Algorithms Acting Badly: A Solution from Corporate Law

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Abstract

Sometimes algorithms work against us. They offer many social benefits, but when they discriminate in lending, manipulate stock markets, or violate expectations of privacy, they can injure us on a massive scale. Only one-third of technologists predict that artificial intelligence will be a net positive for society.

Law can help ensure that algorithms work for us by imposing liability when they work against us. The problem is that algorithms fit poorly into existing conceptions of liability. Liability requires injurious acts, but what does it mean for an algorithm to act? Only people act; and algorithms are not people. Some scholars have argued that the law should recognize sophisticated algorithms as people. However, the philosophical puzzles (are algorithms really people?), practical obstacles (how do you punish an algorithm?), and unexpected consequences (could algorithmic "people" sue us back?) have proven insurmountable.

This Article proposes a more grounded approach to algorithmic liability. Corporations currently design and run the algorithms that have the most significant social impacts. Longstanding principles of corporate liability already recognize that corporations are "people" capable of acting injuriously. Corporate law stipulates that corporations act through their employees because corporations have control over and benefit from employee conduct. When employees misbehave, corporations are in the best position to discipline and correct them. This Article argues that the same control and benefit rationales extend to corporate algorithms. If the law were to recognize that algorithmic conduct could qualify as corporate action, the whole framework of corporate liability would kick in. By exercising the authority it already has over corporations, the law could help ensure that corporate algorithms work largely in our favor.

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> *[A] robot may not injure a human being or, through inaction, allow a human being to come to harm.*
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> —Isaac Asimov, The First Law of Robotics[1]

INTRODUCTION: THE LEGAL CHALLENGE OF ALGORITHMIC INJURY

The first law of robotics is already dead. Robots and the algorithms that run them injure people every day. Some of these injuries are tragically palpable. For example, in 2015, an assembly robot at a car plant bypassed safety protocols, entered an unauthorized area, and crushed employee Wanda Holbrook's head.[2] In 2018, a self-driving car struck and killed pedestrian Elaine Herzberg as she was walking across the street.[3] Some algorithmic injuries are less visceral, but are just as disruptive because they impact thousands of people. Algorithms that help extend loans or hire employees often discriminate against minority applicants.[4] Stock-trading algorithms capable of exe-

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1 ISAAC ASIMOV, *Runaround*, *in* I, ROBOT 25, 37 (Bantam Books 2004) (1950).

2 Conner Forrest, *Robot Kills Worker on Assembly Line, Raising Concerns About Human-Robot Collaboration*, TECHREPUBLIC (Mar. 15, 2017, 10:15 AM), https://www.techrepublic.com/article/robot-kills-worker-on-assembly-line-raising-concerns-about-human-robot-collaboration/ [https://perma.cc/9HBD-TRN5].

3 Daisuke Wakabayashi, *Self-Driving Uber Car Kills Pedestrian in Arizona, Where Robots Roam*, N.Y. TIMES (Mar. 19, 2018), https://nyti.ms/2u3QDYx [https://perma.cc/2PK8-4ZBR].

4 *See* Robin Nunn, *Discrimination and Algorithms in Financial Services: Unintended Consequences of AI*, CYBERSPACE LAW., Apr. 2018, at 4, 4 (discussing "AI's so called 'white guy problem'"). For a similar example describing a study that found ads for high-paying jobs targeted unequally towards men, see Esha Bhandari & Rachel Goodman, *ACLU Challenges Computer Crimes Law That Is Thwarting Research on Discrimination Online*, ACLU: FREE FU-

cuting thousands of trades a second can artificially distort stock prices for higher profit.[5] Price-setting algorithms from competing retailers can collude to raise costs for customers.[6]

When robots and algorithms injure people (whether physically, financially, or otherwise), recovery and justice prove elusive. Many forms of criminal and civil liability require that (or are much easier to prove if) a legally cognizable defendant actually did something injurious, rather than indirectly causing some injury. Wanda Holbrook's husband sued five U.S. robotics companies—Prodomax, Flex-N-Gate, FANUC, Nachi, and Lincoln Electric[7]—for wrongful death but struggled in his case to find a suitable defendant.[8] Against the defendants that remained,[9] he could not make the obvious and direct case that

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TURE (Mar. 27, 2020), https://www.aclu.org/blog/racial-justice/race-and-economic-justice/aclu-challenges-computer-crimes-law-thwarting-research [https://perma.cc/N7LT-T6Y2]. *See also* Mikella Hurley & Julius Adebayo, *Credit Scoring in the Era of Big Data*, 18 YALE J.L. & TECH. 148, 152, 194 (2016) (discussing the challenges of such cases).

5 Enrique Martínez-Miranda, Peter McBurney & Matthew J. Howard, *Learning Unfair Trading: A Market Manipulation Analysis from the Reinforcement Learning Perspective*, ASS'N FOR ADVANCEMENT A.I. (2015), https://arxiv.org/pdf/1511.00740.pdf [https://perma.cc/J226-GPTD]; Renato Zamagna, *The Future of Trading Belongs to Artificial Intelligence*, MEDIUM: DATA DRIVEN INV. (Nov. 15, 2018), https://medium.com/datadriveninvestor/the-future-of-trading-belong-to-artificial-intelligence-a4d5887cb677 [https://perma.cc/4J3H-2CWF]. *See* Council Regulation 596/2014, arts. 3, 12, 2014 O.J. (L173) 1, 20, 30 (EU) (defining and regulating "high-frequency algorithmic trading techniques"); Council Directive 2014/57, arts. 1, 5, 2014 O.J. (L173) 179, 182, 186–87 (EU) (complementing Council Regulation 596/2014 with criminal sanctions for market manipulation); Michael P. Wellman & Uday Rajan, *Ethical Issues for Autonomous Trading Agents*, 27 MINDS & MACHS. 609, 614 (2017); Tom C.W. Lin, *The New Market Manipulation*, 66 EMORY L.J. 1253, 1284–85 (2017) (discussing how AI can learn to engage in pump-and-dump manipulation); Ben van Lier, *From High Frequency Trading to Self-Organizing Moral Machines*, 7 INT'L J. TECHNOETHICS 34, 34 (2016).

6 *See* Greg Rosalsky, *When Computers Collude*, NPR: PLANET MONEY (Apr. 2, 2019, 7:30 AM), https://www.npr.org/sections/money/2019/04/02/708876202/when-computers-collude [https://perma.cc/7EYM-QW72]; Emilio Calvano, Giacomo Calzolari, Vincenzo Denicolò & Sergio Pastorello, *Artificial Intelligence, Algorithmic Pricing, and Collusion*, VOXEU (Feb. 3, 2019), https://voxeu.org/article/artificial-intelligence-algorithmic-pricing-and-collusion [https://perma.cc/6RDJ-HRHP]; Maurice E. Stucke & Ariel Ezrachi, *Two Artificial Neural Networks Meet in an Online Hub and Change the Future (of Competition, Market Dynamics and Society)*, at 2–3 (Univ. of Tenn. Coll. of L., Legal Stud. Rsch. Paper Ser. No. 323, 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2949434 [https://perma.cc/Z2KL-KHNM].

7 Harriet Agerholm, *Robot 'Goes Rogue and Kills Woman on Michigan Car Parts Production Line*,' INDEPENDENT (Mar. 15, 2017, 11:37 AM), https://www.independent.co.uk/news/world/americas/robot-killed-woman-wanda-holbrook-car-parts-factory-michigan-ventra-ionia-mains-federal-lawsuit-100-a7630591.html [https://perma.cc/632N-NG8Q].

8 *See* Jack Queen, *Robot Maker Escapes Liability in Fatal Auto Factory Accident*, LAW360 (Aug. 27, 2019, 6:04 PM), https://www.law360.com/articles/1192734/robot-maker-escapes-liability-in-fatal-auto-factory-accident [https://perma.cc/4HK5-M2CK].

9 Holbrook v. Prodomax Automation, Ltd., No. 17-cv-219, 2019 WL 6840187, at *3 (W.D. Mich. Aug. 26, 2019) (granting summary judgment to Nachi).

one of the defendants killed his wife; instead, he had to circuitously identify some prior negligent act that indirectly caused her death.[10] Now, four years after Holbrook's death, the defendants seem optimistic—none have settled and her family still awaits justice.[11] In a similar vein, prosecutors decided not to press charges against Uber for killing Elaine Herzberg.[12] Victims of algorithmic discrimination flounder about for a theory of liability.[13] Algorithmic stock manipulation is hard to prosecute unless there is a guilty human pulling the strings.[14] And antitrust law has yet to see its first case alleging purely algorithmic collusion.[15]

There are compelling reasons to use algorithms. Although some may take lives, they have the capacity to save many more.[16] Although some discriminate in lending or hiring, they have the potential to make these processes more objective.[17] Although some manipulate markets, effective algorithmic trading can also make markets more efficient.[18] We have only scratched the surface of the cost savings and big-data insights that robots and algorithms will come to offer.[19] These

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10 *See* Complaint & Jury Demand at 3–13, *Holbrook*, 2019 WL 6840187 (No. 17-cv-00219).

11 *See* Holbrook v. Prodomax Automation, Ltd., No. 17-cv-00219, 2020 U.S. Dist. LEXIS 207134, at *1 (W.D. Mich. Nov. 5, 2020) (listing remaining defendants).

12 Angie Schmitt, *Uber Got Off the Hook for Killing a Pedestrian with its Self-Driving Car*, STREETSBLOG (Mar. 8, 2019), https://usa.streetsblog.org/2019/03/08/uber-got-off-the-hook-for-killing-a-pedestrian-with-its-self-driving-car/ [https://perma.cc/6BDN-6X7Y].

13 *See* Solon Barocas & Andrew D. Selbst, *Big Data's Disparate Impact*, 104 CALIF. L. REV. 671, 711–12, 726 (2016).

14 *See generally* Lin, *supra* note 5, at 1300–01 (discussing the difficulty of prosecuting market manipulation without a human actor).

15 The closest have been cases that involve algorithms purposely developed by competing retailers to collude on pricing. *See, e.g.*, Andrew C. Finch, Acting Assistant Att'y Gen., Dep't of Just., Antitrust Div., Remarks at the 44th Annual Conference on International Antitrust Law and Policy (Sept. 14, 2017), https://www.justice.gov/opa/speech/file/996756/download [https://perma.cc/2RKN-8ZKV].

16 *See, e.g.*, Bernard Marr, *AI that Saves Lives: The Chatbot that Can Detect a Heart Attack Using Machine Learning*, FORBES (Dec. 21, 2018, 12:23 AM), https://www.forbes.com/sites/bernardmarr/2018/12/21/ai-that-saves-lives-the-chatbot-that-can-detect-a-heart-attack-using-machine-learning/#2a5b95d850f9 [https://perma.cc/Z46P-PDZN]; Will Knight, *How AI Could Save Lives Without Spilling Medical Secrets*, MIT TECH. REV. (May 14, 2019), https://www.technologyreview.com/s/613520/how-ai-could-save-lives-without-spilling-secrets/ [https://perma.cc/QN9K-2ZA3].

17 *See* Stephanie Bornstein, *Antidiscriminatory Algorithms*, 70 ALA. L. REV. 519, 531–37 (2018).

18 ONNIG H. DOMBALAGIAN, CHASING THE TAPE: INFORMATION LAW AND POLICY IN CAPITAL MARKETS 16, 166 (2015); Terrence Hendershott, Charles M. Jones & Albert J. Menkveld, *Does Algorithmic Trading Improve Liquidity?*, 66 J. FIN. 1, 1 (2011). *But see* Yesha Yadav, *How Algorithmic Trading Undermines Efficiency in Capital Markets*, 68 VAND. L. REV. 1607 (2015).

19 *See* Frank Holmes, *AI Will Add $15 Trillion to the World Economy by 2030*, FORBES

social benefits, however, are no guarantee that algorithms will not harm us along the way. Most experts are skeptical that advanced algorithms are worth the risk. In a large-scale survey of technologists, the Pew Research Center found that only around a third of respondents thought "the net overall effect of algorithms [will] be positive for individuals and society."[20] The fact is, "[a]s robotics and artificial intelligence systems increasingly integrate into our society, they will do bad things."[21] With the speed and geographic reach that the internet adds to the mix, algorithms can have disastrous effects in many places at once.[22] As the European Union's High-Level Expert Group on Artificial Intelligence has opined: "AI systems need to be human-centric, resting on a commitment to their use in the service of humanity and the common good . . . . This entails seeking to maximise the benefits of AI systems while at the same time preventing and minimising their risks."[23]

The key to making algorithms work for us, rather than against us, is to use the law to address the threats they pose. Accountability is the law's most direct and effective tool for turning behavior in socially constructive directions. And yet there is currently no general framework for algorithmic accountability.[24] In reporting on Elaine Herzberg's death, a journalist hit on the central challenge: "Who killed Elaine Herzberg? Not the driver of the car that ran her over—because there was no driver. And therein lies a problem."[25] When people kill

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(Feb. 25, 2019, 3:16 PM), https://www.forbes.com/sites/greatspeculations/2019/02/25/ai-will-add-15-trillion-to-the-world-economy-by-2030/#655d649b1852 [https://perma.cc/Q77F-2VUG].

20 Lee Rainie & Janna Anderson, Pew Rsch. Ctr., Code-Dependent: Pros and Cons of the Algorithm Age 5 (2017), https://www.pewresearch.org/internet/wp-content/uploads/sites/9/2017/02/PI_2017.02.08_Algorithms_FINAL.pdf [https://perma.cc/3N8E-8LCV].

21 Mark A. Lemley & Bryan Casey, *Remedies for Robots*, 86 U. Chi. L. Rev. 1311, 1311 (2019).

22 *See* Exec. Off. of the President, Big Data, at iii (2014), https://obamawhitehouse.archives.gov/sites/default/files/docs/big_data_privacy_report_may_1_2014.pdf [https://perma.cc/YH77-VCVS] (describing potential of algorithms to undermine "longstanding civil rights protections").

23 High-Level Expert Grp. on A.I., Ethics Guidelines for Trustworthy AI 4 (2019), https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai [https://perma.cc/2DRQ-75D5] (footnote omitted).

24 *See* Rainie & Anderson, *supra* note 20, at 15 ("[Technology experts in a large survey] noted that those who create and evolve algorithms are not held accountable to society and argued there should be some method by which they are.").

25 Schmitt, *supra* note 12. There was a human "monitor" in the car. Jack Stilgoe, *Who Killed Elaine Herzberg?*, Medium: OneZero (Dec. 12, 2019), https://onezero.medium.com/who-killed-elaine-herzberg-ea01fb14fc5e [https://perma.cc/YBA8-RXTT] ("Rafaela Vasquez was behind the wheel, but she wasn't driving. The car, operated by Uber, was in autonomous mode. Vasquez's job was to monitor the computer that was doing the driving . . . ."). The monitor seems

each other or manipulate stock, the law knows how to respond.[26] When algorithms do the same, there is a wide gap in legal accountability.[27]

To close the algorithmic accountability gap, the law needs to say what liability looks like when algorithms are behind the wheel. Most liability, whether criminal[28] or civil,[29] requires two things: an injurious act and a defective mental state. Acts and mental states are the sorts of requirement that only people can satisfy, but neither algorithms nor robots are people. In earlier work, I provided an account of what liability-entailing mental states could be for algorithmic injury.[30] That account called for inferring culpable mental states from patterns of injurious conduct, regardless of whether algorithmic or human activity caused it.[31] That account conspicuously avoided the more fundamental question: What does it mean for an algorithm to act?

Scholars in law,[32] computer science,[33] and business ethics[34] who have broached the question of algorithmic liability often assume that

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to have been looking down (perhaps at her phone) at the time of the crash. *Id.* Attention fatigue for human monitors in self-driving cars is a natural and predictable event. *See* Jack Stewart, *Self-Driving Cars Won't Just Watch the World—They'll Watch You*, WIRED (Feb. 13, 2017, 7:30 AM), https://www.wired.com/2017/02/self-driving-cars-wont-just-watch-world-theyll-watch/ [https://perma.cc/UW2D-FEKT]. In Uber's eyes, this only made it easier to distance the company, morally and legally, from the tragedy: "[W]e refused to take responsibility. They blamed it on the homeless lady [and] the Latina with a criminal record driving the car . . . . But *our car* hit a person. No one inside [Uber] said, 'We did something wrong and we should change our behavior.'" Julie Bort, *Uber Insiders Describe Infighting and Questionable Decisions Before Its Self-Driving Car Killed a Pedestrian*, BUS. INSIDER (Nov. 19, 2018, 5:17 PM), https://www.businessinsider.com/sources-describe-questionable-decisions-and-dysfunction-inside-ubers-self-driving-unit-before-one-of-its-cars-killed-a-pedestrian-2018-10 [https://perma.cc/H8UY-WMP5].

