Monroe

Rep. Denyc Boles

Rep. Susan McLain

Tom McClellan,
Department of Transportation/DMV

Richard Blackwell,
Department of Consumer and Business Services

Capt. Teresa Bloom,
Oregon State Police

Marie Dodds,
American Automobile Association

Jebediah Doran (TriMet),
Oregon Transit Association

Steve Entler (Radio Cab),
Taxicab industry

Daniel Fernández (Jaguar Land Rover),
Automotive Industry

Jared Franz (ATU),
Transportation union

Jim Pfarrer,
Employment Department

Chris Hagerbaumer (Oregon Environmental Council),
Nonprofit organization

Eric Hesse (City of Portland),
League of Oregon Cities

Cheryl Hiemstra,
Department of Justice

Jon Isaacs (Uber),
Transportation network company

Neil Jackson (OTLA),
Trial lawyers

Jana Jarvis,
Oregon Trucking Association

Sid Leiken (Lane County),
Association of Oregon Counties

Carrie MacLaren,
Department of Land Conservation and Development

Mark MacPherson (Teamsters),
Transportation union

David McMorries (Office of the Chief Information Officer),
Cybersecurity industry

Robert Nash (State Farm),
Automotive insurance industry

Carly Riter (Intel Corp.),
AV technology industry

Eliot Rose (Metro),
Metropolitan planning organization

Jeremiah Ross (Ross Law LLC),
Consumer protection advocates

Becky Steckler (University of Oregon),
Public University

Graham Trainor (AFL),
Workers' union

Sean Waters (Daimler),
Commercial truck manufacturing industry



10/1/2018

13

Charge from the Legislature

Framing the Future for Autonomous Vehicles in Oregon

- Develop recommendations on four policy areas relating to AVs
- Submit a report, including recommendations for legislation, to the Legislature
- **Deadline: September 15, 2018**



10/1/2018

Automated Vehicle Task Force

HB 4063 directs ODOT to convene and staff the group, which examined:



10/1/2018

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Goals and Values of the Task Force



10/1/2018

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Topics Discussed by the Subcommittees

Licensing and Registration

- AV testing framework
- Rules for testing with and without a human backup driver
- Licensing requirements
- Roles and responsibilities for various users of AVs
- Registration and titling requirements

Law Enforcement and Crash Reporting

- Safety requirements
- Adherence to traffic laws
- Assignment of driver responsibilities when there is no human driver
- Crash and incident reporting
- Law enforcement and first responder engagement



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Topics Discussed by the Subcommittees, cont.

Insurance and Liability

- Minimum insurance requirements
- Limits of coverage
- Should insurance follow the person, vehicle, or manufacturer?
- Product liability and ownership liability
- Assigning fault in incidents

Cybersecurity and Long-Term Policy

- Changes to the workforce
- Preventing and responding to cyberattacks
- Consistency with State's long-term plans and goals
- Protection of consumer privacy
- Data collection and management



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Task Force recommendations

Requirements for AV testing permit

ID for test and driver vehicles

Safety requirement certification

Information about prior testing

Law enforcement interaction plan

Proof of insurance

Certification vehicle meets cybersecurity standards



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Task Force recommendations

Additional recommendations

Driver license requirements

Insurance requirements and liability

Compliance with Oregon Laws

Crash and incident reporting

Safety standards

Data privacy



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20

Task force recommendations

Recommendations for continuing work of the task force

Insurance requirements and liability for the deployment stage

Independent workforce study

Ensure AV policies further Oregon's existing goals and objectives

Data collection and management



10/1/2018

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Future of Task Force on Autonomous Vehicles

Framing the Future for Autonomous Vehicles in Oregon

- Task Force may also develop recommendations on long-term effects
- May submit a second report and recommendations to the legislature

Land Use

Road and Infrastructure Design

Public Transit

Workforce Changes

Cybersecurity and Privacy



10/1/2018

22



Questions?

Chapter 7


Presentation Slides: “I’m Sorry, Dave. I’m Afraid I Can’t Do That.”

BARBARA FREDERIKSEN-CROSS
Director of Litigation Services
Juris Logic LLC
Portland, Oregon



I am not a human

Select all of the robots in the pictures below:



Verify

We have already assimilated robots into all aspects of our lives:

- Home assistants
- Entertainment
- Food services
- Medical services
- Transportation
- Manufacturing
- Information services

