

ARTIFICIAL INTELLIGENCE, LLC: CORPORATE PERSONHOOD AS TORT REFORM

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ABSTRACT

Our legal system has long tried to fit the square peg of artificial intelligence (AI) technologies into the round hole of the current tort regime, overlooking the inability of traditional liability schemes to address the nuances of how AI technology creates harms. The current tort regime deals out rough justice—using strict liability for some AI products and using the negligence rule for other AI services—both of which are insufficiently tailored to achieve public policy objectives.

Under a strict liability regime where manufacturers are always held liable for the faults of their technology regardless of knowledge or precautionary measures, firms are incentivized to play it safe and stifle innovation. But even with this cautionary stance, the goals of strict liability cannot be met due to the unique nature of AI technology: its mistakes are merely “efficient errors”—they appropriately surpass the human baseline, they are game theory problems intended for a jury, they are necessary to train a robust system, or they are harmless but misclassified.

Under a negligence liability regime where the onus falls entirely on consumers to prove the element of causation, victimized consumers must surmount the difficult hurdle of tracing the vectors of causation through the “black box” of algorithms. Unable to do so, many are left without sufficient recourse or compensation.

This Article proposes a new framework to regulate AI technologies: bestowing corporate personhood to AI systems. First, the corporate personality trait of “limited liability” strikes an optimal balance in determining liability—it would both compensate victims

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(for instance, through obligations to carry insurance and a straightforward burden of causation) while holding manufacturers responsible only when the infraction is egregious (for instance, through veil-piercing). Second, corporate personhood is “divisible”—meaning not all corporate personality traits need to be granted—which circumvents many of the philosophical criticisms of giving AI the complete set of rights of full legal personhood. Third, innovation incentives weigh heavily in favor of shifting to a tort regime better tailored to the potential promises and unique harms of AI.

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INTRODUCTION

The warning signs of a heart attack are undetectable to the naked eye—by the time the patient or onlookers notice the shortness of breath or tightness in the chest, it is often too late. Imagine a hypothetical woman in her early 60s: she is in all aspects in good

health; she responsibly has her doctor check her pacemaker during every annual appointment. Perhaps she reports chest pain, so her doctor runs the traditional coronary CT angiogram to scan the coronary arteries for blocked segments. But—like 75% of patients’ scans—the image appears visually regular and she is sent home.¹ Later, she collapses from a fatal heart attack.

For an artificial intelligence (AI) system trained on the right data, the warning signs would be obvious. The latest advances use machine learning to extract additional information from PET scans and CCTA scans on inflammation, scarring, and blood supply levels into the latest biomarker: a perivascular fingerprint.² Now imagine that the pacemaker manufacturer possessed this exact technology, sufficient to detect and prevent such an incident—an AI system that could be easily integrated into pacemakers, which predicts heart attacks to 95.4% accuracy³—but the company actively decided against rolling out the technology. Unfortunately, under the current tort regime, the decision makes logical business sense. If the company’s AI technology is classified as a product, it would be subject to strict liability: unwilling to face the cost of guaranteed legal liability from the 4.6% of false negatives, the company would not continue to test the technology, much less implement this improved (but imperfect) solution. If the AI technology is classified as a service, it would be subject to the negligence rule: patients would be unable to prove that the “black box” AI nor its human operator “caused” their injuries and would not receive damages or financial compensation. It is a lose-lose situation. Society misses out on the lives that could have been saved, as well as potential innovation from the manufacturer’s continued investment in the industry.

Our legal system has long tried to fit the square peg of AI technologies into the round hole of the current tort regime, overlooking the inability of traditional liability schemes to address the nuances of how AI technology creates harms. The current tort regime

1. See Brit. Heart Found., *New AI Technology for Advanced Heart Attack Prediction*, EUREKALERT! (Sept. 3, 2019), https://www.eurekalert.org/pub_releases/2019-09/bhf-nat090219.php [<https://perma.cc/3ZCA-TKD2>] (stating that 75% of scans show no significant narrowing of the artery).

2. Evangelos K. Oikonomou et al., *A Novel Machine Learning-Derived Radiotranscriptomic Signature of Perivascular Fat Improves Cardiac Risk Prediction Using Coronary CT Angiography*, 40 EUR. HEART J. 3529, 3541 (2019).

3. See Luis Eduardo Juarez-Orozco, Speaker at the Young Investigator Awards, Refining the Long-Term Prognostic Value of Hybrid PET/CT Through Machine Learning (May 12, 2019).

deals out rough justice—using strict liability for some AI products and using the negligence rule for other AI services—both of which are insufficiently tailored to achieve public policy objectives. Under a strict liability regime where manufacturers are always held liable for the faults of their technology regardless of knowledge or precautionary measures, firms would be incentivized to play it safe and stifle innovation.⁴ Under a negligence liability regime where the onus falls entirely on consumers to prove the element of causation, victimized consumers must surmount the difficult hurdle of tracing the vectors of causation through the “black box” of algorithms. Unable to do so, many are left without sufficient recourse or compensation.⁵ Critiques have been leveled against the “black box” nature of these technologies.⁶ The logical solution for our hypothetical pacemaker patient and manufacturer is not to continue under the current tort regime, but to develop a more nuanced system.

This Article proposes a new framework to regulate AI technologies: bestowing corporate personhood to AI systems. First, the corporate personality trait of “limited liability” strikes an optimal balance in determining liability—it would both compensate victims (such as through obligations to carry insurance and a straightforward burden of causation) while holding manufacturers responsible only when the infraction is egregious (such as through veil-piercing).⁷ Second, corporate personhood is “divisible”—meaning not all corporate personality traits need to be granted—which circumvents many of the philosophical criticisms of giving AI too many rights of full legal personhood.⁸ Third, innovation incentives weigh heavily in favor of shifting to a tort regime better tailored to the potential promises and unique harms of AI.⁹ This framework can be implemented through the mandate of incorporation filings, which would allow states to regulate which corporate traits, rights, and restrictions would be in an AI corporate charter.

Critics have haphazardly brushed aside the possibility of legal status for AI systems without considering whether it would be in the best interests of consumers and manufacturers.¹⁰ They argue on moral

4. See *infra* Section II.A.

5. See *infra* Section II.B.

6. See *infra* note 171 and accompanying text.

7. See *infra* Section III.A.

8. See *infra* Section III.B.

9. See *infra* Section III.C.

10. See, e.g., *Opinion of the European Economic and Social Committee on “Artificial Intelligence – The Consequences of Artificial Intelligence on the (Digital)*

grounds that this framework would impermissibly equate robots as truly human, and effectively allow AI robots to become “liability shields” for the human manufacturers.¹¹ However, such an approach conflates legal rhetoric with philosophical truths. The caveats of “limited liability,” such as theories of veil-piercing and robot solvency, make it clear that human manufacturers would not be absolved of blanket responsibility. The costs, benefits, and incentives of the players surrounding AI systems are unique and warrant unique solutions.

This Article is structured as follows. Part I defines the scope of AI technology that this Article encompasses while acknowledging the definitional problem arising from the diversity of AI applications. It continues to trace the development of the Supreme Court’s corporate rights jurisprudence, concluding that the grant of corporate personhood is dependent upon the functional protection of the rights of natural persons interacting with the incorporated entities, not the philosophical idea that a corporation is a constitutionally protected “person” in a biological, social, or intellectual sense. Part II elucidates the current tort regime and its fatal shortcomings. Both strict liability and negligence rule are inadequate to regulate, hold accountable, or promote innovation of AI technologies. Part III sketches a proposal of a limited liability framework of corporate personhood as an alternative method of regulating AI in tort law, including the benefits for both consumers and manufacturers. Not only does this proposal circumvent the main criticism of a full grant of legal personhood to AI systems, there is also an obligation to shift to this new framework. A brief conclusion follows.

I. BACKGROUND

This Part provides brief background to two essential components of this proposal: AI systems and theories of corporate personhood.

A. AI Systems

Any proposal regarding AI must define what exactly it seeks to regulate; however, there has been no consensus and no working

Single Market, Production, Consumption, Employment and Society,” 2017 O.J. (C 288) 3.33.

11. *See id.* (“The EESC is opposed to any form of legal status for robots or AI (systems), as this entails an unacceptable risk of moral hazard.”).

definition of artificial AI.¹² This difficulty likely lies in the diverse applications of AI: to manifest as abstract digital programs or tangible robotic objects, to be utilized in our personal lives or to shape nations, and to provide solutions to a broad range of problems.¹³

AI can be best understood as a “set of techniques aimed at approximating some aspect of human or animal cognition using machines.”¹⁴ Today’s AI innovations frequently emphasize machine learning—which fundamentally refers to a statistical process that derives patterns from the existing data and predicts future data, with the capacity to learn from its performance and improve its outputs over time.¹⁵ A particular technique—deep learning—utilizes structures that are loosely based on the human brain to extract patterns from enormous data sets.¹⁶ For example, a multilayered structure for image recognition might consist of a first layer that combines raw data in the image to locate simple patterns, a second layer that combines the results of the first layer to locate patterns-of-patterns, a third layer that does the same to the second layer, and so on.¹⁷ The current waves of progress and enthusiasm for AI have been shaped by three defining characteristics: first, access to big data from sources like social media, science, government, and business;¹⁸ second, the ability to use a great deal of processing power from more powerful computers;¹⁹ and third, the result of improved machine learning approaches and algorithms.²⁰ The year 2019 saw 74% growth in the demand for AI jobs.²¹

12. See Matthew U. Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies*, 29 HARV. J.L. & TECH. 354, 359 (2016) (stating that there does not appear to be any widely accepted definition of artificial intelligence, nor a useful definition for regulatory purposes).

13. *Id.* at 354, 360.

14. Ryan Calo, *Artificial Intelligence Policy: A Primer and Roadmap*, 51 U.C. DAVIS 399, 404 (2017).

15. See *id.* at 405.

16. See *id.*

17. See NAT’L SCI. & TECH. COUNCIL COMM. ON TECH., EXEC. OFF. OF THE PRESIDENT, PREPARING FOR THE FUTURE OF ARTIFICIAL INTELLIGENCE 9 (2016).

18. See MIKE PURDY & PAUL DAUGHERTY, WHY ARTIFICIAL INTELLIGENCE IS THE FUTURE OF GROWTH 11 (2016) (“Global data has seen a compound annual growth rate (CAGR) of more than 50 percent since 2010 as more of the devices around us have become connected.”).

19. See *id.*

20. See *id.*

21. See Jonathan Vanian, *This Year’s Hottest Job Involves Artificial Intelligence*, FORTUNE (Dec. 10, 2019, 11:56 AM), <https://fortune.com/2019/12/10/artificial-intelligence-hottest-job/> [<https://perma.cc/962A-WKWB>].

However, AI exists in more or less of a legal vacuum.²² The federal government has primarily passed high-level initiatives for general AI applications, with specific regulations far and few in between.²³ State and local governments have just begun to enact sector-specific laws restricting the usage of particular AI technologies.²⁴ Courts have opined on few cases involving AI liability. Policymakers must confront the rise of the diverse variety of AI applications—they may embrace, reject, or manipulate it—but they must confront it. And effective regulations must consider not only

22. See Lee Tiedrich, B.J. Altwater & James Yoon, *Recent Developments in Artificial Intelligence Law and Policy*, REG. REV. (Apr. 25, 2020), <https://www.theregreview.org/2020/04/25/tiedrich-altwater-yoon-recent-developments-artificial-intelligence-law-policy/> [<https://perma.cc/Rf77-G8UT>] (“[T]he NAIIA [National Artificial Intelligence Initiative Act] and Trump Administration have taken a light-touch approach to AI regulation.”). As of today, the regulatory slate is relatively blank. In 2019, the president released an Executive Order on Maintaining American Leadership in Artificial Intelligence, meant to promote connections between the federal government, AI industry, and academia. See Exec. Order No. 13,859, 84 Fed. Reg. 3967 (Feb. 11, 2019). It aims to ensure public trust and education in AI-based technologies across five particular areas: research and development, infrastructure, governance, the American workforce, and international engagement. See *id.* Building upon the Executive Order, several senators introduced the bipartisan Artificial Intelligence Initiative Act (AI-IA), which would allocate \$2.2 billion over five years to create an official American AI strategy. See Artificial Intelligence Initiative Act, S. 1558, 116th Cong. (2019). This initiative would include education goals under the National Science Foundation, an AI-based research program under the Department of Energy, and the creation of a National AI Coordination Office. See *id.* Although these steps seem promising, it is unclear whether they will effectuate meaningful change in the immediate future. Deciding how accountable to hold AI technology for its actions depends upon balancing safety concerns against incentives to innovate.

23. See generally Christopher S. Yoo & Alicia Lai, *Regulation of Algorithmic Tools in the United States*, 13 J. L. & ECON. REG. 7 (2020). These broad initiatives include U.S. adoption of the Organisation for Economic Co-operation and Development (OECD) Principles on Artificial Intelligence, the Global Partnership on Artificial Intelligence (GPAI), the Office of Management and Budget (OMB) Draft of Guidance for Regulation of Artificial Intelligence Applications, and the National Institute of Standards and Technology (NIST) Plan for Federal Engagement in Developing Technical Standards and Related Tools, among others. See *id.* at 7–17.

24. See *id.* at 20–21 (providing examples where “Washington state enacted a statute creating a legal framework by which agencies may use facial recognition technologies to the benefit of society . . . but prohibits uses that ‘threaten our democratic freedoms and put our civil liberties at risk,’” where “Maryland passed a bill prohibiting the use of facial recognition technologies during job interviews without the applicant’s consent,” and where “San Francisco passed a bill strictly banning any use of facial recognition technologies by the city police or city officials, departments, boards, or commissions over concerns for civil liberties”).

what definition of AI it sets forth, but also *who* it trusts with the responsibility to create it.

For now, this Article will follow Matthew Scherer’s “blissfully circular” approach to defining intelligence in discussing regulation of AI: “‘artificial intelligence’ refers to machines that are capable of performing tasks that, if performed by a human, would be said to require intelligence.”²⁵ The argument will refer to AI as both a concept and as a tangible technology hosted on robotic platforms, computers, or networked computers.

B. Theories of Corporate Personhood

The story of corporate personhood has been told before.²⁶ But it has been told through the lens of various philosophical conceptions of the incorporated entity, emphasizing the origin of its core rights or the nature of its moving parts.²⁷ Depending on the theory, extending corporate personhood—to corporations, to rivers, to trees, to banks—is either entirely logical or entirely impermissible. This Section traces the jurisprudence but rejects the logic. Rather, corporate personhood is a constructed fiction revolving around the social interests of natural persons, not the characteristics of the corporation. Applying this functional perspective to the developers and consumers of AI technologies is crucial in the argument to extend corporate personhood to AI.

As a preliminary matter, the recognition of corporations as a separate legal personality goes back centuries. This Article briefly traces several such dissonant theories. Legal systems have generally chosen to frame natural persons as *legal persons*.²⁸ Legal systems have also chosen to give corporations (and occasionally other inanimate

25. Scherer, *supra* note 12, at 362.

26. See generally John Dewey, *The Historical Background of Corporate Legal Personality*, 35 YALE L.J. 655 (1926) (describing the various theories of corporate personhood and their abilities to limit and enhance corporate power); MEIR DAN-COHEN, RIGHTS, PERSONS, AND ORGANIZATIONS (1986) (analyzing corporations and their relation to the state, fair dispute processing, and natural persons’ rights); Elizabeth Pollman, *Reconceiving Corporate Personhood*, 2011 UTAH L. REV. 1629 (2011) (tracing historical and theoretical developments in the jurisprudence of corporate personhood).

27. These theories include the artificial person doctrine, the aggregate theory, and the natural entity theory, as further explained in this Section.

28. See *Person*, BLACK’S LAW DICTIONARY (11th ed. 2019) (internal citation omitted) (“So far as legal theory is concerned, a person is any being whom the law regards as capable of rights or duties.”).

objects²⁹) a degree of legal personality as *corporate persons*—a subset of legal personhood with its own set of rights.³⁰ Those stories tend to adopt one of the multitude of personhood theories, wielding it to argue for subsequent limits or extensions on legal personhood.³¹ But old and new scholarship show that these arguments are fairly arbitrary, as “[e]ach theory has been used to serve the same ends, and each has been used to serve opposing ends.”³² These simultaneous, competing theories over the nature of the corporation have resulted in a “remarkably fluctuating reality.”³³ In other words, these theories have leveraged the mask of philosophical theory to advance political ideology.³⁴

Early after the founding of the United States, under the *artificial person*, or *fiction*, or *concession*, or *grant* doctrine, the corporation was considered to be merely a creation of the legislature.³⁵ It was the state that endowed the corporation with certain core rights such as the capacity to be party to lawsuits, to hold and transfer property, and to have perpetual existence, independent of changes in the its shareholders.³⁶ In *Trustees of Dartmouth College v. Woodward*, Chief Justice Marshall stated that a corporation is “an artificial being, invisible, intangible, and existing only in contemplation of law. Being

29. Attempts within the United States largely failed. See, e.g., CITY OF TOLEDO, LAKE ERIE BILL OF RIGHTS (2019) (giving Lake Erie the “right to . . . flourish”); Order Invalidating Lake Erie Bill of Rights at 1, *Drewes Farms P’ship v. City of Toledo*, 441 F. Supp. 3d 551, 544, 558 (N.D. Ohio 2020) (invalidating the Lake Erie Bill of Rights in its entirety); see also Mora County, N.M., Ordinance 2013-01 (Apr. 29, 2013) (giving natural rights to the natural ecosystems and bodies of water within the county); *SWEPI, LP v. Mora Cnty.*, 81 F. Supp. 3d 1075, 1088 (D.N.M. 2015) (invalidating the Ordinance).