26 Lin, *supra* note 5, at 1300–01.

27 Herzberg's family sued Uber, but the case never went to court. Likely for PR reasons, Uber "c[a]me to a fast settlement." Connie Loizos, *Uber Has Settled with the Family of the Homeless Victim Killed Last Week*, TECHCRUNCH (Mar. 29, 2018, 6:53 PM), https://techcrunch.com/2018/03/29/uber-has-settled-with-the-family-of-the-homeless-victim-killed-last-week/ [https://perma.cc/J56X-8GER].

28 22 C.J.S. *Criminal Law* § 35 (2020) ("Strict criminal liability statutes remain the exception in our criminal law system, not the rule, and have a generally disfavored status . . . ." (footnote omitted)).

29 RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM ch. 4, scope note (AM. L. INST. 2010) (noting that strict liability is generally limited to torts involving abnormally dangerous activity, possession of animals, and products liability).

30 Mihailis E. Diamantis, *The Extended Corporate Mind: When Corporations Use AI to Break the Law*, 98 N.C. L. REV. 893, 930 (2020).

31 *Id.*

32 *See* GABRIEL HALLEVY, LIABILITY FOR CRIMES INVOLVING ARTIFICIAL INTELLIGENCE SYSTEMS 7 (2015); Steven J. Frank, *Tort Adjudication and the Emergence of Artificial Intelligence Software*, 21 SUFFOLK U. L. REV. 623, 625 (1987); Christina Mulligan, *Revenge Against Robots*,

the answer would somehow require the law to recognize algorithms as people. The journalist's musings about Elaine Herzberg's death also imply as much—if there was no human in control of the car, no person was. Granting algorithms the status of legal persons is deeply unappealing for several reasons. First, it would require a seismic reworking of current law; algorithms are presently not legal people and they cannot be civil or criminal defendants.[35] In the current climate of legislative stagnation, relying on Congress for any prompt action is a poor bet.[36] Setting public choice theory aside, it is far from clear that algorithms presently do, or ever could,[37] satisfy the conditions of personhood and accountability.[38] Even if they could, there is no way to sanction them: algorithms lack bodies to jail and pocketbooks to pay.[39]

Lastly, and most worryingly for the sci-fi readers out there, it would be foolhardy to assume that the slick slope of algorithmic per-

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69 S.C. L. Rev. 579, 592 (2018); Gabriel Hallevy, *Unmanned Vehicles: Subordination to Criminal Law Under the Modern Concept of Criminal Liability*, 21 J.L. Info. & Sci. 200, 201 (2011).

33 *See* Luciano Floridi & J.W. Sanders, *On the Morality of Artificial Agents*, 14 Minds & Machs. 349, 350–51 (2004); Fahad Alaieri & André Vellino, *Ethical Decision Making in Robots: Autonomy, Trust and Responsibility*, *in* Social Robotics 159, 159 (Arvin Agah et al. eds., 2016) ("[N]on-predictability and autonomy may confer a greater degree of responsibility to the machine . . . .").

34 *See* Nicholas Diakopoulos & Sorelle Friedler, *How to Hold Algorithms Accountable*, MIT Tech. Rev. (Nov. 17, 2016), https://www.technologyreview.com/s/602933/how-to-hold-algorithms-accountable/ [https://perma.cc/78NG-BEFS].

35 Thomas Beardsworth & Nishant Kumar, *Who to Sue When a Robot Loses Your Fortune*, Bloomberg (May 5, 2019, 8:00 PM), https://www.bloomberg.com/news/articles/2019-05-06/who-to-sue-when-a-robot-loses-your-fortune [https://perma.cc/SEC2-R9RT] ("Robots are getting more humanoid every day, but they still can't be sued.").

36 Derek Willis, *A Do-Nothing Congress? Well, Pretty Close*, N.Y. Times (May 28, 2014), https://www.nytimes.com/2014/05/28/upshot/a-do-nothing-congress-well-pretty-close.html [https://perma.cc/A64P-5WM6] ("After a burst of legislative activity in the past decade, representatives in the House are now proposing fewer bills."); *see* Sarah Binder, Ctr. for Effective Pub. Mgmt. at Brookings, Polarized We Govern? 10 (2014), https://www.brookings.edu/wp-content/uploads/2016/06/BrookingsCEPM_Polarized_figReplacedTextRevTableRev.pdf [https://perma.cc/SXN9-DB6P] (charting continuous rise of legislative gridlock).

37 Thomas C. King, Nikita Aggarwal, Mariarosaria Taddeo & Luciano Floridi, *Artificial Intelligence Crime: An Interdisciplinary Analysis of Foreseeable Threats and Solutions*, 26 Sci. & Eng'g Ethics 89, 95, 102 (2019) (asserting that "the idea that an [algorithm] can act voluntarily is contentious" and "an [artificial agent] cannot itself meet the *mens rea* requirement [of a crime]"); John R. Searle, Minds, Brains and Science 28–41 (1984) (arguing that computers cannot think).

38 *See generally* John Chipman Gray, The Nature and Sources of the Law 27–52 (2d ed. 1921) (discussing legal personhood).

39 *See* Ryan Abbott & Alex Sarch, *Punishing Artificial Intelligence: Legal Fiction or Science Fiction*, 53 U.C. Davis L. Rev. 323, 364–68, 383 (2019) (discussing and ultimately rejecting possibility of punishing algorithms); *see also* Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 N.C. L. Rev. 1231, 1244–48 (1992) (discussing difficulties of punishing algorithms).

sonhood stops with liability. Rights usually accompany responsibilities in law,[40] and the prospect of pitting algorithm rights against human rights is full of chillingly unanticipatable consequences.[41] We have seen this before with other artificial persons.[42] Could the early engineers of legal personhood for corporations have predicted the conflict between corporations and individuals for religious freedom[43] and political speech?[44] Corporations depend on individuals to do anything;[45] many algorithms, once designed, can become self-executing.[46]

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40 *See* W. Robert Thomas, *How and Why Corporations Became (and Remain) Persons Under the Criminal Law*, 45 FLA. ST. U. L. REV. 479, 504–14 (2018) (relating parallel development of corporate legal powers and corporate legal liabilities); *id.* at 533 ("The second dimension of fairness responded to the growing powers and opportunities available to corporations. Courts explained that a corporation's exposure to legal liability served to complement the expansion of its legal rights and powers."); *see also* Mark M. Hager, *Bodies Politic: The Progressive History of Organizational "Real Entity" Theory*, 50 U. PITT. L. REV. 575, 578 (1989) ("Thinkers from the early twentieth century speak of organizations as 'persons' and attempt to deduce from this concept the rights and responsibilities such entities should carry.").

41 *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, 275 (2017) (criticizing the possibility of extending rights to algorithms in part because of the implications it would have for humans' rights).

42 *See* Adam Winkler, *Corporations Are People, and They Have More Rights than You*, HUFFINGTON POST (Aug. 30, 2014, 11:10 AM), https://www.huffpost.com/entry/corporations-are-people-a_b_5543833 [https://perma.cc/5ESY-5ZZZ]; *see also* Adam S. Mintz, Note, *Do Corporate Rights Trump Individual Rights? Preserving an Individual Rights Model in a Pluralist Society*, 44 COLUM. J.L. & SOC. PROBS. 267, 284–85 (2011) (discussing Supreme Court cases balancing First Amendment rights of individuals and unions).

43 *See* Burwell v. Hobby Lobby Stores, Inc., 573 U.S. 682, 685, 720 (2014) (upholding protections for corporation's "sincere religious belief[s]" even when they interfere with individual healthcare rights).

44 *See* Citizens United v. FEC, 558 U.S. 310, 340–43 (2010) (finding that corporations enjoy constitutionally protected free speech rights even when they compete with individual speech rights).

45 Jaguar Cars, Inc. v. Royal Oaks Motor Car Co., 46 F.3d 258, 265 (3d Cir. 1995) ("[C]orporations are by definition passive instruments, since they are artificially created legal persons that can only act through their officers and employees."). *But see* Carla L. Reyes, *Autonomous Business Reality*, 21 NEV. L.J. (forthcoming 2021) (proposing a taxonomy of autonomous businesses).

46 Michal S. Gal, *Algorithmic Challenges to Autonomous Choice*, 25 MICH. TECH. L. REV. 59, 70 (2018) ("The self-executing quality of these autonomous algorithmic assistants limits the need for human intervention beyond the employment of the algorithm and the initial placement of the sensors."); Hilary J. Allen, *The SEC as Financial Stability Regulator*, 43 J. CORP. L. 715, 745 (2018) ("While humans are certainly involved in programming [high frequency trading] algorithms, once the algorithm has been set, the trading is self-executing—there is no time to apply human judgment to individual decisions about whether to trade or not. . . . Before trading was so fully automated, human judgment acted as something of a circuit-breaker . . . ."); Annemarie Bridy, *The Evolution of Authorship: Work Made by Code*, 39 COLUM. J.L. & ARTS 395, 397 (2016) ("Practitioners of generative art take a systems-approach to artistic production, removing

There is a silver lining to the cautionary tale of corporate personhood—whatever its faults, it is here to stay,[47] and it may offer a scaffold for constructing an approach to algorithmic injuries.[48] There was no legally responsible natural person driving the car that killed Elaine Herzberg.[49] There was no legally responsible algorithm driving the car either, because algorithms, not being people, cannot be responsible. The basic thesis advanced here is that there was a third possibility, an overlooked person in control of the car: Uber.

Corporations develop, run, and maintain the world's most impactful algorithms.[50] In such cases, I claim that algorithmic action is corporate action.[51] Just as corporations act through their employees,[52] they may also act through their algorithms. Holding corporations liable for the things they do through their employees induces corporations to ensure that their employees behave in socially beneficial ways.[53] Recognizing that corporations act through their algorithms would similarly encourage corporations to exercise responsible control over algorithmic injuries. By converting the question of injurious algorithmic action into a question of injurious corporate action, the

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their own personalities from the creative process and ceding control to self-executing algorithms.").

47 If anything, corporate criminal law is, and has been, expanding in the United States, V.S. Khanna, *Corporate Criminal Liability: What Purpose Does It Serve?*, 109 HARV. L. REV. 1477, 1477 (1996) (noting the expansion of corporate criminal liability), and abroad, Edward B. Diskant, Note, *Comparative Corporate Criminal Liability: Exploring the Uniquely American Doctrine Through Comparative Criminal Procedure*, 118 YALE L.J. 126, 142 (2008) ("Germany continues to resist corporate criminal liability, even as many of her neighbors in Western Europe have tentatively begun to change course in response to recent corporate scandals in the United States and Europe.").

48 In spirit, this project resembles Joanna Bryson's call to locate responsibility for algorithmic conduct in human actors, whom she believes to be the only loci of true responsibility. *See generally* Joanna J. Bryson, *The Artificial Intelligence of the Ethics of Artificial Intelligence: An Introductory Overview for Law and Regulation*, *in* THE OXFORD HANDBOOK OF ETHICS OF AI 3 (Markus D. Dubber et al. eds., 2020) (describing how the law applies to AI ethics).

49 Schmitt, *supra* note 12.

50 *See, e.g.*, George Dvorsky, *The 10 Algorithms that Dominate Our World*, GIZMODO (May 22, 2014, 1:26 PM), https://io9.gizmodo.com/the-10-algorithms-that-dominate-our-world-1580110464 [https://perma.cc/JKE9-38R2].

51 The sense of "action" I employ throughout this paper is the legal sense, not the philosophical. For philosophers, "action" typically refers to a bodily movement with the right connection to a mental state, usually intention. *See Action Theory*, BRITANNICA, https://www.britannica.com/topic/action-theory [https://perma.cc/MG9B-HBJX]. In the law, "action" usually just refers to movement, without implying any further assumption about what is going on in the head. *See, e.g.*, MODEL PENAL CODE § 1.13(2) (AM. L. INST. 1962) ("'[A]ct' or 'action' means a bodily movement whether voluntary or involuntary.").

52 *See infra* note 85 and accompanying text.

53 *See infra* note 182 and accompanying text.

approach advanced here crucially avoids the practical and philosophical challenges that accompany any effort to personify algorithms. Algorithms become an extension of the corporate person, not persons in their own right. In my earlier work on mental states, I asked: "Under what conditions should corporations be liable when their algorithms act on their behalf?"[54] Here I ask the logically prior question: "Under what conditions does algorithmic action qualify as corporate action?"

Although the proposal I develop below is grounded in U.S. law, it should be of interest beyond American borders. The Organization for Economic Cooperation and Development ("OECD") has recommended to all its nation-members that AI actors (defined as "those who play an active role in the AI system lifecycle") "should be accountable for the proper functioning of AI."[55] Similarly, the European Union has acknowledged the need for "civil liability rules . . . to ensure adequate compensation in case of [algorithmic] harm and/or rights violations" and "the need to ensure that criminal responsibility and liability can be attributed in line with the fundamental principles of criminal law."[56] It is not enough simply to stipulate that AI actors will be accountable because there will often be many actors connected to algorithmic injury. Operationalizing the recommendation requires a mechanism for apportioning liability. What I offer is one approach, grounded in principles of fairness and prevention.

Without a framework establishing a robust connection between algorithmic misconduct and corporate liability, the algorithmic accountability gap will only grow wider. Technologists' pessimistic predictions may prove inevitable. Algorithms can now carry out many functions that just a decade ago required human employees.[57] That

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54 Diamantis, *supra* note 30, at 907.

55 OECD, RECOMMENDATION OF THE COUNCIL ON ARTIFICIAL INTELLIGENCE 7–8 (2019), https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449 [https://perma.cc/MH8C-4N79].

56 HIGH-LEVEL EXPERT GRP. ON A.I., POLICY AND INVESTMENT RECOMMENDATIONS FOR TRUSTWORTHY AI 39 (2019), https://ec.europa.eu/digital-single-market/en/news/policy-and-investment-recommendations-trustworthy-artificial-intelligence [https://perma.cc/M6UJ-MHTR].

57 *See* Vishal Marria, *The Future of Artificial Intelligence in the Workplace*, FORBES (Jan. 11, 2019, 2:58 PM), https://www.forbes.com/sites/vishalmarria/2019/01/11/the-future-of-artificial-intelligence-in-the-workplace/#3826d3473d4d [https://perma.cc/YV8C-B3XM] ("Although AI will affect every sector in some way, not every job is at equal risk. PwC predicts a relatively low displacement of jobs (around 3%) in the first wave of automation, but this could dramatically increase up to 30% by the mid-2030's."); Dan Wellers, Timo Elliott & Markus Noga, *8 Ways Machine Learning Is Improving Companies' Work Processes*, HARV. BUS. REV. (May 31, 2017), https://hbr.org/2017/05/8-ways-machine-learning-is-improving-companies-work-processes [https://perma.cc/CU33-EMEM] ("Today's leading organizations are using machine learning-based

trend will accelerate over the decade to come.[58] When algorithmic injuries do not qualify as corporate actions, the law effectively shields corporations from the liability they would have faced using human employees instead. Businesses will seek the safe harbor of algorithmic misconduct rather than risk liability for misconduct by human employees. This gives corporations strong incentives to automate, even when automation might not otherwise be profitable or socially beneficial.[59]

In providing a framework for addressing algorithmic injury, this Article seeks the path of least resistance. In pursuit of realistic prospects for success, it grounds itself in existing corporate law principles. Part I details the current law of corporate liability, emphasizing how the law conceives of injurious corporate action by looking for an injurious employee action to attribute to the corporation. Part II shows how law, as presently applied, cannot close the algorithmic accountability gap because algorithmic injury has no obvious place in it.

Part III argues that an approach to algorithmic accountability may be hiding in plain sight. The principles behind the current law of corporate liability—which emphasize relationships of control and benefit[60]—extend beyond the employment context. Corporations also have control over and benefit from their algorithms, which motivates two possible approaches. A "control-based account" would attribute algorithmic harms to any corporation that exercises sufficient control over the algorithm in question. By contrast, a "benefits-based account" would attribute algorithmic harms to any corporation that lays substantial claim to the productive benefits of the algorithm in question. After detailing both accounts, this Article criticizes them for being overbroad. In their stead, this Article settles on a "beneficial-

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tools to automate decision processes, and they're starting to experiment with more–advanced uses of artificial intelligence (AI) for digital transformation.").

