Utah Law Review

Volume 2018 | Number 5 Article 3

12-2018

How to Sue a Robot

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Michalski, Roger (2018) "How to Sue a Robot," *Utah Law Review*: Vol. 2018 : No. 5 , Article 3.
Available at: https://dc.law.utah.edu/ulr/vol2018/iss5/3

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HOW TO SUE A ROBOT

Roger Michalski*

Abstract

We are entering the age of robots where autonomous robots will drive our cars, milk cows, drill for oil, invest in stock, mine coal, build houses, pick strawberries, and work as surgeons. Robots, in mimicking the work of humans, will also mimic their legal liability. But how do you sue a robot? The current answer is that you cannot. Robots are property. They are not entities with a legal status that would make them amendable to sue or be sued. If a robot causes harm, you have to sue its owner. Corporations used to be like this for many procedural purposes. They were similarly tethered to human owners. Over time, courts and legislators abandoned the model of treating corporations solely as property and increasingly treated them as an independent artificial person for litigation purposes.

Robots might also make a transition along those lines. If they do, which legal model should we adopt for robots? Are they more like an employee, a franchisee, a slave, a subsidiary, a child, an animal, a subcontractor, an agent, or something else altogether? Given the inherent path-dependence of procedural law, picking the right model will have important consequences and will be difficult to reverse.

This Article lays the groundwork for this fundamental decision. It explains the urgency and importance of this decision and presents three analytical frameworks (ontological, deontological, and functional) for how we can approach the question of robots in civil litigation. Often unnoticed and unarticulated, these analytical frameworks structure important doctrinal and normative positions. The Article then applies these analytical frameworks to evaluate numerous concrete contestant models for treating robots as litigation entities. The resulting taxonomy exposes the weaknesses of analogizing robots to established models—none fits, and all would have negative practical consequences. Instead of utilizing an existing model, this Article argues that we must treat robots as a new litigation category that borrows insights selectively and partially from a range of the existing models. For example, we must craft a new in robotam personal jurisdiction doctrine to supplement the old in personam jurisdiction doctrine. Doing otherwise would expose procedure to doctrinal incoherence, legislation to policy mayhem, and parties injured by robots to unnecessary costs and insurmountable procedural hurdles.

* © 2018 Roger Michalski. Associate Professor at the University of Oklahoma College of Law. I am grateful to Steven Gensler, Joshua Sellers, and above all Melissa Mortazavi for their helpful comments, suggestions, and insights.

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INTRODUCTION

Welcome to the age of robots. They drive our trucks,[1] milk cows,[2] drill for oil,[3]

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[1] *See, e.g.*, Conner Dougherty, *Self-Driving Trucks May Be Closer than They Appear*, N.Y. TIMES (Nov. 13, 2017), https://www.nytimes.com/2017/11/13/business/self-driving-trucks.html [https://perma.cc/2U44-UWTP] ("Trucks will someday drive themselves out of warehouses and cruise down freeways without the aid of humans or even a driver's cab — about that there seems little disagreement. The question is how soon that day gets here."); Daisuke Wakabayashi, *Uber's Self-Driving Trucks Hit the Highway, But Not Local Roads*, N.Y. TIMES (Mar. 6, 2018), https://www.nytimes.com/2018/03/06/technology/uber-self-driving-trucks.html [https://perma.cc/67PC-K4VV] ("Uber said . . . its self-driving trucks have been carrying cargo on highways in Arizona for commercial freight customers over the past few months.").

[2] Jesse McKinley, *With Farm Robotics, the Cows Decide when it's Milking Time*, N.Y. TIMES (Apr. 22, 2014), https://www.nytimes.com/2014/04/23/nyregion/with-farm-robotics-the-cows-decide-when-its-milking-time.html [https://perma.cc/ZW9T-HHHZ] ("Desperate for reliable labor and buoyed by soaring prices, dairy operations across the state are charging into a brave new world of udder care: robotic milkers, which feed and milk cow after cow without the help of a single farmhand.").

[3] Clifford Krauss, *Texas Oil Fields Rebound from Price Lull, But Jobs Are Left Behind*, N.Y. TIMES (Feb. 19, 2017), https://www.nytimes.com/2017/02/19/business/energy-

invest in stock,[4] mine coal,[5] lay bricks,[6] pick strawberries,[7] and work as longshoreman.[8] A broad literature anticipates that robots will do more and more jobs in the years to come.[9] Robots, in mimicking the work of humans, will also mimic

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environment/oil-jobs-technology.html?_r=0#story-continues-1 [https://perma.cc/QWG7-TFRS] ("Pretty soon every rig will have one worker and a robot.").

[4] *See, e.g.*, Tom C.W. Lin, *The New Investor*, 60 UCLA L. REV. 678, 687 (2013) ("Modern finance is cyborg finance, an industry in which the key players are part human and part machine."); Yesha Yadav, *How Algorithmic Trading Undermines Efficiency in Capital Markets*, 68 VAND. L. REV. 1607, 1609 (2015) ("[T]oday's marketplace has come to rely heavily on automation and algorithms as an essential part of the trading process."); Nils Pratley, *The Trillion-Dollar Questions over the Flash Crash and the Hound of Hounslow*, GUARDIAN (Apr. 25, 2015), http://www.theguardian.com/business/2015/apr/25/flash-crash-hound-of-hounslow-trillion-dollar-question [https://perma.cc/YKU3-2UV4] (explaining how autonomous machines that trade stocks in fractions of a second caused a "flash crash"); *see also* Landon Thomas Jr., *At BlackRock*, *Machines Are Rising over Managers to Pick Stocks*, N.Y. TIMES (Mar. 28, 2017), https://www.nytimes.com/2017/03/28/business/deal book/blackrock-actively-managed-funds-computer-models.html [https://perma.cc/RPD7-LNWS] ("'The democratization of information has made it much harder for active management,' Mr. Fink said in an interview. 'We have to change the ecosystem — that means relying more on big data, artificial intelligence, factors and models within quant and traditional investment strategies.'").

[5] Hiroko Tabuchi, *Coal Mining Jobs Trump Would Bring Back No Longer Exist*, N.Y. TIMES (Mar. 29, 2017), https://www.nytimes.com/2017/03/29/business/coal-jobs-trump-appalachia.html?_r=0 [https://perma.cc/FRC2-RDGW] ("Caterpillar engineers are working on the future of mining: mammoth haul trucks that drive themselves. The trucks have no drivers, not even remote operators. Instead, the 850,000-pound vehicles rely on self-driving technology, the latest in an increasingly autonomous line of trucks and drills that are removing some of the human element from digging for coal. . . . Caterpillar's autonomous trucks are already being used at mines in Western Australia."); *see also Driving Productivity in the Pilbara*, RIOTINTO, http://www.riotinto.com/ourcommitment/spotlight-18130_18328.aspx [https://perma.cc/24XS-CTT9] (last updated June 1, 2016).

[6] Vice News, *This Bricklaying Robot Can Build Walls Faster than Humans (HBO)*, YOUTUBE (July 26, 2017), https://www.youtube.com/watch?v=2-VR4IcDhX0 [https://perma.cc/4GBV-M2DY]; *see also* Quoctrung Bui & Roger Kisby, *Bricklayers Think They're Safe from Robots. Decide for Yourself*, N.Y. TIMES: THE UPSHOT (Mar. 6, 2018), https://www.nytimes.com/interactive/2018/03/07/upshot/bricklayers-think-theyre-safe-from-automation-robots.html [https://perma.cc/GSU2-EXTZ].

[7] Ilan Brat, *Robots Step into New Planting, Harvesting Roles*, WALL STREET J. (Apr. 23, 2015), https://www.wsj.com/articles/robots-step-into-new-planting-harvesting-roles-1429781404 [https://perma.cc/Z7HF-HPCK].

[8] *See, e.g.*, Andrew O'Reilly, *Automation of Port Terminals Threatens Thousands of Lucrative Dock Worker Jobs*, FOX NEWS U.S. (Mar. 27, 2017), http://www.foxnews.com/us/2017/03/27/automation-port-terminals-threatens-thousands-lucrative-dock-worker-jobs.html [https://perma.cc/9R2Y-PL54] ("'Those robots represent hundreds of (lost) jobs,' Bobby Olvera Jr., president of International Longshore and Warehouse Union Local 13, told the Press-Telegram. 'It means hundreds of people that aren't shopping. They aren't paying taxes and they aren't buying homes.'").

[9] *See* RICHARD YONCK, HEART OF THE MACHINE: OUR FUTURE IN THE WORLD OF

their legal liability. Autonomous cars and trucks will cause accidents.[10] Robots will engage in war crimes.[11] Paparazzi drones will invade private spaces.[12] Corporate robots will breach contracts.[13] Machine doctors will botch surgeries.[14] Artificial

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ARTIFICIAL EMOTIONAL INTELLIGENCE xi (2017) (exploring a near future where robots are "designed to read, interpret, replicate, and potentially even influence human emotions."); JOHN MARKOFF, MACHINES OF LOVING GRACE: THE QUEST FOR COMMON GROUND BETWEEN HUMANS AND ROBOTS 27 (2016); MARTIN FORD, THE RISE OF THE ROBOTS: TECHNOLOGY AND THE THREAT OF A JOBLESS FUTURE 1 (2015); JERRY KAPLAN, HUMANS NEED NOT APPLY: A GUIDE TO WEALTH AND WORK IN THE AGE OF ARTIFICIAL INTELLIGENCE 10 (2015); ERIK BRYNJOLFSSON & ANDREW MCAFEE, THE SECOND MACHINE AGE: WORK, PROGRESS, AND PROSPERITY IN A TIME OF BRILLIANT TECHNOLOGIES 173 (2014).

[10] *See, e.g.*, Faiz Siddiqui & Michael Laris, *Self-Driving Uber Strikes and Kills Pedestrian*, WASH. POST (Mar. 19, 2018), https://www.washingtonpost.com/news/dr-gridlock/wp/2018/03/19/uber-halts-autonomous-vehicle-testing-after-a-pedestrian-is-struck/?utm_term=.5294aeea968e [https://perma.cc/7T28-U6XY] ("Uber abruptly halted testing of its autonomous vehicles across North America on Monday, after a 49-year old woman was struck and killed by one of its cars while crossing a Tempe, Ariz. Street Sunday night."); Charles Rotter, *Self-Driving Uber Running Red Light*, YOUTUBE (Dec. 14, 2016), https://www.youtube.com/watch?v=_CdJ4oae8f4 [https://perma.cc/Q28S-PS95]; Kenneth S. Abraham & Robert L. Rabin, *Automated Vehicles and Manufacturer Responsibility for Accidents: A New Legal Regime for a New Era*, 105 VA. L. REV. (forthcoming 2019) (manuscript at 19) ("The current driver-focused liability system will become a thing of the past, by virtue of technological change itself—there will be very few occasions for drivers to be negligent, because there will be very little "driving" by people. Auto manufacturers will still be making vehicles, however, and their vehicles will be the cause of most accidents.").

[11] *See* John Yoo, *Embracing the Machines: Rationalist War and New Weapons Technologies*, 105 CAL. L. REV. 443, 449–57 (2017).

[12] Andreas Ulrich et al., *Snapping Tina's Wedding: Paparazzi Turn to Drones*, ABC NEWS (Aug. 3, 2013), http://abcnews.go.com/International/snapping-tinas-wedding-paparazzi-turn-drones/story?id=19842233 [https://perma.cc/SW7F-EQQ7]; *see generally* Margot Kaminski et al., *Averting Robot Eyes*, 76 MD. L. REV. 983 (2017) (discussing privacy concerns caused by "home robots").

[13] *See generally* Tom Allen & Robin Widdison, *Can Computers Make Contracts?*, 9 HARV. J.L. & TECH. 25 (1996) (analyzing a computer's ability to enter into and enforce contracts); *see also* Daisuke Wakabayashi, *Meet the People Who Train the Robots (to Do Their Own Jobs)*, N.Y. TIMES (Apr. 28, 2017), https://www.nytimes.com/2017/04/28/technology/meet-the-people-who-train-the-robots-to-do-their-own-jobs.html [https://perma.cc/AP23-66PQ] (quoting an entrepreneur who aims to innovate how contracts are written through machine learning because "legal documents are well suited to machine learning because they are highly structured and repetitive").

[14] *See* Jane R. Bambauer, *Dr. Robot*, 51 U.C.D. L. REV. 383, 384 (2017) ("[T]he most important contributions from health and medical AI will substitute not devices, but doctors."); Meera Senthilingham, *Would You Let a Robot Perform Your Surgery By It-self?*, CNN (May 12, 2016), http://www.cnn.com/2016/05/12/health/robot-surgeon-bowel-operation/ [https://perma.cc/MAY5-HA8U] ("The team showed for the first time that a supervised autonomous robot could perform soft-tissue surgery, stitching together a pig's

intelligence will censor speech[15] and engage in libel.[16] And states will want to tax and regulate robots.

But how can you sue a robot? The current answer is that you cannot. Robots are property. They are not entities with a legal status that would make them amendable to sue or be sued. If a robot causes harm you have to sue its owner. Corporations used to be like that as well for many procedural purposes.[17] They were similarly once tethered to human actors. For example, federal diversity jurisdiction did not assign corporations citizenship.[18] Instead, corporations as property had the citizenship of all the owners of the corporation.[19] Over time, courts and legislators

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bowel during open surgery — and doing so better than a human surgeon."); Yohannes Kassahun et al., *Surgical Robotics Beyond Enhanced Dexterity Instrumentation: A Survey of Machine Learning Techniques and their Role in Intelligent and Autonomous Surgical Actions*, 11 INT'L J. CARS 553, 553 (2016) (reviewing "the current role of machine learning (ML) techniques in the context of surgery with a focus on surgical robotics"); Todd C. Frankel, *New Machine Could One Day Replace Anesthesiologists*, WASH. POST (May 11, 2015), https://www.washingtonpost.com/business/economy/new-machine-could-one-day-replace-anesthesiologists/2015/05/11/92e8a42c-f424-11e4-b2f3-af5479e6bbdd_story.html?noredirect=on&utm_term=.d9601c4288f1 [https://perma.cc/2BEZ-PCBM].

[15] Daisuke Wakabayashi, *Google Training Ad Placement Computers to Be Offended*, N.Y. TIMES (Apr. 3, 2017), https://www.nytimes.com/2017/04/03/technology/google-training-ad-placement-computers-to-be-offended.html [https://perma.cc/7PAA-JQCW] ("Google engineers, product managers and policy wonks are trying to train computers to grasp the nuances of what makes certain videos objectionable. Advertisers may tolerate use of a racial epithet in a hip-hop video, for example, but may be horrified to see it used in a video from a racist skinhead group.").

[16] *See* Ben Sisario, *It's Not Their Pop Idol, But a Bot Fans Cheer Anyway.*, N.Y. TIMES (Apr. 3, 2017), https://www.nytimes.com/2017/04/03/business/media/its-not-their-pop-idol-but-a-bot-fans-cheer-anyway.html [https://perma.cc/2GLE-A2K6].

[17] *See generally* Gregory A. Mark, *The Personification of the Business Corporation in American Law*, 54 U. CHI. L. REV. 1441 (1987) (explaining the law's shifting views of corporations); William W. Bratton, Jr., *The New Economic Theory of the Firm: Critical Perspectives from History*, 41 STAN. L. REV. 1471 (1989) (discussing new theories of firm identity and legality).

[18] *See, e.g.*, Bank of United States v. Deveaux, 9 U.S. 61, 86 (1809) (describing a corporation as an "invisible, intangible, and artificial being" that is "certainly not a citizen" for diversity jurisdiction purposes).

[19] *See, e.g.*, Commercial & R.R. Bank of Vicksburg v. Slocomb, Richards & Co., 39 U.S. 60, 63 (1840) ("The artificial being, a corporation aggregate, is not, as such, a citizen of the United States; yet the Courts of the United States will look beyond the mere corporate character, to the individuals of whom it is composed: and if they were citizens of a different state from the party sued, they are competent to sue in the Courts of the United States; but all the corporators must be citizens of a different state from the party sued. The same principle applies to the individuals composing a corporation aggregate, when standing in the attitude of defendants, which does when they are in that of plaintiffs."); *see also* Hertz Corp. v. Friend, 559 U.S. 77, 84 (2015) (describing early Supreme Court cases where "the Court held that a corporation could invoke the federal courts' diversity jurisdiction based on a pleading that the corporation's shareholders were all citizens of a different State from the

abandoned the model of treating corporations solely as property and increasingly treated them as an independent artificial person for litigation purposes.[20]

Robots might also make a transition along those lines. If they do, which legal model should we adopt for robots? Are they more like an employee, a franchisee, a slave, a subsidiary, a child, an animal, a subcontractor, an agent, or something else altogether? Given the inherent path-dependence of procedural law, picking the right model will have important consequences and will be difficult to reverse.[21] This Article lays the groundwork for this fundamental decision. It aims to inform a broad literature that spans across many legal fields with a unified framework for treating robots as capable of being sued separately from their owners.[22]

This decision about how the law treats robots will only grow in importance as robots proliferate across industries, take on more autonomous decision-making, and become commonplace on streets, in kitchens, offices, and the skies. Predictably, courts and legislators will soon have to establish standards in torts for the reasonable

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defendants").

[20] *See, e.g.*, Louisville, Cincinnati, & Charleston R.R. Co. v. Letson, 43 U.S. 497, 558 (1844) ("It is, that a corporation created by and doing business in a particular state, is to be deemed to all intents and purposes as a person, although an artificial person, an inhabitant of the same state, for the purposes of its incorporation, capable of being treated as a citizen of that state, as much as a natural person. Like a citizen it makes contracts, and though in regard to what it may do in some particulars it differs from a natural person, and in this especially, the manner in which it can sue and be sued, it is substantially, within the meaning of the law, a citizen of the state which created it, and where its business is done, for all the purposes of suing and being sued."); Barrow S.S. Co. v. Kane, 170 U.S. 100, 106 (1898) ("The constant tendency of judicial decisions in modern times has been in the direction of putting corporations upon the same footing as natural persons in regard to the jurisdiction of suits by or against them."); *see also* 28 U.S.C. § 1332(c)(1) (2012) ("[A] corporation shall be deemed to be a citizen of every State and foreign state by which it has been incorporated and of the State or foreign state where it has its principal place of business").