30. Dictionary Act, 1 U.S.C. § 1 (2018) (“[T]he words ‘person’ and ‘whoever’ include corporations, companies, associations, firms, partnerships, societies, and joint stock companies, as well as individuals.”); see also Am. Bridge 21st Century, *Mitt Romney: “Corporations Are People, My Friend,”* YOUTUBE (Aug. 11, 2011), https://www.youtube.com/watch?v=St1wSWtm_BI [<https://perma.cc/5M5J-ST7F>] (“Corporations are people, my friend.”).

31. See, e.g., *infra* notes 54, 57 and accompanying text.

32. Dewey, *supra* note 26, at 669.

33. See Gunther Teubner, *Enterprise Corporatism: New Industrial Policy and the “Essence” of the Legal Person*, 36 AM. J. COMPAR. L. 130, 130–33, 138 (1988).

34. See Pollman, *supra* note 26, at 1650.

35. See *Case of Sutton’s Hosp.* (1612) 77 Eng. Rep. 960, 973 (K.B.) (defining the corporation as “invisible, immortal, and rests only in intendment and consideration of the law”).

36. See Phillip Blumberg, *The Corporate Personality in American Law: A Summary Review*, 38 AM. J. COMPAR. L. 49, 49 (1990).

the mere creature of law, it possesses only those properties which the charter of its creation confers upon it, either expressly, or as incidental to its very existence.”³⁷ Chief Justice Marshall’s opinion emphasized that state action was at the core of corporations, and still very much restrained the rights of corporations to actions that would serve humans, as well as designating political rights and powers off-limits to corporations.³⁸

As the Supreme Court continued to elucidate which rights corporations held, the *associational*, or *aggregate*, or *contract* theory emerged. Under this doctrine, corporations were seen as “an association of individuals contracting with each other in organizing the corporation, with its core attributes as an artificial legal person supplemented by the attribution to it of constitutional rights of its shareholders.”³⁹ In *The Railroad Tax Cases*, Justice Field deemphasized the role of the corporation and emphasized the role of the “individual[] whom [the artificial being] represents.”⁴⁰ This theory was perpetuated by the growth of general incorporation statutes, which made incorporating widely accessible and shifted the predominant role in corporation from the state to the incorporators.⁴¹

Lastly, the *natural entity* theory views the corporation as a separate entity that extends beyond the context of both the state’s creation and the shareholders’ claims.⁴² The corporation may be

37. 17 U.S. (4 Wheat.) 518, 636 (1819).

38. See *id.* (“It is chiefly for the purpose of clothing bodies of men, in succession, with these qualities and capacities, that corporations were invented, and are in use. . . . Its immortality no more confers on it political power, or a political character, than immortality would confer such power or character on a natural person.”); see also *Proprietors of Charles River Bridge v. Proprietors of Warren Bridge*, 36 U.S. 420, 650 (1837) (Baldwin, J., concurring) (“It is the object and effect of the incorporation, to give to the artificial person the same capacity and rights as a natural person can have. . . . It bestows the character and properties of individuality on a collective and changing body of men . . . , by which their rights become as sacred as if they were held in severalty by natural person.”).

39. Blumberg, *supra* note 36, at 50.

40. *San Mateo Cnty. v. S. Pac. R.R.*, 13 F. 722, 744 (C.C.D. Cal. 1882), *writ of error dismissed as moot*, 116 U.S. 138 (1885) (“It would be a most singular result if a constitutional provision intended for the protection of every person against partial and discriminating legislation by the states, should cease to exert such protection the moment the person becomes a member of a corporation. . . . [T]he courts will always look beyond the name of the artificial being to the individuals whom it represents.”).

41. See, e.g., N.Y. Act of Mar. 22, 1811, ch. 67, § 6, 1811 N.Y. Laws 111, 113 (establishing the first general incorporation statute).

42. See Blumberg, *supra* note 36, at 50.

considered “an organic social reality with an existence independent of, and constituting something more than, its changing shareholders.”⁴³

The tripartite evolution of the theory of corporations underscores not just the historical development, but also the multi-headed philosophical drive, behind corporate personhood. On one hand, the first view of the corporation as an artificial person paves the way for the grant of limited liability status; this notion continues to dominate the public discourse. On the other hand, the second and third views of the corporation as an aggregate of individuals and as a real entity in itself push the law to extend constitutional protections to corporations. These protections have been used to support “the attribution of shareholders’ interests to the corporation for assertion *by the corporation* not by shareholders.”⁴⁴

Now, in the twenty-first century, some scholars suggest that the jurisprudence is shifting to a fourth view of the corporation that emphasizes enterprise over entity, arising from the rapid growth of corporations in number and in size.⁴⁵ In a 1933 case, Justice Brandeis explained that corporations have historically expanded from single-purpose entities with limited terms of existence into the multipurpose, immortal behemoths of the day.⁴⁶ Given the expanding role of large corporations as well as tiers of parent and subsidiary corporations that span across countries, common law has tried increasingly to impose group obligations to supplement the group rights given under the “real entity” view.⁴⁷ Obligations—and liability for failing to meet those obligations—are imposed under new developments such as the

43. *Id.*; see also Roger Scruton, *Corporate Persons I*, 63 ARISTOTELIAN SOC’Y, SUPPLEMENTARY VOLUME 239, 240 (1989) (arguing that corporate persons have moral responsibilities that cannot be reduced to those of constituent natural individuals).

44. Blumberg, *supra* note 36, at 52.

45. See, e.g., *id.*

46. See Louis K. Liggett Co. v. Lee, 288 U.S. 517, 548–49 (1933) (Brandeis, J., dissenting in part) (“[Incorporation] was denied because of fear. Fear of encroachment upon the liberties and opportunities of the individual. Fear of the subjection of labor to capital. Fear of monopoly. Fear that the absorption of capital by corporations, and their perpetual life, might bring evils similar to those which attended mortmain. There was a sense of some insidious menace inherent in large aggregations of capital, particularly when held by corporations. So at first the corporate privilege was granted sparingly; and only when the grant seemed necessary in order to procure for the community some specific benefit otherwise unattainable. . . . The desire for business expansion created an irresistible demand for more charters; and it was believed that under general laws embodying safeguards of universal application the scandals and favoritism incident to special incorporation could be avoided.”).

47. See Blumberg, *supra* note 36, at 52.

concept of “piercing the veil jurisprudence.”⁴⁸ Today, firms can incorporate “for any lawful purpose,” resulting in two million firms incorporated annually.⁴⁹

In the efforts to extend and cabin personhood, the debate over which philosophical theory underscores corporate personhood seems to rear its head rather pointlessly.⁵⁰ Some legal scholars have recognized that the courts are acting not on a comprehensive philosophy perspective, but on an “ad hoc basis.”⁵¹

Consider the grant of constitutional rights. Courts have long leaned on the fictional shorthand that corporations are some extension of human people in order to confer on corporations many of the constitutional rights possessed by humans under our legal system.⁵² The Supreme Court had long decided that corporations were entitled to property rights⁵³ and contract rights.⁵⁴ Then in 1882, the Court extended the Equal Protection Clause of the Fourteenth Amendment to corporations.⁵⁵ Recent Supreme Court decisions extended the First

48. *See id.*

49. *See* Ciara Torres-Spelliscy, *Does “We the People” Include Corporations?*, AM. BAR ASS’N (Jan. 1, 2018), https://www.americanbar.org/groups/crsj/publications/human_rights_magazine_home/we-the-people/we-the-people-corporations/ [<https://perma.cc/H64N-Q828>].

50. *See* Dewey, *supra* note 26, at 655 (dismissing the debate as pointless because “‘person’ signifies what law makes it signify”).

51. *See* Pollman, *supra* note 26, at 1655.

52. *See* Int’l Shoe Co. v. Washington, 326 U.S. 310, 316 (1945) (“[T]he corporate personality is a fiction, although a fiction intended to be acted upon as though it were a fact . . .”).

53. *See* Terrett v. Taylor, 13 U.S. (9 Cranch) 43, 50 (1815) (holding that as a corporation, the Episcopal Church could assert and retain property rights just as “any other corporation or individual [could over] his or its own property” and could not be divested by any act of the state legislature).

54. *See* Trs. of Dartmouth Coll. v. Woodward, 17 U.S. (4 Wheat.) 518, 518 (1819) (holding that, as a corporation, Dartmouth College could claim protection under the Constitution’s Contract Clause, which prohibits any state from passing any “law impairing the obligation of contracts”). Despite recognizing differences between corporations and human citizens, the Court found the state could not interfere with a preexisting contract between two parties. *See* Trs. of Dartmouth Coll., 17 U.S. at 518.

55. In a case brought by Southern Pacific Railroad but settled prior to a decision, the counsel for Southern Pacific produced a journal of the Joint Congressional Committee that drafted the Fourteenth Amendment, arguing that their deliberations vacillated between using the term “citizen” and “person” and that the drafters chose “person” specifically in order to include corporations. *See* Adam Winkler, ‘Corporations Are People’ Is Built on an Incredible 19th-Century Lie, ATLANTIC (Mar. 5, 2018), <https://www.theatlantic.com/business/archive/2018/03/>

Amendment to commercial speech rights⁵⁶ and religious rights⁵⁷ to corporations. Other legal systems have also given select rights to individual entities on the international stage.⁵⁸ Each of these rulings reflect an ad-hoc approach by the Court in conferring personhood rights. Despite a slew of litigation, the Court was always resistant to directly answering the question of whether corporations would be considered persons.⁵⁹ Finally, in 1889, Justice Field wrote that “corporations are persons within the meaning of the clause in question. It was so held in *Santa Clara Co[unty] v. [Southern Pacific] Railroad*.”⁶⁰ Despite the lack of any such holding in *Santa Clara*, in addition to the authoring Justice’s likely status as a subject of industry capture,⁶¹ the phrase would go on to be cited in dozens of future cases.⁶²

corporations-people-adam-winkler/554852/ [https://perma.cc/S8TE-XYGR]. According to historians, while the journal was real, it contained no such evidence. *See id.*

56. *See* *Citizens United v. Fed. Election Comm’n*, 558 U.S. 310, 349 (2010) (internal quotation marks omitted) (holding that corporations had the same free speech rights as human individuals and could freely spend money on election advertising because political speech is “indispensable to decisionmaking in a democracy, and this is no less true because the speech comes from a corporation”).

57. *See* *Burwell v. Hobby Lobby Stores, Inc.*, 573 U.S. 682, 706–07 (2014) (holding that corporations had a right to religious freedom under the First Amendment and were therefore entitled to an exemption from the Obamacare mandate to cover birth control in employee health plans). In his majority opinion, Justice Alito pointedly emphasized that the purpose of the legal fiction of corporations as persons is ultimately for the benefit of humanity: “protecting the free-exercise rights of corporations like Hobby Lobby . . . protects the religious liberty of the humans who own and control those companies.” *Id.* at 707.

58. For example, an arbitral tribunal specifically confirmed that the Bank for International Settlements was an international legal person, created by a 1930 Convention between Germany, Belgium, Great Britain, Italy, Japan, and Switzerland, and treated as a person in other international agreements. *See* Joanna J. Bryson, Mihailis E. Diamantis & Thomas D. Grant, *Of, for, and by the People: The Legal Lacuna of Synthetic Persons*, 25 A.I. & L. 273, 279 (2017).

59. *See* *Santa Clara Cnty. v. S. Pac. R.R. Co.*, 118 U.S. 394, 394 (1886) (stating that before oral arguments, the Court does not wish to hear argument on the question of whether the Fourteenth Amendment applies to corporations).

60. *See* *Minneapolis & St. Louis Ry. V. Beckwith*, 129 U.S. 26, 28 (1889).

61. *See* Winkler, *supra* note 55 (“A confidant of Leland Stanford, Field had advised the company on which lawyers to hire for this very series of cases and thus should have recused himself from them. He refused to—and, worse, while the first case was pending, covertly shared internal memoranda of the justices with Southern Pacific’s legal team.”).

62. *See, e.g.,* *Bell v. Maryland*, 378 U.S. 226, 262 (1964); *First Nat’l Bank v. Bellotti*, 435 U.S. 765, 822 (1978) (Rehnquist, J., dissenting); *Sullivan v. A.W. Chesterton, Inc. (In re Asbestos Prods. Liab. Litig. No. VI)*, 384 F. Supp. 3d 532, 536

The inconsistent framework of corporate personhood has been elucidated by scholars such as Elizabeth Pollman.⁶³ She argued that “despite the transformation in the types of corporations in existence, and the different legal questions presented, the Court has not carefully analyzed its legal theory of corporate rights, nor has it expressly articulated a framework for thinking about corporations that could guide its decision making in a consistent way.”⁶⁴ The Supreme Court’s corporate rights jurisprudence stems not from “the idea that a corporation is a constitutionally protected ‘person’ in its own right,” but out of concern for the “rights of the natural persons that are assumed to be represented by the corporation, or that are interacting with the corporation.”⁶⁵

This functional perspective of corporate personhood is reflected in the divisible nature of corporate personhood. Legal personhood is an aggregate of legal rights and obligations, and thus it is divisible.⁶⁶ As some scholars described:

Legal people need not possess all the same rights and obligations, even within the same system. A legal system might treat a given actor as a legal person in respect of some rights and some obligations but not in respect of others. It may even be helpful to think of legal personhood as a scalar concept, so that an entity can be more or less of a legal person as it possesses more or fewer rights and obligations.⁶⁷

Divisibility of rights extends beyond corporate personhood, as evident in the global struggle for equal rights for women, ethnic minorities, and other disadvantaged groups, or in the policies surrounding different rights for noncitizens, felons, and children.⁶⁸ Corporate

(E.D. Pa. 2019); *SWEPI, LP v. Mora Cnty.*, 81 F. Supp. 3d 1075, 1108–09 (D.N.M. 2015); *United Servs. Auto. Ass’n v. Curiale*, 668 N.E.2d 384, 387 (N.Y. 1996).

63. See Pollman, *supra* note 26; see also Margaret M. Blair & Elizabeth Pollman, *The Derivative Nature of Corporate Constitutional Rights*, 56 WM. & MARY L. REV. 1673 (2015).

64. Blair & Pollman, *supra* note 63, at 1679.

65. *Id.* at 1678.

66. See Bryson, Diamantis & Grant, *supra* note 58, at 277.

67. *Id.*; see also VISA A.J. KURKI, A THEORY OF LEGAL PERSONHOOD 8 (2019) (“Rather than being a black-and-white affair, legal personhood comes in shades of grey—it is a cluster property. A legal person is not simply a right-holder or a duty-bearer; rather, legal personhood consists of divisible but interconnected incidents of legal personhood.”) (emphasis omitted).

68. Bryson, Diamantis & Grant, *supra* note 58, at 280 (citing Peter M. Asaro, *Robots and Responsibility from a Legal Perspective*, 4 PROC. IEEE 20, 22 (2007) (“Minor children are a prime example of quasi-persons. Minors do not enjoy the full rights of personhood that adults do. In particular they cannot sign contracts or become

entities can also have “more, fewer, overlapping, or even disjointed sets” of rights and obligations.⁶⁹ Supreme Court jurisprudence has since affirmed that while corporations have many of the constitutional rights and obligations of personhood, it does not have all of them.⁷⁰

Legal personhood is a fiction. The status is not an inherent characteristic, but the result of the legal system’s decision to confer legal personality on a given entity.⁷¹ Like all good fictions, legal personhood should tangibly serve its creators, not abstract ideologies.⁷² The conception of an entity as a “person” in the biological, philosophical, and social sense is influential to, but not dispositive of, the decision to grant legal personhood.⁷³ And tracing the trajectory of which entities are bestowed with legal personality, and why, reveals not a “clear-cut line, logical or practical,” but very disparate theories.⁷⁴ In fact, the “only unifying strand between these disparate cases was the recognition of corporations as capable of holding rights or liabilities.”⁷⁵ Thus, instead of relying upon philosophy or judicial evocations of prior theories, this Article relies on “a more concrete understanding of society’s interests and the functional relations involved.”⁷⁶

If legal fictions are meant to functionally serve natural persons, Part II makes the case that it is in the interests of consumers, manufacturers, and society as a whole to extend corporate personhood to AI technologies. Part II also analyzes social interests in innovation and liability, as well as the functional relations between manufacturers and consumers.

involved in various sorts of legal arrangements because they do not have the right to do so as minors.”)).

69. *Id.*

70. *See infra* Section III.B.

71. *See, e.g.,* YUVAL NOAH HARARI, HOMO DEUS: A HISTORY OF TOMORROW 206 (2015) (“Fiction isn’t bad. It is vital. Without commonly accepted stories about things like money, states or corporations, no complex human society can function. . . . [However, c]orporations, money and nations exist only in our imagination. We invented them to serve us; why do we find ourselves sacrificing our lives in *their* service?”).

72. *See id.* Fictions have long existed when it advances the goals of an organization: for example, allowing religion in order to solder social coherency, allowing math in order to engineer structures, allowing corporations in order to drive economic development. *See id.*

73. *See* Bryson, Diamantis & Grant, *supra* note 58, at 279.