58 *See* SAM RANSBOTHAM, DAVID KIRON, PHILIPP GERBERT & MARTIN REEVES, MIT SLOAN MGMT. REV., RESHAPING BUSINESS WITH ARTIFICIAL INTELLIGENCE 14 (2017), https://image-src.bcg.com/Images/Reshaping%20Business%20with%20Artificial%20Intelligence_tcm9-177882.pdf [https://perma.cc/3UT9-VZZS]; Ellen Ruppel Shell, *AI and Automation Will Replace Most Human Workers Because they Don't Have to Be Perfect—Just Better than You*, NEWSWEEK (Nov. 20, 2018, 5:04 PM), https://www.newsweek.com/2018/11/30/ai-and-automation-will-replace-most-human-workers-because-they-dont-have-be-1225552.html [https://perma.cc/DPZ7-6Q2G].

59 Microsoft President and Chief Legal Officer Brad Smith remarked, "We don't want to see a commercial race to the bottom. . . . Law is needed." Cade Metz, *Is Ethical A.I. Even Possible?*, N.Y. TIMES (Mar. 1, 2019) (quoting Brad Smith, President and Chief Legal Officer, Microsoft, Statement (2019)), https://www.nytimes.com/2019/03/01/business/ethics-artificial-intelligence.html [https://perma.cc/4AUB-9ZCU].

60 *See infra* notes 166–67 and accompanying text.

control account" which would require algorithmic harms to satisfy both the control and benefit criteria before attribution.

As Part IV shows, recognizing that corporations act through algorithms just as they act through employees would go a long way to address algorithmic injury. This would establish a responsible party against whom victims could seek satisfaction. And that, in turn, would incentivize corporations to take care to discipline their algorithms by designing, releasing, monitoring, and updating them responsibly. Though there would be some challenges with implementation, Part IV shows they would be surmountable. Finally, this Article concludes by noting some limitations of using corporate law to solve the algorithmic accountability gap.

I. The Law of Corporate Liability

The law of liability was built with human defendants in mind. Liability typically requires some kind of injurious act—e.g., driving over someone—attended by some sort of deficient mental state—e.g., purpose or recklessness.[61] To avoid vagueness, the law must often define specific acts and mental states to distinguish them from each other.[62] However, it needs no special definition of what it means for human defendants to act or to have mental states. We are all intimately familiar with how human bodies move and how human minds think.

Corporations are different. "A corporation is an artificial being, invisible, intangible, and existing only in contemplation of law."[63] Corporations exist only because, only to the extent that, and only in the way that, the law dictates. There is no antecedent, prelegal notion of the corporation or how it acts and thinks. The law's account of these basic corporate concepts constitutes what corporations are. The law can and has changed its mind about how corporations act and think. For example, earlier in corporate history, the scope of corporate activity was limited by the ultra vires doctrine.[64] Corporations literally could take no action that went beyond the scope of their very limited[65]

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61 The misdemeanor statute that Uber arguably violated in Herzberg's death required "driv[ing] a vehicle in reckless disregard for the safety of persons." Ariz. Rev. Stat. Ann. § 28-693(A) (2021).

62 *See, e.g.*, Papachristou v. City of Jacksonville, 405 U.S. 156, 162–63 (1972) (listing lack of specific intent element as factor weighing towards unconstitutional vagueness).

63 Trs. of Dartmouth Coll. v. Woodward, 17 U.S. (4 Wheat.) 518, 636 (1819).

64 *Ultra Vires*, Black's Law Dictionary (11th ed. 2019) ("Unauthorized; beyond the scope of power allowed or granted by a corporate charter or by law.").

65 Note, *Constructive Notice of the Charter of a Corporation*, 26 Harv. L. Rev. 540, 541 (1913) ("In the early days of corporations when charters were sparingly granted by public act

chartered purposes, however hard corporate employees might try.[66] Similarly, early corporations were deemed incapable of entertaining criminally inculpating thoughts.[67] Both those limits have since been lifted.[68]

In order for corporations to fulfill their economic and social role, they have to be capable of doing and thinking things. "[A] corporation must of course be able to act . . . [or] else the whole theory of incorporation would make no sense whatsoever."[69] Corporations need to purchase property, set up factories, make goods, and intend to bind themselves to agreement in order to participate meaningfully in the marketplace. Some of these acts and thoughts must be capable of subjecting corporations to future suit. On the one hand, liability is necessary to empower corporations: the capacity to enter into contract is meaningless without the capacity to be sued for breach.[70] On the other hand, corporate liability is also a crucial protection for human participants in the economic and social marketplace.[71]

Lawmakers took two crucial shortcuts in defining what corporations are. Because the law was creating an entirely new creature, it had a blank slate. It could have developed a parallel legal system from scratch, defining afresh what legal concepts mean as applied to corporations. Understandably, lawmakers demurred in the face of that

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and usually for a quasi-public purpose a charter was properly regarded as a very special privilege.").

66 Albert J. Harno, *Privileges and Powers of a Corporation and the Doctrine of Ultra Vires*, 35 YALE L.J. 13, 23 (1925); 1 WILLIAM BLACKSTONE, COMMENTARIES *464 ("A corporation cannot commit treason, or felony, or other crime, in it's [sic] corporate capacity: though it's [sic] members may, in their distinct individual capacities." (footnote omitted)).

67 JAMES D. COX & THOMAS LEE HAZEN, THE LAW OF CORPORATIONS § 8:21, at 523 (3d ed. 2010) ("The early cases declared that a corporation could not commit a crime for want of the requisite mens rea or intent.").

68 *See* JOHN W. SALMOND, THE LAW OF TORTS § 18 at 57–58 (3d ed. 1912); *see, e.g.*, Phila., Wilmington, & Balt. R.R. Co. v. Quigley, 62 U.S. (21 How.) 202, 209–10 (1858); COX & HAZEN, *supra* note 67, § 8:21, at 527 ("Until the twentieth century, only on rare occasion did a court hold a corporation liable for commission of a 'true crime,' that is, a crime in which a mens rea was an essential element.").

69 Gerhard O.W. Mueller, *Mens Rea and the Corporation: A Study of the Model Penal Code Position on Corporate Criminal Liability*, 19 U. PITT. L. REV. 21, 38 (1957).

70 *See* Steven J. Burton & Eric G. Andersen, *The World of a Contract*, 75 IOWA L. REV. 861, 865 (1990) (discussing how an expectation of performance induces a party to change position, and noting that, consequently, harm to a party's expectation interest "is the touchstone in principle for ascertaining a breach of contract").

71 *See* N.Y. Cent. & Hudson River R.R. Co. v. United States, 212 U.S. 481, 495 (1909) ("[There is] no valid objection in law, and every reason in public policy, why the corporation . . . shall be held punishable by fine because of the knowledge and intent of its agents to whom it has intrusted authority to act . . . .").

monumental task. Instead, they took a shortcut, slotting corporations into existing law just as if they were other "people."[72] As the Supreme Court has observed, "the corporate personality is a fiction, although a fiction intended to be acted upon as though it were a fact."[73] Accordingly, any statute that defines civil or criminal liability for people simultaneously defines causes of action applicable to individuals and to corporations.[74] For example, when the False Claims Act[75] states that "any *person* who . . . presents . . . a false or fraudulent claim [to the U.S. government] is liable,"[76] there is no question that both natural and legal people can violate it.

Simply declaring that corporations are people and can violate all the laws natural people can violate says nothing about how to tell when a corporate violation has occurred. Because corporations are "artificial being[s], invisible, intangible,"[77] there is no obvious, a priori answer to what it means for them to present a claim or to know that it is false. When we suspect natural people of False Claims violations, we want to know whether it was their hand that applied the stamp and what information about the claim was stored in their brain. But corporations have neither hands nor brains. The law had to define the "body corporate"—that with which a corporation acts—and the "corporate mind"—that with which a corporation thinks.[78]

This challenge prompted lawmakers to take a second shortcut. There are any number of sophisticated, policy-driven ways that lawmakers could have defined the corporate mind and the body corporate. They could have identified the corporate mind with a range of different corporate features, from internal decision structures,[79] to corporate ethos,[80] to industry norms,[81] to corporate data systems.[82] Instead, the law simply pilfered a doctrine from the ancient law of

72 A corporation is "[a]n entity . . . having authority under law to act as a single person." *Corporation*, BLACK'S LAW DICTIONARY (11th ed. 2019).

73 Int'l Shoe Co. v. Washington, 326 U.S. 310, 316 (1945).

74 *See* 1 U.S.C. § 1 ("In determining the meaning of any Act of Congress, unless the context indicates otherwise . . . the words 'person' and 'whoever' include corporations . . . as well as individuals.").

75 31 U.S.C. §§ 3729–3733.

76 *Id.* § 3729(a)(1) (emphasis added).

77 Trs. of Dartmouth Coll. v. Woodward, 17 U.S. (4 Wheat.) 518, 636 (1819).

78 Mihailis E. Diamantis, *The Body Corporate*, 83 L. & CONTEMP. PROBS. 133 (2020).

79 *See* PETER A. FRENCH, COLLECTIVE AND CORPORATE RESPONSIBILITY 13 (1984).

80 Pamela H. Bucy, *Corporate Ethos: A Standard for Imposing Corporate Criminal Liability*, 75 MINN. L. REV. 1095, 1099 (1991).

81 William S. Laufer, *Corporate Bodies and Guilty Minds*, 43 EMORY L.J. 647, 701 (1994).

82 *See* Mihailis E. Diamantis, *Functional Corporate Knowledge*, 61 WM. & MARY L. REV. 319, 378, 393 (2019).

agency: respondeat superior.[83] That doctrine effectively attributes the thoughts and acts of agents to their principals. Accordingly, what employees think, the corporation thinks; what employees do, the corporation does.[84] The corporate mind is its employees' minds. The body corporate is its employees' bodies. There is not much more nuance to it than that.[85]

Commentators have expressed widespread dissatisfaction with both shortcuts. The fiction of corporate personhood strikes many scholars as absurd,[86] incoherent,[87] and dangerous.[88] As for respondeat superior, "there is virtually unanimous agreement [that it] is extremely broad."[89] The overbroad doctrine unfairly sanctions corporations for wayward employee conduct[90] and overdeters them by incentivizing wasteful levels of compliance.[91]

Despite these criticisms, there is some sense to the fiction of corporate personhood and to respondeat superior. The fiction of corpo-

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83 SALMOND, *supra* note 68, § 18 at 57–58; *see, e.g.*, Phila., Wilmington, & Balt. R.R. Co. v. Quigley, 62 U.S. (21 How.) 202, 209–10 (1859). Some trace the doctrine as far back as Roman times. *See* Oliver Wendell Holmes, Jr., *Agency*, 4 HARV. L. REV. 345, 350 (1891).

84 Old Monastery Co. v. United States, 147 F.2d 905, 908 (4th Cir. 1945); *see* PAULA GILIKER, VICARIOUS LIABILITY IN TORT 1 (2010).

85 Though there is some. The employees have to be working "within the scope of their employment" for their thoughts and acts to be attributable to the corporation; however, the employee satisfies this condition even if she is disobeying orders. United States v. Hilton Hotels Corp., 467 F.2d 1000, 1004 (9th Cir. 1972). Employees must also have some intent to benefit the corporation to attribute their acts and thoughts, though they satisfy this condition even if their intent is subsidiary, United States v. Automated Med. Lab'ys, Inc., 770 F.2d 399, 407 (4th Cir. 1985), hypothetical, United States v. Sun-Diamond Growers of Cal., 138 F.3d 961, 970 (D.C. Cir. 1998), *aff'd*, 526 U.S. 398 (1999), and ineffective, *see Old Monastery Co.*, 147 F.2d at 908.

86 *E.g.*, Robert Wagner, *Cruel and Unusual Corporate Punishment*, 44 J. CORP. L. 559, 564 (2019) ("[A] problem with corporate personhood is that it can lead to absurd conclusions . . . .").

87 Matthew J. Allman, Note, *Swift Boat Captains of Industry for Truth:* Citizens United *and the Illogic of the Natural Person Theory of Corporate Personhood*, 38 FLA. ST. U. L. REV. 387, 388 (2011) ("[T]he 'natural person theory,' which sees the existence of human beings and corporations as legally and factually indistinguishable . . . is divorced from observable reality . . . [and] logically incoherent . . . .").

88 Meir Dan-Cohen, *Epilogue on "Corporate Personhood" and Humanity*, 16 NEW CRIM. L. REV. 300, 302 (2013) ("The issue of corporate personhood in general, and the standard scheme in particular, are fraught with familiar dangers.").

89 Preet Bharara, *Corporations Cry Uncle and Their Employees Cry Foul: Rethinking Prosecutorial Pressure on Corporate Defendants*, 44 AM. CRIM. L. REV. 53, 59 (2007); Comment, *The Creation of a Common Law Rule: The Fellow Servant Rule, 1837–1860*, 132 U. PA. L. REV. 579, 584 (1984) (describing respondeat superior as "extremely broad"); Samuel W. Buell, *The Blaming Function of Entity Criminal Liability*, 81 IND. L.J. 473, 526 (2006) ("[R]espondeat superior is grossly overbroad.").

90 *See* Ellen S. Podgor, *A New Corporate World Mandates a "Good Faith" Affirmative Defense*, 44 AM. CRIM. L. REV. 1537, 1537, 1539 (2007).

91 *See* Diamantis, *supra* note 82, at 324–25.

rate personhood taps into deep psychological intuitions that organized groups are social agents who deserve blame when they do wrong.[92] However discomforting the fiction of corporate personhood may be, denying that corporations deserve blame when they do wrong is even more unsettling.[93] As a tool for channeling legal sanction, respondeat superior's breadth is also one of its greatest strengths. Corporations are in the best position to ensure that their employees obey the law.[94] By treating all employee acts as corporate acts and all employee thoughts as corporate thoughts, the law gives corporations very strong incentives to train, monitor, and discipline their employees.[95] Indeed, it is the contention of this Article that, if anything, respondeat superior is not broad enough. As applied, respondeat superior relies on the outdated assumption that "[a] corporation can only act through natural persons."[96] In the twenty-first century, corporations also interface with the outside world through their algorithms.[97] By failing to recognize that algorithmic effects should sometimes qualify as corporate acts, the law presently gives corporations inadequate incentives to train, monitor, and discipline their algorithms.

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92 Mihailis E. Diamantis, *Corporate Criminal Minds*, 91 NOTRE DAME L. REV. 2049, 2077–80 (2016); Steven J. Sherman & Elise J. Percy, *The Psychology of Collective Responsibility: When and Why Collective Entities Are Likely To Be Held Responsible for the Misdeeds of Individual Members*, 19 J.L. & POL'Y 137, 156 (2010) (noting that the impulse to "blame and punish[] these groups . . . [is] psychologically sensible and sustainable"); *see* Anna-Kaisa Newheiser, Takuya Sawaoka & John F. Dovidio, *Why Do We Punish Groups? High Entitativity Promotes Moral Suspicion*, 48 J. EXPERIMENTAL SOC. PSYCH. 931, 935 (2012) (arguing that people are naturally inclined to blame entitative groups for wrongdoing); Thomas F. Denson, Brian Lickel, Mathew Curtis, Douglas M. Stenstrom & Daniel R. Ames, *The Roles of Entitativity and Essentiality in Judgments of Collective Responsibility*, 9 GRP. PROCESSES & INTERGROUP RELS. 43, 55–56 (2006).

93 *See* William S. Laufer, *Where Is the Moral Indignation over Corporate Crime?*, *in* REGULATING CORPORATE CRIMINAL LIABILITY 19, 19 (Dominik Brodowski et al. eds., 2014).

94 *See* Robert A. Prentice, *Conceiving the Inconceivable and Judicially Implementing the Preposterous: The Premature Demise of Respondeat Superior Liability Under Section 10(b)*, 58 OHIO ST. L.J. 1325, 1386 (1997) ("Several economic arguments have been made for the efficiency of the *respondeat superior* regime. Among other points, the 'least-cost avoider' test has often been used in economic analysis for determining the proper parameters of strict liability. The least-cost avoider is the person who can most efficiently prevent the loss by adjusting his level of care to the most efficient point.").

95 *See* Brent Fisse, *Reconstructing Corporate Criminal Law: Deterrence, Retribution, Fault, and Sanctions*, 56 S. CAL. L. REV. 1141, 1205–06 (1983).

96 Memorandum from Eric Holder, Deputy Att'y Gen., to All Component Heads and U.S. Att'ys 4 (June 16, 1999) [hereinafter Holder Memo], http://www.justice.gov/sites/default/files/criminal-fraud/legacy/2010/04/11/charging-corps.PDF [https://perma.cc/4ELA-QNMN].