[21] Ryan Calo, *Robots as Legal Metaphors*, 30 HARV. J.L. & TECH. 209, 210 (2016) ("[J]udges hold an increasingly outdated mental model of what a robot is."); *see also* MARKOFF, *supra* note 9, at xix (2015) ("During the first half of this century, society will be tasked with making hard decisions about the smart machines that have the potential to be our servants, partners, or masters.").

[22] As such, this effort has many parallels with the work in the mid-1990s of legal scholars to avoid the initial confusion surrounding the characterization and regulation of the then emerging phenomena of the Internet. Their insights and shortcomings are deeply enshrined in how law and society approach Internet-governance issues. *See, e.g.*, Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103 CALIF. L. REV. 513, 514 (2015) [hereinafter Calo, *Lessons of Cyberlaw*] ("In the mid-1990s, a movement arose among legal academics . . . . Known by the name cyberlaw, its central tensions flow from the essential qualities of the Internet, by which I mean the characteristics that distinguish the Internet from prior or constituent technology such as computers or phones.").

robot,[23] in evidence for robot testimony,[24] in contract for a meeting of the minds and circuits,[25] in First Amendment jurisprudence for machine speech,[26] in criminal law for robotic mens rea, in taxation for how to count the work of robots for unemployment insurance purposes,[27] in antitrust for fully automated corporations,[28] in policing for robo-police brutality,[29] and in intellectual property for whether a robot can create copyrightable material[30] and patents.[31] Much of our doctrinal framework might be disrupted by the rise of the machines. But all of these substantive law debates presume that we have an answer to the threshold procedural question of how to sue a robot and enforce these substantive questions.

Two simple examples illustrate the importance of how we approach this procedural question. Imagine a not-too-distant future in which autonomous trucks

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[23] *See generally* Karni Chagal-Feferkorn, *The Reasonable Algorithm*, U. ILL. J.L. TECH. & POL'Y (forthcoming 2018) (discussing standards for determining tort liability for algorithms and their authors).

[24] Andrea Roth, *Machine Testimony*, 126 YALE L.J. 1972, 1972 (2017) [hereinafter Roth, *Machine Testimony*] ("[The article] explains why machine sources can be 'witnesses' under the Sixth Amendment"); *see also* Andrea Roth, *Trial by Machine*, 104 GEO. L.J. 1245, 1245 (2016) [hereinafter Roth, *Trial by Machine*] (exploring "the rise of 'machines' in criminal adjudication").

[25] *See generally* Anthony J. Casey & Anthony Niblett, *Self-Driving Contracts*, 43 J. CORP. L. 1 (discussing implications of contracts that "writes its own terms or fills its own gaps.").

[26] *See generally* Tim Wu, *Machine Speech*, 161 U. PA. L. REV. 1495 (2013) (discussing how the First Amendment applies to algorithms); Stuart Minor Benjamin, *Algorithms and Speech*, 161 U. PA. L. REV. 1445 (2013) (analyzing whether algorithms are protected under the First Amendment); Toni M. Massaro et al., *Siri-ously 2.0: What Artificial Intelligence Reveals about the First Amendment*, 101 MINN. L. REV. 2481 (2017) (discussing the extension of free speech rights to AI speakers).

[27] *See, e.g.*, Georgina Prodhan, *Europe's Robots to Become 'Electronic Persons' Under Draft Plan*, REUTERS (June 21, 2016), http://www.reuters.com/article/us-europe-robotics-lawmaking-idUSKCN0Z72AY [https://perma.cc/UH3P-PW5B] (noting the EU's plan to make robots 'electronic persons' for tax purposes under draft plan).

[28] *See, e.g.*, HANS MORAVEC, ROBOT: MERE MACHINE TO TRANSCENDENT MIND 132–34, 139–41 (1999) (arguing that antitrust law must limit the growth and extent of fully automated corporations run entirely by robots).

[29] *See* Noel Sharkey et al., *The Coming Robot Crime Wave*, COMPUTER, Aug. 2010, at 116 (noting how police departments increasingly rely on robots for police functions).

[30] *See, e.g.*, Annemarie Bridy, *Coding Creativity: Copyright and the Artificially Intelligent Author*, 2012 STAN. TECH. L. REV. 5, 21 (noting that robots, even if authors-in-fact, cannot hold copyrights because they have no legal personhood); *see also About Magenta*, MAGENTA, https://magenta.tensorflow.org/ [https://perma.cc/37J8-QESP] ("Magenta is a research project exploring the role of machine learning in the process of creating art and music.").

[31] *See* ROBERT PLOTKIN, THE GENIE IN THE MACHINE: HOW COMPUTER-AUTOMATED INVENTING IS REVOLUTIONIZING LAW AND BUSINESS 51–52 (2009) (noting that a company used a "Creativity Machine" to generate patentable innovations).

crisscross the nation, picking up and depositing cargo on their own.[32] A foreign company, call it McIntyre Inc., ships these autonomous trucks to the United States.[33] McIntyre hopes to maximize profit as much as it can, wherever it can. It excludes no region or State from where the autonomous truck may operate, but, of course, it seeks to avoid any legal liability in the United States. One of McIntyre's trucks drives through New Jersey where it is involved in a crash with Nicastro that severs four fingers from his right hand. Can Nicastro sue McIntyre in New Jersey, or, really, anywhere in the United States?

If a human had driven the truck, the answer would be fairly straightforward. The truck driver is capable of manifesting purposeful availment sufficient to satisfy the minimum contacts test.[34] She has evinced "implied consent" to personal jurisdiction over her in New Jersey courts.[35] But a robot, as currently conceptualized, is just property. Property cannot have intent (only owners of property can).[36] Without intent, there can be no purposeful availment, no implied consent, and therefore, no personal jurisdiction over McIntyre in New Jersey.[37] This result is striking, in part, because Nicastro might not have been able to tell whether the truck that injured him was driven by a human or an autonomously acting machine. And yet that difference determines whether he has access to domestic courts or must pursue his claim in a

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[32] *See, e.g.*, Tiffany Hsu, *Self-Driving Trucks, Delivery Vans at Vanguard of Autonomous Vehicle Revolution*, TRUCKS.COM (Apr. 13, 2017), https://www.trucks.com/2017/04/13/self-driving-trucks-autonomous-vehicle-revolution/ [https://perma.cc/Q6DD-BFNQ] ("[L]ong-haul trucks, delivery vans, fleet units and other business-based vehicles will be at the front lines as self-driving vehicles are introduced onto city streets.").

[33] This example is loosely based on *J. McIntyre Machinery v. Nicastro* and borrows extensively from Justice Ginsburg's dissent. *See* J. McIntyre Mach., Ltd. v. Nicastro, 564 U.S. 873, 893–910 (2011) (Ginsburg, J., dissenting).

[34] *See, e.g.*, Hanson v. Denckla, 357 U.S. 235, 253 (1958) ("[I]t is essential in each case that there be some act by which the defendant *purposefully avails* itself of the privilege of conducting activities within the forum State, thus invoking the benefits and protections of its laws.") (emphasis added).

[35] *Compare J. McIntyre Mach., Ltd.*, 564 U.S. at 887 (2011) (majority opinion) ("At no time did petitioner engage in any activities in New Jersey that *reveal an intent* to invoke or benefit from the protection of its laws." (emphasis added)) *with id.* at 900 (Ginsburg, J., dissenting) ("[I]n *International Shoe* itself, and decisions thereafter, the Court has made plain that legal fictions, notably 'presence' and 'implied consent,' should be discarded, for they conceal the actual bases on which jurisdiction rests.").

[36] *See* Calo, *Lessons of Cyberlaw*, *supra* note 22, at 539 ("Little is gained, and much is arguably lost, by pretending contemporary robots exhibit anything like intent.").

[37] Intent is, of course, a vital concept in many other areas of law as well (e.g., transferred intent in tort).

foreign, expensive, and perhaps unsympathetic forum.[38] If domestic courts are not available, he likely will not sue at all—anywhere.

Similarly, imagine that New Jersey has a statute that regulates truck deliveries and requires contributions to state programs (e.g., a worker's unemployment fund or highway infrastructure fund).[39] Even though McIntyre's autonomous trucks contribute to a significant volume of interstate commercial activity that touches on New Jersey, McIntyre does not contribute to the state programs as required by the state statute. Can the State of New Jersey acquire personal jurisdiction over McIntyre and enforce its statutes? The answer to this question determines the viability of its substantive regulatory and taxation regimes.[40] Perhaps even more striking, the answer to this question does not just affect activity within courts, but it could also shape whether McIntyre employs humans in New Jersey or opts for machines. How we conceptualize robots for jurisdictional purposes shapes liability, regulation and taxation regimes, and primary conduct.

It is not surprising that *in personam* jurisdiction as here described does not mesh easily with robots. They are not persons and courts crafted in personam jurisdiction with human persons in mind (with uneasy extensions to corporations). Personal jurisdiction is not the only area of procedure where robots do not fit snugly within the current doctrinal framework. Other areas of procedure similarly assume human or human-like entities. For example, diversity jurisdiction is based on citizenship.[41] Citizenship is a concept easily applied to persons and to corporations by statute,[42] but currently not to robots (thus affecting whether Nicastro in the example above has access to federal courts and whether a state court case is removable[43]). Similarly, there is no clear way to serve a summons and complaint on a robot, use tag jurisdiction on a robot, to implead robots, to punish robots for spoliation, to claim-preclude robots,[44] garnish wages from a robot, or to conceive of punitive damages

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[38] Relatedly, humans and even corporations can be "at home" in a state and thus subject to general jurisdiction. But robots, as currently conceived, cannot be at home anywhere because property does not have a home, only a location. *See* Goodyear Dunlop Tires Operations, S.A. v. Brown, 564 U.S. 915, 919 (2011); *see also* BNSF R.R. Co. v. Tyrrell, 137 S. Ct. 1549, 1561 (2017) (Sotomayor, J., concurring in part and dissenting in part) ("It is individual plaintiffs, harmed by the actions of a farflung foreign corporation, who will bear the brunt of the majority's approach and be forced to sue in distant jurisdictions with which they have no contacts or connection.").

[39] This example is loosely based on Int'l Shoe Co. v. Washington, 326 U.S. 310 (1945).

[40] As robots do more and more work previously performed by humans, the question of how to tax robots will have profound consequences on the tax-base of many jurisdictions and the possibility of a wealthy, stable, post-work world.

[41] *See* 28 U.S.C. § 1332 (2012).

[42] *Id.* § 1332(c)(1) ("[A] corporation shall be deemed to be a citizen of every State and foreign state by which it has been incorporated and of the State or foreign state where it has its principal place of business").

[43] *See, e.g.*, *id.* § 1441 (in-state defendant exception).

[44] Does litigation against a robot preclude its owner, does litigation against a robot's owner create a preclusion effect against the robot? *See generally* Taylor v. Sturgell, 553 U.S. 880, 892–93 (2008) (noting the "deep-rooted historic tradition that everyone should have his

against robots.[45] Well-established conflict of laws doctrines utilize residency and intent to establish a domicile as cornerstones of their practical and normative appeal.[46] But robots as property cannot have intent to establish a domicile in ways humans can.[47] All of these doctrines and statutes, among many more, are designed with human actors in mind, not autonomous robots.[48]

This Article's main purpose is to take a foundational and broad view at how robots could be integrated into our human-centric litigation model. Part I makes clear the urgency of filling this procedural gap by descriptively situating the scale of autonomous robot-human interactions. Doing so lays the groundwork for the rest of the Article by answering "why now?" The answer has much to do with truckers. Currently, trucking provides 2 million well-paid blue-collar jobs to people around the country.[49] What if autonomous robots supplant those jobs and jobs in many other sectors of the economy?[50] Arguably, that is a far greater threat than outsourcing or

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own day in court") (internal quotation marks and citations omitted).

[45] *See, e.g.*, State Farm Mut. Auto. Ins. Co. v. Campbell, 538 U.S. 408, 419 (2003) (tying the availability and extent of punitive damages, in part, to whether "the harm was the result of intentional malice, trickery, or deceit, or mere accident").

[46] *See* RESTATEMENT (FIRST) OF CONFLICT OF LAWS § 15(2) (1934) ("To acquire a domicil of choice, a person must establish a dwelling-place with the intention of making it his home."); RESTATEMENT (SECOND) OF CONFLICT OF LAWS § 145(1)–(2) (1971) ("The rights and liabilities of the parties with respect to an issue in tort are determined by the local law of that state which, with respect to that issue, has the most significant relationship to the occurrence and the parties" taking into account a variety of factors including "the *domicil*, *residence*, nationality, place of incorporation, and place of business of the parties" (emphasis added)).

[47] *See generally* Jack L. Goldsmith III, Note, *Interest Analysis Applied to Corporations: The Unprincipled Use of a Choice of Law Method*, 98 YALE L.J. 597 (1989) (noting the difficulties associated with attributing a "domicile" to corporations).

[48] On the federal level, capacity to sue is generally tied in this context to state rules that currently do not take robots into account. *See* FED. R. CIV. P. 17(b)(3) ("Capacity to sue or be sued is determined as follows: . . . for all other parties, by the law of the state where the court is located.").

[49] TABLE 2.7 EMPLOYMENT AND OUTPUT BY INDUSTRY, 2006, 2016, AND PROJECTED 2026, BUREAU OF LAB. STATS., https://www.bls.gov/emp/ep_table_207.htm [https://perma.cc/8M6Q-JAZM]. Many more earn a living by driving commercially non-truck vehicles. *Id.*

[50] Robots do not threaten all sectors of the economy equally. For example, it is more difficult to replace a lawyer with a robot than a fast-food worker. For now. *See generally* Steve Lohr, *A.I. Is Doing Legal Work. But It Won't Replace Lawyers, Yet*, N.Y. TIMES (Mar. 19, 2017), https://www.nytimes.com/2017/03/19/technology/lawyers-artificial-intelligence.html [https://perma.cc/K8DC-Z9J4] ("[L]ike it or not, a robot is not about to replace your lawyer"); *Cf.* Steve Lohr, *A.I. Will Transform the Economy. But How Much, and How Soon?*, N.Y. TIMES (Nov. 30, 2017) https://www.nytimes.com/2017/11/30/technology/ai-will-transform-the-economy-but-how-much-and-how-soon.html [https://perma.cc/YXK2-FDT8] ("[T]he number of Americans who will have to find new occupations by 2030 ranges from 16 million to 54 million—depending on the pace of technology adoption.").

foreign competition.[51] For the first time it is imaginable that robots could soon drive many of these trucks cheaper and safer without the need for rest, sleep, or bathroom breaks.[52] Just as the invention of tractors has made farming more efficient, autonomous trucks could make trucking more efficient.[53] However, the potential for social upheaval is massive. If robots are not properly regulated, taxed, and held legally accountable for mistakes, it will only take one highway accident to bring out the villagers with pitchforks to burn down every robot in sight.[54]

The astonishing expansion of what robots can do, where we use them, and the speed with which they are infiltrating society is rendering many legal doctrines obsolete. We would do well to deliberate carefully about legal responses to the age of robots and adjust our litigation system now in recognition of changes that have already taken place and anticipating the further rise of machines. If we do not, civil procedure will be obsolete with regard to a huge engine of social and economic transformation.

Part II outlines different analytical frameworks for how we can approach the question of robots in civil litigation. It specifies three conceptual approaches that help to frame our thinking about the role of non-humans in litigation settings. Often unnoticed and unarticulated, these analytical frameworks structure important doctrinal and normative thinking. This section makes them explicit and evaluates

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[51] *See, e.g.*, BRYNJOLFSSON & MCAFEE, *supra* note 9, at 185 ("[O]ffshoring is often only a way station on the road to automation."); *see also* Friedhelm Greis, *Trump-Regierung sorgt sich um Jobs für Trucker [Trump Government Worries About Jobs for Truckers]*, GOLEM.DE (Mar. 1, 2017), https://www.golem.de/news/autonome-lkw-trump-regierung-sorgt-sich-um-jobs-fuer-trucker-1703-126472.html [https://perma.cc/97L4-PLFW].

[52] *See generally* COMMERCIAL MOTOR VEHICLE FACTS, U.S. DEP'T OF TRANSP. (2010), https://ai.fmcsa.dot.gov/CarrierResearchResults/PDFs/CMVFacts/CMVFacts-Dec2010-02082011.pdf [https://perma.cc/76TA-4RKG] (reporting that trucks are involved in almost 300,000 accidents a year, 3000 of which result in fatalities). *See also* Dougherty, *supra* note 1 ("Autonomous technology will help trucking companies reduce labor costs in the long run, first by extending the number of hours trucks are in operation, and later, by reducing the number of drivers. The industry spends billions of dollars a year on accidents that are largely caused by human error, and billions more on insurance premiums that should go down if and when self-driving technology is proven to be safer than human drivers.").

[53] *See generally* Wassily Leontief, *National Perspective: The Definition of Problems and Opportunities*, *in* THE LONG-TERM IMPACT OF TECHNOLOGY ON EMPLOYMENT AND UNEMPLOYMENT 3, 3–4 (1983) ("[T]he role of humans as the most important factor of production is bound to diminish—in the same way that the role of horses in agricultural production was first diminished and then eliminated by the introduction of tractors.").

[54] *See generally* Calo, *Lessons of Cyberlaw*, *supra* note 22, at 517 ("[T]he widespread distribution of robotics in society will, like the Internet, create deep social, cultural, economic, and of course legal tensions long before the advent of science fiction."); Kevin Roose, *His 2020 Campaign Message: The Robots Are Coming*, N.Y. TIMES (Feb. 10, 2018), https://www.nytimes.com/2018/02/10/technology/his-2020-campaign-message-the-robots-are-coming.html [https://perma.cc/7XD8-NVCK] ("We have five to 10 years before truckers lose their jobs . . . and all hell breaks loose." (internal quotation marks omitted)).

their strengths. The first approach is ontological, answering questions about the status of robots based on their essential nature. The second approach is deontological, grounding litigation rights in moral obligations we have or do not have toward robots. The last is functional, asking about the practical effects in litigation of treating robots as separate from their owners. A theory of robot litigation could also mix and match elements of all three approaches. Whether unconscious or deliberate, these three analytical frameworks animate much of our thinking about different ways of treating non-humans in the law.