74. *See* Dewey, *supra* note 26, at 669.

75. Pollman, *supra* note 26, at 1649.

76. *See id.* at 1650.

II. CURRENT TORT LIABILITY FOR AI SYSTEMS

When AI technology goes wrong, who is at fault? Legal scholars have toyed with the possibilities: blame the AI, blame the data, blame the users, blame the supply chain, or blame the manufacturers?⁷⁷

Currently, AI technologies are considered property under the purview of individuals or corporations. Instead of delineating what rights and responsibilities an AI system should have, legal systems have instead focused on the liability of the humans who own or control such systems. Given the volume of products and services that incorporate AI technology, it is inevitable that some of those will result in harms. If a consumer-facing technology is used in the wrong context or programmed based on faulty assumptions, it may result in economic losses, property or personal injuries, or deaths.⁷⁸ Specific harms have included medical malpractice,⁷⁹ pedestrian injuries from self-driving cars,⁸⁰ fraud,⁸¹ disproportionate influence on the legislative process,⁸² mistaken blame for illegal purchases,⁸³ massive self-surveillance,⁸⁴ and civilian casualties of autonomous weapons.⁸⁵ There are also fears that AI will eliminate jobs through automation and

77. See John Villasenor, *Products Liability Law as a Way to Address AI Harms*, BROOKINGS INST. (Oct. 31, 2019), <https://www.brookings.edu/research/products-liability-law-as-a-way-to-address-ai-harms/> [<https://perma.cc/J56H-V6T4>].

78. See Curtis E.A. Karnow, *Liability for Distributed Artificial Intelligences*, 11 BERKELEY TECH. L.J. 147, 181 (1996).

79. See *id.* at 163 n.64 (describing how two cancer patients were killed by radiation overdoses from a computer-controlled radiation therapy machine when three lines of code were changed in a telecommunications program).

80. See Zakrzewski, *infra* note 276.

81. See Lisa Vaas, *Scammers Deepfake CEO's Voice to Talk Underling into \$243,000 Transfer*, NAKED SEC. (Sept. 5, 2019), <https://nakedsecurity.sophos.com/2019/09/05/scammers-deepfake-ceos-voice-to-talk-underling-into-243000-transfer/> [<https://perma.cc/6X8N-BECY>].

82. The majority of the 22 million comments on the DC Circuit ruling on net neutrality were automated bots. See Issie Lapowsky, *How Bots Broke the FCC's Public Comment System*, WIRED (Nov. 28, 2017, 12:19 PM), <https://www.wired.com/story/bots-broke-fcc-public-comment-system/> [<https://perma.cc/LR48-P5F3>].

83. A programmer was arrested when his AI bot bought drugs off the dark web. See Arjun Kharpal, *Robot with \$100 Bitcoin Buys Drugs, Gets Arrested*, CNBC (Apr. 21, 2015, 6:32 AM), <https://www.cnbc.com/2015/04/21/robot-with-100-bitcoin-buys-drugs-gets-arrested.html> [<https://perma.cc/A3E3-C439>].

84. See Steven I. Friedland, *Drinking from the Fire Hose: How Massive Self-Surveillance from the Internet of Things Is Changing the Face of Privacy*, 119 W. VA. L. REV. 891, 892 (2017).

85. See PAUL SCHARRE, *ARMY OF NONE: AUTONOMOUS WEAPONS AND THE FUTURE OF WAR* (2018).

worsen economic inequality.⁸⁶ Additionally, given the expansive and uncertain conception of what may constitute an AI “wrong,” the balance of implemented precautions and expected losses typically considered by product manufacturers may not apply to manufacturers of AI goods.

If an injury were to occur today, traditional tort law would apply to determine whether—if at all—to hold the AI manufacturers, AI inventors, or AI users responsible.⁸⁷ Currently, the relationship between AI technologies and AI companies is the relationship between a product and its producer. However, it is clear that placing AI directly under corporate ownership is insufficient. The product liability scheme that has emerged holds manufacturers to both extremes on the spectrum of liability: strict liability on one end and negligence liability on the other. Strict liability does not differentiate between the diverse array of AI applications, and more importantly, disincentivizes research and development of technologies with the potential to greatly benefit humans.⁸⁸ Negligence liability raises issues of proof of causation that renders it difficult to hold manufacturers responsible.⁸⁹ Further, even if liability is established, victims may not have a source of meaningful compensation if the company or people behind the technology personally lack sufficient funds and assets.

Which of these two schemes apply currently depends upon the particular product-or-service characteristics of the technology at issue. Under the Restatement of Torts, a seller is subject to products liability for selling a product in a defective condition unreasonably dangerous to the consumer.⁹⁰ To bring a cause of action for harm allegedly caused by an AI application, (1) the AI must be considered a “product,” (2) the defendant must be a seller of the AI, (3) the AI must reach the injured consumer without substantive alteration, (4) the AI must be defective, and (5) the defect must be the source of the injury.⁹¹ First, a court would need to decide whether the technology is a product, as opposed to a service. For a products liability claim to apply, the AI

86. See, e.g., MARTIN FORD, *RISE OF THE ROBOTS: TECHNOLOGY AND THE THREAT OF A JOBLESS FUTURE* 33, 41, 43, 46–48 (2015) (describing seven deadly trends caused by AI: stagnant wages, a bear market, declining labor force participation, diminishing job creation, soaring inequality, underemployment for college graduates, polarization, and part-time jobs).

87. See Scherer, *supra* note 12, at 388.

88. See *infra* Section II.A.

89. See *infra* Section II.B.

90. See George S. Cole, *Tort Liability for Artificial Intelligence and Expert Systems*, 10 *COMPUTER L.J.* 127, 159 (1990).

91. See *id.*

must be classified as a product: first, “a product—as distinguished from a service—must consist of some physical embodiment that is available to the purchaser directly”; second, the AI “must not be a unique or specially designed item.”⁹² Case law has drawn upon a variety of factors to distinguish products from services, such as the environment in which the AI operates, as well as the result generated by the program.⁹³ Generally, mass-produced, off-the-shelf software is considered a “product,” as opposed to custom-designed software which is considered a “service.”⁹⁴ Depending on how the AI technology is classified in this step of the analysis, one of two possible tort liability schemes apply.

This product-or-service classification is particularly murky because as AI continues to evolve, it will straddle both functions. AI offers the dual-pronged promise of mass production—such as in Microsoft’s development of image recognition APIs that apply to a wide array of cases⁹⁵—and increasing specialization—such as the same Microsoft image recognition APIs that are hyper-localized on one’s problem space when trained on the particular corpus.⁹⁶ This unique trend of AI technologies lends itself to creative arguments from opposing counsels, making it all the more likely courts will have to address both classifications and, by extension, both liability schemes.

This patchwork of approaches could result in inconsistent, fragmented state regimes, with some states retaining common law negligence liability, some retaining strict liability, and some

92. *Id.* at 160.

93. See Spencer Gottlieb, Note, *Installation Failure: How the Predominant Purpose Test Has Perpetuated Software’s Uncertain Legal Status Under the Uniform Commercial Code*, 113 MICH. L. REV. 739, 745–51 (2015) (describing uncertainty in how courts differentiate between software as a good and software as a service).

94. See Nancy Blodgett, *Suit Alleges Software Error*, 72 AM. BAR ASS’N J. 22, 22 (1986) (“The courts are split on whether software is a product or a service, according to [lawyer and computer law expert Jerome] Roberts. ‘If the software comes off the shelf, it more likely will be found to come under the UCC. But if it’s custom-made software, then it more likely will be seen as a service.’”).

95. See *Computer Vision*, MICROSOFT AZURE, <https://azure.microsoft.com/en-us/services/cognitive-services/computer-vision/> [https://perma.cc/HL4W-2V6F] (last visited Nov. 30, 2020).

96. See *Microsoft Empowers Developers with New and Updated Cognitive Services*, MICROSOFT AZURE BLOG (May 7, 2018), <https://azure.microsoft.com/en-us/blog/microsoft-empowers-developers-with-new-and-updated-cognitive-services/> [https://perma.cc/JA45-MA9P].

attempting to develop hybrid approaches.⁹⁷ Other product liability doctrines offer additional caveats.⁹⁸ This Article does not elaborate further upon exactly where the divide between AI products and services is drawn, but it is important to note that there are AI technologies that will fall into either category.

A. Strict Liability

Under a strict liability standard, if a robot causes harm, the creator must be held responsible.⁹⁹ If the AI technology is classified as a product, and additionally satisfies the remaining four factors in the Restatement, then strict liability applies.¹⁰⁰

97. See 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. 127, 148 (2019).

98. Design defect doctrine would require a plaintiff to prove that there was a reasonable alternative design that could have avoided the injury. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY, § 2(b) (AM. L. INST. 1998) (designating a product “defective in design when the foreseeable risks of harm . . . could have been reduced or avoided by the adoption of a reasonable alternative design by the seller or other distributor, or a predecessor in the commercial chain of distribution, and the omission of the alternative design renders the product not reasonably safe”); see also *id.* at § 2 cmt. d (defining “reasonable alternative product design” in terms of a “risk-utility balancing test”). State of the art defense would allow a defendant to argue that product design conforms to industry customs, reflects the most advanced technology developed, or that it is at the cutting edge of scientific knowledge. See *id.* at § 2(b) cmt. f. Manufacturing defect doctrine would require a showing of error during manufacture. See *id.* at § 2(a) (designating a “manufacturing defect when the product departs from its intended design even though all possible care was exercised in the preparation and marketing of the product”). Warning defect doctrine would require a showing an omission of reasonable instructions. See *id.* at § 2(c) (designating a product “defective because of inadequate instructions or warnings when the foreseeable risks of harm . . . could have been reduced or avoided by the provision of reasonable instructions or warnings by the seller or other distributor . . . and the omission of the instructions or warnings renders the product not reasonably safe”). Learned intermediary doctrine would place a duty on an intermediary, such as a physician, who intervenes between the manufacturer and consumer such that the former does not have a direct duty to the latter. See *id.* at § 6.

99. See David C. Vladeck, *Machines Without Principals: Liability Rules and Artificial Intelligence*, 89 WASH. L. REV. 117, 146 (2014) (arguing that a product liability regime is inappropriate “in cases where driver-less cars fail and cause injuries to persons or property and it would be unreasonable to attribute the failure to the vehicle’s manufacture or design” and instead presenting a per se strict liability proposal “completely uncoupled from notions of fault for this select group of cases”).

100. See Cole, *supra* note 90, at 159.

1. Application

A manufacturer will be found strictly liable for selling products with “flaws in product design, manufacture, or warnings that cause personal injury or property damage to others,” regardless of what the manufacturer knew or did to prevent the harm.¹⁰¹ This regime assumes that any harm that results is implicit proof of some defect with the technology, regardless of whether the creator knew about the risk or took steps to prevent the harm. The predominant justification is Guido Calabresi’s cheapest-cost avoider approach: imposing liability upon the party to the accident who “is in the best position to make the cost-benefit analysis between accident costs and accident avoidance costs and to act on that decision once it is made . . . a search for the cheapest cost avoider.”¹⁰² Some consumers may prefer a strict liability regime, since after all, the creator is in the best position to prevent harms and absorb any economic losses stemming from the harms.

For strict liability in product defect cases, a plaintiff merely needs to show that (1) there was an unreasonably dangerous defect in the product that, (2) existed when the product left the defendant’s control, and (3) injured the plaintiff.¹⁰³ If a heart-monitoring wearable resulted in inaccurate data or recommendations, then the plaintiff could allege that the company had a duty to create an accurate product and anything less than 100% accuracy is a dangerous defect.¹⁰⁴ If an autonomous robot were to malfunction in the workplace and harm a human worker, then the AI manufacturer would be found strictly liable even without proof of carelessness or fault. As recently as 2017, in *Taylor v. Intuitive Surgical, Inc.*, the court held that strict liability was the proper test for a manufacturer’s failure to warn of the potential flaws in its surgical robot.¹⁰⁵ Although the manufacturer had taken

101. Jones Day, *Mitigating Product Liability for Artificial Intelligence*, INSIGHTS (Mar. 2018), <https://www.jonesday.com/en/insights/2018/03/mitigating-product-liability-for-artificial-intell> [<https://perma.cc/5SPH-EYWC>].

102. Guido Calabresi & Jon T. Hirschoff, *Toward a Test for Strict Liability in Torts*, 81 YALE L.J. 1055, 1060 (1972) (emphasis omitted); see also GUIDO CALABRESI, *THE COSTS OF ACCIDENTS: A LEGAL AND ECONOMIC ANALYSIS* (1970) (examining the economic and political choices implied in various approaches to reducing accident and accident avoidance costs).

103. See, e.g., *Escola v. Coca Cola Bottling Co.*, 150 P.2d 436, 461 (Cal. 1944) (Traynor, J., concurring) (“[A] manufacturer incurs an absolute liability when an article that he has placed on the market, knowing that it is to be used without inspection, proves to have a defect that causes injury to human beings.”).

104. See hypothetical, *supra* Part I.

105. See 389 P.3d 517, 520 (Wash. 2017).

steps to educate the physician who performed the surgery, the manufacturer was still held liable because it had failed to warn the entire hospital of the specific risks of the surgical robot.¹⁰⁶

Although some scholars may argue that strict liability can be tempered to the level of risk of the activity, this argument is not necessarily true for repeat players like AI technologies. The legal framework for pet ownership provides a comparable model.¹⁰⁷ Owners of animals have a legal obligation to ensure that those animals do not cause harm to others, as “animals are not governed by a conscience and possess great capacity to do mischief if not restrained.”¹⁰⁸ Under American and English law, the extent of the duty depends on the dangerousness of the animal.¹⁰⁹ For “wild” animals that are considered dangerous by nature, the owner is effectively on notice from the very start that the animal presents a risk to others, assumes the high risk, and is held strictly liable for any injuries that the animal causes.¹¹⁰ For “domestic” animals, the owner assumes the low risk, but is held strictly liable if the owners had some knowledge of that specific animal’s dangerous propensity—or, in a popular turn of phrase, the “dog gets one ‘free bite.’”¹¹¹ One can liken AI systems to pets—“not governed by a conscience” and with “great capacity to do mischief.”¹¹² Some may even argue that like wild and domestic animals, the extent of the strict liability should depend upon their specific differentiated risk level.¹¹³ However, AI systems are arguably repeat players—every customer they reach is another “play,” and knowledge of the risk

106. *See id.*

107. *See generally* Matt Scherer, *Digital Analogues (Part 4): Is AI a Different Kind of Animal?*, L. & AI (Aug. 14, 2016), www.lawandai.com/2016/08/14/digital-analogues-part-4-is-ai-a-different-kind-of-animal/ [<https://perma.cc/CQK5-R6NT>] (discussing the legal framework for pet ownership).

108. *Id.*

109. *See id.*

110. *See id.*

111. *See id.*

112. *Id.*

113. *See id.* (discussing differentiation of liability for pet ownership based on differing levels of dangerousness between wild and domesticated animals). Additionally, differentiating between injurers with varying costs of care will generally minimize overall accident costs more so than a single standard. THOMAS J. MICELLI, *THE ECONOMIC APPROACH TO LAW* 50–51 (2d ed. 2009). In fact, the negligence rule is equivalent to strict liability for some: a certain group of injurers who choose the efficient level of care under a single standard, but whose cost of care is so high and individualized standard so low, that they find it too costly to raise their care level up sufficiently and are judged negligent. *See id.* at 51–52.

becomes inevitable.¹¹⁴ Thus, particularly with AI with risky applications like autonomous vehicles, the tort regime quickly moves past the differentiated liability of the first “free bite” and creates a harsh imposition of strict liability.

2. *Disincentivizes Innovation*

Strict liability is detrimentally restrictive on AI manufacturers and disincentivizes innovation.¹¹⁵ The standard entirely removes the nuance and inquiry into human fault for the harm.¹¹⁶ Judge Richard Posner theorized that courts apply strict liability to “accidents in which the most important objective is to influence the level of the defendant’s activity.”¹¹⁷ The mechanism is largely preventative: when the risk lies entirely on the backs of the manufacturers, there is often sufficient incentive to reduce the level or frequency of the dangerous activities.¹¹⁸ However, here, the prohibited activities have great potential benefits, including basic research like computer vision, audio processing, natural language processing, and knowledge representation.¹¹⁹ These steps in research and development provide the foundation to assist medical diagnosis by using personal data to personalize a continuum of care before and after procedures, to relieve the burden of manual labor by stocking and retrieving heavy warehouse items, to save on tedious legal document review by automatically redlining contracts and forms, to equalize financial literacy by handling financial queries into stock markets and trust management, and to advance digital pathology by suggesting new

114. In analogy, repeat players in litigation gain experience through repeated litigation, compounding their resources and knowledge, and allowing them to play the “litigation game” differently. See Marc Galanter, *Why the “Haves” Come Out Ahead: Speculations on the Limits of Legal Change*, 9 L. & SOC’Y REV. 95, 98 (1974).

115. Cf. William M. Landes & Richard A. Posner, *The Positive Economic Theory of Tort Law*, 15 GA. L. REV. 851, 876 (1980) (describing how strict liability reduces the activity of those who bear such liability).