97 *See, e.g.*, Thomas Crampton, *Google Said to Violate Copyright Laws*, N.Y. TIMES (Feb. 14, 2007), https://www.nytimes.com/2007/02/14/business/14google.html [https://perma.cc/E8C9-Q2D8].

From the pragmatic perspective adopted here, perhaps the most significant reason to take the fiction of corporate personhood and respondeat superior on board is that they are not going anywhere. There is broad public support for the sort of corporate legal liability that corporate personhood enables.[98] That makes legislative reform a nonstarter. As to respondeat superior, that doctrine has been entrenched by centuries of jurisprudence.[99] The only notable change to respondeat superior in decades has been the limited introduction of the collective knowledge doctrine.[100]

In the federal system, the basic principles of corporate liability are largely judge-made. Respondeat superior is a common law doctrine,[101] introduced to corporate law and expanded upon through judicial decisions.[102] As was the case with the collective knowledge doctrine, any innovation is most likely to come from the courts. Despite its limited uptake beyond the First Circuit, courts have recognized that they have the power to adopt or decline the doctrine.[103]

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98 *See* Miriam H. Baer, *Choosing Punishment*, 92 B.U. L. REV. 577, 612 (2012) ("The public has increasingly registered greater moral outrage in response to corporate governance scandals. Moral outrage, in turn, fuels retributive motivations and therefore supports those institutions best poised to take advantage of such motivations.").

99 *See* GILIKER, *supra* note 84, at 12 (recounting the development of respondeat superior in English Courts, beginning with *Boson v. Sandford* (1691) 91 Eng. Rep. 382; 2 Salk. 440 (K.B.)).

100 *See* United States v. Bank of New England, N.A., 821 F.2d 844, 855 (1st Cir. 1987) ("[I]f Employee A knows one facet of [a legal] reporting requirement, B knows another facet of it, and C a third facet of it, the bank knows them all.").

101 *See* Packard Motor Car Co. v. NLRB, 330 U.S. 485, 489 (1947) (referring to "the ancient maxim of the common law, *respondeat superior*," which, "[e]ven without special statutory provision . . . would apply to many relations").

102 *See* Buell, *supra* note 89, at 474–75 ("The law in this area had a weak start nearly a century ago when common law courts, looking to expand available means for regulating business enterprises, imported respondeat superior liability from tort law into the criminal law, but without serious theoretical analysis." (footnote omitted)); Daniel L. Cheyette, *Policing the Corporate Citizen: Arguments for Prosecuting Organizations*, 25 ALASKA L. REV. 175, 179–80 (2008) ("Courts were the first to recognize corporations as legal entities capable of suing and being sued. . . . The law imputed tortious intent from the agent to the corporation, making the corporation liable for actual damages.").

103 *See* United States v. Pac. Gas & Elec. Co., No. 14-cr-00175-TEH, 2015 WL 9460313, at *3–5 (N.D. Cal. Dec. 23, 2015) (discussing whether to adopt the collective knowledge doctrine); United States v. T.I.M.E.-D.C., Inc., 381 F. Supp. 730, 738 (W.D. Va. 1974) ("A corporation can only act through its employees and, consequently, the acts of its employees, within the scope of their employment, constitute the acts of the corporation. Likewise, knowledge acquired by employees within the scope of their employment is imputed to the corporation. In consequence, a corporation cannot plead innocence by asserting that the information obtained by several employees was not acquired by any one individual employee who then would have comprehended its full import. Rather, the corporation is considered to have acquired the collective knowledge of its employees and is held responsible for their failure to act accordingly.").

Furthermore, modest changes have a greater chance for uptake than grand ones. Accordingly, the arguments that follow are largely directed to judges, proposing what amounts to an extension of respondeat superior grounded in the doctrine's own motivating principles. In the twenty-first century, limiting respondeat superior to employees is in tension with the principles that justified the doctrine in the first place. Algorithms are coming to fulfill roles previously filled only by humans. Corporate activity is digitizing, and judges should take note.

II. Is Any Change Needed?

Though this Article seeks to ground itself in current law and the policies behind it, it does propose a modest change in order to address the algorithmic accountability gap. In the spirit of being minimally invasive, I should consider first whether present law, more creatively applied and sans modification, could be up to the task. Perhaps respondeat superior would do the work if judges were to focus in a more sophisticated way on the conduct of employees who design corporate algorithms. Or, perhaps employees were the wrong place to look in the first place; if corporations make algorithms, maybe principles drawn from products liability could close the gap. In the two Sections that follow, I argue that, as they presently stand, neither area of law can close the algorithmic accountability gap.

A. Respondeat Superior

Designing, training, and running algorithms presently requires human agency.[104] Humans write the code, compile the data sets, and train the algorithms.[105] If algorithmic misbehavior could reliably be traced back to human mischief, then perhaps respondeat superior's identification of corporate acts with human acts would not be a significant limitation. Maybe courts just need to understand more about how algorithms are made and how to locate the cause of algorithmic injury in deficiencies of responsible corporate programmers. Generally, this is how the law thinks about acts that involve artifacts. For example, it is ordinarily no defense to a reckless driving charge to say, "though I was in control of the car, it was the car, not I, who ran over the pedes-

104 *See* James Vincent, *The State of AI in 2019*, Verge (Jan. 28, 2019, 8:00 AM), https://www.theverge.com/2019/1/28/18197520/ai-artificial-intelligence-machine-learning-computational-science [https://perma.cc/FRB3-EP6Q] (contrasting general AI—which does not yet exist—with machine learning, which involves "a hell of a lot of tinkering").

105 *See* David Lehr & Paul Ohm, *Playing with the Data: What Legal Scholars Should Learn About Machine Learning*, 51 U.C. Davis L. Rev. 653, 668 (2017).

trian. So acquit me." Agency transfers from people to the tools they use; why should the same not be true if those tools happen to be algorithms?

There is some work respondeat superior can do, and is doing, to address the algorithmic accountability gap. When employees purposely design algorithms to engage in misconduct, that misconduct is attributable to the individual employees, and from them, through respondeat superior, to corporate employers. Consider, for example, a case recounted by Principal Deputy Assistant Attorney General Andrew Finch involving criminal antitrust violations by retailers on Amazon Marketplace:

> Although the members of the conspiracy programmed their algorithms differently, the algorithms were nonetheless coordinated to accomplish the conspirators' goal of matching prices. One conspirator programmed its algorithms to search for the lowest price offered by a non-conspiring competitor for a particular poster, and set a price for that poster just below its non-conspiring competitor's price. The other conspirator programmed its algorithm to match the first conspirator's price. Prior to the collusive agreement, these conspirators engaged in vigorous competition to sell posters on Amazon Marketplace. By eliminating the competition between them, they prevented their prices from dropping even further. The conspirators monitored the effectiveness of their pricing agreement by spot-checking prices, but the conspiracy was largely self-executing once the pricing algorithms were in effect.[106]

As Finch noted, the Department of Justice had no trouble fitting criminal charges into the current legal framework.[107] Employees of the retailers purposely designed the algorithms to collude with each other.[108] So the collusion itself, though directly carried out by algorithms that were "largely self-executing," amounted to employee action—executives of the retailers were charged.[109] Respondeat superior filled in the last step by attributing the collusion to the corporate retailers.

Although the use of respondeat superior just described is straightforward, it is not nearly enough to close the algorithmic accountability gap because there are, and increasingly will be, many al-

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106 Finch, *supra* note 15, at 6.

107 *See id.*

108 *See id.*

109 *Id.*

gorithmic injuries that cannot qualify as employee actions. Today, for the most part, algorithms originate with human engineers; however, humans are becoming increasingly absent from the process. There once was a time when humans needed to write every line of code, but now algorithms themselves write most of the code for sophisticated programs.[110] Humans are still usually involved—they generally supervise the process—yet even now there are techniques for unsupervised algorithmic learning.[111] As humans have less and less of a hand in the process of software development, the attempt to reduce corporate algorithmic acts to a species of employee action wears thin. The analogy between an algorithm and a tool like a hammer, which strikes only where a human intends, breaks down.

Even today when software engineers have a heavy hand in supervised algorithmic learning, respondeat superior is often inadequate for closing the algorithmic accountability gap. For one thing, the programmers are often not employees of the corporation using the algorithm; third-party tech companies design custom and off-the-shelf products.[112] Sometimes, holding the third-party tech company liable for its programmers' missteps might help. That solution, however, falsely presumes that there are always programming missteps when an algorithm misbehaves. The algorithmic misbehavior may result from an unexpected interaction between the algorithm (programmed by one company), the way it is used (by a second company), and the hardware running it (owned by a third company). Furthermore, even if the algorithm is defective when it leaves the company that designed it, the connection between any single programmer's activity and the injurious algorithmic conduct will often be highly attenuated. It takes teams of programmers to design the most sophisticated algorithms.[113] Each

110 *See* Catherine Tremble, Note, *Wild Westworld: Section 230 of the CDA and Social Networks' Use of Machine-Learning Algorithms*, 86 FORDHAM L. REV. 825, 837 (2017) ("In traditional programming, mechanisms operate as the result of concrete rules; as such, problems are solved by correcting the programmers' previously written rules to yield a different output. By contrast, if the output of a machine-learning algorithm is unsatisfactory, the program needs more exposure to trial and error; it will self-teach to achieve its goal." (footnote omitted)); Harry Surden & Mary-Anne Williams, *Technological Opacity, Predictability, and Self-Driving Cars*, 38 CARDOZO L. REV. 121, 147–48 (2016) ("[I]n machine learning, loosely speaking, the computer learns the 'rules' to guide its actions on its own, rather than having those rules pre-programmed by human programmers." (footnote omitted)).

111 Jason Brownlee, *Supervised and Unsupervised Machine Learning Algorithms*, MACH. LEARNING MASTERY (Mar. 16, 2016), https://machinelearningmastery.com/supervised-and-unsupervised-machine-learning-algorithms/ [https://perma.cc/YAA9-CM49].

112 *See* Lemley & Casey, *supra* note 21, at 1352 ("Robots are composed of many complex components . . . often designed, operated, leased, or owned by different companies.").

113 *See id.*

line of code may be essential to the algorithm's misconduct, but none may be causally sufficient. Without an individual to whom the misconduct traces, respondeat superior has no application.[114]

To appreciate the challenge the algorithmic era poses for respondeat superior, it is important to understand the type of corporate algorithm at issue. The most powerful and flexible algorithms of today are not the mechanistic if-A-output-B programs of yesteryear and freshman computer science courses. Those algorithms required technicians to write every line of code, to anticipate every possible input, and to specify every possible output.[115] The algorithms that hold the most promise for boosting corporate productivity largely design themselves using a technique called "machine learning."[116] After specifying an algorithm's goal, programmers train it with a set of test cases,[117] telling the algorithm in each instance whether or not it attained its goal.[118] With each test case, the algorithm updates its own code and eventually learns how to perform the task on its own.[119] The result is a program that, at least in many respects, can accomplish a goal faster, more accurately, and cheaper than any human.[120] It is also an algorithm that no human could have designed from the ground up; the resulting code is often inscrutable, so complicated that no one reading it afterwards can understand how it works.[121]

Because algorithms' code is often effectively a black box, algorithms can behave in ways that are unintended, unexpected, and unpredictable by any human intelligence.[122] This is by design and part of the power of machine learning. Employees who do precisely as their

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114 *See* Diamantis, *supra* note 78, at 151–52.

115 *See Data Structures—Algorithms Basics*, TutorialsPoint, https://www.tutorialspoint.com/data_structures_algorithms/algorithms_basics.htm [https://perma.cc/8P6T-REJV].

116 *See* Lemley & Casey, *supra* note 21, at 1335 ("[T]he unpredictability inherent in machine learning is also one of its greatest strengths.").

117 *See* Lehr & Ohm, *supra* note 105, at 668.

118 *See, e.g.*, Chris Nicholson, *A Beginner's Guide to Neural Networks and Deep Learning*, Pathmind, https://wiki.pathmind.com/neural-network [https://perma.cc/K6NK-RTVM].

119 *See, e.g.*, *id.*

120 *See, e.g.*, Keith D. Foote, *A Brief History of Machine Learning*, Dataversity (Mar. 26, 2019), https://www.dataversity.net/a-brief-history-of-machine-learning/# [https://perma.cc/CR48-R897].

121 *See* Matthew Carroll, *The Complexities of Governing Machine Learning*, Datanami (Apr. 27, 2017), https://www.datanami.com/2017/04/27/complexities-governing-machine-learning/ [https://perma.cc/V2HS-P3AX]; Andrew D. Selbst & Solon Barocas, *The Intuitive Appeal of Explainable Machines*, 87 Fordham L. Rev. 1085, 1089–90 (2018).

122 *See* Lemley & Casey, *supra* note 21, at 1365 ("[M]uch of the [algorithmic] misconduct that tomorrow's designers, policymakers, and watchdogs must guard against might not be intentional at all.").

employers command are less valuable, and probably more of a risk, than employees who can interpret commands with a dose of common sense and flexibly apply them to changing circumstances. The same is true of algorithms. Machine learning is so powerful precisely because it moves beyond the basic code its programmers are capable of writing. In fact, many algorithms have built-in randomness as an essential part of their design.[123] If algorithms behave in unforeseeable ways, they will sometimes do things that employers, and the law, prefer they would not.

Creative use of respondeat superior to triangulate between corporations, their programmers, and their algorithms is not a general solution. Machine learning raises the possibility that algorithms will misbehave without any intervening human misconduct.[124] Because machine learning algorithms effectively program themselves, they can draw unanticipated conclusions from test data and interact with the real world in unforeseeable ways.[125] Technologists widely recognize that smart algorithms can misbehave even if every human involved is fully innocent.[126] Without human misconduct, respondeat superior's vision of corporate misconduct cannot apply.

This leaves the law with limited tools to address algorithmic misbehavior. Unlike employees, algorithms are not themselves directly subject to suit.[127] Because respondeat superior excludes algorithms from its understanding of corporate action, the law is handicapped in its efforts to hold corporations liable in their stead. A better approach would attend to the fact that algorithms are, and will increasingly become, significant sources of corporate harm. An updated doctrine could accomplish this by extending the body corporate to include cor-

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123 *See* Joshua A. Kroll, Joanna Huey, Solon Barocas, Edward W. Felten, Joel R. Reidenberg, David G. Robinson & Harlan Yu, *Accountable Algorithms*, 165 U. PA. L. REV. 633, 653 (2017).

124 PEDRO DOMINGOS, THE MASTER ALGORITHM 5 (2015). Ryan Abbott and Alex Sarch call these infractions "[h]ard AI [c]rimes." Abbott & Sarch, *supra* note 39, at 328–29.

125 *See* Kroll et al., *supra* note 123, at 680–81.

126 *See, e.g.*, KEVIN PETRASIC, BENJAMIN SAUL, JAMES GREIG, MATTHEW BORNFREUND & KATHERINE LAMBERTH, WHITE & CASE, ALGORITHMS AND BIAS 1 (2017), https://www.whitecase.com/sites/whitecase/files/files/download/publications/algorithm-risk-thought-leadership.pdf [https://perma.cc/23HU-QRZN] ("[A] perfectly well-intentioned algorithm may inadvertently generate biased conclusions that discriminate against protected classes of people."); Barocas & Selbst, *supra* note 13, at 729 ("[E]rrors may . . . be the result of entirely innocent choices made by data miners.").

127 *See* United States v. Athlone Indus., Inc., 746 F.2d 977, 979 (3d Cir. 1984) ("[R]obots cannot be sued . . . ."); Ugo Pagallo, *Killers, Fridges, and Slaves: A Legal Journey in Robotics*, 26 AI & SOC'Y 347, 349 (2011) ("[C]ommon legal standpoint excludes robots from any kind of criminal responsibility . . . .").

porate algorithms. This would recognize the enabling role corporations play when their algorithms misbehave and incentivize corporations to take preventive measures.

B. Product Liability

There are some mechanisms for imposing corporate liability that—unlike respondeat superior—do not require employee misconduct. One of the best known of these mechanisms is civil products liability. Regardless of what any employee did or thought, when a product's manufacturing or design defect leads to injury, the corporation that made the product is liable.[128] Lawmakers implemented this approach because manufacturers are the least-cost avoiders of such injuries.[129] Requiring tort claimants to prove that some employee at some point in the design or manufacturing process did something negligent would present a prohibitive evidentiary barrier.[130] Accordingly, products liability is strict—it requires no conduct, negligent or otherwise.[131] Could products liability close the algorithmic liability gap? Holding corporations strictly liable for their algorithmic injuries could be an elegant way to sidestep the whole problem of locating and attributing an injurious act.