Part III applies these analytical frameworks to evaluate numerous concrete contestant models for treating robots as litigation entities. The possibilities are broad, ranging from treating robots for litigation purposes as property, corporations, employees, slaves, franchisees, subsidiaries, children, animals, agents, or subcontractors. This taxonomy exposes the weaknesses of analogizing robots to established models. None fits, and all would have negative practical consequences. Part III concludes by exposing the great Faustian bargain inherent in many of the existing litigation models. Analogizing robots to an existing model would make enforcement of laws easier but would also lower how much can be recovered in enforcement.

To solve this dilemma, Part IV argues that we must treat robots as a new litigation category that borrows insights selectively and partially from a range of the existing models. For example, we must craft a new *in robotam* jurisdiction doctrine to supplement the old *in personam* jurisdiction doctrine. We must develop separate standards for how a robot establishes a domicile for choice-of-law purposes, how liability is shared between robot and owner, how wages are garnished from a robot, and the many other procedural rules that hinge on an understanding of intent, personhood, and independent agency. Only by unshackling robots from existing litigation frameworks can we escape the old Faustian bargain.

The main arguments against this proposal are that it will be complicated and stifle the development of new and exciting robot technology. However, we do not want development of just any robot technology. We want *responsible* robot technology that is mindful of the legal harm robots can cause. Only by unbundling litigation doctrines and tailoring them to the practical realities of robots as litigation entities can we provide courts with the tools and flexibility to take account of rapidly developing technology and changing social views of how robots integrate into our society.

Part IV concludes by looking into the crystal ball and projecting future strengths and weaknesses of treating autonomous robots as something other than property for litigation purposes. It argues that a procedural status as an artificial person can lay the groundwork for a substantive status as a kind of person entitled to basic and constitutional rights. Slowly, unintentionally, clandestinely, robots could build on procedural foundations to become substantive rights-bearers (just as corporations did before them).[55] This possibility gives great urgency to procedural discussions about the status of robots in our legal system.

I. THE ROBOTS ARE COMING

Robots in various forms have been with us for a long time, mostly on factory floors. However, a tidal wave of new robots is sweeping into public spaces. Robots are becoming pervasive and integrated into the fabric of daily life. They drive us around, assist us at work, take care of our elders and children,[56] and increasingly build, grow, and transport the things we eat and consume.[57] This section explains how robots are doing more, more autonomously, and why they are no longer confined to factory floors but exist out there in our shared world. Understanding how and why this is happening is the foundation for recognizing the ways in which robots might disrupt existing legal regimes (both for good and for bad). This section will conclude by highlighting how this potential for disruption is being recognized in many substantive areas of law but how procedure has not similarly responded.

A. Moving Beyond Factories

I will discuss issues surrounding the precise definition of robots below.[58] For now I will use as a working definition of robots "a mechanical object that exhibits near, at, or beyond human autonomous decision-making capacity." This is a crude definition. Its sole purpose is to capture the thought that if I cannot tell whether a human or a machine is driving the truck next to me on the highway, then this might require us to rethink litigation practices when the truck collides with my car.

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[55] *See generally* Citizens United v. Fed. Election Comm'n, 558 U.S. 310 (2010) (holding that corporations are protected by the First Amendment).

[56] *See, e.g.*, Rachel Botsman, *Co-Parenting with Alexa*, N.Y. TIMES: OPINION (Oct. 7, 2017), https://www.nytimes.com/2017/10/07/opinion/sunday/children-alexa-echo-robots.html [https://perma.cc/Q5HU-BBGG] ("The next generation will grow up in an age where it's normal to be surrounded by autonomous agents, with or without cute names. The Alexas of the world will make a raft of decisions for my kids . . . .").

[57] *See also* Conrad De Aenlle, *A.I. Has Arrived in Investing. Humans Are Still Dominating.*, N.Y. TIMES (Jan. 12, 2018), https://www.nytimes.com/2018/01/12/business/ai-investing-humans-dominating.html [https://perma.cc/9JRP-NH3R] ("Machines are starting to take the place of the people who flip burgers, drive across town and, lately, manage stock portfolios.").

[58] *See infra* Section II.A & IV.B.

The reason why robots of this variety have suddenly become an issue for civil procedure is two-fold: robots can do more than ever, *and* they are doing it out there in the world. Planes, for example, can largely do without pilots these days.[59] Autonomously driving cars can ferry blind passengers.[60] As these examples illustrate, these robots are no longer confined to factory floors where previous generations of robots toiled. Instead, they control machinery in spaces they share with all of us.

This shift is significant because the environments of robots in the past were rigidly controlled, and human proximity to them limited.[61] Controlling the liability surrounding such bolted-down robots was achieved in significant part by fencing them off.[62] However, barriers and emergency-off buttons are not feasible out there on a highway. Similarly, since access to factory robots could be controlled, factory owners could limit proximity to these robots to workers covered by workers' compensation regimes, thereby managing their own liability.[63] Finally, factory robots do not create jurisdictional and choice-of-law issues like autonomous vehicles since they stay put and do not cross state lines.

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[59] *See generally* John Markoff, *Planes Without Pilots*, N.Y. TIMES (Apr. 6, 2015), https://www.nytimes.com/2015/04/07/science/planes-without-pilots.html?mcubz=1 [https://perma.cc/6XRX-2W6N] ("Advances in sensor technology, computing and artificial intelligence are making human pilots less necessary than ever in the cockpit. Already, government agencies are experimenting with replacing the co-pilot, perhaps even both pilots on cargo planes, with robots or remote operators. . . . In a recent survey of airline pilots, those operating Boeing 777s reported that they spent just seven minutes manually piloting their planes in a typical flight. Pilots operating Airbus planes spent half that time.").

[60] Google, *Self-Driving Car Test: Steve Mahan*, YOUTUBE (Mar. 28, 2012), https://www.youtube.com/watch?v=cdgQpa1pUUE [https://perma.cc/8BT4-6ZA2].

[61] *See, e.g.*, KAPLAN, *supra* note 9, at 6 ("To date, automation has mostly meant special-purpose machines relegated to performing repetitive, single tasks on factory floors, where the environment is designed around them. In contrast, these new systems will be out and about, tending fields, painting houses, cleaning sidewalks, washing and folding laundry.").

[62] *See, e.g.*, U.S. DEP'T OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMIN., STD 01-12-002, GUIDELINES FOR ROBOTICS SAFETY (1987) (emphasizing the value of placing around robots an "Interlocked Barrier Guard" and "Fixed Barrier Guard" as well as "Awareness Barrier Device" and "Presence Sensing Devices").

[63] *See generally* F. Patrick Hubbard, *"Sophisticated Robots": Balancing Liability, Regulation, and Innovation*, 66 FLA. L. REV. 1803, 1830–31 (2014) ("Because so many robots are used in factories and other employment settings, injuries to workers by robotic machines have been the impetus for employees to bring numerous claims. Tort suits against employers are complicated by the fact that employees injured on the job are usually covered by workers' compensation. In most states, workers who are injured while working for their employer cannot sue the employer in tort; workers' compensation is their *exclusive* remedy. In effect, the employer is immune from most tort suits brought by an employee." (citations omitted)).

B. More Autonomously

Understanding how robots have left the factory floor is important to assess how civil procedure should treat robots. Modern robots are acting more and more autonomously than robots of the past because of the confluence of cheap sensors, exponential growth in abundant computation power, and breakthroughs in artificial intelligence.[64] I will focus here on the artificial intelligence element because of the potentially serious implications for procedure.

Until very recently, much programming was algorithmic in nature, leading a program through a series of instructions, step-by-step, to a conclusion. Typically, and by design, these instructions marched from one set of input to the same set of output. This led to the widespread thought in popular culture that computers can only do what they are programmed to do. More recently, two new modes of programming have shown their practical usefulness: machine learning and genetic programming. Both are different from traditional algorithmic programing and might disrupt numerous legal frameworks.

Machine learning typically relies on programming that mimics neural networks.[65] In this approach, computation is based on multiple layers of artificial neurons. Connections between these neurons can be strengthened or weakened over time. A program is "trained" on a set of known inputs. For example, the program is shown a series of pictures, some containing a chair and some containing a dog.[66] These pre-coded examples help to train the network by adjusting the weights between artificial neurons. The advent of big data has contributed to neural networking programming because it has greatly expanded (in many areas) the stock of pre-coded examples that can be used to train an artificial neural network. One famous example is Google Translate. It went from being barely passable to surprisingly useful when the team switched to machine learning paired with a deep

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[64] *See generally* Matthew U. Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies*, 29 HARV. J.L. & TECH. 353, 354 (2016) ("Artificial intelligence ("AI") permeates our lives in numerous subtle and not-so-subtle ways, performing tasks that, until quite recently, could only be performed by a human with specialized knowledge, expensive training, or a government-issued license."); *see also* Gideon Lewis-Kraus, *The Great A.I. Awakening*, N.Y. TIMES MAG. (Dec. 14, 2016), https://www.nytimes.com/2016/12/14/magazine/the-great-ai-awakening.html?_r=0 [https://perma.cc/99Z3-8XPN].

[65] As such, I will treat "machine learning" here as a family of computational approaches. The discussion reduces a massive amount of complexity and variation for the sake of brevity and focus.

[66] Cade Metz, *A New Way for Machines to See, Taking Shape in Toronto*, N.Y. TIMES (Nov. 28, 2017), https://www.nytimes.com/2017/11/28/technology/artificial-intelligence-research-toronto.html?hpw&rref=technology&action=click&pgtype=Homepage&module=well-region&region=bottom-well&WT.nav=bottom-well [https://perma.cc/EKK2-WAWH] ("Loosely modeled on the web of neurons in the human brain, neural networks are algorithms that can learn discrete tasks by identifying patterns in large amounts of data. By analyzing thousands of car photos, for instance, a neural network can learn to recognize a car.").

stock of pre-coded examples from government translation projects.[67] Many robots that accomplish increasingly more autonomous tasks out there in the world rely on such (or similar) machine learning. This is relevant for litigation purposes for what it is and for what it is not.

While machine learning is built on the insights of human neural networks, it does not replicate the human brain.[68] As the saying goes, airplanes were inspired by birds, but they do not flap their wings. Similarly, artificial intelligence built on artificial neural networks is inspired by human brains but does not re-create human brains in a computational environment. This means, among many other things, that we must be very cautious about the use of terms like "artificial intelligence," "robot brain," "thoughts," "intention," and the like. An autonomously driving car on the highway might behave a lot like a car driven by a human, but the computational thought processes that led to the behavior are very different. Robots do stuff (e.g., turn on the blinker and switch lanes). But they do not have intentions, desires, passions, or consciousness (all important categories in many areas of law) in the same way humans do.[69]

Equally startling, artificial neural networks cannot tell us how they do things or how they arrived at a conclusion.[70] They are inscrutable.[71] Even if they get it right every time (e.g., sorting pictures of dogs and chairs perfectly), we cannot peer into their workings to understand how they accomplish a task.[72] To do so would require

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[67] *See, e.g.*, Lewis-Kraus, *supra* note 64 ("The original Rosetta Stone of statistical machine translation was millions of pages of the complete bilingual records of the Canadian Parliament.").

[68] *See, e.g.*, Cade Metz, *Chips Off the Old Block: Computers Are Taking Design Cues from Human Brains*, N.Y. TIMES (Sept. 16, 2017), https://www.nytimes.com/2017/09/16/technology/chips-off-the-old-block-computers-are-taking-design-cues-from-human-brains.html [https://perma.cc/VZ5P-E6WL] ("[S]ome of the world's largest tech companies . . . are rethinking the very nature of computers and are building machines that look more like the human brain . . . .").

[69] *See generally* KAPLAN, *supra* note 9, at 4 ("You might reasonably describe [robots] as exhibiting superhuman intelligence, but that's misleading—at least for the foreseeable future—because these machines aren't conscious, self-reflective, and don't exhibit any hint of independent aspirations or personal desires.").

[70] *See, e.g.*, Tad Friend, *Sam Altman's Manifest Destiny*, NEW YORKER (Oct. 10, 2016), https://www.newyorker.com/magazine/2016/10/10/sam-altmans-manifest-destiny [https://perma.cc/298Y-SJRW] ("Y Combinator has even begun using an A.I. bot . . . to help it sift admission applications: the bot's neural net trains itself by assessing previous applications and those companies' outcomes. 'What's it looking for?' I asked Altman. 'I have no idea,' he replied. 'That's the unsettling thing about neural networks—you have no idea what they're doing, and they can't tell you.'").

[71] Cade Metz, *Competing with the Giants in Race to Build Self-Driving Cars*, N.Y. TIMES (Jan. 4, 2018), https://www.nytimes.com/2018/01/04/technology/self-driving-cars-aurora.html [https://perma.cc/ZW38-GVNJ] ("There is no means of determining exactly why a machine reaches a particular decision.").

[72] KAPLAN, *supra* note 9, at 4 ("They are incredibly good at specific tasks, but we don't fully understand how they do what they do.").

us to simulate a complex artificial neural network in our own head.[73] This is a task that is simply beyond the computational capacity of human brains.

The second computation approach worth mentioning here is genetic and evolutionary programing.[74] The basic idea with these approaches is to construct a range of programs that perform tasks, compete against each other, and change (often randomly) over time.[75] Variations of the program that complete tasks well survive and thrive. They create more copies of themselves with slight modifications for the next iteration. Variations of the program that do not complete tasks well wither and eventually die. In this semi-structured manner programs can emerge that were not contemplated by any human. A human might have contemplated the process of genetic programing, but not the particular program that emerged as a result of the process.

The rise of genetic programming and machine learning (sometimes also combined) is relevant to the discussion at hand because it can be used to design robots that, in some sense, evolve beyond the intent of their creators. To the extent they do, this makes it more difficult to ascribe the intent of the robot to the intent of the owner of the robot. More recently, prominent companies have also started to invest heavily in "artificially intelligent machines that can build other artificially intelligent machines."[76] This removes humans one layer farther away from the actions and decisions of machines.[77] If successful, this would make it more difficult still to trace human intent to machine behavior.[78]

Together, cheap sensors, amble computational power, and artificial intelligence innovations like machine learning and genetic programing have reshaped what robots can do, where they can do it, and how little supervision they need.

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[73] *Id.* at 30 ("In most cases, it's impossible for the creators of machine learning programs to peer into their intricate evolving structure to understand or explain what they know or how they solve a problem, any more than I can look into your brain to understand what you are thinking about.").

[74] Again, I will use the term "genetic programming" as a crude shorthand for a family of approaches. *See generally* J.R. KOZA, GENETIC PROGRAMMING: ON THE PROGRAMMING OF COMPUTERS BY MEANS OF NATURAL SELECTION, 1 (1992) (exploring whether "computers can solve problems without being explicitly programmed," or, in other words, whether computers can "be made to do what is needed to be done without being told explicitly how to do it").

[75] *Id.*

[76] Cade Metz, *Building A.I. that Can Build A.I.*, N.Y. TIMES (Nov. 5, 2017), https://www.nytimes.com/2017/11/05/technology/machine-learning-artificial-intelligence-ai.html [https://perma.cc/PWC8-M4YF].

[77] Machines could, of course, also design machines that design machines, thus adding more and more layers of design between humans and outcomes.

[78] Metz, *supra* note 71(noting that modern robots "operate in ways that their human designers cannot necessarily anticipate or understand.").

C. New Social, Political, and Economic Issues

These developments have led to significant engagement with issues surrounding robots as exemplified by a steady outpouring of TV shows, movies, and stories about robots killing humans and or surpassing us in intelligence and humanity.[79]

While entertaining, the more pressing and realistic concerns raised by autonomous robots are found elsewhere. Robots are not competing with us for political or military supremacy, but they have the potential to radically alter who works, who holds wealth, and who is at the mercy of malfunctioning robots.[80]

A fierce debate is currently taking place in numerous fields whether robots are simply replacing some kinds of work (e.g., truck driving) with other kind of work (e.g., engineering autonomous trucks) or whether autonomous robots will make humans obsolete altogether in many current fields of employment.[81] Either way, the companies and people who control and own the robots will reap enormous economic benefits. Meanwhile, people whose jobs will be performed by robots will suffer economically.[82]

This suggests a new era of great opportunities and dangers. Likely, the overall economic pie will grow,[83] but the distribution of the pie will also grow ever more

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[79] The contested status of quasi-human machines is an old one that runs at least to the Romantic literature movement of the late 18th and early 19th century. *See, e.g.*, E.T.A. HOFFMAN, *The Sandman*, *in* TALES OF HOFFMAN (Penguin Classics, reprt. ed. 1982) (1816). More recent iterations often trace their themes and tropes to Asimov.

[80] *See, e.g.*, KAPLAN, *supra* note 9, at 201 ("The storied robot Armageddon of book and film won't actually unfold as a military conflict. Machines will not revolt and take up arms to challenge our dominance. Instead, it will be a slow and insidious takeover of our economy, barely perceptible as we willingly cede control to seemingly beneficial synthetic intellects.").

[81] *See generally* MARKOFF, *supra* note 9, at 27 ("[Many technologists believe that] we are on the brink of the creation of an entire economy that runs largely without human intervention."); Illah Reza Nourbakhsh, *The Coming Robot Dystopia*, FOREIGN AFF., Jul.–Aug. 2015, at 23, 27 ("No fundamental barrier exists to stop the untoward march of robots into the labor market: almost every job, blue collar and white collar, will be at risk in an age of exponential progress in computing and robotics."); KAPLAN, *supra* note 9, at 3 ("Whether the website that finds you a date or the robot that cuts your grass will do it the same way you do doesn't matter. It will get the job done more quickly, accurately, and at a lower cost than you possibly can."). *But cf. No, Robots Aren't Killing the American Dream,* N.Y. TIMES: OPINION (Feb. 20, 2017) https://www.nytimes.com/2017/02/20/opinion/no-robots-arent-killing-the-american-dream.html [https://perma.cc/LD7Q-TLD3] (arguing that robots are not hurting human employment as much as commonly believed).