116. See *id.* at 853.

117. Mark F. Grady, *The Positive Economic Theory of Tort Law*, in OXFORD RESEARCH ENCYCLOPEDIA OF ECONOMICS AND FINANCE 19 (Oxford Univ. Press 2019); see also Landes & Posner, *supra* note 115, at 904 (explaining that strict liability is preferable when the goal is to reduce the defendant’s activity level, not to change the defendant’s level of care).

118. See Landes & Posner, *supra* note 115, at 876 (“Under strict liability, the injurer has an incentive to change or reduce his activity where such an adjustment is an optimal method of accident avoidance, because he bears the costs of any accident that could be avoided by such an adjustment . . .”).

119. See PURDY & DAUGHERTY, *supra* note 18, at 11.

molecules for pharmaceutical drug candidates, among many others.¹²⁰ To impose strict liability on the manufacturers and researchers for these new applications would deprive all potential customers of potential improvements in their quality of life.¹²¹ In contrast, a more permissive rule may give manufacturers more leeway to experiment by externalizing some of the risk to willing consumers. Some economists have argued that strict liability induces the same degree of precaution as the negligence rule.¹²² However, juries are more sympathetic and do forgive negligence, but strict liability creates liability as a matter of law, decided by a judge without the possibility of sympathy or forgiveness from one's peers.¹²³

Many of the AI errors that plaintiffs could claim do not deserve strict liability. Sometimes, AI errors are inevitable because the underlying data that the system is trained on is inherently rife with human errors.¹²⁴ In other cases, AI errors are necessary because the alternatives are subject to game theory fallacies.¹²⁵ Additionally, some errors are necessary for AI technologies to learn and improve.¹²⁶ Lastly, some AI errors pose no harms, potentially misclassified due to outdated legal frameworks meant for old technologies.¹²⁷ As Mark Grady asserted, “Associating all human errors with inefficiency is a noneconomic way of thinking.”¹²⁸ In fact, these errors—which I term “efficient errors” in this Article—are beneficial to innovation and benign to consumers, and they should not subject the AI manufacturer

120. See *id.*; Conor Hale, *The Top AI Lighthouse Projects to Watch in Biopharma*, FIERCEBIOTECH (Oct. 21, 2019, 7:00 AM), <https://www.fiercebiotech.com/special-report/top-ai-lighthouse-projects-to-keep-eye-biopharma> [<https://perma.cc/E2D8-MRV>].

121. See Landes & Posner, *supra* note 115, at 876.

122. See John Prather Brown, *Toward an Economic Theory of Liability*, 2 J. LEGAL STUD. 323, 323 (1973) (“[T]here is a complete symmetry within each of the following pairs of liability rules: no liability and strict liability; the negligence rule and strict liability with contributory negligence; and the negligence rule with contributory negligence and strict liability with what I call dual contributory negligence.”); see also Steven Shavell, *Strict Liability Versus Negligence*, 9 J. LEGAL STUD. 1 (1980) (comparing the incentives to reduce accident losses provided by strict liability and negligence rules).

123. See Grady, *supra* note 117, at 19 (citing Mark F. Grady, *Justice Luck in Negligence Law*, 37 J. FOR CONST. THEORY & PHIL. L. 95 (2019) (explaining that juries have the power to forgive obvious negligence and frequently do so)).

124. See *infra* Subsection II.A.3.

125. See *infra* Subsection II.A.4.

126. See *infra* Subsection II.A.5.

127. See *infra* Subsection II.A.6.

128. Grady, *supra* note 117, at 8.

to strict liability. This Section subsequently tackles each scenario in turn.

3. *Efficient Errors: Human Baselines*

To begin with, it would be improper to penalize AI errors that depend upon datasets containing human errors, particularly if the AI system is performing better than a human decision-maker would perform on average.

Often, the data used to train AI systems are derived from actions chosen by their human equivalents, which carry with them human irrationalities and subjectivity.¹²⁹ According to behavioral economics, psychologists and economists have found that decision-making by large masses of people are subject to a slew of cognitive biases—people tend to overestimate the importance of what they know, linger on salient information, find patterns where there are not any, give weight to more recent events, confuse correlation with causation, and cling to certainty even when it is costlier than uncertainty.¹³⁰ These decisions are costly, from shaping judicial decisions of disproportionate sentences based on racial characteristics to decisions that quickly snowball into financial bubbles bound to burst.¹³¹ When an AI is trained upon this data, the propensities of humans are effectively transferred to the machines.¹³² When it has proven infeasible to “fix” human decision-making by pinpointing human errors, is it reasonable to expect manufacturers to “fix” artificial decision-making by creating a perfect dataset on which to base the AI training? Arguably, fixing the root of the bias (humans) is the first step towards remedying the symptoms (AI).

In fact, on average, AI performance is often better than human performance.¹³³ In many cases, human decision-makers in the public

129. See Cary Coglianese & Alicia Lai, *Algorithm v. Algorithm: A Framework for Governmental Use of Machine Learning* (unpublished manuscript) (on file with author) (describing cognitive biases in individual and group decision-making for tasks that could be automated).

130. *Id.*; see also David Winter, *AI Errors vs. Human Errors*, INT’L DIRECTOR (June 19, 2018), <https://internationaldirector.com/technology/ai-errors-vs-human-errors/> [<https://perma.cc/2ZS2-CJXH>].

131. See *id.*

132. See *id.*

133. Morgan Stanley shifted to AI after human failures resulted in multimillion-dollar losses. See Stefania Spezzati, Donal Griffin & Viren Vaghela, *Morgan Stanley Ousts FX Traders as It Probes Concealed Loss*, BLOOMBERG (Nov.

and private sectors are subject to physical fatigue, are swayed by external or hierarchical pressures, have poor impulse or emotional control, are inaccurate or inconsistent in their performance, and are prone to groupthink or other cognitive biases. While it may be disconcerting to imagine a robotic arm autonomously conducting a complicated surgical procedure, in most cases the AI will sidestep human mistakes—it will not get tired at the end of a long seventy-two-hour shift; its hand will not shake from nervousness; it will not forget a sponge in the patient’s body.¹³⁴

Due to the unpredictable nature of the physical world, it is impossible to expect an inventor to expose its technology to all corner cases. Although one may wish that inventors were omnipotent, an AI inventor held to a “reasonable expert” standard may not be able to foresee the scope of the potential harms. When AI technologies inevitably falter in the face of an unexpected scenario, strict liability would disincentivize transparency—inventors should be encouraged to be open about the errors in order to proactively correct them.¹³⁵ While these errors could be costly, they are a learning opportunity carrying the seed of future improvement. When a human makes a mistake, the single human actor can only be retrained with difficulty, if at all. When an AI system makes a mistake, the entire system can be retrained with ease, and its entire ecosystem benefits.¹³⁶

28, 2019, 11:36 AM), <https://www.bloomberg.com/news/articles/2019-11-28/morgan-stanley-ousts-fx-traders-amid-multi-million-dollar-loss> [<https://perma.cc/C73U-2YAF>]. Pharmaceutical companies shifted to AI to shave time and costs off the much slower human production. See Eric Palmer, *Sanofi CEO Turns to ‘Cobots’ and AI to Zap Manufacturing Costs*, FIERCEPHARMA (Dec. 11, 2019, 11:49 AM), <https://www.fiercepharma.com/manufacturing/sanofi-ceo-turns-to-cobots-and-ai-to-shave-manufacturing-costs> [<https://perma.cc/V85B-X7LD>].

134. See, e.g., Mark Lieber, *Surgical Sponges Left Inside Woman for at Least 6 Years*, CNN (Feb. 21, 2018), <https://www.cnn.com/2018/02/21/health/surgical-sponges-left-inside-woman-study/index.html> [<https://perma.cc/ZN9Y-RVNE>] (discussing how human error occurs during surgeries, even with strict procedures set in place).

135. See Cary Coglianese & David Lehr, *Transparency and Algorithmic Governance*, 71 ADMIN. L. REV. 1, 29–38 (2019) (discussing types of transparency in algorithmic governance). This reasoning is much like incentivizing universities to publish Title IX reports on sexual assaults in order to openly take efforts to remedy the situation, instead of hiding the numbers in fear of repercussion. While obviously not an end solution, open admission of errors is an important first step to remedying them.

136. See Iryna Bezborodykh, *Why Does AI Make Mistakes?*, STFALCON (Aug. 3, 2018), <https://stfalcon.com/en/blog/post/why-AI-makes-mistakes> [<https://perma.cc/LUK9-SVY9>] (describing Hindsight Experience Replay (HER))

4. *Efficient Errors: Game Theory Problems*

Additionally, it would be improper to penalize AI errors when alternative decisions would result in situations where the community is collectively worse off. Under a game theoretic structure, an individually rational choice may lead to overall worse systemic performance.¹³⁷ Although the superiority of utilitarianism is intensely debated against other tenants of moral philosophy such as deontology, there is no consensus unilaterally refuting either principle in the U.S. legal system.¹³⁸ A utilitarian perspective demands that the better option is the one where the net good is greatest.¹³⁹ Victims may not agree. Because individuals are accustomed to using technology for selfish gains, they may believe that they should be entitled to their individually optimized gain—whether that gain is unequivocal protection within a self-driving car or the fastest network route—and that anything less is an “error.” However, should every individual be afforded the “best” option, game theory problems will collectively arise.

Consider an autonomous vehicle that must choose between hitting a group of innocent pedestrians or crashing the car with the driver inside. Research on machine ethics reveals that moral principles that guide a driver’s decisions vary significantly by country and by culture.¹⁴⁰ Consumers themselves also have contradictory ethical frameworks: survey participants said that they would prefer an autonomous vehicle protect pedestrians even if it meant sacrificing its

technology, which allows machine learning to review its previous actions and learn from its own mistakes).

137. See, e.g., Tim Roughgarden, *Selfish Routing* 6 (May 2002) (A.B. thesis, Cornell University) (on file with the Cornell University Library) (“[T]he intuitively helpful (or at least innocuous) action of adding a new zero-latency link may negatively impact *all* of the [agents]!”); see also Dietrich Braess, *Über ein Paradoxon der Verkehrsplanung*, 12 UNTERNEHMENSFORSCHUNG 258 (1968) (setting forth Braess’s paradox: the observation that adding an innocuous road to a road network can slow down overall traffic flows).

138. See, e.g., Tim Stelzig, *Deontology, Governmental Action, and the Distributive Exemption: How the Trolley Problem Shapes the Relationship Between Rights and Policy*, 146 U. PA. L. REV. 901, 959 (1998) (justifying the distributive exemption to government intervention upon deontological premises, in which consequential justification predominates, but rights are not neglected).

139. See *The History of Utilitarianism*, STAN. ENCYCLOPEDIA PHIL. (Sept. 22, 2014), <https://plato.stanford.edu/entries/utilitarianism-history/> [<https://perma.cc/F9EW-VNBT>].

140. See Edmond Awad et al., *The Moral Machine Experiment*, 563 NATURE 59, 61–63 (2018).

passengers, yet they also said they would not buy autonomous vehicles programmed to act this way.¹⁴¹ Given these variations, an AI system may well choose the good of the community above the good of the individual. The unlucky driver may believe herself to be unfairly harmed, and perhaps even entitled to civil remedies in court, but the proper choice in ethical quandaries should be a jury question, not strict liability as a matter of law.

Alternatively, consider a Google Maps algorithm that allows all cars to take the shortest, most efficient route—a phenomenon deemed “selfish routing.”¹⁴² As a result, a multitude of cars will clog the same highway, slowing traffic down for everyone while leaving sideroads empty. Instead, redirecting some cars through a variety of longer routes may be considered an “error” by an individual unlucky driver who is sent the long way, but ultimately beneficial for road congestion for the area as a whole. A traffic jam is nothing to sue over, but the same principle could be applied to other finite resources such as network routing or natural resources. Today’s AI technology often takes advantage of “efficient errors” by adhering to utilitarianism to avoid collective action problems—a business choice that should be a subject to a jury decision, not strict liability.

5. *Efficient Errors: AI System Training*

Furthermore, some errors are necessary for AI technologies to learn and improve. In general, the conception that stumbles are necessary on the road to success is widely accepted: “Supernova success . . . breakthrough creation . . . is hard and inconsistent,” David Epstein writes in his book *Range*.¹⁴³ “If you want the sky highs, you have to tolerate a lot of lows.”¹⁴⁴ Further, struggling performance can be indicative of future long-term gains, and frustration and errors are stronger signs of learning than are ease and short-term accuracy, as denoted by psychologist Robert Bjork’s term “desirable difficulties.”¹⁴⁵ This approach applies to more than just the process of human learning.

141. See Jean-François Bonnefon, Azim Shariff & Iyad Rahwan, *The Social Dilemma of Autonomous Vehicles*, 352 NATURE 1573, 1574 (2016).

142. See generally Roughgarden, *supra* note 137.

143. See DAVID EPSTEIN, RANGE: WHY GENERALISTS TRIUMPH IN A SPECIALIZED WORLD 278–79 (2019).

144. *Id.* at 279.

145. See Elizabeth L. Bjork & Robert A. Bjork, *Making Things Hard on Yourself, but in a Good Way: Creating Desirable Difficulties to Enhance Learning*,

In reinforcement learning systems, the AI system is constantly updating its predictions based off new data, sometimes generated by human interaction with the model.¹⁴⁶ As the exploration-exploitation theory denotes, all decision-making involves a fundamental choice at each step: “exploit” by making the best decision given current information, or “explore” by gathering more information.¹⁴⁷ This is applicable to decisions by both humans and machines: Go to your favorite restaurant or try a new one? Show the most successful online advertisement or try a different video sequence? Drill for oil at the best-known location or try your luck at a new site? The choice to explore may result in an immediate outcome that is worse than the current best-known outcome, yet it provides invaluable information and has the potential to reveal a new best strategy. In other words, it may be worth exploring suboptimal paths in order to find the global maximum instead of confining oneself to a local maximum.

Consider the natural language processing algorithms in Google Translate or foreign languages on Facebook.¹⁴⁸ Each of these platforms offer an English translation alongside a link to “suggest an edit” or “suggest a better translation” for a human user who notices that the machine language translation failed to catch an idiom or turn of phrase.¹⁴⁹ Strictly speaking, each of these suboptimal translations could be considered an “error,” yet it is only with extensive human feedback that the AI natural language processing algorithm can improve. Other generative adversarial networks—naïve blank-slate AI systems trained on vast data sets—also learn off trial and error, whether or not the errors are consumer-facing. These deviation “errors” are all inherent to the value of self-learning AI, and to impose

in PSYCHOLOGY AND THE REAL WORLD: ESSAYS ILLUSTRATING FUNDAMENTAL CONTRIBUTIONS TO SOCIETY 56, 59 (2011).

146. See, e.g., Will Knight, *A New Artificial Intelligence Makes Mistakes—on Purpose*, WIRED (Feb. 13, 2021, 7:00 AM), <https://www.wired.com/story/new-artificial-intelligence-mistakes-purpose-chess/> [https://perma.cc/4DPM-DM84] (describing a chess program that learns from error).

147. See Oded Berger-Tal, Jonathan Nathan, Ehud Meron & David Saltz, *The Exploration-Exploitation Dilemma: A Multidisciplinary Framework*, 9 PLOS ONE 1, 1 (2014).

148. See GOOGLE, *Help Improve Google Translate*, <https://support.google.com/translate/answer/2534530?hl=en> [https://perma.cc/9FHJ-HEKH] (last visited Nov. 30, 2020); Thuy Ong, *Facebook’s Translations Are Now Powered Completely by AI*, VERGE (Aug. 4, 2017, 4:54 AM), <https://www.theverge.com/2017/8/4/16093872/facebook-ai-translations-artificial-intelligence> [https://perma.cc/2Y5F-KX8R].

149. See GOOGLE, *supra* note 148; Ong, *supra* note 148.

strict liability for such errors would prohibit gradual improvement and would be tantamount to bringing the entire system to a standstill.

Or consider algorithmic adjudication in the information age. Internal policies and adjudicatory decisions on social media platforms develop through an iterative feedback loop.¹⁵⁰ In fact, these “[c]orporations have thus developed the type of dynamic feedback loop between disputes and policymaking to which the public system aspires. . . . They update their substantive and procedural policies regularly in a dynamic feedback loop. They experiment with and innovate their procedures in response to customer feedback.”¹⁵¹ The effectiveness of these adjudicatory frameworks is informed heavily by these conflicts.

The path to breakthrough successes is disorderly and full of commercial failures and flops. In a world without a well-defined formula or perfect system of feedback to follow, AI systems should be given a long leash if we want to unlock their potential benefits. Jurist Oliver Wendell Holmes once wrote a powerful dissent that went beyond legal theory to a fundamental fact of human existence—that we all make mistakes: “It is an experiment, as all life is an experiment. Every year if not every day we have to wager our salvation upon some prophecy based upon imperfect knowledge.”¹⁵²

6. *Efficient Errors: No Harm*

Finally, some AI “errors” pose no harms. In fact, these are not real errors but are merely legally misclassified as errors based on outdated standards meant for old technology. After all, the adaptation of old regulations to the current technology often lags behind the rapid evolution of those technologies.