However, products liability has several limitations that disqualify it from being an effective way to address algorithmic injury. Perhaps most fundamentally, many of the algorithms that hurt people are not

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128 *See* RESTATEMENT (SECOND) OF TORTS § 402A (AM. L. INST. 1965) ("[Strict products liability applies even though] the seller has exercised all possible care in the preparation and sale of his product . . . .").

129 *See* Saul Levmore, *Obligation or Restitution for Best Efforts*, 67 S. CAL. L. REV. 1411, 1416–17 (1994) ("[O]ne plausible description of products liability law is that the manufacturer of a defective product is held responsible for failing to take the affirmative steps necessary to 'rescue' the victim, whether or not the victim is the purchaser of the product, precisely because the manufacturer is the least-cost-avoider, or is best-situated to effect the necessary rescue."); Guido Calabresi, *Civil Recourse Theory's Reductionism*, 88 IND. L.J. 449, 456–57 (2013) ("I believe one does not understand current products liability law unless one understands that frequently it is the 'first party' who is the 'least cost avoider/best decider.'").

130 *See* Kim v. Toyota Motor Corp., 424 P.3d 290, 298 (Cal. 2018) ("Strict products liability, unlike negligence doctrine, focuses on the nature of the product, and not the nature of the manufacturer's conduct."); Pavlik v. Lane Ltd./Tobacco Exps. Int'l, 135 F.3d 876, 881 (3d Cir. 1998) ("To recover under [Pennsylvania's products liability law], a plaintiff must establish: (1) that the product was defective; (2) that the defect was a proximate cause of the plaintiff's injuries; and (3) that the defect causing the injury existed at the time the product left the seller's hands."); RESTATEMENT (SECOND) OF TORTS § 402A (referencing no conduct element of strict products liability other than selling a product).

131 RESTATEMENT (SECOND) OF TORTS § 402A(2) ("[Liability for injuries caused by a defective product] applies although . . . the seller has exercised all possible care in the preparation and sale of his product . . . .").

"products." A product is "[s]omething that is distributed commercially for use or consumption."[132] Although the software on a self-driving car sold to consumers probably qualifies, the software that hedge funds use to execute automatic trades or that banks use to make lending decisions certainly do not. Such programs may be developed in-house for corporate use rather than distribution.

Even if algorithms qualify as "products," a further limitation of products liability enters the fray—products liability only clearly applies when there is "physical harm . . . to the ultimate user or consumer, or to his property."[133] In drafting the Restatement of Torts, the American Law Institute explicitly states that it "expresses no opinion as to whether [strict products liability] appl[ies] . . . to harm to persons other than users or consumers."[134] "Casual bystanders, and others who may come in contact with the product, as in the case of employees of the retailer, or a passer-by injured by an exploding bottle, or a pedestrian hit by an automobile, have been denied recovery."[135] Today some states do allow injured bystanders to sue,[136] but the general rule remains that only consumers and users have standing to bring products liability claims.[137]

Even if manufacturing plants, car owners, and banks are consumers or users of third-party algorithms that assemble goods, drive cars, and extend loans, the people injured by those algorithms often are not. Wanda Holbrook was working for the user of the algorithm; she was not herself a user or consumer of the robot that crushed her.[138] Elaine Herzberg was a hapless pedestrian, not a user or consumer of the car that ran her over.[139] Those who face algorithmic discrimination

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132 *Product*, BLACK'S LAW DICTIONARY (11th ed. 2019).

133 RESTATEMENT (SECOND) OF TORTS § 402A(1).

134 *Id.* § 402A caveat 1.

135 *Id.* § 402A cmt. o.

136 *See, e.g.*, IND. CODE § 34-6-2-29 (2020) (extending products liability standing to "any bystander injured by the product who would reasonably be expected to be in the vicinity of the product during its reasonably expected use").

137 *See* Woods v. Fruehauf Trailer Corp., 765 P.2d 770, 774 (Okla. 1988). Concerning toxic tort claims, some jurisdictions (though not all, *see* Rohrbaugh v. Owens-Corning Fiberglas Corp., 965 F.2d 844, 846 (10th Cir. 1992)), allow a modest extension of the general rule where "it is reasonably foreseeable that [the user's] household members would be exposed [to the toxic product]." Lunsford v. Saberhagen Holdings, Inc., 106 P.3d 808, 812 (Wash. Ct. App. 2005), *aff'd*, 208 P.3d 1092 (Wash. 2009).

138 *See* Forrest, *supra* note 2.

139 *See* Wakabayashi, *supra* note 3.

in the lending industry are hopeful consumers of loans, not of lending platforms.[140]

So far, I have shown that products liability is a poor fit for algorithmic injury because two crucial elements are absent: algorithms are often not products and the injured are often not consumers. Even where products liability could apply to algorithmic injury, it would only be a partial solution. Products liability only allows for a civil cause of action and recovery of damages.[141] Having a reliable way to handle civil algorithmic injury would certainly be a significant step forward. But the law often needs to send a stronger social message for the most egregious violations.[142] That is the function of criminal law.[143]

However, products liability does not apply in the criminal context.[144] Nor would the extension of products liability to criminal law be a welcome development. As explained, products liability is strict. Although strict liability crimes do exist, they are the exception rather than the rule.[145] And with good reason. Strict liability removes any

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140 Because algorithms are not considered toxic substances, the standing to sue that some jurisdictions grant to bystanders in toxic tort situations is inapplicable.

141 *See* Dmitry Karshtedt, *Causal Responsibility and Patent Infringement*, 70 VAND. L. REV. 565, 605 (2017) ("I discuss the application of the principle of causal responsibility in three distinct areas of law—criminal law, the law of trespass, and products liability. These fields have distinct justifications, purposes, and conceptual foundations."); Annotation, *Allowance of Punitive Damages in Products Liability Case*, 13 A.L.R.4th 52 (Supp. 1982) ("Punitive damages are permitted in products liability actions precisely because governmental safety standards and the criminal law have failed to provide adequate consumer protection against the manufacture and distribution of defective products.").

142 *See* Paul H. Robinson, *The Criminal-Civil Distinction and the Utility of Desert*, 76 B.U. L. REV. 201, 210–12 (1996); John C. Coffee, Jr., *Does "Unlawful" Mean "Criminal"?: Reflections on the Disappearing Tort/Crime Distinction in American Law*, 71 B.U. L. REV. 193, 196 (1991).

143 *See* Cass R. Sunstein, *On the Expressive Function of Law*, 144 U. PA. L. REV. 2021, 2024, 2044–45 (1996) ("The criminal law is a prime arena for the expressive function of law . . . ."); Joel Feinberg, *The Expressive Function of Punishment*, 49 MONIST 397, 400–01 (1965); Peter J. Henning, *Corporate Criminal Liability and the Potential for Rehabilitation*, 46 AM. CRIM. L. REV. 1417, 1426 (2009) ("The label 'criminal' has social significance aside from the particular punishment imposed on the offender."); Lawrence Friedman, *In Defense of Corporate Criminal Liability*, 23 HARV. J.L. & PUB. POL'Y 833, 843 (2000) ("Criminal liability in turn expresses the community's condemnation of the wrongdoer's conduct by emphasizing the standards for appropriate behavior—that is, the standards by which persons and goods properly should be valued.").

144 Walter L. Cofer & Alicia J. Donahue, *Product Liability in the USA*, LEXOLOGY (Oct. 25, 2018), https://www.lexology.com/library/detail.aspx?g=3714f105-6d2e-4e33-be4f-17289ae7e547#:~:text=can%20a%20defendant%20be%20held,liability%20specific%20to%20defective%20products. [https://perma.cc/C7DM-42QA] ("There is no criminal liability specific to defective products.").

145 Allison Marston Danner & Jenny S. Martinez, *Guilty Associations: Joint Criminal Enterprise, Command Responsibility, and the Development of International Criminal Law*, 93 CA-

sort of culpability requirement.[146] Yet many think culpability should be an essential precondition to any criminal justice response.[147] Efforts to remove this precondition impair criminal law's integrity, authority, and effectiveness.[148]

There are other policy-based reasons that counsel caution in using products liability as a model for addressing the algorithmic accountability gap. Economists predict that algorithmic innovation will be one of the primary drivers of economic progress in the coming decades.[149] Creating too many obstacles to corporate development, testing, and use of novel algorithms will impede innovation[150] and disadvantage U.S. corporations in relation to foreign competitors.[151] Although algorithmic development should not continue without due regard for the injuries it will cause, nor should it be unduly hampered. The law needs to strike a balance. Product liability's defining feature is strict imbalance.

LIF. L. REV. 75, 147 (2005) ("Strict liability, where the defendant need have no particularly blameworthy mental state, is rare and disfavored in criminal law . . . .").

146 *See* Richard A. Wasserstrom, *Strict Liability in the Criminal Law*, 12 STAN. L. REV. 731, 734 (1960) ("Critics of strict criminal liability usually argue that the punishment of persons in accordance with the minimum requirements of strict liability (I) is inconsistent with any or all of the commonly avowed aims of the criminal law . . . ."); SANFORD H. KADISH, BLAME AND PUNISHMENT 54–55 (1987) (arguing that strict liability crimes dispense with any sort of culpability requirement).

147 *See* MICHAEL MOORE, PLACING BLAME 153–88 (1997); Henry M. Hart, Jr., *The Aims of the Criminal Law*, 23 L. & CONTEMP. PROBS. 401, 422 (1958) ("[There can be no] justification for condemning and punishing a human being as a criminal when he has done nothing which is blameworthy.").

148 PAUL H. ROBINSON, INTUITIONS OF JUSTICE AND THE UTILITY OF DESERT 176–88 (2013) ("[T]he criminal law's moral credibility is essential to effective crime control . . . .").

149 AI could double the rate of economic growth by 2035. *See* MARK PURDY & PAUL DAUGHERTY, ACCENTURE, WHY ARTIFICIAL INTELLIGENCE IS THE FUTURE OF GROWTH 19 (2016), https://www.accenture.com/t20170524T055435__w__/ca-en/_acnmedia/PDF-52/Accenture-Why-AI-is-the-Future-of-Growth.pdf [https://perma.cc/6AUP-SA8K]. *See generally* MARCIN SZCZEPANSKI, EUR. PARL. RSCH. SERV., PE 637.967, ECONOMIC IMPACTS OF ARTIFICIAL INTELLIGENCE (AI) (2019) https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/637967/EPRS_BRI(2019)637967_EN.pdf [https://perma.cc/6EAK-ST89] (describing the benefits and effects of AI on the economy and society).

150 *See* Gideon Parchomovsky & Alex Stein, *Torts and Innovation*, 107 MICH. L. REV. 285, 286 (2008) (highlighting "a previously underappreciated connection between innovation and tort law").

151 *See* DANIEL CASTRO, MICHAEL MCLAUGHLIN & ELINE CHIVOT, CTR. FOR DATA INNOVATION, WHO IS WINNING THE AI RACE: CHINA, THE EU OR THE UNITED STATES? 1 (2019), https://www2.datainnovation.org/2019-china-eu-us-ai.pdf [https://perma.cc/J5V5-A8N9] ("Many nations are racing to achieve a global innovation advantage in artificial intelligence (AI) because they understand that AI is a foundational technology that can boost competitiveness, increase productivity, protect national security, and help solve societal challenges.").

III. Algorithmic Corporate Conduct

This Article seeks a solution to the accountability gap. Algorithms themselves are not people under the law and so are not themselves subject to suit.[152] Although most algorithms are developed, owned, and operated by corporations,[153] those corporations are also often immune from suit because algorithmic injuries do not fit into respondeat superior's employee-focused vision of corporate misbehavior. Trying to restrain the use of algorithms is not a viable path forward because the future of economic development and corporate progress is algorithmic.[154] At the same time, the course of that development and progress should not be charted over the bodies and livelihood of the victims of algorithmic injury. We need a way to reliably insert some accountability into the landscape, to recompense victims, and to discipline those who profit from algorithms.

The sort of solution this Article seeks is one that, although moving beyond existing law, is ultimately grounded in it. Grand solutions like declaring algorithms to be persons[155] or imposing strict liability on corporations for algorithmic injuries,[156] regardless of whatever appeal they may have, are, if they ever arrive, a long way off. To ensure that tomorrow's social gains from corporate algorithms exceed the costs to today's victims, the law must induce corporations to use their algorithms responsibly.

The law already has a template for responding to the algorithmic accountability gap. More than a century ago, it confronted a structurally similar issue that arose in the wake of large-scale employment.[157]

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152 *See* United States v. Athlone Indus., Inc., 746 F.2d 977, 979 (3d Cir. 1984).

153 *See, e.g.*, Dvorsky, *supra* note 50.

154 *See generally* Jacques Bughin, Jeongmin Seong, James Manyika, Michael Chui & Raoul Joshi, McKinsey Glob. Inst., Notes from the AI Frontier: Modeling the Impact of AI on the World Economy 2–3 (2018), https://www.mckinsey.com/featured-insights/artificial-intelligence/notes-from-the-ai-frontier-modeling-the-impact-of-ai-on-the-world-economy [https://perma.cc/6KWT-YL4W] ("AI could potentially deliver additional global economic activity of around $13 trillion globally by 2030, or about 16 percent higher cumulative GDP compared with today. . . . [T]his impact would compare well with that of other general-purpose technologies through history.").

155 *See* Hallevy, *supra* note 32, at 27–28; Frank, *supra* note 32, at 624–25; Mulligan, *supra* note 32, at 579–80.

156 *See* Bryan H. Choi, *Crashworthy Code*, 94 Wash. L. Rev. 39, 52–53 (2019) ("Nevertheless, strict products liability has been enjoying a popular revival within the software and robotics literature. The conceptual moves are well-established: cyber-physical manufacturers should bear unilateral responsibility because they are the 'least cost avoiders' as well as the 'best risk spreaders.'").

157 *See supra* note 102 and accompanying text (describing the development of respondeat superior doctrine).

Just like algorithms, employees sometimes injure people in ways that their corporate employers cannot predict. Unlike algorithms, employees are technically liable to suit in their individual capacities for the crimes and torts they commit.[158] As a practical matter, this often matters little. Employees usually lack adequate personal resources to make victims whole,[159] and identifying responsible individuals within corporations has proven a continuing, often insurmountable, difficulty for plaintiffs and prosecutors.[160] As a policy matter, we have learned that focusing exclusively on employees as potential defendants also overlooks any possible criminogenic role of corporate level systems and ethos.[161] Employee conduct is as much a product of individual initiative as it is of the organizational context in which that initiative plays out.[162]

The law's solution was to look past the trees to the forest, to see employees as part of a broader body corporate, so that their acts became the acts of their corporate employer.[163] This gave victims and prosecutors another potential defendant from whom to seek justice. It also gave corporations some skin in the game when their defective

158 MODEL PENAL CODE § 2.07(6)(a) (AM. L. INST. 1985) ("A person is legally accountable for any conduct he performs or causes to be performed in the name of the corporation or an unincorporated association or in its behalf to the same extent as if it were performed in his own name or behalf."); RESTATEMENT (THIRD) OF AGENCY § 7.01 (AM. L. INST. 2006) ("An agent is subject to liability to a third party harmed by the agent's tortious conduct. Unless an applicable statute provides otherwise, an actor remains subject to liability although the actor acts as an agent or an employee, with actual or apparent authority, or within the scope of employment.").

159 Richard Frankel, *Regulating Privatized Government Through § 1983*, 76 U. CHI. L. REV. 1449, 1455 (2009) ("[I]n many cases, recovery against the individual employee may not be a viable option because individual employees often are judgment proof, protected by common law immunity, difficult to identify, or less likely than companies to possess liability insurance.").

160 Holder Memo, *supra* note 96, at 5 ("It will often be difficult to determine which individual took which action on behalf of the corporation. Lines of authority and responsibility may be shared among operating divisions or departments, and records and personnel may be spread throughout the United States or even among several countries. Where the criminal conduct continued over an extended period of time, the culpable or knowledgeable personnel may have been promoted, transferred, or fired, or they may have quit or retired.").

161 Cindy R. Alexander & Mark A. Cohen, *The Causes of Corporate Crime: An Economic Perspective*, *in* PROSECUTORS IN THE BOARDROOM 11, 17 (Anthony S. Barkow & Rachel E. Barkow eds., 2011) ("Instead of focusing on individual actions, we can consider crime as the outcome of company-level decisions."); *see* Martin L. Needleman & Carolyn Needleman, *Organizational Crime: Two Models of Criminogenesis*, 20 SOC. Q. 517, 517 (1979) (introducing and exploring the concept of crime-facilitative corporate systems in which participants are not compelled to perform illegal acts, but rather face extremely tempting structural conditions that encourage or facilitate crime).