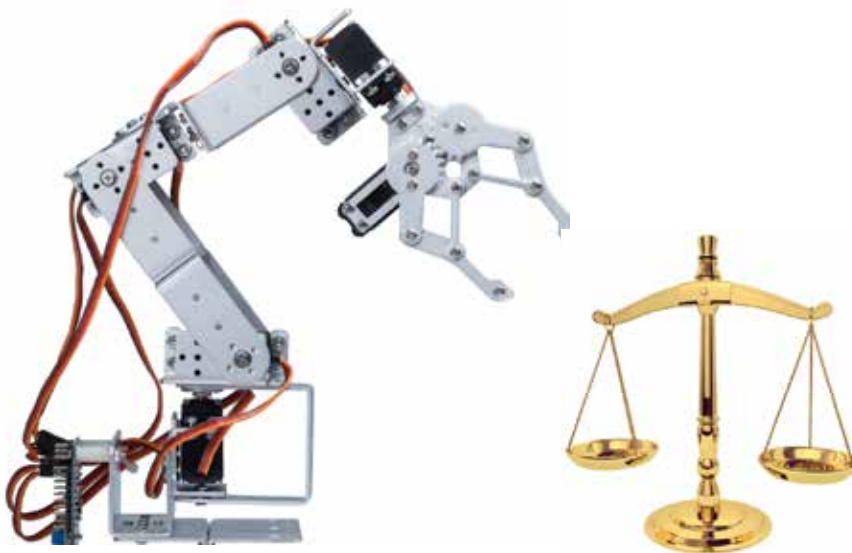
2

But we have no definitions to guide our relationship with this technology

- The law has no clear definition of what is, or is not, a “robot”
- Unlike our relationship to the biological world, no taxonomy has evolved to provide:
 - Nomenclature
 - Classification
 - Description
 - Identification

3

What the law cannot describe, it will struggle to grasp



4

Example 1: Da Vinci Surgical System



- In Europe, this is a class IIb medical device
 - Like a scalpel or scissors
 - No specialized training required
- In the US, operators are required to have:
 - One hour online training, plus watch 2 online procedures (4 hours), operate on one pig (7 hours), participate in two surgeries with an experienced operator

5

Example 2: Software enabled people movers



- iBot 4000 robotic wheelchair
- Class III medical device



- Segway MiniPro
- Consumer product (State regs vary)



- Hoverboard self-balancing scooter
- Laws depend on where you are

6

European Guidelines (RoboLaw project)

- Suggest identification according to five dimensions:
 - Nature (physical, bionic, virtual)
 - Level of autonomy
 - Task – Application or service
 - Operative environment/context of use
 - Human/Robot relationship



7

But what about...

- Hybrid devices, that can be autonomous, or not, depending on operator choice?
- The risk posed by a particular instance of the technology
 - *Example:* In US, UAV's are classified according to weight
- Current law seeks to address people who design/build/operate robots. But what laws will we incorporate into robots themselves?
 - Simple example: speed laws for autonomous vehicles vs. actual behavior of other traffic?
 - Which pattern poses more hazard?
 - Who decides?
 - Can the “laws” we build in be overridden?

8

Other considerations

- To what degree is its behavior adaptive to context
- What type of software controls its behavior (local/remote/cloud)
- To what extent is it self programming/self learning
- What degree of override or configuration can the human operator apply
- Operators: identification and training standards
- Effects of legislation on global competitiveness
 - Technology market, labor, availability of enabled services and or products, security considerations

9

Other significant concerns

- Tension between legislation and innovation
- How to apply mass updates in the face of legislative change (for example vehicle speed laws or bicycle/pedestrian right of way issues)
- Security and cyber security concerns
 - All vehicles are deadly weapons. Autonomous vehicles are deadly weapons controlled by software. Who would ever want to hack that?
- Privacy
 - Networked devices
 - Search/seizure of prosthesis with neural interfaces

10

The rate of technology advance/adoption will continue to accelerate

- AI will become a more vital component of robotics development
 - Software development
 - Hardware development
 - Testing procedures
- What guidelines will be needed for the training/testing/deployment of the AI “designers”?
- Can the law manage what it may not understand?



11

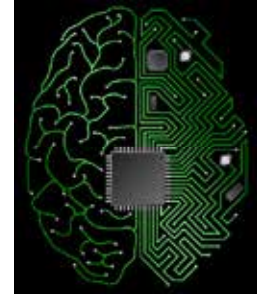
Discovery Issues

- Who has the ability to access software and configuration data?
- Where is the “black box” data?
- Is it in a format that can be readily interpreted?
- How would you detect tampering/hacking
- Special challenges with AI/Neural networks
 - They may give you a decision, but may not be able to recite how it was reached

12

Ethical dilemmas

- Zone of regret
- Effect on society as job markets change
- When are upgrades required vs. optional
- Dual-purpose uses
 - Example: robotic prosthesis: reconstruction vs. voluntary enhancement
 - Does a citizen have the right to choose enhancement?
- Who can access and use data from sensors?
 - For what purposes?
 - HIPAA data, insurance-provided devices...
- What provisions for opt out on automated decisions/behaviors/data collection?



13