Occasionally, government agencies will allow a “regulatory holiday” by lifting a regulation if it no longer makes sense for a new technology. For instance, federal regulations require cars to have rearview mirrors and typically would classify any car without them—even a self-driving car with no need for mirrors—as responsible for a violation.¹⁵³ Recently, the National Highway Traffic Safety Administration exempted a self-driving car startup from these

150. See Rory Van Loo, *The Corporation as Courthouse*, 33 YALE J. ON REGUL. 547, 563 (2016) (applying procedural justice to consumer dispute resolution).

151. *Id.* at 563, 575.

152. See *Abrams v. United States*, 250 U.S. 616, 630 (1919) (Holmes, J., dissenting).

153. See 49 C.F.R. § 571.500 (2017).

decades-old regulations and gave them the green light to produce autonomous vehicles without side-view mirrors, a windshield, or rear-facing cameras that remained on when the vehicle moved forward.¹⁵⁴ For these outdated auto safety regulations, “America’s bureaucrats are willing to unchain autonomous vehicles from rules written for another age.”¹⁵⁵ In particular, regulations for old technology often restrict innovation due to concern for now-inapplicable human limitations.¹⁵⁶ As AI gradually replaces or supplements human functions, regulations for new technology should release outdated restraints that over-restrict new innovations.

Other AI “errors” pose no harms because *not* using an available AI technology is not a recoverable harm.¹⁵⁷ Some technologies are optional, and their unavailability or the choice to *not* use them does not translate into a proactive act of harm by the human operator or the manufacturer. The courts have properly followed this reasoning in the few cases involving surgical assistance robots. In *Mracek v. Bryn Mawr Hospital*, the da Vinci surgical robot failed and laparoscopic equipment was used instead of the surgical robot for the remainder of the surgery.¹⁵⁸ In *O’Brien v. Intuitive Surgical, Inc.*, the plaintiff alleged harm when the da Vinci surgical robot failed and the surgeon simply converted to open surgery without the robot.¹⁵⁹ In both cases, the court dismissed the plaintiff’s claim, noting that it “doubt[s] plaintiff] could claim that defendant had promised or otherwise owed him a duty under which the device would be used in surgery.”¹⁶⁰

Of course, one could argue that AI companies should calculate and integrate the costs of a liable verdict simply into the costs of doing business. Consulting firms already frequently recommend that

154. See Alex Davies, *This Vehicle Has No Side-View Mirrors—and It’s Legal*, WIRED (Feb. 6, 2020, 12:54 PM), <https://www.wired.com/story/vehicle-no-side-view-mirrors-legal/> [<https://perma.cc/4Q2W-HMA6>].

155. *Id.*

156. See, e.g., Marc Scribner, *Outdated Auto Safety Regulations Threaten the Self-Driving Revolution*, WIRED (Feb. 8, 2018, 9:00 AM), <https://www.wired.com/story/outdated-auto-safety-regulations-threaten-the-self-driving-revolution/> [<https://perma.cc/C3UP-88YV>].

157. See *Mracek v. Bryn Mawr Hosp.*, 363 F. App’x 925, 926 (3d Cir. 2010); see also *O’Brien v. Intuitive Surgical, Inc.*, No. 10 C 3005, 2011 U.S. Dist. LEXIS 80868 at *2–3 (N.D. Ill. July 25, 2011).

158. See 363 F. App’x at 926.

159. 2011 U.S. Dist. LEXIS 80868.

160. *Id.* at *2–3 (explaining that “[t]he only way to plaintiff might have a claim would be if the failure of the device, for example, caused a rupture or some injury by way of the failure, or perhaps that it caused a delay in completing the surgery, and the delay was the cause of plaintiff’s injuries”).

insurance companies and pharmaceutical companies be ready to pay court costs and settlement deals even prior to placing their products on shelves.¹⁶¹ But this builds the cost of the risk into the price of the product, which ultimately places the burden onto consumers.¹⁶² And while this practice may be feasible for larger companies like Uber and Google who have the resources to account for uncertainty and variability in the costs of liability and precaution, it would disproportionately impede smaller businesses without the financial bandwidth to do so.

Because it fails to account for the unique nature of AI technologies, strict liability is an insufficient and illogical regime for AI-based harms. The negligence rule does not fare much better.

B. Negligence Rule

If the AI technology is classified as “service,” the negligence rule applies.¹⁶³

1. Application

Negligence requires the provider to compensate victims for conduct that falls below the standard established by law for the protection of others against unreasonable risk of harm.¹⁶⁴ The provider’s actions are measured against that of a reasonable person.¹⁶⁵ The standard of care may differ depending on the industry and expertise of the provider.¹⁶⁶ For instance, when a physician is alleged

161. See generally *Managing Product Liability in the Pharma & Healthcare Sector*, CORP. DISPS., Jan.–Mar. 2015 (advising pharmaceutical companies to invest in liability insurance to buffer against the high stakes of class actions); *Assessing the Complex Coverage Needs of Biotech Companies*, EMBROKER (Apr. 16, 2021), <https://www.embroker.com/blog/biotech-insurance/> [<https://perma.cc/FT69-PF3Z>] (providing highly publicized examples of insurance at work in suits against biotech companies).

162. Reynold M. Sachs, *Negligence or Strict Product Liability: Is There Really a Difference in Law or Economics?*, 8 GA. J. INT’L & COMP. L. 259, 273 (1978) (“Under strict liability, the manufacturer will pass on and so ‘spread’ the cost of accidents among consumers, in the form of higher prices, to cover product liability insurance premiums and damages for which the firm is self-insured.”).

163. See generally Bryan Casey, *Robot Ipsa Loquitur*, 108 GEO. L.J. 225 (2019) (arguing for the negligence rule); see also Jones Day, *supra* note 101.

164. See Casey, *supra* note 163.

165. See Jones Day, *supra* note 101.

166. See Hannah R. Sullivan & Scott J. Schweikart, *Are Current Tort Liability Doctrines Adequate for Addressing Injury Caused by AI?*, AM. MED. ASS’N. J. ETHICS

to have conducted medical malpractice, her conduct is measured against a reasonable physician in light of available clinical literature, statements by the Food and Drug Administration, practice guidelines issued by medical societies, and expert reliance on research findings.¹⁶⁷ Just as medical knowledge is constantly evolving, AI technologies are also developing over time, creating uncertainty for practitioners as to what the current standard of care is.

Regardless, proof of causation is required for a determination of negligence. As every first-year law student learns, if a scale on a railroad platform falls and hits a woman, the railroad's liability depends on whether the string of events can be traced from the railroad employees assisting other passengers, to the shove that dislodged a passenger's package, to the explosion of that package, to the shockwaves that shook the platform, to the dislodged scales that injured the victim.¹⁶⁸ Typically, even in attenuated systems when the causation and outcome are far removed, "[w]hen mistakes are made, one simply traces back the vector of causation to the negligent human agency that caused the error."¹⁶⁹ Proof of causation is much more difficult to establish regarding AI technologies.

2. *Difficulty Proving Causation*

Current AI technologies obscure the vectors of causation, making it difficult to prove liability.¹⁷⁰ But there is a crucial distinction: while it is easy to prove the injury was caused by the *AI system* generally, it is difficult to prove that the injury was caused by the *human operator* behind it. The current negligence regime requires proof of causation tracing back to the latter—the human operator.

The wave of scholarship on "black box" AI demonstrates just how difficult it is to wade through the inner workings of AI technologies back to the human operators.¹⁷¹ For original expert

(Feb. 2019), <https://journalofethics.ama-assn.org/article/are-current-tort-liability-doctrines-adequate-addressing-injury-caused-ai/2019-02> [<https://perma.cc/8PTD-FZ26>].

167. *See id.*

168. *See* *Palsgraf v. Long Island R.R. Co.*, 162 N.E. 99, 99 (N.Y. 1928) (tracing through a long chain of causal events to establish liability for negligence).

169. Karnow, *supra* note 78, at 153–54.

170. *See id.* at 154–55.

171. *See, e.g.*, David Freeman Engstrom & Daniel E. Ho, *Algorithmic Accountability in the Administrative State*, 37 *YALE J. ON REGUL.* 800, 821 (2020) ("[T]he technical opacity and 'black box' nature of the more sophisticated AI-based tools may erode overall accountability by rendering agency enforcement decisions

systems, causation was not a particularly difficult issue, as the systems were only weakly intelligent, spitting out correlations between carefully culled pieces of information.¹⁷² Even neural networks, consisting of layers of weighted nodes, compute the desired outputs based on deliberate inputs.¹⁷³ For instance, a neural network may conclude that “a face was indeed of a certain notorious criminal, that an organ was cancerous or that a stock should be bought or sold.”¹⁷⁴ But these programs had specific applications, and the machine’s operators could be expected to know the program’s purpose and limits, even if they did not know the contents of the “black box.”¹⁷⁵ It would be clear to any judge or jury that it is improper to use a car diagnostic system to analyze a patient’s medical symptoms, or to use Go game strategies to make financial investments.¹⁷⁶ Thus, “when damage results from the employment of a neural net, it is not difficult to trace back causal vectors to the program, to its trainers/programmers or to its users.”¹⁷⁷

However, recent advancements in AI reveal that the linchpin of causation falls apart with respect to creative AI.¹⁷⁸ Creative programs

even more inscrutable than the human judgments . . . [though] the opposite might also prove true”); see also Yavar Bathaee, *The Artificial Intelligence Black Box and the Failure of Intent and Causation*, 31 HARV. J.L. & TECH. 890, 929 (2018) (describing a “complexity” reason and a “dimensionality” reason that “AI may be a black box to humans”); Katherine Freeman, *Algorithmic Injustice: How the Wisconsin Supreme Court Failed to Protect Due Process Rights in State v. Loomis*, 18 N.C. J.L. & TECH. 75, 88 n.82 (2016) (“[P]roprietary software is often described as a ‘black box’ because of the way in which it prevents any outside individuals from viewing the source code.”); Karnow, *supra* note 78, at 156 (“To those ignorant of the internal workings of the [computer] program, it may seem like a ‘black box,’ a secret process that magically generates a sensible, context-accurate and apparently intelligent response.”); Amanda Levandoski, *How Copyright Law Can Fix Artificial Intelligence’s Implicit Bias Problem*, 93 WASH. L. REV. 579, 599 (“These systems obfuscate the mechanics of operation, including training data, in a metaphorical black box, in part because revealing the workings of the AI systems to the public could mean more than scrutiny—it could mean liability.”).

172. See Karnow, *supra* note 78, at 158.

173. See *id.*

174. *Id.*

175. See *id.*

176. See *id.*

177. *Id.* at 159.

178. See, e.g., Kartik Hosanagar, ‘As Machines Become More Intelligent, They Also Become Unpredictable,’ FOUNDING FUEL (Aug. 2, 2019, 11:08 AM), <https://www.foundingfuel.com/article/as-machines-become-more-intelligent-they-also-become-unpredictable/> [<https://perma.cc/M5WQ-S9Y7>] (“What made it unusual was that [AlphaGo’s Move 37] couldn’t be understood by AlphaGo’s human developers, let alone programmed by them.”). Hosanagar asserts that “[a]s machines

may be considered highly intelligent, “designed to handle radical shifts in context, and thus to produce useful and creative output.”¹⁷⁹ Here, unlike expert systems, any intelligence is not “hard-wired.”¹⁸⁰ As with human perception, AI’s assumptions are based on preexisting knowledge structures, constantly updated with new sensory input, and highly dependent upon context and the nature of the problem to be solved.¹⁸¹ Often, even a single integrated result may be “derived from a large number of concurrently interacting components, from a wide range of sources, machine and human, none alone able to make or manifest the ‘error.’”¹⁸² This is not a bug, but a feature: mutability and creativity of these systems are what make them valuable in the first place.

But as the number and distribution of actors increases, a plaintiff’s ability to prove the element of causation decreases. Attorneys cannot draw out testimony from a machine as one could on cross-examination of a human witness.¹⁸³ In fact, if the tort system was obligated to stretch to assign legal liability, it would involve “discrimination among an infinite number of causal candidates” and more problematically, require discrimination “based on perceptions of policy, society’s collective sense of what is reasonable and who should be blamed for certain injuries.”¹⁸⁴ If the tort system were to stubbornly

become more intelligent and dynamic they also become more unpredictable.” *Id.* Hosanagar goes on to describe what he terms a “predictability-resilience paradox,” where a human creator can “either create intelligent algorithms in highly curated environments—for example, programming explicit rules they might follow, expert systems style—to ensure they are highly predictable in behavior, while accepting that they will run up against problems they weren’t prepared for and therefore can’t solve,” or, a human creator can “expose [intelligent algorithms] to messy real-world data to create resilient but also unpredictable algorithms.” *Id.*

179. Karnow, *supra* note 78, at 159. Of course, one may respond with Turing’s Lady Lovelace objection: it is impossible for AI to have true creativity. *See infra* note 235. If AI is merely a tool controlled by a human-in-the-loop, proponents of this argument would point to vicarious liability as a liability scheme. However, holding employers responsible for employees for actions within the scope of employment may simply be another dulled form of strict liability that unduly placed responsibility on manufacturers and subject to the same issues of innovation disincentivization.

180. *See id.*

181. *See id.*

182. *Id.* at 154.

183. This problem also potentially raises a Confrontation Clause issue. *Compare* U.S. CONST. amend. VI (providing an accused with a right to confront any witness against him or her), *with* Katherine B. Forrest, *AI and the Confrontation Clause*, N.Y. L.J., May 3, 2019 (suggesting that the accuser need not be human, particularly if it is more likely than a human to provide an accurate answer).

184. *See* Karnow, *supra* note 78, at 155.

adhere to the negligence scheme of liability, it would be impossible to hold the manufacturer responsible for the harms of commercial AI technology.

Both strict liability and the negligence rule pose their own sets of deficiencies. Part III proposes a middle ground for tort liability for AI.

III. PROPOSED TORT LIABILITY THROUGH CORPORATE PERSONHOOD

The primary social function of tort law is to compensate victims for injuries and to deter unreasonably risky behavior; the primary economic function is to establish optimal deterrence that balances caution with activity.¹⁸⁵ There is a simple solution to remedy the tort system for AI technologies: a partial grant of corporate personhood to AI systems. Part III elucidates how this balance of liabilities and compensations would benefit both consumers and manufacturers, how the legal system already permits the divisibility of rights, and how innovation policy considerations lean in favor of such a proposal.

A. Limited Liability Proposal

A partial grant of corporate personhood to AI systems would strike an optimal balance between the outdated and extreme regimes of strict liability and negligence rule. Under this proposal, all AI systems themselves would be incorporated as a limited liability company (LLC) subject to direct liability while their human members or managers would be subject to *limited liability* for harms that result from the technology.¹⁸⁶ Traditionally, limited liability has been used as a protective legal mechanism that limits harmed plaintiffs to collecting only from the assets of the firm, not from the assets of a firm's investors, even when the firm cannot fully cover the costs of its liability.¹⁸⁷ Limited liability protections ensure that the human

185. See MICELI, *supra* note 113, at 39.

186. See, e.g., N.Y. LTD. LIAB. CO. LAW § 102(m) (“‘Limited liability company’ and ‘domestic limited liability company’ mean, unless the context otherwise requires, an unincorporated organization of one or more persons having limited liability for the contractual obligations and other liabilities of the business . . . other than a partnership or trust, formed and existing under this chapter and the laws of this state.”).

187. See Michael Simkovic, *Limited Liability and the Known Unknown*, 68 DUKE L.J. 275, 284 (2018).

members do not personally shoulder the financial liability of actions of the company.¹⁸⁸ Many scholars have applauded the historical development of broad limited liability as essential to capital formation and economic growth.¹⁸⁹ Specifically, limiting personal liability would help overcome investors' risk aversion, eliminate complexity between investors, and save on time and expense of all involved.¹⁹⁰ But—particularly given that even proponents of limited liability acknowledge that it creates other problems, such as amplifying private profits by externalizing losses onto the public¹⁹¹—such a proposal must be careful to balance the innovation incentives with the accountability of human shareholders and investors. This proposal does so.

By likewise extending the limited liability regime to AI technologies, there are clear benefits for manufacturers. This proposal would resemble a traditional negligence regime more so than a strict liability regime, relieving manufacturers from absolute liability and thus incentivizing them to continue innovating with AI technologies. There are also clear benefits for consumers. AI as a corporate entity is very different from AI as a product under corporate ownership. The difference in defendants is crucial: while it is difficult to trace the vector of causation from the injury back to the *human operator*, it is simple to trace causation from the injury back to the *AI system*. These universal benefits cannot be obtained by simply rearranging traditional corporate structures, shuffling AI technologies into one subsidiary or another.

Additionally, the legal system can use corporate personhood to mandate the AI system hold corporate insurance, such that any injured victims who do successfully sue an AI system may be financially compensated adequately through this pool of funds instead of meeting an empty entity or human individual who lacks the personal funds. Furthermore, when it is appropriate for the individuals behind the AI system to be held responsible for egregious errors, corporate personhood provides mechanisms such as “piercing the corporate veil” to do so.¹⁹²

188. *See id.*

189. *See id.* at 285 (citing STEPHEN M. BAINBRIDGE & M. TODD HENDERSON, LIMITED LIABILITY 20–32 (2016)).

190. *See id.*

191. *See id.* at 287–88.

192. *See, e.g., In re Lupo*, 353 B.R. at 542. *See generally* Tan Cheng-Han, JIANGYU WANG & CHRISTIAN HOFFMANN, *Piercing the Corporate Veil: Historical, Theoretical and Comparative Perspectives*, 16 BERKELEY BUS. L.J. 140 (2019).