162 *See* FIONA HAINES, CORPORATE REGULATION 25 (1997) ("Organizational culture forms the 'touchstone' by which individuals behave and act.").

163 *See supra* note 83 and accompanying text.

systems enabled or encouraged employee misconduct, thereby inducing corporations to train, monitor, and discipline their employees better.[164]

A similar development could work for algorithmic injuries. Corporate algorithms should, like employees, be recognized as part of the body corporate. Then algorithmic injuries could qualify as corporate acts, potentially subjecting corporate owners to suit. That solution would give victims and prosecutors a potential defendant and would go a long way to inducing corporations to develop, train, use, monitor, and update their algorithms responsibly. Importantly, such a solution does not require the law to recognize algorithms as people capable of acting independently. It leverages the fiction of corporate personhood to say that *corporations* sometimes do things through algorithms just as a person might do something with her hand without her hand being independently cognizable as a separate agent.

To define a new type of corporate conduct—algorithmic corporate conduct—the law must say when an algorithm counts as part of the body corporate. Respondeat superior presently does this for employees by saying that natural people are part of a body corporate only when there is an employment relationship, and only so long as the scope and intent requirements are met.[165] As explained in the previous Part, algorithmic misconduct can occur without any employee misconduct. Furthermore, respondeat superior's specific doctrinal requirements cannot apply directly to algorithms. Algorithms never operate in the scope of their employment—there being none. Lacking minds, they also never intend to benefit their corporate owners.

A path forward emerges if one abstracts from the particular application of respondeat superior in the employment context to appreciate the deeper corporate law principles behind the doctrine. As explained in the Sections that follow, these are principles about corporate control (of employees) and benefit extraction (from employees). Respondeat superior's basic requirements provide guidelines for courts to ensure that, for an employee to qualify as part of the body corporate, she should be under the corporation's control[166] and bene-

164 *See* Mihailis E. Diamantis, *Successor Identity*, 36 YALE J. ON REG. 1, 18, 24–25 (2019).

165 30 C.J.S. *Employer—Employee* § 221 (2020) ("The doctrine of respondeat superior ordinarily requires an employment relationship at the time of the injury and with regard to the transaction resulting in it.").

166 RESTATEMENT (THIRD) OF AGENCY § 7.07(2) (AM. L. INST. 2006) ("An employee acts within the scope of employment when performing work assigned by the employer or engaging in a course of conduct subject to the employer's control.").

fiting the corporation.[167] The manifestation of those requirements in the scope and intent elements of respondeat superior may have been appropriate to the historical context in which respondeat superior developed. Historically, expanding corporate productive capacity meant hiring human help.[168] Today, corporations have another option when they want to grow: they can develop, buy, or lease algorithms to perform old tasks previously limited to employees.[169] Yet the risk of injury to third parties persists despite this technological revolution. So do the control corporations have and the benefits they claim. Respondeat superior's underlying logic still applies.

The next two Sections proceed in the spirit of viewing respondeat superior not as a restrictive doctrine—corporations can only be liable for employee misconduct—but as an enabling doctrine—corporations can at least be liable for employee misconduct. Translated from Latin, "respondeat superior" means "[l]et the master answer."[170] As presently applied, respondeat superior's familiar conditions are satisfied by control and benefit relationships—characteristic of the master-servant relationship.[171] The next two Sections explore principles of control and benefit to say what it might mean to be "master" of an algorithm. The third Section draws both principles together to propose a unified test for when a corporation acts through an algorithm.

A. A Control-Based Account

Deterrence and prevention are some of the most important goals of civil[172] and criminal[173] corporate liability. In criminal law, federal

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167 *Id.* ("An employee's act is not within the scope of employment when it occurs within an independent course of conduct not intended by the employee to serve any purpose of the employer."); *id.* at cmt. b ("When an employee commits a tort with the sole intention of furthering the employee's own purposes, and not any purpose of the employer, it is neither fair nor true-to-life to characterize the employee's action as that of a representative of the employer.").

168 *Cf.* Neil Petch, *If You Want to Grow Your Company, You Need to Hire*, ENTREPRENEUR (Mar. 8, 2016), https://www.entrepreneur.com/article/272027 [https://perma.cc/66YE-YAPZ] ("[I]f you do want to grow . . . . [a] team is needed.").

169 Aaron Smith & Monica Anderson, *Americans' Attitudes Toward a Future in Which Robots and Computers Can Do Many Human Jobs*, PEW RSCH. CTR. (Oct. 4, 2017), https://www.pewresearch.org/internet/2017/10/04/americans-attitudes-toward-a-future-in-which-robots-and-computers-can-do-many-human-jobs/ [https://perma.cc/5SK2-B9D2].

170 Harvey L. Pitt & Karl A. Groskaufmanis, *Minimizing Corporate Civil and Criminal Liability: A Second Look at Corporate Codes of Conduct*, 78 GEO. L.J. 1559, 1563 (1990).

171 *See* RESTATEMENT (THIRD) OF AGENCY § 7.07.

172 *See* Ashley S. Kircher, Note, *Corporate Criminal Liability Versus Corporate Securities Fraud Liability: Analyzing the Divergence in Standards of Culpability*, 46 AM. CRIM. L. REV. 157, 170 (2009) ("Corporate criminal liability and corporate civil liability share two important qualities: both impose liability on the corporation, and both aim to deter future corporate wrongdo-

statutes,[174] Department of Justice enforcement policy,[175] and sentencing guidelines[176] explicitly reference deterrence as an organizing principle. Deterrence is also a recurring theme in various corporate civil liability regimes like consumer protection,[177] anti-discrimination,[178] and fair labor practices.[179] Corporations are in the best position to address the harms they cause because they have the most information about those harms and have the greatest power to shape the underlying causal mechanisms.[180] By threatening corporations with penalties when those harms result, the law hopes it can induce corporations to exercise their influence over those mechanisms in socially productive ways.[181]

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ing."); *see also* Amanda M. Rose & Richard Squire, *Intraportfolio Litigation*, 105 Nw. U. L. Rev. 1679, 1679 (2011) ("[C]orporate liability serves to compensate victims and—by forcing shareholders to bear the costs of their agents' actions—to deter wrongdoing.").

173 *See* Darryl K. Brown, *Street Crime, Corporate Crime, and the Contingency of Criminal Liability*, 149 U. Pa. L. Rev. 1295, 1325 (2001) ("Corporate criminal law . . . operates firmly in a deterrence mode."); *see also* Gregory M. Gilchrist, *The Expressive Cost of Corporate Immunity*, 64 Hastings L.J. 1, 6 (2012) ("Criminal liability for corporations exists in large part to deter undesirable corporate conduct and to encourage desirable corporate practices . . . .").

174 *E.g.*, 18 U.S.C. § 3553(a)(2)(B) (listing deterrence as a purpose of criminal punishment).

175 *See, e.g.*, Holder Memo, *supra* note 96, at 3 ("[In deciding whether to charge corporations], prosecutors should ensure . . . deterrence of further criminal conduct . . . [is] adequately met . . . .").

176 *See, e.g.*, U.S. Sent'g Guidelines Manual ch. 8, introductory cmt. (U.S. Sent'g Comm'n 2018) ("This chapter is designed so that the sanctions imposed upon organizations and their agents, taken together, will provide . . . adequate deterrence . . . .").

177 *See* 21 C.J.S. *Credit Reporting Agencies* § 34 (2020) ("The purpose of a penalty provision in a consumer protection statute is to punish and deter a person for violation of the statute . . . ."); Heastie v. Cmty. Bank of Greater Peoria, 690 F. Supp. 716, 722 (N.D. Ill. 1988) ("[T]he purpose of the Consumer Fraud Act [is] to deter all forms of unfair and deceptive conduct and to provide remedies to those who have been damaged . . . ."); Maggie Lynn McMichael, Note, *Cybersecurity on My Mind: Protecting Georgia Consumers from Data Breaches*, 51 Ga. L. Rev. 265, 277 (2016) ("Statutory damage provisions are designed to further several goals . . . [including] to deter companies from violating consumer protection laws.").

178 *See* Gregg D. Polsky & Stephen F. Befort, *Employment Discrimination Remedies and Tax Gross Ups*, 90 Iowa L. Rev. 67, 106 (2004) ("[F]ederal anti-discrimination statutes impose meaningful remedies in part to encourage meritorious litigation that will root out and deter discrimination in the workplace.").

179 *See* Ronald C. Brown, *Up and Down the Multinational Corporations' Global Labor Supply Chains: Making Remedies that Work in China*, 34 UCLA Pac. Basin L.J. 103, 113 (2017) ("[T]he Fair Labor Standards Act (FLSA) seeks to deter wage and hour violations of workers . . . .").

180 *Cf.* Holder Memo, *supra* note 96, at 2 ("[C]orporations are likely to take immediate remedial steps when one is indicted for criminal conduct that is pervasive throughout a particular industry, and thus an indictment often provides a unique opportunity for deterrence on a massive scale.").

181 *See* Fisse, *supra* note 95, at 1153–55; Larry D. Thompson, *The Blameless Corporation*, 47 Am. Crim. L. Rev. 1251, 1255 (2010).

With respect to employees as potential sources of corporate harm, deterrence is an important justifying premise for respondeat superior.[182] From its beginning, courts explained the rationale behind respondeat superior by reference to the "control" that employers exercise over their employees.[183] By holding employers liable for the behavior of their employees, respondeat superior presses employers to use that control to steer employees away from misconduct.[184] Employers have many tools at their disposal for shaping employee behavior, such as commands, incentives, monitoring, training, and discipline.[185] Because employers interact with their employees on a daily basis and establish the context in which productive or destructive business behavior takes place, they are in a unique position to determine how employees behave.[186]

Respondeat superior's supporters see it as leveraging the economic efficiencies of strict liability rules.[187] Monitoring employees is costly.[188] So, all else being equal, corporations would rather avoid doing so (except to the extent that employees might victimize the corporation itself or otherwise behave unproductively). By holding corporations liable when their employees misbehave, the law can in-

182 Pitt & Groskaufmanis, *supra* note 170, at 1573 ("[T]he most commonly accepted basis for corporate criminal liability is the need to deter misconduct."). Some are skeptical of respondeat superior's ability to successfully deter corporate misconduct. Irina Sivachenko, Note, *Corporate Victims of "Victimless Crime": How the FCPA's Statutory Ambiguity, Coupled with Strict Liability, Hurts Businesses and Discourages Compliance*, 54 B.C. L. REV. 393, 396–97 (2013) ("[T]oday there is little a corporation can do to avoid prosecution for the unauthorized acts of its employees . . . . In turn, such helplessness leads to an undesired and unexpected result: a significant drop in a corporation's incentive to vigorously monitor its own compliance and conduct.").

183 *See* Holmes, *supra* note 83, at 347 ("[I]t is plain good sense to hold people answerable for wrongs which they have intentionally brought to pass, and to recognize that it is just as possible to bring wrongs to pass through free human agents as through slaves, animals, or natural forces."); Davis-Lynch, Inc. v. Asgard Techs., LLC, 472 S.W.3d 50, 72 (Tex. App. 2015).

184 Albert W. Alschuler, *Two Ways to Think About the Punishment of Corporations*, 46 AM. CRIM. L. REV. 1359, 1380 (2009) ("Strict *respondeat superior* liability gives managers an incentive to establish effective compliance programs . . . .").

185 *See* W. PAGE KEETON, DAN B. DOBBS, ROBERT E. KEETON & DAVID G. OWEN, PROSSER AND KEETON ON THE LAW OF TORTS § 69, at 501 (5th ed. 1984).

186 *See* Fleming James, Jr., *Vicarious Liability*, 28 TUL. L. REV. 161, 168 (1954) ("Pressure of legal liability on the employer therefore is pressure put in the right place to avoid accidents.").

187 *See* Alschuler, *supra* note 184, at 1376 n.102 ("[*R*]*espondeat superior* in criminal cases seeks to promote the efficient monitoring of employees by holding firms *strictly* (and jointly) liable for the employees' *intentionally* produced harms."); *see also infra* note 278 and accompanying text (stating that respondeat superior is widely viewed as overbroad).

188 Joe Mont, *Ex-Wells Fargo CEO Slams 'Absurd' Compliance Spending*, COMPLIANCE WEEK (May 29, 2015, 11:30 AM), https://www.complianceweek.com/ex-wells-fargo-ceo-slams-absurd-compliance-spending/12194.article [https://perma.cc/V3ZW-ZYNX]; William S. Laufer, *A Very Special Regulatory Milestone*, 20 U. PA. J. BUS. L. 392, 392 (2017).

duce corporations to exercise the socially optimal level of control.[189] The whole system only works because corporations are in the best position to calculate what level of control, given its cost, is optimal and then to implement it.

If corporate liability is about getting corporations to prevent harms that are under their control, there is no reason to limit its reach to employee misconduct. There are other sources of harm that corporations are in a privileged position to manage. A *control-based account* of corporate action would recognize as corporate acts any effects over which a corporation exercises substantial control. Organizational structures and corporate culture are active systems that influence how corporations interact with the world around them.[190] Because corporations themselves are best positioned to control organizational structures and culture, the control-based account would deem corporate structures and culture to be part of the body corporate. Their effects would count as corporate acts.

As applied to algorithmic injuries, the control-based account would consider corporate algorithms as part of the body corporate whenever they cause injuries that the corporation had the substantial power to prevent. Just as corporations can fire employees, they can pull the plug on computer programs.[191] Although nothing can guarantee that a machine learning algorithm will always follow the law—nor can anything guarantee that employees will always follow the law[192]—there are steps corporations can take to reduce the probability that the algorithm will cause harm.[193] These steps include diversifying the

189 *See* Diamantis, *supra* note 82, at 352–65 (discussing optimal deterrence and respondeat superior).

190 Mihailis E. Diamantis, *The Law's Missing Account of Corporate Character*, 17 GEO. J.L. & PUB. POL'Y 865, 876–79 (2019).

191 This is what Microsoft did with its chatbot, Tay. Rob Price, *Microsoft Is Deleting Its AI Chatbot's Incredibly Racist Tweets*, BUS. INSIDER (Mar. 24, 2016, 7:31 AM), https://www.businessinsider.com/microsoft-deletes-racist-genocidal-tweets-from-ai-chatbot-tay-2016-3 [https://perma.cc/U3GH-FRQH].

192 *See* Irwin Schwartz, *Toward Improving the Law and Policy of Corporate Criminal Liability and Sanctions*, 51 AM. CRIM. L. REV. 99, 112 (2014) ("No organization—private or government—can prevent all misconduct by all employees, all of the time.").

193 *See generally* WILLIAM D. SMART, CINDY M. GRIMM & WOODROW HARTZOG, AN EDUCATION THEORY OF FAULT FOR AUTONOMOUS SYSTEMS (2017) (describing ways to reduce educational failures in algorithms), http://people.oregonstate.edu/~smartw/library/papers/2017/werobot2017.pdf [https://perma.cc/J2LD-ZCZ6]. For a detailed treatment on how bias can arise in algorithms, see Nizan Geslevich Packin & Yafit Lev-Aretz, *Learning Algorithms and Discrimination*, *in* RESEARCH HANDBOOK ON THE LAW OF ARTIFICIAL INTELLIGENCE 88, 91 (Woodrow Barfield & Ugo Pagallo eds., 2018).

body of engineers writing algorithms,[194] more careful initial programming,[195] more mindful selection of training data sets,[196] more extensive pre-rollout testing,[197] regular post-rollout quality audits,[198] routine runtime compliance layers,[199] effective monitoring,[200] and continuous software updates to address problems as they arise.[201] Each of these precautions entail costs that, all things considered, corporations would rather avoid. Through the threat of sanction, the law can make taking precaution cheaper than risking violation.

To make the control-based account workable in practice, the law would need to specify several indicia of control to guide factfinders at trial. These indicia should be powers that tell in favor of finding that the corporation had the requisite control. Currently, the only criteria respondeat superior applies to measure corporate control over employees is whether the employee was working within the scope of her

194 *See* Kate Crawford, Opinion, *Artificial Intelligence's White Guy Problem*, N.Y. TIMES (June 25, 2016), https://www.nytimes.com/2016/06/26/opinion/sunday/artificial-intelligences-white-guy-problem.html [https://perma.cc/5ZTR-GR74].

195 *See* Mark A. Geistfeld, *A Roadmap for Autonomous Vehicles: State Tort Liability, Automobile Insurance, and Federal Safety Regulation*, 105 CALIF. L. REV. 1611, 1634–36 (2017).

196 *See* Barocas & Selbst, *supra* note 13, at 677; Oscar H. Gandy, Jr., *Engaging Rational Discrimination: Exploring Reasons for Placing Regulatory Constraints on Decision Support Systems*, 12 ETHICS & INFO. TECH. 29, 30 (2010) (discussing how bad data can bias automated systems).