[82] They might also suffer in other ways. Given the centrality of work to the identity of many people, seeing a robot perform your job (and perhaps do it better than you ever did) could entail its own kind of trauma.

[83] *See, e.g.*, BRYNJOLFSSON & MCAFEE, *supra* note 9, at 9–10 ("[T]he transformations brought about by digital technology will be profoundly beneficial ones. We're heading into an era that won't just be different; it will be better, because we'll be able to increase both the

uneven.[84] According to some estimates, roughly half of all U.S. blue-collar and white-collar jobs are at a high risk of significant automation.[85] Even a partial realization of this prophecy could have dramatic economic, social, and political consequences. For example, recent political debates have focused on the role of outsourcing U.S. jobs to factories abroad.[86] However, autonomous robots might be a bigger danger to U.S. manufacturing jobs than foreign competition.[87]

Combined with concentrated wealth, the visible replacement of human labor with robots might already contribute to voting preferences[88] and could have profound political consequences in the long run.[89] For example, imagine if Uber succeeds and replaces its many human drivers with robots. What kind of political response will these replaced humans demand? What kind of social turmoil will this

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variety and the volume of our consumption.").

[84] *See id.* at 133 (noting that "exponential, digital, and combinatorial" technological change is the "primary driver of growing inequality").

[85] *See* Carl Benedikt Frey & Michale Osborne, *The Future of Employment: How Susceptible Are Jobs to Computerisation?*, OXFORD MARTIN SCH. (Sept. 2013),http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf) [https://perma.cc/JGT2-9VSD]; *See also* KAPLAN, *supra* note 9, at 10 ("A broad cross section of today's blue-collar and white-collar jobs will soon come under threat from forged laborers and synthetic intellects respectively. An astonishing range of productive activities, both physical and mental, will become vulnerable to replacement.").

[86] Interestingly, there is some early evidence that factories are returning to the US to be closer to customers but with the significant caveat that the new re-shored factories are mostly run by robots and few jobs compared to their old versions.

[87] Meanwhile, the foreign competition is turning increasingly away from human labor in favor of robots as well. *See, e.g.*, Martin Ford, *China's Troubling Robot Revolution*, N.Y. TIMES: OPINION (June 10, 2015), https://www.nytimes.com/2015/06/11/opinion/chinas-troubling-robot-revolution.html?mcubz=1) [https://perma.cc/YF3J-Q7W7] ("Foxconn, which makes consumer electronics for Apple and other companies, plans to automate about 70 percent of factory work . . . ."). Interestingly, this could contribute to a "reshoring" trend. *See generally* FORD, *supra* note 9, at 9 (noting a "reshoring" trend where work that was previously outsourced to other nations is brought back because of new technologies that, however, rely on fewer workers).

[88] *See, e.g.*, Thomas B. Edsall, *Robots Can't Vote, But They Helped Elect Trump*, N.Y. TIMES (Jan. 11, 2018), https://www.nytimes.com/2018/01/11/opinion/trump-robots-electoral-college.html?action=click&pgtype=Homepage&clickSource=story-heading&module=opinion-c-col-left-region&region=opinion-c-col-left-region&WT.nav=opinion-c-col-left-region [https://perma.cc/L44B-LJZR] ("[T]he workers who experience the highest costs from industrial automation fit the crucial Trump voter demographic . . . .").

[89] *See, e.g.*, BRYNJOLFSSON & MCAFEE, *supra* note 9, at 170–73 (highlighting the connection between technological change, decreased social mobility, and political instability).

instigate?[90] What will extreme concentrations of wealth do to democratic norms?[91] And more pressing still, how will those hurt by malfunctioning robots receive relief?

D. Responses from Substantive Law

Technology leaders have recognized the massive potential inherent in artificial intelligence and the infiltration of robots throughout society, with many of them calling for significant regulation.[92] Congress[93] and other legislators[94] are considering bills to regulate artificial intelligence.

Legal scholars, similarly, have recognized that the widespread infiltration of robots into society could disrupt much of our substantive doctrinal frameworks. For example, robots are more intimately involved in creating and vetting speech than ever before. This has led to a lively debate in First Amendment jurisprudence about the status of "machine speech."[95] Scholarship on the use of machine learning

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[90] *See* KAPLAN, *supra* note 9, at 3 ("[W]e may be in for an extended period of social turmoil.").

[91] *See generally id.* at 11 ("The wealthy [who own and control the robots] will need few, if any, people to work for them at all.").

[92] *See, e.g.*, Eric Mack, *Bill Gates Says You Should Worry About Artificial Intelligence*, FORBES (Jan. 28, 2015), http://www.forbes.com/sites/ericmack/2015/01/28/bill-gates-also-worries-artificial-intelligence-is-a-threat/ [https://perma.cc/789W-UZB5] (quoting Bill Gates as writing that "I am in the camp that is concerned . . . . First the machines will do a lot of jobs for us and not be super intelligent. That should be positive if we manage it well . . . . A few decades after that though the intelligence is strong enough to be a concern."); Peter Holley, *Apple Co-Founder on Artificial Intelligence: "The Future Is Scary and Very Bad for People*," WASH. POST: THE SWITCH (Mar. 24, 2015), http://www.washingtonpost.com/blogs/the-switch/wp/2015/03/24/apple-co-founder-on-artificial-intelligence-the-future-is-scary-and-very-bad-for-people/ [https://perma.cc/2MCX-K2ZP] (quoting Steve Wozniak as saying that "[i]f we build these devices to take care of everything for us, eventually they'll think faster than us and they'll get rid of the slow humans to run companies more efficiently." (internal quotation marks omitted)); Aileen Graef, *Elon Musk: We Are 'Summoning a Demon' with Artificial Intelligence*, UPI (Oct. 27, 2014), http://www.upi.com/Business_News/2014/10/27/Elon-Musk-We-are-summoning-a-demon-with-artificial-intelligence/4191414407652/ [https://perma.cc/6AYU-BDZ7] ("I think we should be very careful about artificial intelligence. If I had to guess at what our biggest existential threat is, it's probably that. . . . I'm increasingly inclined to think there should be some regulatory oversight, maybe at the national and international level, just to make sure that we don't do something very foolish.").

[93] *See, e.g.*, Fundamentally Understanding the Usability and Realistic Evolution of Artificial Intelligence Act of 2017, S. 2217, 115th Cong. (2017), https://www.cantwell.senate.gov/imo/media/doc/The%20FUTURE%20of%20AI%20Act%20Introduction%20Text.pdf [https://perma.cc/U6YX-WGGW].

[94] *See, e.g.*, Automated Decision Systems Used by Agencies, 2017 N.Y.C. Council, Int. No. 1696-A, (N.Y. 2017), legistar.council.nyc.gov/LegislationDetail.aspx?ID=3137815&GUID=437A6A6D-62E1-47E2-9C42-461253F9C6D0 [https://perma.cc/SCB3-H4K2].

[95] *See e.g.*, Wu, *supra* note 26; Benjamin, *supra* note 26; Massaro et al., *supra* note 26.

algorithms in the financial services industries is examining related issues.[96] Similarly, much of tort law is predicated on a stable notion of intent and negligence. However, both concepts are inherently human centric and a poor fit for how robots operate. For example, how does the notion of "transferred intent" apply to a robot that can strike and harm people but cannot form intent? Predictably, this mismatch between doctrine and social reality will call for modifications and clarifications of substantive tort rules as robots do more things that, if done by a human, might constitute an intentional tort or a negligent act.[97] Copyright[98] and patent law,[99] contracts,[100] evidence,[101] taxation,[102] administrative law,[103] criminal law, police regulation,[104] and antitrust law[105] struggle with similar questions. Much of our doctrinal framework could be disrupted by the rise of the machines.

In short, substantive law scholars have recognized the growing need to incorporate the challenges robots pose to our doctrinal thinking. Yet, despite this need, procedural scholarship has not similarly responded.

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[96] *See generally* Chris Odinet, *Consumer Bitcredit and Marketplace Lending,* 69 ALA. L. REV. 781 (2018) (describing how a newly emergent sector of the financial services industry uses machine learning algorithms in the context of loan underwriting to score a borrower's credit application).

[97] *See generally* Chagal-Feferkorn, *supra* note 23, at 2 (discussing how algorithmic decision-makers may face tort claims.).

[98] *See, e.g.*, Bridy, *supra* note 30, at 21 (noting that robots, even if authors-in-fact, cannot hold copyrights because they have no legal personhood); *see also About Magenta*, *supra* note 30 ("Magenta is a Google Brain project to ask and answer the questions, 'Can we use machine learning to create compelling art and music?'").

[99] *See* PLOTKIN, *supra* note 31, at 51–52 (noting that a company used a "Creativity Machine" to generate patentable innovations).

[100] *See generally* Casey & Niblett, *supra* note 25 (discussing the theoretical implications of self-driving contracts).

[101] Roth, *Machine Testimony*, *supra* note 24, at 1972 ("[The article] explains why machine sources can be 'witnesses' under the Sixth Amendment . . . ."); *see also* Roth, *Trial by Machine*, *supra* note 24, at 1245 (exploring "the rise of 'machines' in criminal adjudication").

[102] *See, e.g.*, Prodhan, *supra* note 27 (noting the EU's plan to make robots 'electronic persons' for tax purposes under draft plan).

[103] Cary Coglianese & David Lehr, *Regulating by Robot: Administrative Decision Making in the Machine-Learning Era*, 105 GEO. L.J. 1147, 1147–48 (2017) ("When machine-learning technology is properly understood, its use by government agencies can comfortably fit within conventional legal parameters."); *cf.* Melissa Mortazavi, *Rulemaking Ex Machina*, 117 COLUM. L. REV. ONLINE 202 (2018), https://columbialawreview.org/content/rulemaking-ex-machina/ [https://perma.cc/P9KN-4822] (examining the "key ways that automation can support or hinder the legal exercise of agency action.").

[104] *See generally* Sharkey et al., *supra* note 29, at 116 (noting how police departments increasingly rely on robots for police functions).

[105] *See, e.g.*, MORAVEC, *supra* note 28, at 132–34, 139–41 (arguing that antitrust law must limit the growth and extent of fully automated corporations run entirely by robots).

Civil procedure scholarship has simply overlooked the need to deliberate carefully and early about the impending changes in how robots interact with society and fail to interact with well-established, but increasingly outdated pillars of procedural thinking that were designed long before autonomous robots were imaginable. The following sections aim to make strides to fix this lacuna, first by providing broad analytical frameworks and then by offering concrete proposals.

II. ANALYTICAL FRAMEWORKS

There are many types of legally relevant entities out there roaming the legal savannah. Some, like corporations, have been with us for centuries.[106] Others, like for-profit public benefit corporations, are more recent inventions.[107] The law needs to account for all of them, if only, sometimes, to decide to ignore them. But before judges, legislators, and academics can evaluate substantive and procedural treatments, they must utilize an analytical framework to make sense of an entity. Tacitly or explicitly, the shape of the analytical framework underlies all questions of legal treatment.

There is a great temptation to default into a framework without acknowledging such a choice or questioning its implications. All too often, this choice goes unnoticed and unarticulated, with wide-ranging consequences. The chosen analytical framework drives answers to questions large and small, from abstract discussions of policy, to evaluations of principles and standards, down to the nitty-gritty of statutory construction and rule interpretation.

This section will identify and explain three ideal-type analytical frameworks to evaluate entities in general and robots in particular. The first approach is ontological, answering question about the litigation status of robots based on their essential nature. The second approach is deontological, grounding litigation rights in moral obligations we have or do not have toward robots. The last is functional, asking about the practical effects of treating robots as separate from their owners.

These frameworks can be utilized in all substantive areas of law. For example, a tort scholar might use them to evaluate whether a robot can form the intent to trespass. However, given the aims of this Article, I will focus on procedural questions and examples drawn from the history of procedure.

Preferences of one framework over another affect how we resolve fundamental questions about the role of robots in litigation. Because of this latent influence, it is important to make explicit the conceptual machinery of each framework, its appeal, and its problems.

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[106] Samuel Williston, *History of the Law of Business Corporations Before 1800*, 2 HARV. L. REV. 105 (1888).

[107] *See, e.g.*, Kevin V. Tu, *Socially-Conscious Corporations and Shareholder Profit*, 84 GEO. WASH. L. REV. 121, 125 (2016) ("In response to the perception that corporate law does not adequately facilitate the needs of socially conscious corporations, thirty states and the District of Columbia have enacted Benefit Corporation statutes. These statutes adopt the 'Benefit Corporation' as a new class of corporation under state law." (citations omitted)).

A. Ontological

One way we could approach the question of how to treat robots is to ask what they are. This approach asserts that the essential nature of a thing can guide our thinking about that thing.[108] For example, nobody asks about the role of rocks in litigation because their essential nature is passive and unfeeling. Rocks share few fundamental attributes with entities (like persons or corporations) that can and do litigate.[109] I will first sketch the argumentative structure of such ontological arguments, then illustrate the use of ontological thinking that led courts and commentators to grant corporations (but not animals or plants) litigation rights, before turning to the strengths and weaknesses of ontological thinking as applied to robots.

Ontology is a branch of metaphysics.[110] It is concerned with the nature of being, the types of entities that exist, their properties, and relations. As one of the oldest area of philosophical inquiry, the ontology literature is filled with obscure and abstract questions. However, ontology also captures a common and concrete approach to solve problems in the world. To understand how to deal with a new type of object, ask first about its fundamental nature and then analogize its core attributes to objects you already know. For example, in the early 1990s, commentators and courts inquired into the fundamental nature of the Internet to solve legal problems.[111] Is the Internet at heart a kind of common space? Or is the essence of the Internet that it is not locatable in any specific locale? These are abstract, ontological questions, but they have real consequences for how courts think about jurisdiction,[112] choice of

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[108] *See* Calo, *Lessons of Cyberlaw*, *supra* note 22, at 549 ("[T]transformative technologies tend to have essential qualities that drive the legal and policy conversations that attend them.").

[109] *See* Pater Kahn, Jr. et al., *The New Ontological Category Hypothesis in Human-Robot Interaction*, 2011 PROC. 6TH INT'L CONF. ON HUMAN-ROBOT INTERACTION 159, 160 (2011) ("For the most part, people are not confused about how to categorize most entities in the world. We do not, for example, talk to a brick wall and expect it to talk back, nor do we attribute to it mental capabilities or think of it as a possible friend. But robots appear different.").

[110] And as such distinct from epistemology, ethics, or aesthetics.

[111] *See, e.g.*, Edias Software Int'l v. Basis Int'l, 947 F. Supp. 413, 419 (D. Ariz. 1996) ("The Internet can be described by a number of different metaphors, all fitting for different features and services that it provides. For example, the Internet resembles a highway, consisting of many streets leading to places where a user can find information. The metaphor of the Internet as a shopping mall or supermarket, on the other hand, aptly describes the Internet as a place where the user can shop for goods, information, and services. Finally, the Internet also can be viewed as a telephone system for computers by which data bases of information can be downloaded to the user, as if all the information existed in the user's computer's disc drive." (citations omitted)).

[112] *See, e.g.*, Henry H. Perritt, Jr., *Jurisdiction in Cyberspace*, 41 VILL. L. REV. 1, 13–25 (1996) (examining personal jurisdiction doctrine in the context of cyberspace); Allan R. Stein, *Personal Jurisdiction and the Internet: Seeing Due Process Through the Lens of Regulatory Precision*, 98 NW. U. L. REV. 411, 411–12 (2004).

law,[113] taxation, free speech,[114] and much more.[115] Sometimes, ontological thinking happens explicitly, but frequently such thinking is short-circuited into single terms that do the heavy conceptual lifting. For example, the term "cyberspace" suggests an electronic analogy to a physical space. Use of that term can implicitly or explicitly justify treatment of the Internet as a kind of locale based on the postulated essential nature of the Internet as a quasi-physical space.

Ontological arguments have been used in the context of civil procedure for a long time. One of the clearest examples of this type of thinking concerns corporations. At the founding of the republic, few corporations existed.[116] Within a few decades, they spread across the U.S. economy. Courts were quickly confronted with puzzling questions about how civil procedure should treat corporations. Many courts resorted to ontological arguments. They asked what a corporation "is," inquiring into a corporation's essential nature and attributes. Courts, over time, gave different answers to this ontological question. At times, they treated corporations akin to individuals working together (i.e., roughly large partnerships). At other times, they conceived of the essential nature of corporations as akin to the essential nature of a person because a corporation makes decisions and exhibits agency that cannot be reduced to the agency of the people who own the corporation. These answers about the ontological status of corporations then drove the procedural rights and opportunities afforded to corporations.[117]

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[113] *See, e.g.*, Damon C. Andrews & John M. Newman, *Personal Jurisdiction and Choice of Law in the Cloud*, 73 MD. L. REV. 313, 313–14 (2013).

[114] *See, e.g.*, Universal City Studios v. Corley, 273 F.3d 429, 434 (2d Cir. 2001).

[115] *See generally* Orin S. Kerr, *The Problem of Perspective in Internet Law*, 91 GEO. L.J. 357 (2003) (discussing the internal and external perspectives of Internet law).

[116] *See* Gregory A. Mark, *The Personification of the Business Corporation in American Law*, 54 U. CHI. L. REV. 1441, 1443 (1987) ("Business corporations, of which there were only a handful when America adopted the constitution, grew in size and number as the country expanded and exploited its resources.").

[117] *See supra* notes 17–20 and accompanying text.

Similar ontological arguments, some successful and some not, were made to define the litigation status of cities[118] and more recently of animals,[119] plants, rivers,[120] and other objects.[121]

Thinking about the role of robots in litigation could proceed along similar lines.[122] Using this framework, one first asks about the fundamental nature of a robot.[123] Perhaps the core of robot-ness is autonomous decision-making;[124] or servility, cold rationality, soullessness, or mechanical robustness?[125] Popular culture furnishes many examples of stories that emphasize different aspects of each fundamental trait. A focus on any of these traits could furnish a foundation for a different assessment of litigation-worthiness. Autonomous decision-making, for

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[118] *See generally* Gerald Frug, *The City as a Legal Concept*, 93 HARV. L. REV. 1057 (1980) (examining how the law contributes to the powerlessness of cities); Sarah Lynnda Swan, *Plaintiff Cities*, 71 VAND. L. REV. 1227 (2018) (discussing how plaintiff cities are legally, morally, and sociologically legitimate).