This solution is not a radical proposal: limited liability in tort has long been the prevailing rule for corporations in the United States and elsewhere in order to incentivize growth and innovation.¹⁹³ In fact, one scholar suggests that it is already possible for an unsupervised AI system to obtain legal personhood under existing law.¹⁹⁴ Although each states' LLC laws differ, the noncorporate nature of AI and incorporation potentially allows the adoption of limited liability regardless of state borders: "The permission of just a single state would be sufficient to enable autonomous businesses."¹⁹⁵ But under the current dichotomous tort regime, where the application of the negligence rule would effectively let manufacturers entirely off the hook, manufacturers may want to play their odds.¹⁹⁶ They may have little incentive to collapse the two prongs to shift to a universally advantageous limited liability regime.

193. See Henry Hansmann & Reinier Kraakman, *Toward Unlimited Shareholder Liability for Corporate Torts*, 100 YALE L.J. 1879, 1879 (1991).

194. See Shawn Bayern, *The Implications of Modern Business-Entity Law for the Regulation of Autonomous Systems*, 19 STAN. TECH. L. REV. 93, 101 (2015) (arguing that an AI effectively controls an LLC if the LLC's human organizers create and ultimately withdraw from the LLC, leaving a member-less LLC that requires no ongoing intervention from any preexisting legal person in order to maintain its status).

195. See Shawn Bayern, *Of Bitcoins, Independently Wealthy Software, and the Zero-Member LLC*, 108 NW. U. L. REV. ONLINE 1485, 1497 (2014); see also ALA. CODE § 10A-5A-1.01 (2014); ALASKA STAT. § 10.50 (2013); ARIZ. REV. STAT. ANN. § 29-732 (2016); ARK. CODE ANN. § 4-32-306 (2015); CAL. CORP. CODE § 17704.08 (2016); COLO. REV. STAT. § 7-80-203 (2016); CONN. GEN. STAT. § 34-243 (2019); DEL. CODE ANN. tit. 6, § 18-101 (2016); FLA. STAT. § 608.405 (2013); GA. CODE ANN. § 14-11-101 (2010); HAW. REV. STAT. § 428-101 (2010); IDAHO CODE § 53 (2005); 805 ILL. COMP. STAT. 180/1-5 (1998); IND. CODE § 23-18-1-1 (2010); IOWA CODE § 489.201 (2011); KAN. STAT. ANN. § 17-76 (2017); KY. REV. STAT. ANN. § 275.001 (1996); LA. STAT. ANN. § 12:1301 (2013); ME. REV. STAT. ANN. tit. 31, § 1508 (2018); MD. CODE ANN., CORPS. & ASS'NS § 4A (2017); MASS. GEN. LAWS ch. 156C, § 1 (2012); MICH. COMP. LAWS § 450.4101 (2014); MINN. STAT. § 322C (2014); MISS. CODE ANN. § 79-29-101 (2013); MO. REV. STAT. § 347.010 (2017); MONT. CODE ANN. § 35-8-101 (2009); NEB. REV. STAT. § 21-104 (2018); NEV. REV. STAT. § 86.011 (2013); N.H. REV. STAT. ANN. § 304-C:3 (2013); N.J. REV. STAT. § 42:2C (2018); N.M. STAT. ANN. § 53-19-1 (2006); N.Y. LTD. LIAB. CO. LAW § 102 (2006); N.C. GEN. STAT. § 57D-1 (2014); N.D. CENT. CODE § 10-32.1-01 (2013); OHIO REV. CODE ANN. § 1705.01 (2011); OKLA. STAT. tit. 18, § 2012.2 (2014); OR. REV. STAT. § 63.001 (2017); 15 PA. CONS. STAT. § 89 (2010); R.I. GEN. LAWS § 7-16-1 (2005); S.C. CODE ANN. § 33-44-101 (2013); S.D. CODIFIED LAWS § 47-34A-101 (2013); TENN. CODE ANN. § 48-201-101 (2017); TEX. BUS. ORGS. CODE ANN. § 3-101 (2017); UTAH CODE ANN. § 48-3a-101 (2018); VT. STAT. ANN. tit. 11, § 25 (2015); VA. CODE ANN. § 13-1 (2016); WASH. REV. CODE § 25.15.006 (2016); W. VA. CODE § 31B-1-101 (2010); WIS. STAT. § 183.0102 (2011); WYO. STAT. ANN. § 17-29-101 (2015).

196. See *infra* Subsection III.A.2.

The suite of “corporate characteristics” for traditional corporations includes unchallenged core rights: limited liability, perpetual life, centralized management, and free transferability of shares.¹⁹⁷ The system is free to grant only a subsection of these rights when it grants corporate personhood.¹⁹⁸ Personhood is a legal fiction intended to functionally benefit natural persons, and it is important to remember that it is possible to narrowly tailor this grant of corporate personhood to remedy the specific problems AI technologies pose to humans.¹⁹⁹ While there are a multitude of other possible rights implicated by a grant of personhood—including but not limited to the right to own intellectual property, the right to marry, or the right to protected First Amendment rights—Section III.A focuses solely on the corporate rights and obligations that may be imposed to replace the current, insufficient tort liability regime for AI manufacturers and consumers.

1. *Benefits for Consumers*

Under this proposal, injured consumers will be financially compensated and, more importantly, be able to prove causation tracing back to the general AI system.

First, legal personhood guarantees that injured consumers pragmatically have sufficient financial resources to draw upon. Under the traditional tort regime, even if plaintiffs surmounted the hurdle of proving an AI manufacturer liable in court, there is no guarantee that the plaintiffs will be compensated by judgment-proof defendants.²⁰⁰ But under a limited liability regime, corporations may be required to hold compulsory insurance.²⁰¹ If AI systems were subject to the same

197. See Larry E. Ribstein, *Limited Liability and Theories of the Corporation*, 50 MD. L. REV. 80, 89 (1991) (referencing the “Kintner regulations” that govern on the issue and listing the four corporate features).

198. See Bryson, Diamantis & Grant, *supra* note 58, at 280 (“In almost every case [granting corporate personhood], these [entities] will have both fewer rights and fewer obligations.”).

199. See *supra* Section I.B.

200. Defendants may be functionally judgment-proof if they lack sufficient assets to pay the full judgment. See Steven Shavell, *The Judgment Proof Problem*, 6 INT’L REV. L. & ECONOMICS 45, 45 (1986) (defining individuals and firms who are “unable to pay fully the amount for which they have been found legally liable” when the judgment exceeds “their assets plus any liability insurance coverage” as “judgment proof”).

201. See, e.g., Steven Shavell, *Minimum Asset Requirements and Compulsory Liability Insurance As Solutions to the Judgment-Proof Problem*, 36 RAND J. ECON. 63, 63 (2005) (providing examples that businesses are frequently required to have

requirement, they will no longer be an empty shell when potential victims seek to hold them accountable. Many states require workers' compensation insurance for work-related illness and injury; some states require general liability insurance or products liability insurance depending on the dangerousness of the industry.²⁰² Other states have already passed legislation that treats every individual autonomous car as an insurable entity, thereby providing a faster, assured payout to victims while protecting the owners from frivolous suits.²⁰³ If AI systems were subject to the same requirement, the insurance framework would create a natural incentive structure to decrease risk and provide a resource pool for potential victims. Any of these resource pools would only be available to injured consumers after they have satisfactorily proven manufacturer liability in a court of law. Other compensation schemes do not offer the same level of nuance. For instance, no-fault compensation is a framework that would compensate every harmed consumer regardless of whether the consumer was contributorily responsible.²⁰⁴

Even when these funds run out, corporations can structure a "living will"—a plan for how they might unwind themselves and allocate their funds and assets should they face insolvency.²⁰⁵ Although scholars Joanna Bryson, Mihailis Diamantis, and Thomas Grant argue that potential remedies are "unavailable, unsatisfying, and/or ineffective" because robots cannot apologize or do jail time, robots can still follow through on arguably a more tangible form of compensation: financial remedies.²⁰⁶ And if one buys into writer Tim

"liability insurance coverage of at least a prescribed magnitude" in sectors of transportation of hazardous waste, construction, and banking operations).

202. See *Workers' Compensation Laws—State by State Comparison*, NAT'L FED'N INDEP. BUS. (June 7, 2017), <https://www.nfib.com/content/legal-compliance/legal/workers-compensation-laws-state-by-state-comparison-57181/> [<https://perma.cc/9LQ7-DCB5>].

203. See Comm. on Transp., S. Assemb. 511, 76th Gen. Assemb., Reg. Sess. (Nev. 2011).

204. See Nora Freeman Engstrom, *An Alternative Explanation for No-Fault's "Demise,"* 61 DEPAUL L. REV. 303, 313 (2012) (explaining that movement to replace tort law with no-fault legislation failed because costs were too high, plaintiffs' lawyers pushed back, and the "policy window" of the late 1960s and early 1970s closed).

205. See *Living Wills (or Resolution Plans)*, BD. OF GOVERNORS OF THE FED. RSRV. SYS., <https://www.federalreserve.gov/supervisionreg/resolution-plans.htm> [<https://perma.cc/22X9-EQKV>] (Dec. 9, 2020) (providing guidance on how designated companies should periodically submit resolution plans, commonly known as "living wills," to the Federal Reserve and the Federal Deposit Insurance Corporation).

206. Bryson, Diamantis & Grant, *supra* note 58, at 288.

Worstell's turn of phrase—as a corporate entity, an AI system can certainly be subject to the harshest punishment of all: “[Corporate entities] get extinguished, their legal existence liquidated, all the time: they get executed.”²⁰⁷ By giving AI systems legal personhood, one can guarantee a resource pool for injured consumers by mandating that they hold mandatory insurance or that they satisfy an initial capitalization threshold.

Second, and more importantly, this liability scheme entirely resolves the problems of proving causation through a “black box.” Under the traditional liability regime, even if an alternative non-AI corporate structure provides financial redress—for instance, limited liability protections for its human protectors or business liability insurance to cover potential claims—proving causation is still a significant hurdle.²⁰⁸ But granting corporate personhood transforms the AI “black box” from an insurmountable impediment into an accessible target. Under the limited liability scheme, consumers will face the easier task of proving causation stemming *from the AI itself*, not the difficult task of proving causation stemming from the human or business behind the AI. For the former, consumers would merely need to point to the AI technology, as a whole, as the source of harm. The causation analysis stops at the AI; the corporate structure does the rest of the work. But for the latter, consumers would need to reason through the internal guts of the technology and provide proof that the human or business knew of or directed the technological evolution of the automated intelligence.

Some scholars worry that corporate defendants would skirt accountability as “the accountable but empty, like the International Tin Council; the fully-financed but unaccountable, like the United Nations; and *sui generis* arrangements like the Bank for International Settlements.”²⁰⁹ Although critics of AI personhood argue that the “readily-manufacturable legal lacuna” of corporate personhood is the *problem* that would be exploited as a mechanism to avoid legal liability,²¹⁰ one could point to corporate personhood as the *solution*. After all, by designating the AI technology as the defendant to hold

207. Tim Worstell, “I’ll Believe Corporations Are People When Texas Executes One”: *What Is This Foolishness from Robert Reich?*, FORBES (Nov. 17, 2012, 7:45 AM), <https://www.forbes.com/sites/timworstell/2012/11/17/ill-believe-corporations-are-people-when-texas-executes-one-what-is-this-foolishness-from-robert-reich/#43f71add33f2> [<https://perma.cc/5BMH-9SUB>].

208. See *supra* Subsection II.B.2.

209. Bryson, Diamantis & Grant, *supra* note 58, at 289.

210. See *id.*

liable, injured consumers need not wade through the “black box” causation conundrum at all.

2. *Benefits for Manufacturers*

Limited liability offers a shield, but reserves the ability to pierce that shield. Limited liability strikes the perfect balance—manufacturers will be held accountable, but not so categorically that they are deterred from bringing innovative products to market.

On one hand, manufacturers can avoid per se liability. A key characteristic of limited liability is establishing that shareholders are not personally liable for corporate debts in excess of their investment in the corporation.²¹¹ Plaintiffs can typically only reach the corporation’s assets, not those of its shareholders.²¹² Limited liability does not automatically clear a path for the vector to reach the human behind the technology. The limited liability regime only allows a plaintiff to trace the vector of causation back to the AI system: that regardless of what occurred in the “black box” of the AI system, it ultimately resulted in an outcome that harmed the plaintiff. Unlike the traditional negligence rule regime, this framework does not hold the individual human creator responsible as a de facto matter.

Economists may argue that if there are clear economic incentives of a limited liability regime over a strict liability regime, why haven’t manufacturers already shifted their behavior toward some version of this proposal? After all, under existing law, a corporation could easily create a barebones subsidiary with ownership over an AI product and very little else.²¹³ While such a structure would not provide the nuance provided by a grant of corporate personhood to the AI—it would only add another layer of product ownership, making it equally difficult for consumers to prove causation through the AI “black box” to the humans responsible—it is easy to imagine that a corporation may find it appealing to distance itself from a risky but lucrative AI product in such a way. However, the current tort regime would not actually incentivize manufacturers to shift to the middle ground of limited liability. With the current murky product-or-service classification of AI technologies, firms may find it to be a reasonable gamble to proceed under the existing dichotomous tort regime.²¹⁴ And on the

211. See Simkovic, *supra* note 187, at 284.

212. See *id.*

213. See, e.g., Bayern, *supra* note 194, at 101.

214. See *supra* notes 90–96 and accompanying text.

chance that the AI is classified as service, the negligence rule would apply in court and the chances of a plaintiff's recovery would become slim.

On the other hand, manufacturers can be held liable for exceptional situations at times when the violation is egregious. Critics argue that legal personhood would be a liability shield that renders it impossible to hold anyone accountable when AI systems violate the rights of others: the "temptation to treat sophisticated intelligent agents as independent legal entities, thus absolving the humans involved, is powerful."²¹⁵ According to these critics, the difficulties in holding electronic persons accountable outweigh the precarious moral interests that AI legal personhood might protect.²¹⁶ However, courts have developed mechanisms to bolster their ability to hold corporate entities accountable—ones that do not involve the fickle process of untangling the AI "black box." Just as the human stakeholders of a corporation may be subject to personal liability when the harms created by the corporation are great enough, the human manufacturers and creators of an AI technology may be subject to personal liability when the harms created by the AI are foreseeable enough.

For instance, under the "ultra vires" doctrine, actions taken outside the purpose of the corporation are void and the resulting harms are the responsibility of the individual human actors.²¹⁷ The ultra vires doctrine has since been defanged, but the idea manifests itself in the doctrine of "piercing the corporate veil," where courts will reach behind the legal form to sanction the human people behind the form.²¹⁸

215. Karnow, *supra* note 78, at 189.

216. *See id.* at 181–82.

217. *See* Joseph Donald Brady, *The Doctrine of Ultra Vires, Its Nature, Elements and Modern Application*, 54 AM. L. REV. 535, 535 (1920) (defining "ultra vires" as "an act which transcends the powers conferred by law on the corporation—something which is not within the power of a corporation to perform under any circumstances, or for any purpose").

218. *See* Bryson, Diamantis & Grant, *supra* note 58, at 286. Of course, it is certainly possible that there will be *no* human members of the AI LLC at all if the AI should develop another AI to be the sole member of the incorporated AI. But such a cascading chain of unaccountable AI is unlikely: just as most corporations are meant to functionally benefit their human members and thus ultimately trace back to humans who benefit from the corporation's activities, AI LLCs are also a legal fiction over which its human initiators are unlikely to relinquish control. At any rate, the United States has enacted the Corporate Transparency Act of 2019, passed as part of the annual National Defense Authorization Act, to require the beneficial owners of LLCs and shell corporations to be reported to the federal government. *See* National Defense Authorization Act for Fiscal Year 2021, H.R. 6395, 116th Cong. § 6403 (2020) (requiring new and existing entities report beneficial ownership information to the

This doctrine is well-known in various legal systems.²¹⁹ In fact, courts in the United States have an expansive view of wrongdoing and are quite liberal in construing the “wrong” required to pierce the corporate veil.²²⁰ Although the particular test differs by state, in order to pierce the corporate veil, a plaintiff must generally prove by a preponderance of the evidence that:

- (1) control over the corporation by those to be held liable was so complete that the corporation has no separate mind, will, or existence of its own, (2) control over the corporation by those to be held liable was exercised in such a manner to commit fraud or an illegal act against the person seeking to disregard the corporate entity, and (3) injury or unjust loss resulted from such control and wrong.²²¹

Courts have previously pierced the corporate veil to impose personal liability in cases of using the corporate form as a sham to pursue fraudulent activities, failing to maintain separate identities of the corporation and its shareholders, ignoring corporate formalities, undercapitalizing the corporation, and exerting control to influence corporate actions for personal interests, among others.²²² The same principles can be applied to AI systems.

Other corporate mechanisms are already in place to prevent abuse of this framework. An AI LLC would not be able to simply incorporate with the bare minimum risk pool, declare bankruptcy as soon as it faced legal penalties, and subsequently reincorporate as a new entity with similar technology. Certain penalties upon traditional corporations cannot be discharged even when the corporation files for

Financial Crimes Enforcement Network, creating an ownership database, and instituting civil penalties and criminal sanctions for noncompliance).