197 Geistfeld, *supra* note 195, at 1651–54; *see* Dave Cliff & Linda Northrop, *The Global Financial Markets: An Ultra-Large-Scale Systems Perspective*, *in* LARGE-SCALE COMPLEX IT SYSTEMS 29, 29 (Radu Calinescu & David Garlan eds., 2012) (discussing the need for testing trading algorithms using simulations).

198 *See* B. Bodo, N. Helberger, K. Irion, F. Zuiderveen Borgesius, J. Moller, B. van de Velde, N. Bol, B. van Es & C. de Vreese, *Tackling the Algorithmic Control Crisis—The Technical, Legal, and Ethical Challenges of Research into Algorithmic Agents*, 19 YALE J.L. & TECH. 133, 142–44 (2017) (describing audits of algorithms); James Guszcza, Iyad Rahwan, Will Bible, Manuel Cebrian & Vic Katyal, *Why We Need to Audit Algorithms*, HARVARD BUS. REV. (Nov. 28, 2018), https://hbr.org/2018/11/why-we-need-to-audit-algorithms [https://perma.cc/WA3D-M3FV]. *See generally* Shlomit Yanisky-Ravid & Sean K. Hallisey, *"Equality and Privacy by Design": A New Model of Artificial Intelligence Data Transparency Via Auditing, Certification, and Safe Harbor Regimes*, 46 FORDHAM URB. L.J. 428, 429 (2019) (proposing "an auditing regime"); Shea Brown, Jovana Davidovic & Ali Hasan, *The Algorithm Audit: Scoring the Algorithms that Score Us*, 8 BIG DATA & SOC'Y, Jan.–June 2021, at 1, 1–2 (proposing a framework for ethically assessing algorithms).

199 *See* Felipe Meneguzzi & Michael Luck, *Norm-Based Behaviour Modification in BDI Agents*, 8 INT'L CONF. ON AUTONOMOUS AGENTS & MULTIAGENT SYS. 177, 177–78 (2009), https://dl.acm.org/doi/pdf/10.5555/1558013.1558037 [https://perma.cc/2PYV-NDS2]; Louise Dennis, Michael Fisher, Marija Slavkovik & Matt Webster, *Formal Verification of Ethical Choices in Autonomous Systems*, 77 ROBOTICS & AUTONOMOUS SYS. 1, 2–3 (2016).

200 King et al., *supra* note 37, at 110–11.

201 *See* NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., FEDERAL AUTOMATED VEHICLES POLICY 16 (2016), https://www.hsdl.org/?view&did=795644 [https://perma.cc/S9RV-KH8L] (envisioning manufacturers of self-driving cars will update software regularly to improve safety).

employment.[202] Where employees are concerned, such a simple approach may be appropriate because the range of relationships between corporations and employees is relatively limited. An employer's power to promote, terminate, and set pay for an employee is a relatively reliable proxy for the powers the law hopes corporations will exercise over employees: to train and discipline.[203] Incentivizing effective corporate compliance programs is the surest way to get employees, and hence corporations acting through employees, to behave.

Measuring corporate control over algorithms requires a multifaceted approach because the relationship between corporations and algorithms is not always straightforward. One corporation may design the algorithm, a second may own it, a third may use it, a fourth may own the hardware that runs the algorithm, and a fifth may monitor and update it.[204] Algorithmic injuries could trace to any of those five contributions or to an interaction between them.[205] Trying to measure corporate control over algorithms by using a simple proxy, e.g., which corporation designed the algorithm, which owns it, or which uses it, risks missing the mark where the proxies overlap and intersect in complex ways. The law would do better to inquire directly about corporate power over algorithms.

The relevant powers are those that confer the ability to prevent algorithmic injury. These include the power to design the algorithm in the first place, the power to pull the plug on the algorithm, the power to modify it, and the power to override the algorithm's decisions. A

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202 *See* RESTATEMENT (THIRD) OF AGENCY § 7.07 (AM. L. INST. 2006).

203 *See* N.E. Ins. Co. v. Soucy, 693 A.2d 1141, 1144 (Me. 1997) ("The most important point in determining [whether a worker is an employee] is the right of either [party] to terminate the relation without liability." (quoting Murray's Case, 154 A. 352, 355 (Me. 1931))); McDonald v. Hampton Training Sch. for Nurses, 486 S.E.2d 299, 301 (Va. 1997) ("The factors which are to be considered when determining whether an individual is an employee or an independent contractor are well established: (1) selection and engagement; (2) payment of compensation; (3) power of dismissal; and (4) power to control the work of the individual.").

204 *See* Andrew Tutt, *An FDA for Algorithms*, 69 ADMIN. L. REV. 83, 106 (2017) ("Algorithms can be sliced-and-diced in several ways that many other products are not. A company can sell only an algorithm's code or even give it away." (footnote omitted)); Marta Infantino & Weiwei Wang, *Algorithmic Torts: A Prospective Comparative Overview*, 29 TRANSNAT'L L. & CONTEMP. PROBS. 309, 353 (2019) ("[A]lgorithmic activities usually involve a variety of participants: somebody designs the algorithms, somebody else programs them, connects them to databases and feeds them with selected data, sells and distributes the resulting product or service, uses them, and finally allows herself to be governed by them.").

205 *See* Infantino & Wang, *supra* note 204, at 353–54 ("The variety of these people's contributions is likely to complicate the search for which party 'caused' the accident and to what extent. The causal investigation might be additionally convoluted by the difficulties in understanding how algorithms concretely work and in locating the exact source of the accident: in the code, and, if yes, at what stage of its development?" (footnote omitted)).

corporation need not have these powers directly in order to count as possessing them. For example, a corporation may have indirect power if it has the legal or economic influence to induce another corporation to act. None of these powers standing alone is determinative of corporate control over algorithms, but the more powers a corporation has, the more control it has. It may even happen that more than one corporation has control,[206] in which case injurious algorithmic conduct may be attributable to multiple possible defendants.

Standing alone, the control-based account is ultimately unappealing because it risks expanding the scope of corporate liability for algorithmic injuries too far. If corporations act through any algorithms in their control, they would be liable for many more injuries than sound policy or fairness would dictate. Consider, for example, a corporation that operates a social media platform. The corporation may exhibit all of the indicia of control over the platform: it may have designed the platform and have the powers to pull it down, regularly modify it, and override anything the platform does. Even if the corporation exercises its control responsibly, users may end up manipulating features of the platform in ways that injure third parties, perhaps by sending offensive messages,[207] violating intellectual property,[208] or engaging in identity theft.[209] In these sorts of cases, it would be inappropriate to automatically hold the corporation responsible, despite its control over the algorithms that run the platform. Some share of the fault—or perhaps all of it—may rest with the individual user rather than the corporation. The law has no preventive interest beyond encouraging the corporation to maintain responsible oversight. In such cases, asking more of the corporation would not only be unproductive, it would be unfair.

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206 An analogous situation is common in products liability contexts. *See* 2 DAVID G. OWEN & MARY J. DAVIS, OWEN & DAVIS ON PRODUCTS LIABILITY § 11:5 (4th ed. 2014) ("A large number of products liability cases involve more than one defendant. More than one defendant may act, independently or together, to be the cause in fact and proximate cause of a plaintiff's harm.").

207 *See, e.g.*, Jack Schofield, *Is There Any Way To Stop 'Adult' Spam Emails?*, GUARDIAN (Feb. 21, 2017, 12:14 AM), https://www.theguardian.com/technology/askjack/2016/sep/22/is-there-any-way-to-stop-adult-spam-emails [https://perma.cc/3MTF-QPRT].

208 *See, e.g.*, Mason Sands, *Why Copyright Will Be the Biggest Issue for Youtube in 2019*, FORBES (Dec. 30, 2018, 11:55 AM), https://www.forbes.com/sites/masonsands/2018/12/30/why-copyright-will-be-the-biggest-issue-for-youtube-in-2019/#7f9f44cc1c12 [https://perma.cc/D6RF-EG3L].

209 *See, e.g.*, Robin Gray, *Facebook Phishing Scams: How to Spot and Prevent Them*, WANDERA (Nov. 18, 2018), https://www.wandera.com/facebook-phishing-scams/ [https://perma.cc/VT6H-2SQG].

Some might believe in holding corporations responsible regardless of what optimal prevention and fairness would dictate. However, behind every faceless corporation are shareholders and employees who bear the brunt of any corporate sanction.[210] The law owes them a duty of fairness that it cannot fulfill without committing itself to fairness toward their corporation as a whole.[211]

Furthermore, pursuing prevention against corporations too vigilantly risks dampening innovation.[212] Especially when it comes to the fast-developing digital space, U.S. corporations must be able to innovate if they are to remain competitive with foreign peers and to deliver the social value that algorithms promise.[213] In the 1990s and 2000s, when the internet was *the* fast-developing technology, the Communications Decency Act[214] provided crucial protections for innovation by immunizing service providers from liability for information published on their platforms by other content providers.[215] Though the corporations controlled the digital platforms, they were protected when individual users turned the platforms to injurious ends.[216] In part as a consequence of these protections,[217] most of the world's largest

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210 *See* Alschuler, *supra* note 184, at 1367 ("This punishment is inflicted instead on human beings whose guilt remains unproven. Innocent shareholders pay the fines, and innocent employees, creditors, customers, and communities sometimes feel the pinch too.").

211 *See* Diamantis, *supra* note 190, at 879–80; John Hasnas, *The Centenary of a Mistake: One Hundred Years of Corporate Criminal Liability*, 46 AM. CRIM. L. REV. 1329, 1339 (2009) ("How can punishing the innocent advance any of the legitimate purposes of punishment? It cannot.").

212 Rebecca Crootof, *The Internet of Torts: Expanding Civil Liability Standards to Address Corporate Remote Interference*, 69 DUKE L.J. 583, 663 (2019) ("Increasing corporate liability may chill innovation, but a light chill may be warranted if the alternative is significant risk to consumers' safety.").

213 *See* Gustavo Manso, *Creating Incentives for Innovation*, 60 CAL. MGMT. REV. 18, 18 (2017) ("In an era of fast-paced technological change, innovation has become a business imperative.").

214 47 U.S.C. § 230.

215 *Section 230 of the Communications Decency Act*, ELEC. FRONTIER FOUND., https://www.eff.org/issues/cda230 [https://perma.cc/8YLN-B854] ("No provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider." (quoting 47 U.S.C. § 230(c)(1))).

216 *See, e.g.*, Universal Commc'n Sys., Inc. v. Lycos, Inc., 478 F.3d 413, 418 (1st Cir. 2007) ("Congress intended that, within broad limits, message board operators would not be held responsible for the postings made by others on that board.").

217 *See* Derek Khanna, *The Law that Gave Us the Modern Internet—and the Campaign to Kill It*, ATLANTIC (Sept. 12, 2013), https://www.theatlantic.com/business/archive/2013/09/the-law-that-gave-us-the-modern-internet-and-the-campaign-to-kill-it/279588/ [https://perma.cc/R8KB-MHSD].

social media services today are American.[218] The law should provide similar protections for algorithmic innovation in the coming decade.

The law must strike a balance. Some corporate liability for algorithmic misconduct is essential for closing the algorithmic accountability gap. The control-based approach seems to go too far, and thereby threatens algorithmic innovation. I turn now to another approach, premised on the second principle behind respondeat superior: corporate benefits.

B. A Benefits-Based Account

The control-focused analysis speaks to the law's efforts to prevent injury by inducing potential criminals and tortfeasors to take care. However, prevention is not the law's only concern with imposing liability. It also aims to do so in a way that is fair, both to the injured and to those who cause injury.

In the law of corporate liability, fairness is an enduring concern. Fairness pervades the civil liability analysis in many domains, from copyright infringement,[219] to successor liability,[220] to competition injuries.[221] In corporate criminal law, legislators,[222] prosecutors,[223] and judges[224] explicitly strive for fairness toward corporations and their victims.[225] Justice and retribution, the most familiar fairness concepts

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218 *See* H. Tankovska, *Most Popular Social Networks Worldwide as of January 2021, Ranked by Number of Active Users*, STATISTA (Feb. 9, 2021), https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/ [https://perma.cc/E3MJ-CDLJ].

219 *See* Lloyd L. Weinreb, *Fair's Fair: A Comment on the Fair Use Doctrine*, 103 HARV. L. REV. 1137, 1141 (1990) ("[Copyright law's fair use doctrine] has from the beginning had the flavor of an equitable doctrine, importing, as its name indicates, considerations of fairness not directly related to the statutory purpose.").

220 *See, e.g.*, Ray v. Alad Corp., 560 P.2d 3, 8–9 (Cal. 1977) ("Justification for imposing strict liability [in tort law] upon a *successor* to a manufacturer . . . rests upon[, among other factors,] the fairness of requiring the successor to assume a responsibility for defective products . . . .").

221 *See* RESTATEMENT (THIRD) OF UNFAIR COMPETITION § 1 (AM. L. INST. 1995) ("One who causes harm to the commercial relations of another by engaging in a business or trade is not subject to liability to the other for such harm unless: (a) the harm results from [specified circumstances] . . . or from other acts or practices of the actor determined to be actionable as an unfair method of competition . . . .").

222 *See* 18 U.S.C. § 3553(a)(2)(A) (citing justice as a purpose of criminal punishment).

223 *E.g.*, Holder Memo, *supra* note 96.

224 *E.g.*, U.S. SENT'G GUIDELINES MANUAL ch. 8, introductory cmt. (U.S. SENT'G COMM'N 2018) ("This chapter is designed so that the sanctions imposed upon organizations and their agents, taken together, will provide just punishment . . . .").

225 *See, e.g.*, Jennifer Moore, *Corporate Culpability Under the Federal Sentencing Guidelines*, 34 ARIZ. L. REV. 743, 797 (1992); *cf.* KIP SCHLEGEL, JUST DESERTS FOR CORPORATE

from criminal law, call for corporate defendants to receive the punishment they deserve; not less, not more.[226]

Because corporations are not typical moral agents, it can be difficult to comprehend what "fairness" means as applied to them.[227] Oftentimes, shareholder interests are substituted for corporate interests, and fairness toward corporations translates to fairness toward shareholders.[228] The translation is very imprecise,[229] especially in circumstances where the two sets of interests diverge.[230] Regardless, shareholders represent at most the corporate side of the fairness inquiry. The regrettable trend among corporate crime scholars and criminologists is to focus on corporate defendants rather than their victims.[231] Victims tend to become conceptual placeholders as units of

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CRIMINALS 11–12 (1990) (listing factors the Justice Department considers when deciding whether to charge corporations).

226 *See* ANDREW VON HIRSCH, CENSURE AND SANCTIONS 1 (1993); H.L.A. HART, PUNISHMENT AND RESPONSIBILITY 24–25 (Oxford Univ. Press 2008) (1968).

227 *See, e.g.*, F. Patrick Hubbard & Evan Sobocinski, *Crashworthiness: The Collision of Sellers' Responsibility for Product Safety with Comparative Fault*, 69 S.C. L. REV. 741, 746 (2018) ("Because corporations lack the moral right to fairness that humans have, they are not entitled to the application of the unstructured, ad hoc scheme of comparative fault to all aspects of wrongful causation-in-fact."). The most effective take on retribution in corporate criminal law sees it as a tool for expressing communal condemnation of immoral corporate behavior. *See* Diamantis, *supra* note 92, at 2062–64. *See generally* Buell, *supra* note 89 (arguing that criminal liability for entities serves an expressive function).

228 *See* Deborah A. DeMott, *Beyond Metaphor: An Analysis of Fiduciary Obligation*, 1988 DUKE L.J. 879, 917 ("True, particular shareholders' interests may diverge from those of other shareholders, or directors may use their powers inconsistently with the shareholders' interests, but the notion that in theory a corporation's 'own' interests could diverge from those of its shareholders is difficult to fathom.").

229 *See generally* LYNN STOUT, THE SHAREHOLDER VALUE MYTH (2012) (identifying issues with the idea that companies should and do exist only to increase the wealth of their shareholders).