[119] *See, e.g.*, Nonhuman Rights Project, Inc. v. Lavery, 998 N.Y.S.2d 248, 249 (N.Y. App. Div. 2014) (plaintiffs unsuccessfully argued that chimpanzees should be treated as legal persons for some purposes); *see also* Ian E. Waldick, Comment, *Let Willy Free Himself: The Case for Expanding Standing to Marine Mammals to Challenge Regulations of the Public Display Industry*, 31 J. LAND USE & ENVTL. L. 117, 117–48 (2015).

[120] *See* Julie Turkewitz, *Corporations Have Rights. Why Shouldn't Rivers?* N.Y. TIMES (Sept. 26, 2017), https://www.nytimes.com/2017/09/26/us/does-the-colorado-river-have-rights-a-lawsuit-seeks-to-declare-it-a-person.html [https://perma.cc/BL42-YBFP] (describing a lawsuit that "ask[s] a judge to recognize the Colorado River as a person.").

[121] Christopher D. Stone, *Should Trees Have Standing? Revisited: How Far Will Law and Morals Reach? A Pluralist Perspective*, 59 S. CAL. L. REV. 1, 4–5 (1985) (cataloging lawsuits filed "in the name or interest of nonhumans—including a river, a marsh, a brook, a beach, a national monument, a commons, a tree, and a species—with somewhat ambiguous results." (citations omitted)).

[122] *See generally* Calo, *Lessons of Cyberlaw*, *supra* note 22, at 515 ("The *essential* qualities of robotics will drive a distinct conversation." (emphasis added)).

[123] One important implication of this approach is that it is supposed to look beyond superficial traits and build on more fundamental aspects of a robot being. Most notably, this approach avoids inquiring into whether a robot takes a humanoid physical manifestation or not. Notice however that human-like appearance is a vital aspect of our typical thinking about robots. Notice furthermore that most robots are not just modeled on generic humans, but male humans. Female robots are rare and trigger their own (questionable) tropes of seduction and deceit. Amazingly, studies suggest that people discriminate more against robots with feminine names than male names. *See* Benedict Tiong Chee Tay et al., *When Stereotypes Meet Robots: The Effect of Gender Stereotypes on People's Acceptance of a Security Robot*, *in* ENGINEERING PSYCHOLOGY AND COGNITIVE ERGONOMICS: UNDERSTANDING HUMAN COGNITION 261 (Donald Harris ed., 2013).

[124] *Cf.* SAMIR CHOPRA & LAURENCE F. WHITE, A LEGAL THEORY FOR AUTONOMOUS ARTIFICIAL AGENTS 11–13 (2011) (emphasizing the "intentional stance" of robots in relation to a "legal theory for autonomous agents.").

[125] *Cf.* Calo, *Lessons of Cyberlaw*, *supra* note 22, at 549 ("The essential, distinguishing facets of robotics portend a new set of challenges centered around embodying data, harnessing unpredictability, and disentangling person from instrument.").

example, suggests an intellectual capacity expected of litigants. Mechanical robustness, in contrast, does not.[126]

This points to the strengths and weaknesses of ontological approaches to litigation capacity. The main strength is that this approach is intuitive, and perhaps on some level, inescapable.[127] To answer what litigation capacity entity Z has, of course, we would like to know more about the essential qualities of Z.

The main downside of this approach, as the example above suggests, is that it lacks determinacy.[128] Depending on which attributes we focus on, we receive diametrically opposed prescriptions. This would be less of a problem if the underlying attributes were not controversial, but here they are. At heart, we are comparing non-humans to humans and inquire about the essential attributes of personhood.[129] That might just be one of the most contentious concepts in our culture as exemplified in another context by debates about whether to characterize fetuses as persons.[130]

As such, ontological arguments lack determinacy and often appear either as circular or elaborate smoke-screens for deontological or functional arguments.

B. Deontological

A different approach to ontological thinking is deontological thinking.[131] Rather than focusing on the nature of robots, this approach focuses on the moral duties we have toward robots (the answer might be none) and the people who want to sue robots. This approach inquires into what kind of treatments are morally

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[126] *See also* Kahn, Jr. et al., *supra* note 109, at 159–60 (arguing that robots occupy an ontological middle-ground somewhere between object and agent).

[127] For example, artificial intelligence systems themselves rely on a model of knowledge about a domain of objects and their attributes and relations. *See generally* Thomas R. Gruber, *A Translation Approach to Portable Ontology Specifications*, 5 KNOWLEDGE ACQUISITION 199, 199 (1993) ("To support the sharing and reuse of formally represented knowledge among AI systems, it is useful to define the common vocabulary in which shared knowledge is represented. A specification of a representational vocabulary for a shared domain of discourse — definitions of classes, relations, functions, and other objects — is called an ontology.").

[128] *Cf.* Calo, *Lessons of Cyberlaw*, *supra* note 22, at 529 ("Few complex technologies have a single, stable, uncontested definition. Robots are no exception. There is some measure of consensus, however, around the idea that robots are mechanical objects that take the world in, process what they sense, and in turn act upon the world.").

[129] *Id.* at 515. ("Robotics blurs the very line between people and instrument.").

[130] *See, e.g.*, Jonathan F. Will et al., *Personhood Seeking New Life with Republican Control*, 93 IND. L.J. (forthcoming 2018) (noting various legislative attempts at the federal and state level to "provide that the rights associated with legal personhood begin at fertilization.").

[131] I focus on deontological thinking as the strongest candidate within moral philosophy for the task at hand. Others, conceivably, will prefer arguments based on aretaic theories or consequentialists theories (accounted for, in part, in this and the next section, *see infra* Section II.C.).

permitted, required, or forbidden.[132] Instead of focusing on traits that robots might possess, this normative approach focuses on moral obligations and duties.[133] Deontological thinking is frequently explained by contrasting it with consequentialist thinking.[134] Consequentialists evaluate choices by the outcomes they produce.[135] If the outcome is bringing about more "good" (however defined), then the choice is morally compelling.[136] If the outcome reduces the overall good, then the choice is undesirable.[137]

Deontologists question this singular focus with outcomes.[138] If outcomes are all that mattered, then sometimes killing or hurting innocents might be justified, perhaps even morally required. A frequently used example of this critique postulates a doctor who has two dying patients in urgent need of organs. The doctor also has one healthy patient whose organs could save the other two. Some have argued that consequentialism demands that the healthy patient be killed to save the other two.[139]

Deontological thinking can be understood as a rejection of the basic premise of consequentialism. Deontologists hold that moral judgment requires a focus on duties and obligations that are independent of outcomes.[140] Some actions are right and morally required, whether they improve the overall "good" or not. Some things are forbidden and some required. Right takes priority over Good. By rejecting an analysis of effects, deontologists refocus morality on the moral norm to avoid evil. The main attraction of deontological thinking is that it accounts for a sense of moral duty that many people feel independent of elaborate calculations of consequences. Killing is wrong—period.[141]

The main downside of deontological normativity is that it is indeterminate in content and scope. Just as much about consequentialism depends on how we define the "good" to be maximized by our choices, much about deontology depends on what counts as moral evil and moral duty. Even if there were widespread agreement

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[132] LARRY ALEXANDER & MICHAEL MOORE, *Deontological Ethics*, *in* THE STANFORD ENCYCLOPEDIA OF PHILOSOPHY § 2 (Edward N. Zalta, ed., Winter 2016 ed.).

[133] *Id.* § 3.

[134] *See, e.g.*, Larry Alexander, *Deontology at the Threshold*, 37 SAN DIEGO L. REV. 893, 894 (2000) (noting that deontologists believe that "[t]here are some acts that are morally wrong despite producing a net positive balance of consequences . . .").

[135] ALEXANDER & MOORE, *supra* note 132, § 1.

[136] *Id.*

[137] This makes it easy for consequentialist to deal with robots. Often, the "good" to be maximized is happiness. Since robots cannot be happy, they are beyond consequentialist normative theories. Similarly, since robots have no capacity to "suffer" or experience "pain," they are not included in the calculus of minimizing pain (unlike animals). *See* PETER SINGER, ANIMAL LIBERATION: A NEW ETHICS FOR OUR TREATMENT OF ANIMALS 8–9 (1975).

[138] There are of course many other critiques of consequentialism.

[139] *See generally* Judith Jarvis Thomson, *The Trolley Problem*, 94 YALE L.J. 1395 (1985) (discussing various scenarios wherein consequentialism requires a holistic approach).

[140] Heidi M. Hurd, *The Deontology of Negligence*, 76 B.U. L. REV. 249, 252–53 (1996).

[141] Interestingly, humans are currently hard at work to teach robots moral duties. *See, e.g.*, NICK BOSTROM, SUPERINTELLIGENCE: PATHS, DANGERS, STRATEGIES 185 (2014) (discussing efforts to instill our core moral values into artificial agents).

about what counts as a moral duty, its scope is not clear. Do robots have moral standing? Does permanently turning off a robot count as killing a robot?

We do have moral duties towards other humans, of course. If robots were like humans, then they would similarly be under the umbrella of deontological derived moral duties. And the human-like look of many robots makes it tempting to anthropomorphize robots.[142] However, human-like appearances do not make something human.[143] That said, non-human-like entities might someday have traits (other than appearance) that entitle them to human-like treatment.[144] While unlikely, no account should foreclose the possibility that non-humans deserve some aspects of human-like treatment. More troubling still, the law is already willing to treat non-humans such as corporations to some extent as moral agents. For example, corporations can incur criminal liability.[145] Computer scientists and moral philosophers, meanwhile, are creating the emerging field of "computational ethics" to build morality into robots.[146] Their hope is to create "artificial moral agents."[147]

Given the indeterminacy in content and scope, deontological thinking, though intuitive to many, is of limited usefulness in determining the litigation-rights of non-humans.

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[142] *See generally* Kate Darling, *'Who's Johnny?' Anthropomorphic Framing in Human-Robot Interaction, Integration, and Policy, in* ROBOT ETHICS 2.0: FROM AUTONOMOUS CARS TO ARTIFICIAL INTELLIGENCE 173, (Patrick Lin et al. eds. 2017) (emphasizing how people have a tendency to project life-like qualities onto robots that can be enhanced by anthropomorphizing robots through personified name or story); KAPLAN, *supra* note 9, at 36 ("[AI] has a long history of exploiting our natural tendency to anthropomorphize objects that look or act like us in order to attract attention and increase funding.").

[143] *See* Neil Richards & William Smart, *How Should the Law Think About Robots?, in* ROBOT LAW 4 (Ryan Calo et al. eds., 2016) ("Finally, we argue that one particularly seductive metaphor for robots should be rejected at all costs: the idea that robots are 'just like people' . . . [w]e call this idea 'the Android Fallacy.'").

[144] *See generally* F. Patrick Hubbard, *"Do Androids Dream?": Personhood and Intelligent Artifacts*, 83 TEMP. L. REV. 405 (2011) (arguing that artificial entities should be granted a legal right to personhood if they display the capacities for complex thought and communication, a sense of being a self, and an ability to live in a community).

[145] *See, e.g.*, Guilty Plea Agreement at 14–15, United States of America v. BP Exploration & Production, Inc., No. 2:12-cr-00292-SSV-DEK (E.D. LA. Jan. 29, 2013) (admitting to negligently causing the deaths of eleven men and the resulting oil spill).

[146] *See* Cristina Baroglio et al., *Special Issue: Computational Ethics and Accountability*, 18 ASS'N FOR COMPUTING MACHINERY TRANSACTIONS ON INTERNET TECH. 40, 40 (2018); *see also* ISAAC ASIMOV, I, ROBOT 44–45 (1942) (describing the seminal Three Laws of Robotics: "[a] robot may not injure a human being or, through inaction, allow a human being to come to harm . . . [a] robot must obey the orders given it by human beings except where such orders would conflict with the First Law . . . a robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.").

[147] *See generally* Laura Pana, *Artificial Ethics: A Common Way for Human and Artificial Moral Agents and an Emergent Technoethical Field*, 3 INT'L J. TECHNOETHICS 1 (discussing ethics as applied to both humans and artificial moral agents).

C. Functional

The strongest stand-alone candidate for a conceptual framework that can resolve the question of robots in civil litigation is a functional account. It asks about the practical effects of treating robots as separate from their owners for litigation purposes.[148] Does such treatment serve a useful function? This approach shifts our analytical focus away from the lofty realms of philosophy to the pressing and concrete demands and effects of litigation.

Instead of asking about the fundamental nature of robots or whether they are due moral standing, this approach is agnostic towards ontological and deontological questions. Robots' deep essence might one day resemble the essence of humans—or not. Robots might deserve rights—or not. The functional approach sidesteps these (perhaps unanswerable) questions and asks instead about the practical effects of treating robots as separate from their owners for litigation purposes.[149] How would this change litigation when an autonomous truck strikes a pedestrian at the intersection of Main Street and Erie Street? Would it be for the better or worse?

Courts and legislators have engaged in a functional argument about artificial personhood before when dealing with the emergence of corporations. Corporate personhood in litigation is clearly a legal fiction. Corporations have no soul to condemn, no body to punish,[150] can live forever unlike humans,[151] and do not have sentimental feelings towards a house where their child took first steps that leads them to call that place home. And yet, civil procedure routinely anthropomorphizes corporations and asks where they are "essentially at home" for personal jurisdiction purposes,[152] and where they are "citizens" for subject matter jurisdiction purposes.[153]

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[148] As such, in can be understood as a modified consequentialist account.

[149] *See generally* Lawrence B. Solum, Essay, *Legal Personhood for Artificial Intelligences*, 70 N.C. L. REV. 1231, 1232 (1992) (arguing that "only some of the claims made in the debate over the possibility of AI do make a pragmatic difference, and it is the pragmatic differences that ought to be decisive.").

[150] John C. Coffee, Jr., *"No Soul to Damn: No Body to Kick": An Unscandalized Inquiry into the Problem of Corporate Punishment*, 79 MICH. L. REV. 386, 459 (1981).

[151] *See, e.g.*, Trs. of Dartmouth Coll. v. Woodward, 17 U.S. 518, 636 (1819) ("Being the mere creature of law, [the corporation] possesses only those properties which the charter of its creation confers upon it, either expressly, or as incidental to its very existence . . . . Among the most important are *immortality*, and, . . . individuality . . . ." (emphasis added)).

[152] Goodyear Dunlop Tires Operations v. Brown, 564 U.S. 915, 919 (2011) ("A court may assert general jurisdiction over foreign (sister-state or foreign-country) corporations to hear any and all claims against them when their affiliations with the State are so 'continuous and systematic' as to render them *essentially at home* in the forum State." (emphasis added)).

[153] Hertz Corp. v. Friend, 559 U.S. 77, 80 (2010) (holding that the statutory phrase "a corporation shall be deemed to be a citizen of any State . . . where it has a principal place of business" means "the place where the corporation's high level officers direct, control, and coordinate the corporation's activities." (quoting in part 28 U.S.C. § 1332(c)(1) (2012))).

Commentators[154] and courts[155] have recognized that this artificial personhood metaphor is silly, but they have also successfully argued that it is useful. It serves an important function.

That function is to integrate lawsuits by and against corporations into the well-established procedural framework (developed originally for humans) without causing debilitating disruptions. The courts, legislators, and rule-makers believed that avoiding the need to create entity-specific procedures was worth some metaphorical fudging.[156]

This is a noble goal, but it comes at a price. The bending of metaphors like "home" and "citizen" is not only confusing, but it introduces into well-established doctrines inconsistencies and incoherence. Personal jurisdiction doctrine works reasonably well for persons, but is in disarray in large part because of its uneasy extension to corporations. For example, "presence" is one of the cornerstone concepts of personal jurisdiction doctrine.[157] Courts have repeatedly asked what it would mean for a corporation to be "present."[158] For humans that is a relatively easy inquiry: you are present where your body is located.[159] But corporations do not have a body. They are only "present" insofar as human actors working on behalf of the corporation make them present. This has raised endless debates about which human actors, doing what kind of things, in what context, suffice for a corporation to be "present" in a forum.[160]

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[154] *See, e.g.*, Felix S. Cohen, *Transcendental Nonsense and the Functional Approach*, 35 COLUM. L. REV. 809, 810–11 (1935) (arguing that "[n]obody has ever seen a corporation. What right have we to believe in corporations if we don't believe in angels? To be sure, some of us have seen corporate funds, corporate transactions, etc. . . . [b]ut this does not give us the right to hypostatize, to 'thingify,' the corporation, and to assume that it travels about from State to State as mortal men travel." And suggesting it would be much better to inquire into "political or ethical value judgments as to the propriety of putting financial burdens upon corporations . . . .").

[155] *See, e.g.*, Int'l Shoe Co. v. Washington, 326 U.S. 310, 316 (1945) (accepting that, "[s]ince the corporate personality is a fiction, although a fiction intended to be acted upon as though it were a fact, . . . it is clear that unlike an individual its 'presence' without, as well as within, the state of its origin can be manifested only by activities carried on in its behalf by those who are authorized to act for it." (citation omitted)).

[156] *See generally* Roger Michalski, *Trans-Personal Procedures*, 47 CONN. L. REV. 321 (2014).

[157] *See generally* Pennoyer v. Neff, 95 U.S. 714 (1877) (holding generally that a court can exert personal jurisdiction over a party if that party was served while physically present within the state).

[158] *See, e.g.*, *Int'l Shoe Co.* 326 U.S. at 316–17 (1945) ("To say that the corporation is so far 'present' there as to satisfy due process requirements, for purposes of taxation or the maintenance of suits against it in the courts of the state, is to beg the question to be decided. For the terms 'present' or 'presence' are used merely to symbolize those activities of the corporation's agent within the state which courts will deem to be sufficient to satisfy the demands of due process.").

[159] Arguably the Internet has complicated even this inquiry.

[160] Since robots have a physical manifestation, their "presence" will often be easier to

On balance, courts and legislators decided that treating corporations mostly like humans for litigation purposes serves important functions. It makes litigation predictable and uniform while protecting litigation speed and cost.[161] A functional account allows for such a weighing of procedural values in ways that ontological and deontological accounts do not.