219. See, e.g., Mark Wu, *Piercing China's Corporate Veil: Open Questions from the New Company Law*, 117 *YALE L.J.* 329, 329 (2007) (noting that China's new Company Law allowed the notion of piercing the corporate veil in 2006).

220. See Cheng-Han, Wang & Hoffmann, *supra* note 192, at 162 (citing KAREN VANDEKERCKHOVE, *PIERCING THE CORPORATE VEIL: A TRANSNATIONAL APPROACH* 81 (2007)).

221. *In re Lupo*, 353 B.R. 534, 542 (Bankr. N.D. Ohio 2006). Plaintiffs may not easily meet this standard. See, e.g., *In re Sch. Asbestos Litig.*, 1993 U.S. Dist. LEXIS 7984, at *44 (E.D. Pa. June 14, 1993) (holding that the corporate veil could not be pierced for lack of evidence).

222. See, e.g., *E. Mins. & Chems. Co. v. Mahan*, 225 F.3d 330, 333 n.7 (3d Cir. 2000) (considering factors such as “failure to observe corporate formalities; non-payment of dividends; insolvency of debtor corporation; siphoning the funds from corporation by dominant shareholders; non-functioning of other officers and directors; absence of corporate records; whether the corporation is a mere facade for the operations of a common shareholder or shareholders; and gross undercapitalization”) (internal citations omitted).

bankruptcy. Bankruptcy Code § 523(a)(6) prevents a debtor from obtaining the discharge of any debt for “willful and malicious injury by the debtor to another entity or to the property of another entity.”²²³ Generally, corporations will be held accountable in cases of intentional misconduct, such as for false pretenses, actual fraud, fraud while acting in a fiduciary capacity, or willful and malicious injury.²²⁴ These accountability mechanisms can likewise be applied to AI.

B. Divisibility

The grant of personhood to AI may be selectively limited, just as the rights and obligations of corporate personhood are likewise limited.²²⁵ To be clear, this Article does not liken AI to living, breathing humans with emotions and volition—at least in the philosophical sense—even if they are granted legal personhood. But in response to recent proposals of granting full “electronic personhood” to artificial technologies, critics have latched onto exactly that argument: legal and technology experts have expressed their vehement disapproval in giving AI the moral rights of personhood. However, these concerns should not apply to a proposal to give AI corporate personhood because corporate personhood entails a *divisible*, limited set of rights and obligations. No moral rights are necessary.

Critics argue that granting the moral rights of personhood to AI systems would improperly violate humanist exceptionalism.²²⁶

223. 11 U.S.C. § 523(a)(6) (2018); *see also* *Kawaauhau v. Geiger*, 523 U.S. 57, 60, 64 (1998) (addressing whether reckless or negligent conduct could prevent the discharge ability of a debt); *Carillo v. Su*, 290 F.3d 1140, 1142–43 (9th Cir. 2002) (interpreting *Geiger* as requiring the debtor’s actions be accompanied by some form of tortious conduct which gives rise to “willful and malicious injury”); *Williams v. IBEW Local 520*, 337 F.3d 504, 509 (5th Cir. 2003) (interpreting *Geiger* as not requiring tortious conduct, but only evidence that debtor intended to injure the other party or if the injury to the other party was “substantially certain” from the conduct of the debtor).

224. *See, e.g.*, *In re Jacobs*, 490 F.3d 913, 913 (11th Cir. 2007) (denying the discharge of the debtor’s tax debts because his attempt to avoid tax liability was voluntary, conscious or knowing, and intentional).

225. *See generally* JOHN C. GRAY, *THE NATURE AND SOURCES OF THE LAW* (Roland Gray ed., MacMillan 1921) (1909) (describing the origin of the definition for a “legal person”).

226. *See, e.g.*, David Watson, *The Rhetoric and Reality of Anthropomorphism in Artificial Intelligence*, 29 *MINDS & MACHS*. 417, 434 (2019) (“Algorithms are not ‘just like us’ and the temptation to pretend they are can have profound ethical consequences By anthropomorphizing a statistical model, we implicitly grant it

According to these critics, the human species inherently possesses unique traits of ethics, morality, and emotions. Because AI lacks these fundamental, intangible characteristics, they will never be able to replace humans or assume legal personhood. The World Commission on the Ethics of Scientific Knowledge and Technology Commission said as much in its report, arguing that it is “highly counterintuitive to call [AI] ‘persons’ as long as they do not possess some additional qualities typically associated with human persons, such as freedom of will, intentionality, self-consciousness, moral agency or a sense of personal identity.”²²⁷ The opposition to the 2017 European Union proposal to grant legal personhood to AI also furthered this argument: 285 AI experts in an open letter argued that AI systems could not derive human rights from the natural person model, the legal entity model, nor the Anglo-Saxon trust model.²²⁸ This branch of criticism invokes a “persons-are-conceptually-human” argument that suggests that “our very concept of person is inextricably linked to our experience of a human life.”²²⁹

Courts have also tried to refute the notion that nonhuman entities could partake in moral rights. In *Citizens United*, Justice Stevens worried that,

[C]orporations have no consciences, no beliefs, no feelings, no thoughts, no desires. Corporations help structure and facilitate the activities of human beings, to be sure, and their “personhood” often serves as a useful legal fiction. But they are not themselves members of “We the People” by whom and for whom our Constitution was established.²³⁰

But the majority rejected Justice Stevens’ concerns that nonhuman entities are not natural persons.²³¹ Tongue in cheek, Saudi Arabia has

a degree of agency that not only overstates its true abilities, but robs us of our own autonomy.”).

227. WORLD COMM’N ON THE ETHICS OF SCI. KNOWLEDGE & TECH. (COMEST), REPORT OF COMEST ON ROBOTICS ETHICS 46 (2017).

228. See *Open Letter to the European Commission Artificial Intelligence and Robotics*, www.robotics-openletter.eu [<https://perma.cc/PC7E-A4Z8>] (last visited Nov. 30, 2020); see also *Report with Recommendations to the Commission on Civil Law Rules on Robotics*, EUR. PARL. DOC. (COM 1115573EN) (2017) (setting out general principles for AI regulation).

229. Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 N.C. L. REV. 1231, 1259 (1992); see also DAVID WIGGINS, SAMENESS AND SUBSTANCE 148–89 (1980); Abraham & Rabin, *supra* note 97, at 127.

230. *Citizens United v. Fed. Election Comm’n*, 558 U.S. 310, 466 (2010) (Stevens, J., concurring in part).

231. See *id.* at 343. In considering whether corporate funding of political communications could be limited under the First Amendment, the majority reasoned

even gone further to announce it considered robots capable of achieving citizenship by giving citizenship to Sophia, a humanoid robot capable of complex interactions.²³²

As a philosophical matter, the logic underlying the attribution of human capabilities and rights to other natural persons likewise extends to an attribution of rights to AI. Other natural persons are considered philosophical and legal persons because we believe that they are like ourselves in possessing a conscious intelligence.²³³ This is entirely dependent upon our external interactions with them.²³⁴ AI may be capable of exhibiting similar external interactions that would justify granting them legal rights. In his classic article, *Computing Machinery and Intelligence*, Alan Turing proposes a test as a proxy for conscious intelligence, where hidden humans and machines answer conversational responses to human testers.²³⁵ The machine is said to pass the Turing test if the testers cannot distinguish which responses are from which entities.²³⁶ Once a machine has passed the Turing test, it functionally performs the external interactions necessary to attribute human capabilities—and thus legal personhood—to it, regardless of whether it possesses true intelligence. After all, if we cannot understand the black box of the human mind, how can we reject the possibility that a machine could learn to act comparably? AI systems have access to far greater datasets and have far greater processing power than the limited, faulty human mind.²³⁷ Perhaps they could

that “[c]orporations and other associations, like individuals, contribute to the ‘discussion, debate, and the dissemination of information and ideas’ that the First Amendment seeks to foster.” *Id.* (internal citations omitted). It then stated that “[t]he 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.’” *Id.*

232. See Zara Stone, *Everything You Need to Know About Sophia, The World’s First Robot Citizen*, FORBES (Nov. 7, 2017, 12:22 PM), <https://www.forbes.com/sites/zarastone/2017/11/07/everything-you-need-to-know-about-sophia-the-worlds-first-robot-citizen/#282d104846fa> [<https://perma.cc/WB2W-PLM6>].

233. See GRAY, *supra* note 225, at 28.

234. See *id.*

235. Alan M. Turing, *Computing Machinery and Intelligence*, 59 MIND: Q. REV. PSYCH. & PHIL. 433 (1950).

236. See *id.*; see also John R. Searle, *Minds, Brains, and Programs*, 3 BEHAV. & BRAIN SCI. 417, 417 (1980).

237. Considering the human alternative to autonomous weapons, human control is not a guarantee of ethical decision-making. Human decision-making drove our history of war crimes, civilian casualties, target misidentifications, military culture, and studies of human psychology such as the Stanford Prison Experiment. See *Cioca v. Rumsfeld*, 720 F.3d 505, 506 (4th Cir. 2013) (abstaining from judicial

make more comprehensive, insightful, ethical decisions than humans would be capable of.

As a legal matter, corporate personhood does not require proof that AI is effectively a natural person. Unlike a proposal of full legal personhood, a proposal of corporate personhood entirely circumvents the question of whether AI should be equivocated to a natural person because corporate personhood may be divvied up.²³⁸ It is not an all-or-nothing proposition.

Corporate rights are divisible.²³⁹ Entities can have “more, fewer, overlapping, or even disjointed sets” of rights and obligations.²⁴⁰ While the Supreme Court has granted corporations many human legal rights, the jurisprudence allows for the nuanced selection of which rights to confer. The Court has previously refused to grant corporations the right against self-incrimination in criminal trials.²⁴¹ The Court has also refused to apply Article IV’s Privileges and Immunities Clause to corporations for protection against states treating out-of-staters worse than it treats its own citizens.²⁴² This scheme makes it evident that while corporations and human persons are both considered “legal persons” under the law, each has their own distinctive set of rights.²⁴³

If the law were to grant personhood to AI, a legal system could selectively choose which rights it conferred. For instance, if the legal system reaches a consensus that limited liability and the right to be sued are not moral rights inherent to human beings, it may confer those rights. If the law agrees that the right to vote or bear arms is a moral right inherent to human beings—as it did with the right against self-incrimination, for example—it may choose to withhold those rights

intervention in rape and sexual misconduct charges brought by members of the U.S. armed forces against fellow servicemembers); Craig Haney, Curtis Banks & Philip Zimbardo, *A Study of Prisoners and Guards in a Simulated Prison*, in *THEATRE IN PRISON: THEORY AND PRACTICE* 19, 19–32 (Michael Balfour ed., Intellect Books 2004) (documenting the psychological effects of the Stanford Prison Experiment, where conflict quickly escalated in roleplay after participants were arbitrarily assigned to be prisoners or guards).

238. See *id.* at 1718–19, 1731 (“[T]he Court has found that corporations have some rights (e.g., equal protection, due process, protection against unreasonable searches and seizures), but not all of the rights that natural persons have (privileges and immunities, protection against self-incrimination, voting).”).

239. See *supra* Section I.B.

240. Bryson, Diamantis & Grant, *supra* note 58.

241. See *Hale v. Henkel*, 201 U.S. 43, 61 (1906).

242. See Torres-Spelliscy, *supra* note 49.

243. See Solum, *supra* note 229, at 1239.

from corporations. AI, too, could be given a narrowly tailored set of rights and obligations.

C. Innovation Policy

Granting AI technologies corporate personhood would also align with innovation policies. Given the significant potential benefits promised and so far realized through advancements in AI, there is an obligation to—albeit carefully and incrementally—adopt these new technologies. This obligation should not be easily extinguished by a blanket precautionary approach.

First, there is an obligation to improve the quality of human life by advancing industries through technological improvements. AI systems have led to incredible advances in academia, private industry, and public sectors.²⁴⁴ Our economies are entering a stage where AI developments have the potential to overcome the physical limitations of capital and labor by creating an entirely new workforce.²⁴⁵ As a capital-labor hybrid, AI serves to both supplement and replace human efforts by expediting labor activities at a much greater scale and speed.²⁴⁶ We have already begun seeing the potential of AI to be the future of economic growth.²⁴⁷

If new, developed technologies are available and effective, then there may even be a duty to adopt them. In *T.J. Hooper*, two barges were lost in a storm because their owners chose not to equip them with

244. See, e.g., Kai-Fu Lee, *Covid-19 Will Accelerate the AI Health Care Revolution*, WIRED (May 22, 2020, 7:00 AM), <https://www.wired.com/story/covid-19-will-accelerate-ai-health-care-revolution/> [https://perma.cc/F4N8-992B] (describing new AI technologies to enhance disease diagnosis, drug discovery, and robot delivery in the wake of the COVID-19 pandemic); Elizabeth Svoboda, *Your Robot Surgeon Will See You Now*, NATURE (Sept. 25, 2019), <https://www.nature.com/articles/d41586-019-02874-0> [https://perma.cc/XD2Z-UH3C] (describing self-guided robotic systems that are on par with human surgeons, with researchers hoping that “autonomous surgery will make specialized procedures available to many more people”); see also Michael Chui, Martin Harrysson, James Manyika, Roger Roberts, Rita Chung, Pieter Nel & Ashley van Heteren, *Applying AI for Social Good* 11–12 (discussion paper) (Nov. 28, 2018) (listing advances in AI capabilities, such as computer vision, speech and audio processing, natural language processing, content generation, reinforcement learning, deep learning on structured data, and analytics, and corresponding examples of the applications).

245. See PURDY & DAUGHERTY, *supra* note 18, at 3–5.

246. See *id.* at 5.

247. See *id.* at 3 (showing that based on an analysis of twelve developed economies, AI has the potential to double annual economic growth rates by 2035). See, e.g., Coglianesi & Lai, *supra* note 129 (presenting the case for governmental use of machine learning for various administrative functions).

radios that would have warned them of the inclement storm.²⁴⁸ The court found that the barge owners “unduly lagged in the adoption of new and available devices”; regardless of whether or not it had become general custom for most responsible barge owners to equip their vessels with radios, “there are precautions so imperative that even their universal disregard will not excuse their omission.”²⁴⁹ With AI technologies, the new devices are often so imperatively beneficial that there is no excuse not to adopt the devices. While the current legal system cannot mandate the adoption of autonomous vehicles, the case can be made on policy grounds that it would be morally irresponsible to drive a conventional car if the autonomous car is safer. Perhaps eventually, a human driver could even be found negligent if he chose to manually drive instead of getting into a statistically safer autonomous car.

Similarly, diagnostic medicine promises to be a particularly good fit for AI’s strengths in pattern recognition.²⁵⁰ One Cornell study reports that AI systems correctly detected 92.4% of breast-cancer tumors compared to the 73.2% accuracy rate by human doctors.²⁵¹ Another study, conducted by University of Nottingham, describes an AI neural network that can predict heart attacks ten years before they occur with 67.5% accuracy, a result of 7.6% more correct identifications of true positives than human doctors using the traditional American Heart Association/American College of Cardiology (ACC/AHA) guidelines.²⁵²

248. 60 F.2d 737, 737 (2d Cir. 1932).

249. *Id.* at 740.

250. See A. Michael Froomkin, Ian Kerr & Joelle Pineau, *When AIs Outperform Doctors: Confronting the Challenges of a Tort-Induced Over-Reliance on Machine Learning*, 61 ARIZ. L. REV. 33, 41 (2019).

251. See Yun Liu et al., *Detecting Cancer Metastases on Gigapixel Pathology Images*, ARXIV:1703.02442v2 [cs.CV] (Mar. 3, 2017), <http://arxiv.org/abs/1703.02442> [<https://perma.cc/U8XK-KCJY>] (“At 8 false positives per image, we detect 92.4% of the tumors, relative to 82.7% by the previous best automated approach. For comparison, a human pathologist attempting exhaustive search achieved 73.2% sensitivity.”).

252. See Stephen F. Weng et al., *Can Machine-Learning Improve Cardiovascular Risk Prediction Using Routine Clinical Data?*, 12 PLOS ONE 1, 1 (Apr. 4, 2017), <https://doi.org/10.1371/journal.pone.0174944> [<https://perma.cc/GZV8-CAQH>] (finding that the highest achieving (neural networks) algorithm predicted 4,998/7,404 cases and 53,458/75,585 non-cases, “correctly predicting 355 (+7.6%) more patients who developed cardiovascular disease compared to the established algorithm [of American College of Cardiology guidelines used by human doctors]”).

Failing to adopt new technology or to conduct research and development in AI hinders innovation across a broad range of industries. Innovation begets innovation: AI has the potential to propel innovations diffusely across the economy.²⁵³ For instance, advancements in AI have empowered autonomous vehicles to sense their surrounding and drive themselves accordingly.²⁵⁴ These changes would result in impacts well beyond the automotive industry: drivers have more time to enjoy leisure activities; insurance companies could create new revenue streams from the autonomous vehicle data; local authorities could reduce congestion and regulate road usage with real-time traffic data; road accidents and fatalities would be drastically reduced.²⁵⁵ Likewise, development of fundamental AI capabilities map directly onto development of practical tools.²⁵⁶ Computer vision can support the tracking of illegal fishing vessels via satellite imagery.²⁵⁷ Speech and audio processing can support assistance for individuals on the autism spectrum in social interactions.²⁵⁸ Natural language processing can support distribution of online education services to underserved populations.²⁵⁹ Cutting off innovation for AI for one application stymies innovation in other sectors.