It allows us to measure and compare the consequences of non-property treatment for robots. The effects of such potential robot litigation take place in two settings. The first is the courtroom itself. Any account of robot litigation must articulate and weigh how suing robots directly would interact with the practical and abstract issues of litigation. On the practical side, people pursuing a functional approach must account for how robotic entities are compatible (or not) with long-standing jurisdictional doctrines, service of process difficulties, the availability and scope of remedies, the scope of res judicata doctrines, and the hundreds of other nitty-gritty vital minutia of procedure. On the abstract side, functional accounts of robot litigation must account for broad procedural values to be protected and weighted against each other like speed, cost, accuracy, finality, fairness, accessibility, simplicity, privacy, and participation.[162] Ideally a procedural system would further all these values, but alas, often trade-offs between these values are inevitable. Robot litigation would likely require a re-balancing of these procedural values.[163]

The second setting where the availability of robot litigation has an effect is outside of the courtroom. Litigation rules do not only impact what happens in the courtroom. Instead, litigation rules affect conduct long before and after lawsuits are contemplated and filed.[164] For example, stringent pleading standards[165] might make it more tempting to engage in antitrust behavior because of less fear of effective enforcement. As such, a functional account helps us evaluate how litigation rules shape primary conduct.

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determine. *But cf. infra* Section IV.C.

[161] *See generally* FED. R. CIV. P. 1 (2015) (instructing that the rules "should be construed, administered, and employed . . . to secure the just, speedy, and inexpensive determination of every action and proceeding.").

[162] *See generally* Roger Michalski, *The Clash of Procedural Values*, 22 LEWIS & CLARK L. REV. 61 (2018).

[163] For example, treating robots simply as property would certainly be simple and keep doctrinal confusion at bay, but might make it increasingly difficult for harmed individuals to access courts to obtain relief (as the examples in the introduction illustrated). *See generally* Calo, *Lessons of Cyberlaw*, *supra* note 22, at 537 ("[T]he law will face the question, maybe soon, and likely often, of what to do when a digital object made up of bits becomes a physical object made up of atoms. . . . [T]he set of compromises we have in place today—the balances lawmakers, courts, and regulators have struck—will plausibly unwind in the coming decades.").

[164] *See, e.g.*, Hanna v. Plumer, 380 U.S. 460, 475 (1965) (Harlan, J., concurring) (noting that litigation rules might "substantially affect . . . primary decisions respecting human conduct . . . .").

[165] *See generally* Bell Atlantic Corp. v. Twombly, 550 U.S. 544 (2007).

In the context of robot litigation such effects on primary conduct could take multiple forms. Most notably, it might affect whether companies hire robots or humans to do their work. If robots make it difficult to establish personal jurisdiction over a company in an unfavorable forum, this might tip a company's decision away from hiring humans in that forum. Similarly, the contours of robot litigation rules might affect whether work is performed locally by a company from nearby or from abroad.

All in all, a functional account is uniquely suited to account for the economic, social, and political consequences of integrating robots into civil litigation or continuing to treat them as mere property. In contrast, ontological and deontological thinking can resemble an empty vessel into which we pour our policy-preferences, biases, hopes, and prejudices all in the name of essential claims of existence or thoughts.

That is not to say that ontological and deontological thinking have no role to play. An ideal model of robot litigation would satisfy ontological *and* deontological *and* functional requirements. However, such a model is unlikely. Realistically, we must settle for reasonable trade-offs between these three analytical approaches. To receive widespread acceptance, a model of robot litigation must be above a minimal threshold on all three analytical frameworks, and a good match on at least one. The next section will go on the hunt for a model of robot litigation that satisfies this test.

III. POSSIBLE MODELS

This Part applies the ontological, deontological, and functional frameworks to evaluate numerous concrete contestant models for treating non-humans as litigation entities. The possibilities are broad,[166] ranging from treating robots for litigation purposes as employees, slaves, franchisees, subsidiaries, children, animals, agents, or subcontractors. Each will be evaluated in turn. The resulting taxonomy exposes the weaknesses of analogizing robots to established models. None fits, and all would have negative practical consequences.[167] As courts will encounter more litigation involving robots, they will likely try to fit robots into one of these models. It is therefore important to dispel these attempts before case law builds up in favor of one of these models.

This Part concludes by exposing the great Faustian bargain inherent in treating robots as something other than property. Analogizing robots to an existing model would make enforcement of laws easier, but would also lower how much can be recovered in enforcement.

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[166] *See generally* SALMOND ON JURISPRUDENCE 306–08 (P.J. Fitzgerald ed., 12th ed. 1966) ("[L]egal personality is not limited by any logical necessity, or indeed by any obvious requirement of expedience, to the incorporation of bodies of individual persons.").

[167] The discussion is focused on procedure. I will leave aside here whether these models might make sense in other contexts (e.g., tort, contract, antitrust, etc.). *See infra* Part IV.

A. The Default: Robots as Property or Things

The current default model is that robots are things without independent litigation status. Robots are property. To sue a robot is to sue its owner. Robots have no separate status from their owners.

This conception of robots as mere property has important consequences in procedure. For example, property alone cannot serve as an independent basis for personal jurisdiction.[168] An autonomous robot driving around in Montana cannot, on its own, create the basis for Montana courts to assert jurisdiction over the robot. As the Supreme Court argued in the seminal case of *Shaffer v. Heitner*, "[t]he phrase, 'judicial jurisdiction over a thing,' is a customary elliptical way of referring to jurisdiction over the interests of persons in a thing."[169] As such, Montana courts would have to analyze the contacts of the robot's owners with Montana to determine whether its courts could hear the case consistent with constitutional limitations on their powers.[170]

The robot's presence in Montana, while not an automatic way to gain jurisdiction in Montana, could still be used to establish jurisdiction in Montana. However, only in a roundabout way. Plaintiffs would need to argue that the presence of the robot indicates contacts between the robot's owner and Montana in relation to the lawsuit at hand that satisfy the minimum contacts test. This might be doable if the controversy is about the ownership of the robot itself.[171] But it might be very difficult or impossible where the autonomous robot caused harm (say, in a highway accident).

Since the robot is mere property, it cannot have intent, it cannot establish independent contacts with Montana, and it cannot avail itself of the benefits and protections of Montana. Only the robot's owner can do that. But since the robot acted autonomously, there never was the need for the robot's owner to intend anything in Montana, to establish contacts with Montana, or to purposefully avail herself of anything in Montana.

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[168] Shaffer v. Heitner, 433 U.S. 186, 212 (1977) ("The fiction that an assertion of jurisdiction over property is anything but an assertion of jurisdiction over the owner of the property supports an ancient form without substantial modern justification. Its continued acceptance would serve only to allow state-court jurisdiction that is fundamentally unfair to the defendant.").

[169] *Id.* at 207 (quoting RESTATEMENT (SECOND) OF CONFLICT OF LAWS § 56 introductory note (1971)).

[170] *Id.* ("[I]n order to justify an exercise of jurisdiction in rem, the basis for jurisdiction must be sufficient to justify exercising 'jurisdiction over the interests of persons in a thing.'" (citations omitted)).

[171] *Id.* ("[T]he presence of property in a State may bear on the existence of jurisdiction by providing contacts among the forum State, the defendant, and the litigation. For example, when claims to the property itself are the source of the underlying controversy between the plaintiff and the defendant, it would be unusual for the State where the property is located not to have jurisdiction." (citations omitted)).

Similarly, the robot by itself is not "at home" anywhere for general jurisdiction. Only the owner (a person or corporation) might be at home in a U.S. jurisdiction. Thus, even if the robot was created in Montana, spent all of its time in Montana, worked in Montana, used Montanan roads and services, it still is not "at home" in Montana and Montana's courts cannot exert general jurisdiction over the robot.

The conception of robots as property thus provides a shield to the robot's owner that makes it difficult for plaintiffs to sue the robot or its owner in Montana. If the robot's owner is foreign, perhaps no domestic court would be available for such a plaintiff.

Similarly, treating robots as property has ramifications across the procedural spectrum: robots cannot have citizenship for diversity jurisdiction purposes, are not contemplated by long-arm and venue statutes, are not part of the forum non conveniens analysis,[172] cannot be sanctioned for spoliation of evidence, and have no ability to be implead nor the capacity to plead. Furthermore, there is no mechanism to serve process on a robot, no choice-of-law preferences, and no other procedural doctrine, statute, or rule that enables, hinders, or facilitates robot litigation.

To sue a robot is thus currently like suing a car that hit you on the intersection. You figure out who owns the car and sue that person. This stands in sharp contrast to injuries caused by corporations. In those instances, the suit is not against the owners of the corporation, but the corporation directly. The justifications for this difference are manifold. First, separate corporate existence provides a liability limitation that encourages investment in corporations and overall economic activity. Liability of a corporation is (typically) limited to the assets of the corporation, not the assets of the owners of the corporation.[173] A person who buys stock in a large corporation must only fear losing the value of that stock, not that litigants could come to satisfy judgments against the corporation with the assets of the stockholder. A second reason for treating corporate litigation separate from the owners is litigation ease. For example, serving process on corporations is relatively easy, cheap, and straight-forward.[174] Serving process on everybody who has a stake in the corporation, in contrast, would be anything but.

This discussion points to the appeal and downside of treating robots as property. On the ontological side, it is intuitive to treat robots as property for litigation purposes because they *are* property. They are things that can be bought, sold, activated, deactivated, or modified. As with all chattel, so the argument goes, there is no role in litigation for robots separate from their owners. The rebuttal is that robots are a strange and perhaps new kind of chattel—property that can or soon will be able to act autonomously in meaningful ways. Some robots appear to make

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[172] Except perhaps under the prong testing for "relative ease of access to sources of proof." Piper Aircraft Co. v. Reyno, 454 U.S. 235, 241 n.6 (1981).

[173] *See, e.g.*, John A. Swain & Edwin E. Aguilar, *Piercing the Veil to Assert Personal Jurisdiction Over Corporate Affiliates: An Empirical Study of the* Cannon *Doctrine*, 84 B.U. L. REV. 445, 446 (2004) (noting that limited liability is the "bedrock proposition of corporate law that a shareholder's risk of loss is generally limited to the amount of the shareholder's investment.").

[174] *See, e.g.*, FED. R. CIV. P. 4(h).

decisions that cannot be traced back in any straightforward manner to their owners. The result is that people might not be able to tell whether the car next to them is driven by a human or an autonomous robot. That puts robots, one might argue, into a new kind of property category. I doubt that will affect anytime soon whether robots can or cannot be sold, but robot autonomy suggests an ontological status beyond what a traditional, non-autonomous car might enjoy.

This ontological tension is on a spectrum. Currently, treating robots as property is uncontroversial and most robots do not differ in fundamental ways from more traditional machines. However, if robots grow more autonomous, their litigation status as property will seem increasingly antiquated.

Technological advances will likely make the treatment of robots as property for litigation purposes seem increasingly out of touch. Perhaps robots cannot, on some fundamental level, form intent (to establish contacts with a forum for personal jurisdiction purposes or form an intent to establish a domicile somewhere). But they can act in ways and contexts where ascribing intent has intuitive, and perhaps one day popular, appeal. That would undermine our treatment of robots as chattel for litigation purposes.

The main functional reasons why robots might not be treated as chattel is that such treatment within the current doctrinal framework makes it difficult and expensive for injured parties to recover. The widespread use of autonomous robots will likely provide a new economic bounty,[175] but this bounty will be accompanied by endless robot malfunctions and mishaps. The law will have to provide an answer for who should bear the significant burden for robot accidents and litigation involving robots.

Procedure is part of the answer because no amount of substantive law remedies is useful if concrete plaintiffs cannot invoke the courts to access such remedies. Treatment of robots as property will make it easier for the owners of autonomous robots to deploy robot workers from distant states or countries with little fear of litigation in unfavorable forums where their robots might have caused harm. Plaintiffs will find it difficult to pursue remedies close to home and states will find it difficult to tax and regulate foreign robots. A treatment of robots as something other than property for litigation purposes might make it easier for injured parties to recover for their injuries.

There is, however, a significant downside to treating robots as something other than property of their owners. While such treatment might make it easier to satisfy jurisdictional hurdles and choice-of-law limitations, it could also limit how much plaintiffs could recover. The tradeoff, as the following sections will show, is often between ease of recovery and extent of recovery.

B. Corporate Variations

Another model is to treat robots like corporations. Like robots, corporations are inherently human owned (directly or indirectly), controlled by humans, and can exist

[175] *See supra* notes 83–87.

for a broad spectrum of purposes.[176] Even if we do not treat robots like corporations, robots will still likely confront the law as corporations with increased frequency. As others have pointed out, "wrapping each synthetic intellect in its own legal corporation" is easy and cheap to do.[177] Incorporating robots "as an asset of its own legal entity" would insulate assets from liability to prevent "a single catastrophic [robot] mistake to bankrupt [an] entire enterprise."[178] While clearly beneficial to the owner of the robot, this approach of wrapping robots in corporate blankets leaves parties injured by the catastrophic mistake with no or limited ability to collect damages. Their suffering would, in effect, subsidize robot ownership and experimentation.

The main appeal of treating robots like corporations is that civil procedure has well-established and efficient means for dealing with corporate litigants. For example, corporations are citizens for diversity jurisdiction purposes in their state of incorporation and their "principal place of business."[179] Robots, similarly, could be deemed citizen for federal subject matter jurisdiction purposes where they were created[180] and where they conduct most of their activities.[181]

However, treating robots as corporations makes little sense from a corporate law standpoint. The corporate-robot analogy fails in terms of formation, decision-making, and accountability. Corporations must be incorporated and must follow state corporate law. There is nothing about robots that suggests that such processes must be followed. I can build a robot in my garage without ever informing the state or thinking about establishing a new kind of legal entity. I cannot incorporate a corporation without state involvement and a high degree of intentionality.

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[176] Cities and municipal organizations (still sometimes called "municipal corporations") were and are also often analogized to corporations (and vice versa). *See generally* Frug, *supra* note 118, at 1082 ("It must be understood that before the nineteenth century, there was no distinction in England or in America between public and private corporations, between businesses and cities. As a legal matter, all these corporations had the same rights.").

[177] KAPLAN, *supra* note 9, at 91.

[178] *Id.*

[179] 28 U.S.C. § 1332(c)(1) (2012).

[180] Though, again, there are important boundary issues. For example, it might be difficult to define clearly where a robot is "created." Is it the place where a robot is first physically assembled, where the software is first installed, where the software is last updated (or significantly altered), where it is first booted up, where it first acts autonomously, etc.?

[181] Predictably, there will also be robots that cross national borders and create new subject matter jurisdiction puzzles. For example, when does a domestically created and initially domestically active robot lose its US-based state citizenship when acting abroad? (E.g. a truck that used to conduct its affairs in Minnesota but then crossed to Canada and has been active there for months or years). Similarly, is a robot created abroad that is shipped to the US and conducts all of its activities domestically more like a foreigner, dual-citizen, undocumented immigrant, or permanent resident?

The rights and protections incorporation affords are granted by states conditional on numerous and often intricate requirements and rules. In contrast, robots do not have and cannot have an internal governing structure akin to corporations. Corporate decision-making rules are therefore inapplicable and common accountability measures fail.

Similarly, because of the special relationship between a corporation and its chart-granting state, a relationship that is absent for robots, corporate treatment is a poor fit for robot litigation.

A related corporate template is subsidiary treatment for robots. Subsidiaries are legal entities that are separate from their corporate owners. Civil procedure over time has developed ways to account for subsidiaries. For example, personal jurisdiction doctrine treats, generally, a subsidiary's contacts with a forum as distinct from a parent company's contacts with that forum.[182] However, there are ways to pierce the veil between a subsidiary and the parent company and treat the contacts as originating from the same source.[183]

The main appeal of modeling robot litigation on how subsidiaries are currently integrated into the litigation process is that it provides a built-in method to probe the level of control or independence of the parent company over the subsidiary and assign procedural and liability consequences to that variation. For example, plaintiffs can aggregate the jurisdictional contacts of a parent company that treats the subsidiary simply as part of a unitary business.[184] Similarly, courts could test whether a robot is acting above a threshold of autonomy or whether the robot's owner effectively controls the robot. Depending on where a robot falls on that spectrum, courts could either treat the robot as a separate jurisdictional entity (like a true subsidiary) or aggregate jurisdictional contacts (like a subsidiary in name only that is fully integrated into the parent company).

While tempting, treating robots as subsidiaries of their owners fails for two reasons. The first reason is based on the difficulties of probing and assigning control when it comes to robots. With subsidiaries, courts can examine emails and memoranda to test whether the subsidiary acts independently or is controlled by the parent company. With robots, a similar analysis would entail the analysis of complex, dynamic,[185] and often inscrutable code that does not lend itself to easy

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[182] *See, e.g.*, Goodyear Dunlop Tires Operations, S. A. v. Brown, 564 U.S. 915, 930 (2011); Daimler AG v. Bauman, 571 U.S. 117, 135 (2014).

[183] *See e.g.*, Jennifer A. Schwartz, *Piercing the Corporate Veil of an Alien Parent for Jurisdictional Purposes: A Proposal for a Standard that Comports with Due Process*, 96 CALIF. L. REV. 731, 731–32 (2008); Robert B. Thompson, *Piercing the Corporate Veil: An Empirical Study*, 76 CORNELL L. REV. 1036, 1048 (1991) ("Courts pierced the veil in about 40% of reported cases.").

[184] *See, e.g.*, *Daimler AG*, 571 U.S. at 121–22. *See generally* Lea Brilmayer & Kathleen Paisley, *Personal Jurisdiction and Substantive Legal Relations: Corporations, Conspiracies, and Agency*, 74 CALIF. L. REV. 1, 14, 29–30 (1986) (explaining that combining parent and subsidiary for jurisdictional purposes requires an inquiry "comparable to the corporate law question of piercing the corporate veil.").

[185] For example, many neural network-styled robots might adapt over time to new input

interpretation.[186] For example, does tilting a robot's neural network to seek work in warm and humid weather show that the robot's owner directed the robot to work in Florida? Even if a robot's code could be analyzed in this manner, doing so would be time intensive and dependent on the work of extremely costly experts. In many cases (say a run-of-the-mill car accident case), plaintiffs would be unlikely to shoulder such costs early in the lifecycle of a case simply to establish jurisdiction.[187]

Beyond the difficulty of operationalizing the autonomy spectrum in actual cases, another reason why a subsidiary-like treatment for robots fails is that it relies on treating robots, again, as corporations (subsidiaries are by definition business entities). For the reasons we saw above (formation, management, taxation, and regulation), such treatment fails ontological and functional frameworks.[188]

C. Vicarious Entities

In agency law, a principal engages an agent to act on her behalf.[189] This creates an agency relationship. While the agent is engaged within the scope of the agreed relationship, he is acting within the scope of his agency. The principal is responsible for the liability the agent incurs (as agent, rather than as her private self).[190] The substantive law imputes the agent's actions to the principal. Similarly, jurisdictional contacts of the agent can be imputed to the principal.[191] For example, the agent's contacts with Montana on behalf of the principal might subject the principal to suit in Montana under a modern personal jurisdiction analysis.[192]

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without preserving a record of the previous configuration that existed at the time of, say, an accident.

[186] This approach could also encourage robot owners to avoid clear instructions and write inscrutable (and perhaps inefficient) code precisely to make a jurisdictional analysis more cumbersome. This is undesirable from a policy and aesthetic perspective.

[187] That is to say nothing of Rule 11 complications. *See, e.g.*, FED. R. CIV. P. 11(b) ("By presenting to the court a pleading, written motion, or other paper—whether by signing, filing, submitting, or later advocating it—an attorney or unrepresented party certifies that to the best of the person's knowledge, information, and belief, formed after an inquiry reasonable under the circumstances . . . (3) the factual contentions have evidentiary support or, if specifically so identified, will likely have evidentiary support after a reasonable opportunity for further investigation or discovery . . . .").

[188] *See supra* notes 184–187 and accompanying text.

[189] *See generally* 2A C.J.S. *Agency* § 34 ("An agency relationship is created when there is mutual consent, express or implied, that the agent is to act on behalf and for the benefit of the principal and subject to the principal's control.").

[190] *See generally id.* § 410 ("A duly authorized agent may act for and bind the principal, thereby subjecting the principal to liability." (citations omitted)).

[191] *See* Brilmayer & Paisley, *supra* note 184, at 2.

[192] *See* Int'l Shoe Co. v. Washington, 326 U.S. 310, 316–17 (1945) (noting that corporate contacts are measured by the contacts "of the corporation's agent within the state which courts will deem to be sufficient to satisfy the demands of due process."). *But cf.* Lonny Sheinkopf Hoffman, *The Case Against Vicarious Jurisdiction*, 152 U. PA. L. REV. 1023, 1032 (2004) ("I argue in these pages, against the grain of judicial and academic

The power of agency law in procedure is that it gives courts tools to examine when a person's activities can be imputed to another. That imputation hinges on the scope of the agency and whether the person, at any given point in time, acted within the agreed-upon scope (thus allowing imputation) or not (thus undermining imputation).

An agent model could serve as the foundation of robot litigation by recognizing that robots act on behalf of somebody else (their owners) but could potentially act beyond the intent and authorization of the owners.[193] For example, a robot endowed with complex machine learning processes might one day do something that was unanticipated (and maybe un-anticipatable) by the owner and should not be imputed to the owner.

The fundamental problem with an agent approach to robot litigation is that agents and principals must voluntarily consent to establish this kind of relationship. Beyond merely providing a normative foundation for liability based on consent, this moment of establishing an agency relationship serves to define the contours of the agent's authorization (and thus also the principal's liability). But robots cannot consent to become agents, cannot enter a mutual agreement, have no ability to negotiate the scope of authorization, cannot dissolve the agent-principal relationship, and cannot renegotiate the terms of the relationship. Because of the lack of consent to become an agent, there is no normative or practical boundary to the robot's agency. Everything the robot does would be attributable to the principal. This would reduce the agent model back to a property-based litigation model, adding no analytical tools to account for the ontological, in-between status and capabilities of robots.

Other vicarious entity models fail along the same lines. For example, robots cannot be franchisees because they cannot consent to establish a contractually defined relationship to the franchisor. Similarly, robots cannot be treated as subcontractors or independent contractors because they cannot contract in any meaningful way with their owners. Finally, robots cannot be treated as employees for litigation purposes because of their inability to define the scope of their employment.[194]

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wisdom, that the use of veil piercing for jurisdictional purposes is unwarranted as a matter of precedent and unwise as a matter of policy.").

[193] KAPLAN, *supra* note 9, at 73 (noting from a practical and moral but not necessarily legal standpoint that "[w]e need to control when and where synthetic intellects (or any electronic agent, for that matter) are permitted to act on our behalf. This need is particularly acute when they commingle with human agents.").

[194] *Cf.* KAPLAN, *supra* note 9, at 6 (referring to robots who work beyond factory floors as "forged laborers."); FORD, *supra* note 9, at xii (noting that recent technological shifts are challenging "our most basic assumptions," including "that *machines are tools* that increase the productivity of workers. Instead, machines themselves are turning into workers . . . .").

Contract-based models might be attractive to the robot's owners (allowing, for example, advantageous indemnification and forum selection clauses). But they cannot serve as foundations for robot litigation models because robots cannot provide the built-in pushback and ability to negotiate that furnishes the normative and practical appeal of vicarious entity models.

D. Slaves

Another possible model, though a terrible one, is that of the slave.[195] Antebellum laws in the United States provided detailed rules to govern the legal status of slaves.[196] These rules provided for a slave's ability to sue and be sued and liability rules.

All of these rules were founded on abhorrent morals and on a conceptual contradiction: slaves were treated as property yet, unquestionably, had some agency. Even the staunchest and blindest defenders of slavery recognized that slaves could and often did make their own choices.[197] This presented a conundrum for slave legal codes—as property, all the slaves' liability was ultimately the slave owner's liability,[198] but as agents, they could engage in behavior that was disconnected from the slave's owner.[199] Slaves were property that could change hands through wills and contracts, but slaves were also considered persons when accused of crimes (after all, true property cannot commit crimes). Slaves could not be a party to a lawsuit[200]

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[195] The following paragraphs are a gross simplification of a complex, dynamic, and fluid field. Others have written far more knowledgably and thoroughly on this topic.

[196] *See* A. Leon Higginbotham, Jr. & F. Michael Higginbotham, *"Yearning to Breathe Free": Legal Barriers Against and Options in Favor of Liberty in Antebellum Virginia*, 68 N.Y.U. L. REV. 1213, 1223 (1993).

[197] Ranging from the monumental (e.g. escaping to freedom) to the mundane (negligently driving a horse cart).

[198] *See, e.g.*, WILLIAM GOODELL, THE AMERICAN SLAVE CODE IN THEORY AND PRACTICE: ITS DISTINCTIVE FEATURES SHOWN BY ITS STATUTES, JUDICIAL DECISIONS, AND ILLUSTRATIVE FACTS 290 (1968); Thomas D. Morris, *As If the Injury Was Effected by the Natural Elements of Air, or Fire: Slave Wrongs and the Liability of Masters*, 16 L. & SOC'Y R. 569, 569–99 (1981).

[199] *See, e.g.*, Ewing v. Thompson, 13 Mo. 132, 138 (Mo. 1850) ("The power of the master being limited, his responsibility is proportioned accordingly. It does not extend to the willful and wanton aggressions of the slave except where the statute has expressly provided."); Ingram v. Linn, 4 Tex. 266, 269 (Tex. 1849) ("[T]he master is answerable for the misconduct and negligence of his slave when acting in the immediate employment, or under the authority, of the master. . . . But this liability does not extend to unauthorized acts, committed by the servant, out of the course of his employment." (citations omitted)); Snee v. Trice, 2 S.C.L. (2 Bay) 345, 348 (1802) (noting the need to protect slave owners from absolute liability that "would place all the slave-owners in the state at the mercy of their numerous slaves, who might commit what trespasses, or be guilty of what neglects and omissions they thought proper, to the ruin of their masters.").

[200] *See, e.g.*, JACOB D. WHEELER, A PRACTICAL TREATISE ON THE LAW OF SLAVERY 197 n.1 (1837) ("It would be an idle form and ceremony to make a slave a party to a suit, by

yet were able to sue for their freedom.[201] As chattel, slaves could not hold property yet could (at times and under constraints) have separate funds.[202] Slaves could not independently contract, but slave owners could (sometimes) be bound by the contracts slaves made.[203]

Strikingly, this description and the contradictions it entails is, on first sight, a good fit for robots. Somewhat akin to slaves, robots are property but also capable of making (some) autonomous decisions. This is a scary and striking fit—chattel that works for a human owner and is defined as quasi-human without legal and moral protections.

While a fitting model in some ways, I urge courts to refuse analogizing robots to slaves and to reject this model. Antebellum slavery codes should not serve as a model for, really, anything. They are morally repulsive. Let's leave them buried in the ashes of history.[204]

E. Children, Incompetents, and Animals

There are, of course, numerous other possible models. They are, however, increasingly untenable. For example, one could analogize robots to children or incompetents.[205] All are, arguably, somewhat autonomous but less capable than most adults. Litigation rules account for this difference by specifying persons that can sue and be sued on behalf of the minor or incompetent person.[206] However, elsewhere statutes provide that minors and incompetents have an independent jurisdictional status from their guardians.[207] Procedure, in short, conceptualizes minors and incompetents as separate from others, but tethered to their control in litigation matters. Robots could similarly combine elements of independence (say in jurisdictional matters) with elements of control (say in liability matters).

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the instrumentality of which he could recover nothing; or if a recovery could be had, the instant it was recovered would belong to the master. The slave can possess nothing; he can hold nothing. He is, therefore, not a competent party to a suit. And the same rule prevails wherever slavery is tolerated, whether there be legislative enactments on the subject or not.").

[201] *See generally* LEA VANDERVELDE, REDEMPTION SONGS: SUING FOR FREEDOM BEFORE DRED SCOTT (2014) (documenting the story of law suits by people held as slaves who claimed that they were free).

[202] Called a "peculium."

[203] *See, e.g.*, Chastain v. Zach & Bowman, 19 S.C.L. (1 Hill) 270, 270 (1833).

[204] The very attempt to analogize robots to slaves might also be disrespectful to the suffering slaves had to endure.

[205] "Incompetents" strikes me as an ill-chosen moniker. I use it here only because that is the term used in various Rules and statutes. *See, e.g.*, FED. R. CIV. P. 4(e) ("Unless federal law provides otherwise, an individual—other than a minor, an incompetent person, or a person whose waiver has been filed—may be served in a judicial district of the United States . . . .").

[206] FED. R. CIV. P. 17(c).

[207] 28 U.S.C. § 1332(c)(2) (2012) ("[T]he legal representative of an infant or incompetent shall be deemed to be a citizen only of the same State as the infant or incompetent.").

Though attractive in some ways, the model ultimately fails to meet basic ontological and deontological thresholds.[208] Robots are not young humans and not like young humans. They will not grow up to be full adults. Even if they did, the robot's owners are not the robot's parents, tasked with a special privilege and duty to raise the next generation of humanity. Similarly, parents and society owe incompetents special care and protections arising from their fundamental humanity that cannot be extended to robots. As such, it would be strange indeed to extend to robots the protections and concern afforded to minors and incompetents when it comes to, for example, default judgments[209] or the approval of settlements.[210]

Yet another model for robot litigation would be to treat robots like (dangerous) animals.[211] Robots are a bit like animals in that they have owners who are responsible for them, but the law also recognizes that animals might act and cause damage on their own. This model might be useful in other areas of law (e.g., tort) but it does not help with procedural issues raised by robots because procedure does not provide special rules for litigation involving animals (animals are just chattel).[212]

F. The Faustian Bargain

While all of the above models fail to provide workable accounts for robot litigation, they are instructive of a Faustian bargain embedded in existing non-human litigation. In various forms and mixtures, each model presents a tradeoff between ease of enforcement and recovery limitation. For example, treating robots as property would make it difficult to sue a robot with a foreign owner close to home, but a successful suit would provide full access to the owner's assets. Treating robots as subsidiaries, in contrast, would make a suit against the robot close to home easier than suing the parent, but recovery can only be had from the subsidiary robot, not the parent.[213] This would create an unnecessary hardship for parties injured by

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[208] As it did in other contexts, though for different reasons. For example, some courts treated Native American Tribes as wards of the federal government. This approach implied that the federal government could sue on behalf of tribes but the tribes could not vindicate their rights on their own. *See generally* Richard B. Collins & Karla D. Miller, *A People Without Law*, 5 INDIGENOUS L.J. 83, 95–101 (2006) (discussing leaders who believed that without reform, "Indians had no legal rights at all."); *cf.* 28 U.S.C. §§ 1362, 1505.

[209] FED. R. CIV. P. 55(b)(1) (stating that clerks may not enter default judgments against either "a minor [or] an incompetent person.").

[210] Contrary to all other cases (except class actions), judges must approve or disapprove settlements involving minors and incompetents. *See, e.g.,* C.D. CAL. CIV. R. 17-1.2 ("No claim in any action involving a minor or incompetent person shall be settled, compromised, or dismissed without leave of the Court embodied in an order, judgment, or decree.").

[211] *See generally* RESTATEMENT (THIRD) OF TORTS § 23 cmt. c (AM. LAW INST. 2010) ("For strict liability to attach, it is not required that the animal be 'vicious' or aggressive; a finding of the animal's abnormal 'dangerousness' is sufficient.").

[212] *But see generally* Kate Darling, *Extending Legal Rights to Social Robots*, in ROBOT LAW (Ryan Calo et al. eds., 2015) (proposing limited substantive rights for robots based on the analogy of animal abuse protections).

[213] The primary behavior effect of such a rule would be that owners would, all else

robots. Relying on an existing model as guidance for the shape of robot litigation would make us choose between ease of litigation versus ease of recovery. Given the potential for a new economic bounty for owners of robots and the potential for numerous injuries caused by robots, this is an undesirable Faustian bargain.

Luckily, there is no conceptual or normative necessity for striking such a bargain (on whichever side of the spectrum).[214] Choosing a model for robot litigation affords us the chance, if taken early and decisively, to transcend past limitations and fashion a fresh litigation model that provides injured parties with access to courts *and* access to recovery.

The argument against such a proposal is that it would be unfair to robot owners to create special robot litigation rules that deviate from the usual litigation fabric. Potentially, such litigation rules could also stifle economic activity (discouraging the deployment of robots) and innovation (discouraging R&D into robot technology).

These arguments are important but not decisive. While litigation rules generally apply to all litigants and all types of suits, there are many, many exceptions to the trans-substantive and trans-personal norms. As such, while these norms are important, we have recognized time and again that these norms can and should be violated when warranted by specific litigation needs and vulnerabilities.

Robot litigation presents such an instance. As noted, the owners of robots in the future will likely possess far greater economic means than a typical member of the broad public. As such, owners of robots will possess far greater means to defend lawsuits away from home than plaintiffs injured by robots. Denying such plaintiffs access to recovery could lead to hostility towards robots that, in the long run, could result in public opinion and legislation far more harmful to robot owners and the economy as a whole. The remainder of this Article will examine what robot litigation beyond the Faustian bargain entails.

IV. THE PROPOSED SOLUTION, TIMING, PROBLEMS, AND GRAY SPACES

The previous Part explored whether *existing* models for nontypical human litigation could be applied to robots. The central argument was that none of these models are a good fit. All failed minimal ontological, deontological, or functional thresholds. None seem like a good choice. But choose we must (if only to choose to remain with the current default). To move forward and to solve the Faustian bargain between access to enforcement and access to remedies, this Part argues that we must treat robots as a new litigation category that borrows insights selectively and partially from the range of existing models. For example, we must craft a new *in*

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being equal, build cheaper robots who control little or no assets (because confiscation of the robot and the robot's assets to satisfy a judgment would hurt the owner less). A non-subsidiary treatment in contrast might lead to the development of robots that are more expensive and that control more assets.

[214] I leave aside here the question whether this kind of bargain is desirable for other models of litigation.

robotam personal jurisdiction doctrine to supplement the old *in personam* jurisdiction doctrine.[215] We must develop separate standards for how a robot can establish a domicile for choice-of-law purposes, how liability is shared between robot and owner, and the many other procedural rules that hinge on an understanding of intent, personhood, and independent agency. Only by unshackling robots from existing litigation frameworks can we escape the old Faustian bargain.

This proposed solution is not without problems and ambiguities (as later sections discuss). Still, it provides a viable, flexible, and pragmatic framework to account for changing technological capabilities and emerging social norms about how to integrate robots into everyday interactions.

A. Solution: Split the bundle

The previous sections all implied that procedural treatment can and sometimes should be separate from substantive treatment. For example, churches and federal agencies might be treated differently for First Amendment purposes, but both litigate under the same pleading rules.[216] Meanwhile, they might be treated the same under substantive contract law but different for service of process purposes.[217]

In short, we recognize in many areas the value of de-coupling substance from procedure. As such, different procedural treatment for robots in the litigation context does not necessitate changing how we tax and (substantively) regulate robots. Contract law may develop separate rules for robot contracting—or not. Tort might establish unique standards for robot negligence and intent—or not. Similarly, contract rules might borrow from the insights of robot torts or reject them. The procedural proposal here has little to say about how substantive legal rules should treat robots. The argument simply recognizes that robots present unique litigation problems that are best resolved by creating a unique bundle of solutions.[218]

These unique solutions cannot be based entirely on one of the existing litigation models. Instead, we must develop a new synthesis based on the strengths and weaknesses of existing models. Such a synthesis must account for the special, in-between ontological status of robots as well as innumerable practical and political value judgments (briefly, to encourage innovation in robot technology but also

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[215] Other scholars have made similar arguments that particular classes of litigants call for different personal jurisdiction analyses. *See, e.g.*, William S. Dodge & Scott Dodson, *Personal Jurisdiction and Aliens*, 116 MICH. L. REV. 1205, 1205 (offering a "theory of personal jurisdiction over aliens" under which "alienage status broadens the geographic range for minimum contacts from a single state to the whole nation.").