To be clear, this Article does not advocate that AI should bypass human labor or production completely in all applicable tasks. Optimal performance often occurs with a mix of both humans and AI playing their part in a human-in-the-loop system, each making up for the other's inevitable weaknesses.²⁶⁰ But such a hybrid solution would be impossible should we allow strict liability to entirely wipe AI from the equation.

Second, difficulty estimating the exact costs and benefits of diverse AI systems should not impede innovation. Critics may argue that AI technologies are overhyped and the uncertain benefits are not worth the risk of reduced liability. Under that logic, discretionary decisions to forbid an activity are justified when the risks are unclear because there is a social responsibility to protect the public from harm.

253. See PURDY & DAUGHERTY, *supra* note 18, at 14.

254. See *id.*

255. See *id.* at 15.

256. See Chui, Harrysson, Manyika, Roberts, Chung, Nel & van Heteren, *supra* note 244, at 15.

257. See *id.*

258. See *id.*

259. See *id.*

260. See ARNOLD J. TOYNBEE, A STUDY OF HISTORY 42 (1961) (“[N]o tool is omnicompetent . . . no such thing as a master-key that will unlock all doors.”).

Accordingly, firms would be held responsible for the harms that do occur.

However, this perspective—deemed the “Precautionary Principle”—has been categorically rejected by legal scholars.²⁶¹ Cass Sunstein argued that the Precautionary Principle causes paralysis for all actions, good or bad.²⁶² If the risk of arsenic levels in water is unclear, the principle suggests no standard should be imposed; if the dangers of global warming are in dispute, the principle suggests no greenhouse gases should be reduced.²⁶³ The Precautionary Principle offers little guidance, much less dispositive guidance, on whether to categorically deter AI research. Further, stringent regulation would entirely eliminate the opportunity for benefits, lead to equally risky alternatives, create great regulatory costs, and hinder innovation.²⁶⁴ If the government is highly wary of introducing a new drug and forbids clinical testing and market sales, in theory it would save lives from faulty drugs. But it would also cause preventable deaths due to the “drug lag” of such a precautionary approach.²⁶⁵ Sunstein argues that it is unclear whether it would be “precautionary” to require extensive premarket testing, or to do the opposite.²⁶⁶ This argument maps directly onto AI technology: the time lost by extensive premarket testing of AI technologies writes off the lives that could be saved or improved by these new developments.

Furthermore, litigation is already overly precautionary because the nature of the court system disproportionately weighs the specific risks heavier than the broader benefits.²⁶⁷ As Scherer explains, “procedural and evidentiary rules act to focus attention on the specific facts that led to harm in that case; the ability to introduce information regarding broader social and economic considerations is limited.”²⁶⁸ If courts give greater consideration to the risks of a technology and less to its benefits, this tendency “if left unchecked, could stunt investment in unfamiliar but useful new technologies.”²⁶⁹

To unilaterally reject corporate personhood and its incentivization of AI innovation is more revealing of hidden cognitive

261. See Cass R. Sunstein, *The Paralyzing Principle*, 25 REGUL. 32, 37 (2002).

262. See *id.* at 33.

263. See *id.* at 33–34.

264. See *id.* at 34.

265. See *id.* at 33–34.

266. See *id.* at 34.

267. See Scherer, *supra* note 12, at 390.

268. *Id.* at 388.

269. *Id.*

biases than rational legal consideration. These calls for increased regulation and liability of a burgeoning industry are in dangerous parallel with the “entrepreneurial politics” described by James Wilson:

[Increased regulation of new technology] requires the efforts of a skilled entrepreneur who can mobilize latent public sentiment (by revealing a scandal or capitalizing on a crisis), put the opponents of the plan publicly on the defensive (by accusing them of deforming babies or killing motorists), and associate the legislation with widely shared values (clean air, pure water, health, and safety).²⁷⁰

The sentiment is psychosocial roadblock: accepting the levels of regulation does not solely depend on the strength of the evidence but on the amount of trust that consumers have in the technology.²⁷¹ Several phenomena are implicated here: spotlight effect, loss aversion, probability neglect, and system neglect.²⁷² The saliency of AI causes a *spotlight effect* on resulting injuries.²⁷³ Even official government documents express the fear that the rapid onslaught of machine intelligence will surpass human intelligence altogether in a moment of “singularity.”²⁷⁴ While it would be naïve to assert that AI never causes harm, public sentiment is overly salient and inflammatory in public discourse.²⁷⁵ Such sentiments are not necessarily a solid foundation on

270. JAMES Q. WILSON, *THE POLITICS OF REGULATION* 370 (1980) (emphasis omitted).

271. *See id.* at 363.

272. *See* Coglianese & Lai, *supra* note 129; Sunstein, *supra* note 261, at 35–36.

273. *See generally* Thomas Gilovich, Victoria Husted Medvec & Kenneth Savitsky, *The Spotlight Effect in Social Judgment: An Egocentric Bias in Estimates of the Saliency of One’s Own Actions and Appearance*, 78 J. PERSONALITY & SOC. PSYCH. 211 (2000) (describing the spotlight effect).

274. *See* NAT’L SCI. & TECH. COUNCIL COMM. ON TECH., *supra* note 17, at 8 (describing singularity as an intelligence explosion when a “sufficiently intelligent AI [is] tasked with developing even better, more intelligent systems, and that these in turn could be used to create systems with yet greater intelligence, and so on,” racing far ahead of humans).

275. In a paper by the Red Cross, the organization gives fair weight to public concerns of “killer robots” and “visions of machines being used to kill humans like vermin.” *See* INT’L COMM. OF THE RED CROSS, *ETHICS AND AUTONOMOUS WEAPON SYSTEMS: AN ETHICAL BASIS FOR HUMAN CONTROL?* at 8, 11 (2018). In a video published by the Campaign to Stop Killer Robots, autonomous drones break free of human control to independently identify, pursue, and assassinate human targets for political agendas. *See* David Nield, *This Horrifying ‘Slaughterbot’ Video Is the Best Warning Against Autonomous Weapons*, SCIENCE ALERT (Nov. 22, 2017), <https://www.sciencealert.com/chilling-drone-video-shows-a-disturbing-vision-of-an-ai-controlled-future> [<https://perma.cc/UE8U-DSNJ>].

which to base policy decisions. For instance, during Google’s self-driving car testing in Arizona, the spotlight effect of the single death resulting from the endeavor within the state was sufficient to elicit an outcry for regulation of all such AI technology—including self-assessments overseen by the National Transportation Safety Board and a “safety management system” overseen within Uber.²⁷⁶ In theory, regulation would save lives,²⁷⁷ but the immediate effect was two dozen attacks by Arizonan citizens wielding rocks and knives on self-driving cars on the road following the incident.²⁷⁸ Such imagery and rhetoric are overreactions that obscure the nuances of how to regulate AI usage in industry. Often, AI-based harms are infrequent, theoretically preventable, and an improvement (such as Uber’s single pedestrian fatality) compared to the low standards of human operation (such as the 104 fatalities per day currently caused by human drivers in the United States).²⁷⁹

Humans are also *loss averse*, disliking losses far more than they like corresponding gains.²⁸⁰ As a result, people tend to disregard the potential gains and focus on the losses associated with the activity, because the latter is cognitively “available” regardless of whether the statistical risk is high.²⁸¹ If a doctor (human or machine) diagnosed a patient’s medical condition correctly nine times out of ten, onlookers would typically weigh the one faulty diagnosis much more heavily than the correct diagnoses. One could argue that we should hold actors

276. See U.S. NAT’L TRANSP. SAFETY BD., PUBLIC MEETING, COLLISION BETWEEN VEHICLE CONTROLLED BY DEVELOPMENTAL AUTOMATED DRIVING SYSTEM AND PEDESTRIAN 3–4 (2019); Cat Zakrzewski, *The Technology 202: Government Should Do More to Regulate Self-Driving Cars, Investigators Find After Uber Death*, WASH. POST (Nov. 20, 2019, 9:15 AM), <https://www.washingtonpost.com/news/powerpost/paloma/the-technology-202/2019/11/20/the-technology-202-government-should-do-more-to-regulate-self-driving-cars-investigators-find-after-uber-death/5dd4407c602ff1184c3166bb/> [<https://perma.cc/579N-WEUX>].

277. See Cass R. Sunstein, Adm’r, Office of Info. & Regul. Affs., Regulation: Looking Backward, Looking Forward (May 10, 2012) (“Smart regulations save lives. For example, the number of deaths on the highways is now down to its lowest level in sixty years.”).

278. See Simon Romero, *Wielding Rocks and Knives, Arizonans Attack Self-Driving Cars*, N.Y. TIMES (Dec. 31, 2018), <https://www.nytimes.com/2018/12/31/us/waymo-self-driving-cars-arizona-attacks.html> [<https://perma.cc/Y3SY-WZ7C>].

279. See *Road Safety Facts*, ASS’N SAFE INT’L ROAD TRAVEL, <https://www.asirt.org/safe-travel/road-safety-facts/> [<https://perma.cc/A9V4-RUM9>] (last visited Apr. 3, 2021) (“More than 38,000 people die every year in crashes on U.S. roadways.”).

280. See Sunstein, *supra* note 261, at 35.

281. See *id.*

to a high standard of care in high-stakes situations like medical treatment, but it should be noted that such a disproportionate allocation is a policy choice that reflects human cognitive habits.

Humans are also prone to *probability neglect*, overlooking the statistical probability that a bad outcome will occur and instead focusing on the gravity of the outcome itself.²⁸² For instance, after the sniper attacks in Washington, D.C. in 2002, people were more concerned about the possibility of attack than the statistical realities warranted, partly due to the salience of the attacks.²⁸³ In fact, the additional precautions that people took—such as extra driving to circumvent the area—actually increased the drivers’ overall risk of injury via car accidents.²⁸⁴ Likewise, the salience of an autonomous system going rogue is so great in the public imagination that many overlook the incredibly low probability of its occurrence.

Lastly, humans may shy away from endorsing AI innovation due to *system neglect* of the systemic effects of innovation.²⁸⁵ In light of a single problem, it is often difficult to see the full consequences. The risks of alternatives could be as great or worse than the contemplated action. For instance, banning nuclear power would increase dependence on harmful fossil fuels; banning asbestos would increase dependence on equally hazardous substitutes. A regulation may focus on inhibiting the development of a single, dangerous piece of technology, but the ripple effects may in fact restrict the development of all interconnected innovations that depend upon the novel research.

Certainly, there is some legitimacy to concerns over—or at least very real psychological aversion to—the harms of under-regulated AI.²⁸⁶ This Article does not take on the meta-analysis of which types of tasks are best suited to algorithms—but generally, while AI may not yet be prepared for generalized, open-world problems, it is well-

282. *See id.*

283. *See id.*

284. *See id.*

285. *See id.* at 35–36.

286. *See* Jim A. C. Everett, David A. Pizarro & M. J. Crockett, *Inference of Trustworthiness from Intuitive Moral Judgments*, 145 J. EXPERIMENTAL PSYCH.: GEN. 772, 774 (2016) (finding that human participants who made a consequentialist choice in the trolley problem were regarded as less trustworthy by human observers, even if it resulted in better consequences); *see also* 2019 in Review: 10 AI Failures, MEDIUM (Dec. 19, 2019), <https://medium.com/syncedreview/2019-in-review-10-ai-failures-317b46155350> [<https://perma.cc/VCL9-D6J3>]; 2018 in Review: 10 AI Failures, MEDIUM (Dec. 10, 2018), <https://medium.com/syncedreview/2018-in-review-10-ai-failures-c18faadf5983> [<https://perma.cc/E6GV-P5R9>].

suiting to areas of well-constructed rules and robust historical data.²⁸⁷ But the unilateral fear of the potential harms of AI are a distraction from the near-term benefits of the technology, particularly because the technology is nowhere near reaching an explosion of true AI singularity.²⁸⁸ As one leading researcher declared, “I don’t worry about that for the same reason I don’t worry about overpopulation on Mars.”²⁸⁹ The European Union has already recognized that the “innovation principle” is at least on par or greater than the “precautionary principle.”²⁹⁰

Unfortunately, technological realities may very well be a moot point as prominent experts wax poetic.²⁹¹ Philosopher Nick Bostrom draws cleverly upon this fear: “Before the prospect of an intelligence explosion, we humans are like small children playing with a bomb. . . . We have little idea when the detonation will occur, though if we hold the device to our ear we can hear a faint ticking sound.”²⁹² Stephen Hawking has said that AI “could spell the end of the human race.”²⁹³ Bill Gates is “concerned about super intelligence.”²⁹⁴ And even Elon Musk has called for “some regulatory oversight, maybe at the national and international level, just to make sure that we don’t do something

287. See Cary Coglianese & David Lehr, *Regulating by Robot: Administrative Decision Making in the Machine-Learning Era*, 105 GEO. L.J. 1147, 1175 (2017) (positing that algorithms are appropriate when there is sufficient simulated data, the environment is reasonably well-specified, and the actors and parameters are limited).

288. See Luciano Floridi, *Should We Be Afraid of AI?*, AEON (May 9, 2016), <https://aeon.co/essays/true-ai-is-both-logically-possible-and-utterly-implausible> [<https://perma.cc/B2KP-QZBF>].

289. See Raffi Khatchadourian, *The Doomsday Invention*, NEW YORKER (Nov. 23, 2015), <https://www.newyorker.com/magazine/2015/11/23/doomsday-invention-artificial-intelligence-nick-bostrom?verso=true> [<https://perma.cc/S29Q-Z4QX>].

290. See *The Innovation Principle*, EUR. RISK FORUM (Mar. 5, 2015), www.riskforum.eu/uploads/2/5/7/1/25710097/innovation_principle_one_pager_5_march_2015.pdf [<https://perma.cc/4Y3S-NPXM>].

291. See Khatchadourian, *supra* note 289 (discussing the opinions of various philosophers and technical experts on the world’s proximity to a major AI revolution, including an informal poll that gives a “fifty-fifty chance that human-level A.I. would be attained by 2050”).

292. NICK BOSTROM, *SUPERINTELLIGENCE: PATHS, DANGERS, STRATEGIES* 259 (2014).

293. See Rory Cellan-Jones, *Stephen Hawking Warns Artificial Intelligence Could End Mankind*, BBC (Dec. 2, 2014), <https://www.bbc.com/news/technology-30290540> [<https://perma.cc/9VSS-JH66>].

294. See Ina Fried, *Bill Gates Worries About Machines Gaining Super Intelligence*, VOX (Jan. 28, 2015, 10:44 AM), <https://www.vox.com/2015/1/28/11558204/bill-gates-worries-about-machines-gaining-super-intelligence> [<https://perma.cc/8TTV-2CKN>].

very foolish,” framing the AI risk of “summoning the demon” as “our biggest existential threat.”²⁹⁵ For generalist legislators, courts, and juries, these prominent voices may be hard to ignore.²⁹⁶

CONCLUSION

Lawmakers and policymakers have an obligation to reconcile the tort regime with AI technologies that are becoming crucial to every segment of the commercial world today. The history of corporate personhood jurisprudence demonstrates an emphasis on granting personhood when it is socially and economically beneficial for natural persons.²⁹⁷ In the case of AI technologies, limited liability corporate personhood is functionally beneficial. Our current tort system is not. Strict liability and negligence rules should only be a temporary crutch to tide the legal system over to a more nuanced method of addressing and compensating injuries from AI technologies. To rely for too long on the current system would drastically deter innovation and leave victims without a source of adequate compensation.²⁹⁸

Corporate personhood provides a scheme of limited liability, balancing freedom to innovate with the ability to pierce the corporate veil to hold natural persons liable for drastic harms. While granting personhood to robots may seem drastic, the move is solidly based on existing law and reasoning. Corporate characteristics are divisible, leaving criticisms of moral rights without air.²⁹⁹ The potential social benefits of AI technologies are great, leaving an obligation to give the technology room to grow. Certainly, limited liability personhood is not the sole solution to a flawed tort system for AI—lawmakers are free to pass federal regulations or create new tort systems altogether for AI technologies. In the meantime, limited liability personhood is the existing legal liability scheme that most closely addresses AI’s unique characteristics.

295. See Samuel Gibbs, *Elon Musk: Artificial Intelligence Is Our Biggest Existential Threat*, *GUARDIAN* (Feb. 21, 2017, 1:34 PM), <https://www.theguardian.com/technology/2014/oct/27/elon-musk-artificial-intelligence-ai-biggest-existential-threat> [<https://perma.cc/X7XC-US2W>].

296. See Alicia Lai, *Brain Bait: Effects of Cognitive Biases on Scientific Evidence in Legal Decision-Making* (2018) (A.B. thesis, Princeton University) (on file with the Princeton University Library) (discussing the over-persuasiveness of scientific jargon and images).

297. See *supra* Section I.B.

298. See *supra* Part II.

299. See *supra* Section III.B.

As with all new technologies, “[w]ith great (processing) power comes great responsibility,” and we are obligated to embrace that responsibility with an open mind.³⁰⁰

300. See Jeremy Erdman, *With Great (Processing) Power Comes Great Responsibility*, HACKER NOON (Mar. 15, 2018), <https://hackernoon.com/with-great-processing-power-comes-great-responsibility-7c57a100a12f> [<https://perma.cc/Y53K-XSWF>].



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