[216] *See generally* FED. R. CIV. P. 8(a) (setting forth the pleading requirements for all claims for relief in federal court).

[217] *Compare* FED. R. CIV. P 4(h) (outlining the rule for serving corporations) *with id.* 4(i) (outlining the rule for serving the United States and related entities).

[218] *See* Margot E. Kaminski, *Authorship, Disrupted: AI Authors in Copyright and First Amendment Law*, 51 U.C. DAVIS L. REV. 589, 591 (noting that "[t]he algorithmic 'author,' it turns out, gets framed differently by [copyright and First Amendment law], with differently disruptive results.").

protect those injured by robots). This necessitates a rethinking of different areas of procedure and tailoring each to the challenges robots pose.

Civil procedure did this before with the advent of corporations. Courts could have treated corporations like individuals, government entities, or some other established model.[219] For a while, courts attempted to fit corporations into one of the existing folds. But in time the shortcomings of such an accommodationist approach became apparent. Corporations simply are not like individuals or government entities (an ontological argument). They are not due the same respect (a deontological perspective). And treating them like individuals or government entities undermines important litigation values (a functional point).

As a result, courts and legislators went to work, over many decades, and crafted litigation rules for corporations that were attentive to the unique nature and functioning of corporations in the U.S. economy and society. For example, Congress amended the diversity jurisdiction statute repeatedly to redefine citizenship for corporations.[220] Currently, corporations, unlike humans, can have citizenship in two states.[221] This is a strange result, until one recognizes that it is simply the political compromise to ongoing debates about corporations' access to federal courts.[222] The Supreme Court, similarly, continues to weigh in on how to integrate corporations into the usual litigation fabric and how to set them apart.[223] Likewise, numerous procedural rules and statutes are uniquely addressed to corporations.[224]

In doing so, legislators and courts created numerous special litigation rules for corporations but also left many litigation rules untouched. The challenges of corporate litigation necessitated a doctrine-by-doctrine, rule-by-rule, statute-by-statute approach. Each had to be evaluated and either modified or retained. This is an ongoing project.

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[219] Mark, *supra* note 116, at 1445 ("Several conceptions of the corporation were available to theorists and policy makers. Corporations could have been seen as analogous to either individuals or governments. Alternatively, these analogies could have been rejected and theorists and policymakers could have developed an entirely new body of law to supersede contemporary doctrine.").

[220] *See generally* EDWARD A. PURCELL, LITIGATION AND INEQUALITY: FEDERAL DIVERSITY JURISDICTION IN INDUSTRIAL AMERICA, 1870–1958 (1992) (examining the patterns of disputes between individuals and national corporations surrounding federal diversity jurisdiction between the 1870s and the 1940s).

[221] 28 U.S.C. § 1332(c)(1) (2012).

[222] Or, as it is more commonly put: access to federal courts for plaintiffs who sue corporations. *See* PURCELL *supra* note 220, at 4. ("[N]ational corporations favor[] the federal courts")

[223] *See, e.g.*, Hertz Corp. v. Friend, 559 U.S. 77, 92–97 (2010).

[224] *See, e.g.*, FED. R. CIV. P. 7.1(a) ("A nongovernmental corporate party must . . . . "); FED. R. CIV. P. 23.1(a) ("This rule applies when one or more shareholders or members of a corporation or an unincorporated association bring a derivative action to enforce a right that the corporation or association may properly assert but has failed to enforce.").

Similarly, courts and legislators must soon reevaluate innumerable litigation rules with an eye toward creating exceptions for robot litigation. Of course, such an approach is super cumbersome and will likely create new doctrinal complexity and confusion. The alternative, however, is to jam an increasingly square peg into a round hole.

B. Timing Questions

There remains the question of timing. When should we launch such a project? Somebody might believe that robots, in some distant future, could raise new procedural problems but doubt that the time has already come to tackle this question. Perhaps the question of timing is best left to substantive law considerations. Until the day when robots are deemed by legislators to hold property, one could argue, it makes little practical sense anyway to think of robots as separate from their owners for litigation purposes because, at the end of the day, there is no recovery to be had from them directly anyway.

This argument, while intuitive in some ways, fails for an abstract and a concrete reason. On the abstract side, the argument above implicitly assumes the primacy of substantive over procedural concerns.[225] It holds that substance must first recognize robot personhood before procedure can follow the lead and recognize robot litigation rules. However, there is no necessity for such a blunt assertion of primacy. Procedure is concerned with enforcement of substantive rules, whatever they might be. Plaintiffs injured by robots must be able to enforce, say tort rules against them as much as plaintiffs who were injured by corporations. If robots raise new jurisdictional challenges, then procedure can resolve these challenges without having to wait for substantive tort law to change (similarly, tort law must not await procedural changes to create, say, a new robot battery rule).[226]

Beyond this abstract argument about the relationship between substantive law and procedure, there is also a practical reason to reject a holding-pattern approach in procedure until robots can hold property in their own name. Recovery from robots is available even before they can have their own Swiss bank accounts.[227] There is nothing that prevents garnishment of wages or income from robot activities. For example, imagine a robo-truck that makes deliveries in a state where it causes harm. The plaintiff could ask for a percentage of the future income the robot generates from future deliveries until the judgment is satisfied. Similarly, a successful plaintiff who wins a judgment against a robot could seize the robot itself. Alas, that might be

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[225] I leave aside here the massive and persistent problems of drawing the line between the two.

[226] For example, on the federal level, the Rules Enabling Act allows federal courts to promulgate rules that structure the enforcement of existing substantive law as long as they do "not abridge, enlarge or modify any substantive right." 28 U.S.C. § 2072(b) (2012).

[227] I leave aside here the issue of injunctions.

the only valuable asset that the robot owner has in that jurisdiction anyway. As a matter of timing, there is nothing that prevents procedure from engaging with these questions before substantive law adjusts to robot liability itself.

Also, the rise of cryptocurrency disrupts traditional thinking about rules surrounding the control of assets. Cryptocurrencies have no built-in conditions concerning who can control, use, spend, and accumulate them. As such, a robot truck could accumulate bitcoins (say through completing deliveries) and spend bitcoins (say on fuel and repairs) without having to wait for the law to allow it to hold property in its own name.

More fundamentally still, law (whether substantive or procedural in nature) should not wait for technology to create facts and then simply react to new facts.[228] Law unavoidably is intertwined with shaping new technologies because innovators, entrepreneurs, and society create and use new technology with legal entitlements and liabilities in mind.[229] Questions of timing might thus be misplaced in the sense that the legal construction of the meaning of robots is already ongoing,[230] whether procedure innovates or chooses to hold on to the current treatment of robots as property.

C. Problems and Gray spaces

Beyond timing questions there are numerous problems with the proposed solution of creating a new category of robot litigation rules. Relatedly, there are numerous gray spaces and ambiguities that will complicate any attempts to treat robots for litigation purposes as anything other than property (no matter how problematic that categorizations is in its own right).

First, robots as defined and discussed here are physical objects.[231] However, one might question this emphasis on material embodiments of complex algorithms. Notice, for example, that the term "robots" is frequently applied to essentially non-physical programs that never interact with humans in the material world.[232] Clearly,

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[228] *See* Meg Leta Jones, Does Technology Drive Law? The Dilemma of Technological Exceptionalism in Cyberlaw 6 (June 8, 2017) (unpublished manuscript), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=29818 [https://perma.cc/KQF2-FDY4] ("[U]ntil recently the debate around technological exceptionalism has been not whether it exists, but when it exists. When is a technology so new and so different that it will drive significant legal change? When is a technology so novel that the law, as established, breaks and cannot account for it?").

[229] *See* Kaminski, *supra* note 218, at 590 ("The law can itself drive technological development; technologists often design around legal entitlements.").

[230] *See, e.g.*, Chris Arnold, *Tax Bill Favors Adding Robots over Workers, Critics Say*, NAT'L. PUB. RADIO (Dec. 8, 2017, 5:01 PM) https://www.npr.org/2017/12/08/569118310/tax-bill-favors-adding-robots-over-workers-critics-say [https://perma.cc/XYW6-DQPU] (noting that some argue that recent tax reforms "expand incentives for companies to buy robots and machines that replace workers.").

[231] *See supra* Section I.A.

[232] *See, e.g.*, Elaine Glusac, *Meet Your New Data-Driven Travel Agent,* N.Y. TIMES

a sophisticated program that we encounter over the internet might display autonomy similar to the autonomy displayed by a self-driving car. For example, a virtual assistant without a clear physical embodiment might learn your travel routines and anticipate your needs and desires and, on its own, make suitable reservations at your new favorite shawarma restaurant in a town you have never visited before.

Still, it is important and reasonable to emphasize the physical nature of a robot (as opposed to a detached algorithm). Robots embodied in physical shells force themselves upon us in ways that naked algorithms do not. Walking down the road from my home I might encounter an autonomously driving car whether I want to or not. In contrast, I typically must take an affirmative step to come into contact with an algorithm in the cloud. For example, I must have decided to engage the aforementioned travel agent.[233] That choice opens the normative and legal foundation for a contractual relationship that entails, among many other things, the possibility of a forum-selection clause.[234] Since there never was a contract with the unwillingly encountered autonomous car and no possibility to negotiate a forum-selection clause, my ability to recover for damages depends on jurisdictional doctrines that are fundamentally premised on physical contacts. Insisting on a material embodiment for a robot thus has important jurisdictional consequences.[235] Robots are not just code. They are code embodied in a shell that can be encountered out there in the world.[236] That makes them different from nonphysical algorithms.

(July 10, 2017) https://www.nytimes.com/2017/07/10/travel/meet-your-next-travel-agent-diy-artificial-intelligence.html [https://perma.cc/E9VL-6J9F] ("New-wave [travel] agents [might be] human, robotic or a combination . . . . ").

[233] *But cf.* Yaniv Leviathan & Yossi Matias, *Google Duplex: An AI System for Accomplishing Real-World Tasks over the Phone*, GOOGLE AI BLOG (May 8, 2018), https://ai.googleblog.com/2018/05/duplex-ai-system-for-natural-conversation.html [https://perma.cc/CL6L-AVWU].

[234] Form-selection clauses can be one-sided, of course, and used abusively. But those are problems with forum-selection clause doctrine, not robots or algorithms. *See, e.g.*, Carnival Cruise Lines, Inc. v. Shute, 499 U.S. 585, 590–91 (1991); Atlantic Marine Const. Co., Inc. v. United States Dist. Court for the W. Dist. of Tex., 571 U.S. 49, 59–60 (2013); *See generally* Roger Michalski, *Transferred Justice: An Empirical Account of Federal Transfers in the Wake of* Atlantic Marine, 53 HOUS. L. REV. 1289 (2016).

[235] Despite the misleading language, algorithms "in the cloud" still have a concrete physical manifestation. After all, the algorithm must run on some hardware that must be hosed and located somewhere. However, users typically do not know and do not care where an algorithm that they are using is "located." Even if they did, it might change instantly or could be the product of sub-algorithms working together that are located in different location. Given these additional complexities, I will leave the issue of algorithm jurisdiction aside here. *See* Kristen Eichensehr, *Data Extraterritoriality*, 95 TEX. L. REV. 145, 145 (2017) ("Data's intangibility poses significant difficulties for determining where data is located. The problem is not that data is located *nowhere*, but that it may be located *anywhere*, and at least parts of it may be located nearly *everywhere*. And access to data does not depend on physical proximity." (citations omitted)).

[236] As embodied code it also is easier to count instances. Each physical robot is its own jurisdictional entity. With algorithms, counting entities can be more difficult. Is Siri one thing

The second objection is similarly definitional. Just how autonomous does a robot have to be?[237] After all, robots predictably will fall on a broad spectrum of autonomy. On one side of the spectrum might be robots that act autonomously only rarely, in narrowly defined circumstances, and only for a short time. For example, some flying drones might contain fail-safe tools that allow them to autonomously return to the place from where they were launched should their radio-link to a human controller fail or be interrupted. On the other side of the spectrum we might imagine autonomous trucks that operate for years with little or no human input, ferrying cargo back and forth between warehouses based on delivery orders that no human ever approved or reviewed. Where, on this spectrum, should procedure draw the line? This is a difficult question that undoubtedly will be impacted by advances in technology and our social understanding of robots.[238] As an initial matter, I suggested above (built into the definition of robots used in this Article) a human-centric definition: robots that display near, at, or beyond human autonomy should be treated differently than devices that show only minimal autonomy. I suspect that fairly soon there will be robots for which this question of how much autonomy is enough will be easy to answer. And undoubtedly there will always be robots that fall into a narrow band of space somewhere in the middle between no autonomy and full autonomy where reasonable people could disagree. Still, the presence of some entities in this middle gray space does not undermine the important conceptual and normative work accomplished by drawing a reasonable line between autonomous robots and non-autonomous devices.[239]

(in the cloud, accessed by many) or is it many things (one instance in each iPhone)? That being said, counting robots could also prove difficult in the future because significant research emphasizes the value of swarm robotics where many physical components come together (for long or short period of times) in constantly changing constellations to accomplish tasks. *See e.g.*, KAPLAN, *supra* note 9, at 45 (discussing the potential military application of "swarm robotics").

[237] This question quickly leads to a philosophical morass about the nature of thought, the self, self-awareness, independent reasoning, creativity, adaptability, consciousness, and the essence of humanity itself. *See generally* A.M. Turing, *Computing Machinery and Intelligence*, 59 MIND 433, 442 (1950) (arguing that instead of discussing essential traits, our focus should be on external manifestations of thought processes as illustrated by an "imitation game" where a human has to guess whether she is interacting with another human or a machine).

[238] It is complicated further by the strong likelihood that many robots will work in collaboration with humans yet still make their own decisions. Separating human decision-making from robot decision-making in such circumstances promises to be a massive headache. However, it is unavoidable. If we do not decide such question at the jurisdictional stage, we just delay the decision to the liability stage.

[239] Similarly, substantive law will have to confront and answer this definitional question. *See, e.g.*, Scherer, *supra* note 64, at 395 (calling for a government agency that can will establish an AI safety certification process); Andrew Tutt, *An FDA for Algorithms*, 69 ADMIN. L. REV. 83, 83 (2017) ("This Article proposes that certain classes of new algorithms should not be permitted to be distributed or sold without approval from a government agency designed along the lines of the FDA.").

D. In the Crystal Ball

So far, we mostly focused on robot defendants. But can they sue as well as plaintiffs? As part of a class? As an entire class without non-robot litigants? These are seemingly small issues, but they point to a larger concern: creep.

There is a danger in treating autonomous robots as something other than property for litigation purposes that is highly speculative and highly problematic. Separating robots from their owners for procedural purposes can lay the groundwork for separating them from owners for other purposes as well. A procedural status as something other than property can be the beginning for a substantive status as something other than property.[240] Perhaps a kind of artificial person entitled to basic and constitutional rights. Slowly, unintentionally, clandestinely, robots could build on procedural foundations to become substantive rights bearers.[241]

This is not mere fantasy. Something like it has happened once before. Corporations acquired a unique status in procedural affairs long before they started to amass substantive rights, cumulating, for now, in claims to constitutional protections previously only afforded to humans.[242]

This possibility of procedural changes laying the foundation for substantive rights gives great urgency to procedural discussions about the status of robots in our legal system.[243] Much of this is speculative. However, given our path-dependent legal system, small decisions now can have significant and unintended ramifications down the road.

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[240] *See, e.g.*, *Open Letter to the European Commission Artificial Intelligence and Robotics*, ROBOTICS-OPENLETTER.EU, http://www.robotics-openletter.eu/ [https://perma.cc/R6ZL-XR4C] ("A legal status for a robot can't derive from the Natural Person model, since the robot would then hold human rights, such as the right to dignity, the right to its integrity, the right to remuneration or the right to citizenship, thus directly confronting the Human rights. This would be in contradiction with the Charter of Fundamental Rights of the European Union and the Convention for the Protection of Human Rights and Fundamental Freedoms."); *See also* Ivana Kottasová, *Experts Warn Europe: Don't Grant Robots Rights*, CNN TECH, (Apr. 12, 2018), http://money.cnn.com/2018/04/12/technology/robots-rights-experts-warn-europe/index.html [https://perma.cc/PB69-UVXF].

[241] *See* Calo, *Lessons of Cyberlaw*, *supra* note 22, at 515 ("[R]obots, more so than any technology in history, feel to us like social actors—a tendency so strong that soldiers sometimes jeopardize themselves to preserve the 'lives' of military robots in the field.").

[242] *See, e.g.*, Citizens United v. Fed. Election Comm'n, 558 U.S. 310, 343 (2010) ("The Court has thus rejected the argument that political speech of corporations or other associations should be treated differently under the First Amendment simply because such associations are not 'natural persons.'").

[243] *See* KAPLAN, *supra* note 9, at 199–200 ("There's nothing to stop a synthetic intellect, whether enshrined in law as an artificial person or crudely wrapped in a corporate shell, from outcompeting us at our own game. Such entities could amass vast fortunes, dominate markets, buy up land, own natural resources, and ultimately employ legions of humans as their nominees, fiduciaries, and agents—and that's in the happy event that they deign to use as at all. The slave becomes the master.").

CONCLUSION

The rise of robotics out there in the shared world has massive implications for how we tax, how we regulate, how we think about responsibilities, intent, and rights. All of these substantive questions will pass, sooner or later, through litigation because laws and regulations do not enforce themselves. Substantive law is already adjusting to autonomous robots, but procedure has not similarly engaged with the thorny questions raised by robots.

Doing so will require a tremendous amount of guesswork, continuous adjusting, and admitting folly.[244] It will also require rethinking many areas of procedural law to meet the unique challenges robot litigation presents. As such, this Article is not a final answer to the questions of robot litigation, but a call to scholars to address doctrine-by-doctrine, statute-by-statute, and rule-by-rule the places where our unitary litigation framework will hold and identify the places where it will need to be adjusted. This work is practical, political, philosophical, and ultimately as unavoidable as an autonomous car hurtling straight at you on the highway.

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[244] *See, e.g.*, Bambauer, *supra* note 14, at 383 ("Predicting the future is a surefire way to embarrass oneself.").