230 *See, e.g.*, United States v. Sun-Diamond Growers of Cal., 138 F.3d 961, 970 (D.C. Cir. 1998) (holding corporation liable for criminal conduct that arguably had no benefit to shareholders); Credit Lyonnais Bank Nederland, N.V. v. Pathe Commc'ns Corp., Civ. A. No. 12150, 1991 WL 277613, at *34 n.55 (Del. Ch. Dec. 30, 1991) ("[C]ircumstances may arise when the right (both the efficient and the fair) course to follow for the corporation may diverge from the choice that the stockholders . . . would make if given the opportunity to act."); Lucian A. Bebchuk & Robert J. Jackson, Jr., *Corporate Political Speech: Who Decides?*, 124 HARV. L. REV. 83, 90 (2010) ("[T]he interests of directors and executives may also diverge frequently and significantly from those of shareholders with respect to corporate political speech decisions."); Ralph K. Winter, *Paying Lawyers, Empowering Prosecutors, and Protecting Managers: Raising the Cost of Capital in America*, 42 DUKE L.J. 945, 973 (1993) ("[T]he view that management can prevent shareholders from selling their shares, particularly at a premium over market price, is based on an unspoken assumption that the corporation is an entity with interests that diverge from those of its shareholders.").

231 Mihailis E. Diamantis & William S. Laufer, *Prosecution and Punishment of Corporate Criminality*, 15 ANN. REV. L. & SOC. SCI. 453, 454 (2019) ("To compound gaps in our under-

social disutility in cost-benefit policy calculations.[232] Reclassified this way, the harms victims experience lose their empathetic pull, and scholarship loses its indignant bite.[233] Predictably, commentators' fairness analyses often tip pro-corporate.[234]

From a fairness perspective, corporate liability is an odd development. Vicarious liability, i.e., holding one person to account for injuries caused by another person,[235] is generally thought to present special fairness challenges.[236] Usually, only very strong policy rationales can overcome the default position that fault is personal.[237]

Corporate liability is vicarious at two different levels. At one level, corporate liability transmits burdens vicariously to individuals from corporations. Though the law may formally punish or award damages against corporations, it can do this only by way of forcing

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standing of corporate victimization and the extent of the government's response to corporate wrongdoing, there is no empirical or theoretical subfield of corporate victimology . . . .").

232 *E.g.*, Mark Dowie, *Pinto Madness*, MOTHER JONES (Sept./Oct. 1977), https://www.motherjones.com/politics/1977/09/pinto-madness/ [https://perma.cc/G9TR-SXL3] (describing how Ford calculated the dollar value of each life at risk from its car design).

233 *See* Laufer, *supra* note 93, at 30; *see also* Robin Paul Malloy, *Equating Human Rights and Property Rights—The Need for Moral Judgment in an Economic Analysis of Law and Social Policy*, 47 OHIO ST. L.J. 163, 176 (1986) ("As an example of an amoral approach to cost and benefit analysis, the Ford Pinto case emphasizes that economics, when applied as a purely neutral and objective science, is ill-suited to aid the resolution of pressing social problems.").

234 *See, e.g.*, W. Kip Viscusi, *Corporate Risk Analysis: A Reckless Act?*, 52 STAN. L. REV. 547, 550 (2000) ("Any systematic attempt to trade off costs and risk-reduction benefits may appear to be a cold-blooded calculation invented by economists. . . . The merits of the analysis and the ultimate balance struck should . . . not [turn on] whether undertaking a systematic analysis allegedly reflects a cold-blooded attitude towards human life. . . . [L]iability for corporate behavior should hinge on the risk and cost decisions, not on whether the firm undertook a risk analysis." (footnote omitted)).

235 *Liability, Vicarious Liability*, BLACK'S LAW DICTIONARY (11th ed. 2019) ("Liability that a supervisory party (such as an employer) bears for the actionable conduct of a subordinate or associate (such as an employee) based on the relationship between the two parties.").

236 *See* United States v. Decker, 543 F.2d 1102, 1103 (5th Cir. 1976) ("[H]olding one vicariously liable for the criminal acts of another may raise obvious due process objections . . . ."); *see also* Lake Shore & Mich. S. Ry. Co. v. Prentice, 147 U.S. 101, 111 (1893) ("[W]here it has been held that [a principal can be held liable for the criminal libel of his agent], it is admitted to be an anomaly in the criminal law.").

237 Scales v. United States, 367 U.S. 203, 224–25 (1961) ("In our jurisprudence guilt is personal . . . ."); DAN B. DOBBS, PAUL T. HAYDEN & ELLEN M. BUBLICK, THE LAW OF TORTS § 425 (2d ed. 2011) ("[Vicarious] liability is an important exception to the usual rule that each person is accountable for his own legal fault but in the absence of such fault is not responsible for the actions of others."); Shawn Bayern, *Three Problems (and Two Solutions) in the Law of Partnership Formation*, 49 U. MICH. J.L. REFORM 605, 622–23 (2016) ("To the contrary, in the usual case, parties are not legally responsible for the actions of others; it requires an exceptional doctrine . . . to cause one party to be liable for another's actions." (footnotes omitted)).

corporations' stakeholders to pay.[238] The corporation has no existence separate from them.[239] Shareholders, employees, and creditors are the real-life people who compose the fictional corporate entity[240] and are therefore its direct stakeholders.[241] When courts order corporations to pay, these stakeholders are necessarily worse off—they lose retirement savings, face less favorable employment prospects, and take on additional credit risk. These stakeholder impacts are often referred to as "collateral" effects,[242] but they are more properly regarded as the sanction itself—nominally imposed on the corporation, but vicariously imposed on its stakeholders.

Commentators concerned about the fairness of corporate liability have a partial response. As it turns out, the deterrence rationale for this species of vicarious liability is quite weak—the individual shareholders, employees, and creditors who bear the brunt of any corporate sanction are usually in no position to affect the risk that the corporation will reoffend.[243] Even if they were, the fractional share that any of them pays of the corporate sanction will usually not be sufficient to move them to action.[244] The more powerful fairness-based justification is that the burdens of corporate misconduct often come paired with the benefits of corporate success.[245] The same stakeholders who share

238 *See* John C. Coffee, Jr., *"No Soul to Damn: No Body to Kick": An Unscandalized Inquiry into the Problem of Corporate Punishment*, 79 MICH. L. REV. 386, 401 (1981) ("[W]hen the corporation catches a cold, someone else sneezes."); BARNALI CHOUDHURY & MARTIN PETRIN, CORPORATE DUTIES TO THE PUBLIC 194 (2019) ("Fundamentally, it is impossible to punish a corporation without indirectly affecting its individual stakeholders."); Jill E. Fisch, *Criminalization of Corporate Law: The Impact on Shareholders and Other Constituents*, 2 J. BUS. & TECH. L. 91, 93 (2007).

239 *See* Mihailis E. Diamantis, *Corporate Essence and Identity in Criminal Law*, 154 J. BUS. ETHICS 955, 962 (2019).

240 *See* Alschuler, *supra* note 184, at 1367 ("This punishment is inflicted instead on human beings whose guilt remains unproven. Innocent shareholders pay the fines, and innocent employees, creditors, customers, and communities sometimes feel the pinch too.").

241 Margaret M. Blair & Lynn A. Stout, *A Team Production Theory of Corporate Law*, 85 VA. L. REV. 247, 278 (1999).

242 *E.g.*, Holder Memo, *supra* note 96, at 9 ("Prosecutors may consider the collateral consequences of a corporate criminal conviction in determining whether to charge the corporation with a criminal offense.").

243 *See* Mihailis E. Diamantis, *Ditching Deterrence: Preventing Crime by Reforming Corporations Rather than Fining Them*, N.Y.U. PROGRAM ON CORP. COMPLIANCE & ENF'T: COMPLIANCE & ENF'T (Jan. 3, 2018), https://wp.nyu.edu/compliance_enforcement/2018/01/03/ditching-deterrence-preventing-crime-by-reforming-corporations-rather-than-fining-them/ [https://perma.cc/L7EZ-75QN].

244 Mihailis E. Diamantis, *An Academic Perspective*, *in* THE GUIDE TO MONITORSHIPS 75, 77–78 (Anthony S. Barkow et al. eds., 2019).

245 RESTATEMENT (SECOND) OF AGENCY § 219 cmt. a (AM. L. INST. 1958) ("[I]t would be unjust to permit an employer to gain from the intelligent cooperation of others without being

some portion of corporate losses generally also share some portion of corporate gains—increased share value, better job opportunities, and more credit security. Because stakeholders participate in the upside of corporate gains, it is fair for them to share in the losses when things go awry and third parties get hurt.[246]

At a second level, corporate liability also transmits fault vicariously to corporations from individuals. Because corporations can only misbehave through employees, respondeat superior holds corporations to account for the misconduct of employees.[247] At this level too, the most powerful fairness rationale has to do with pairing burdens with benefits: because corporate employers enjoy the benefits of employees' productive activity, they should share in its burdens too.[248] Indeed, *not* having some doctrine like respondeat superior would be unfair—employers could claim the fruits of labor but disclaim its social costs. "Just as liability for damage can be equitably balanced against the defendant's fault, so it can be equitably balanced against his benefit."[249] This is part of the rationale behind respondeat superior's requirement that an employee intend to benefit her employer—it limits the doctrine to those cases where employer benefits are to be expected.[250]

Pairing the burdens of productive activity with its benefits mitigates the fairness concerns that arise by allocating burdens or benefits separately. Once again, the logic behind respondeat superior applies beyond the employment context. Looking beyond employees to other sources of corporate benefit motivates a *benefits-based account* of the body corporate that includes all—and only—mechanisms from which

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responsible for the mistakes, the errors of judgment and the frailties of those working under his direction and for his benefit.").

246 *See* Sara Sun Beale, *A Response to the Critics of Corporate Criminal Liability*, 46 AM. CRIM. L. REV. 1481, 1484–85 (2009) ("There is nothing wrong with recognizing that it was Siemens, not simply some of its officers or employees, who should be held legally accountable. . . . The shareholders of Siemens benefitted from its success when it used bribery and kickbacks to obtain contracts that generated billions of dollars of profit."). This argument works best as to shareholders who share in corporate profits and losses in proportion to their ownership interest. As to other stakeholders, like employees and creditors, the argument is far from perfect because the level of upside and downside risk from corporate performance is likely unevenly and unfairly distributed. *See* Coffee, *supra* note 238, at 401–02. Those who enjoy the big bonuses on good years are likely also those whose jobs are most protected on bad years.

247 *See* Larry May, *Vicarious Agency and Corporate Responsibility*, 43 PHIL. STUD. 69, 71 (1983) (arguing that corporations have no minds).

248 T. BATY, VICARIOUS LIABILITY 32 (1916).

249 Glanville Williams, *Vicarious Liability and the Master's Indemnity*, 20 MOD. L. REV. 220, 230 (1957).

250 *See supra* note 167 and accompanying text.

the corporation claims substantial productive benefits.[251] Consequently, if a corporation claims the benefits of some mechanism, any injuries the mechanism causes would count as acts of the corporation. As with the control-based account, the benefits-based account clearly includes corporate employees, but it could also include corporate algorithms. These require corporate resources to run, so presumably a corporation would only utilize algorithms from which it expects to benefit.

Like the control-based account, the benefits-based account is an unappealing solution to the algorithmic accountability gap when viewed in isolation. Although its underlying logic is fairness, it threatens to extend to cases where fairness and sound policy would call for a different result. The clearest cases are those where some third party controls an algorithm that provides some unique or nearly unique function, the substantial benefits of which a corporation claims for itself. Some of these third parties might be private, like Alphabet, which owns Google.[252] Data about Google's corporate users is unavailable, but the numbers for individual users illustrate the point. Estimates of how much Google makes off each individual user range from $10.09[253] up to $359.00.[254] By contrast, some economists estimate that the average user of internet search services like Google values them at $17,500.00.[255] So users claim the vast majority of the productive benefit of search algorithms like Google. Yet, as a matter of fairness or preventive policy, it would make very little sense to hold the otherwise innocent third parties that use web search services liable (and to let Alphabet off) when Google injures someone, e.g., by facilitating illegal access to copyrighted material[256] or making illegal use of protected personal information.[257]

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251 As will become clear, I mean "mechanism" to have a very broad reading.

252 Kamil Franek, *What Companies Google & Alphabet Own: Visuals & Full List*, KAMIL FRANEK BUS. ANALYTICS (Oct. 16, 2019), https://www.kamilfranek.com/what-companies-alphabet-google-owns/ [https://perma.cc/HYH2-GSDH].

253 Tristan Louis, *How Much Is a User Worth?*, FORBES (Aug. 31, 2013, 3:25 PM), https://www.forbes.com/sites/tristanlouis/2013/08/31/how-much-is-a-user-worth/#1e478f9b1c51 [https://perma.cc/2AKB-A4Q5].

254 Sheiresa Ngo, *Here's How Much Google and Facebook Really Think You're Worth*, SHOWBIZ CHEATSHEET (Apr. 16, 2018), https://www.cheatsheet.com/money-career/heres-much-google-facebook-really-think-youre-worth.html/ [https://perma.cc/ST93-TMGF].

255 The Indicator, *Internet a la Carte*, NPR: PLANET MONEY (May 31, 2018, 5:07 PM), https://www.npr.org/transcripts/615932894?storyId=615932894?storyId=615932894 [https://perma.cc/B72X-K5YB].

256 *See, e.g.*, Crampton, *supra* note 97.

257 *See, e.g.*, Natasha Singer & Kate Conger, *Google Is Fined $170 Million for Violating*

C. *The Beneficial-Control Account*

The control-based and benefits-based accounts each speak to different values in the law of corporate liability: prevention and fairness, respectively. They also offer very different criteria for determining when algorithmic injury should qualify as a corporate act. Having two distinct accounts of the body corporate seems to set up an unhappy impasse. It is an impasse because deciding which is the better theory seems to force a preference of one value over the other. It is unhappy because, as explained above, both accounts suffer from disqualifying overbreadth.

Trying to choose between the control-based and benefits-based accounts presumes a false dichotomy between prevention and fairness. There is no reason the law should have to choose—it could instead demand both. A *beneficial-control account* would accomplish this by treating algorithms as part of the body corporate, and hence treating algorithmic injury as corporate action, only when both the control-based and benefits-based criteria are met. This would ensure that each imposition of corporate liability for algorithmic misconduct satisfies both preventive and fairness constraints. Indeed, respondeat superior is a version of a beneficial-control account limited just to employees. The doctrine requires that employees acted within the scope of their employment (a rough proxy for corporate control) *and* intended to benefit their corporate employer (a rough proxy for corporate benefit).[258]

Just as employees routinely satisfy the control-based and benefits-based criteria, so will algorithms. One obvious reason is that corporate control generally begets corporate benefit. Corporations are rational, profit-seeking enterprises.[259] So they will turn any resource they control to their benefit. An unproductive employee will be retrained. An unprofitable corporate algorithm will, once identified as such, be modified. Those resources and mechanisms that corporations cannot turn to their benefit are generally not within their control or

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Children's Privacy on YouTube, N.Y. TIMES (Sept. 4, 2019), https://www.nytimes.com/2019/09/04/technology/google-youtube-fine-ftc.html [https://perma.cc/M7E6-HYWY].

258 *See supra* notes 166–67 and accompanying text.

259 Harvey M. Silets & Susan W. Brenner, *The Demise of Rehabilitation: Sentencing Reform and the Sanctioning of Organizational Criminality*, 13 AM. J. CRIM. L. 329, 367 (1986) ("The corporation is a rational actor striving to maximize financial gain and minimize financial loss, and so can be manipulated most easily by imposing monetary penalties that affect these acts." (footnote omitted)).

will not be for long. Corporations fire wayward employees. They discontinue incorrigible algorithms.[260]

Even though many algorithms will routinely count as part of the body corporate under the beneficial-control account, there are many instances in which they will not. Importantly, the benefits-based criteria constrain the most concerning overbreadth of the control-based criteria, and vice versa. Recall the example of the control-based account's overbreadth—a social media platform fully controlled by a corporation but put to illegal and injurious ends by a user.[261] Assuming the corporation is not also profiting from the illegal use,[262] then this case would fail the benefits-based criteria. Similarly, the example above of the benefits-based account's overbreadth involved a corporation that benefited from using a third-party search engine.[263] If the search engine ended up causing injuries, it would make no sense to hold the corporation engaged in beneficial use liable. Fortunately, the beneficial-control account can accommodate this result because the corporation using the search engine would not satisfy the control-based criterion.

As test cases, we might inquire how the beneficial-control account would address the cases of Wanda Holbrook and Elaine Herzberg, with which this Article began. Recall that a robot escaped and killed Wanda Holbrook in the manufacturing plant where she worked,[264] and a self-driving car killed Herzberg.[265] For both, justice proved elusive because of the algorithmic accountability gap: the law had no straightforward way to recognize the algorithmic conduct as the sort of corporate action to which liability could attach.[266]

There is no question in both cases that Ventra Ionia—the manufacturer that Holbrook worked for[267]—and Uber—which owned the car that ran over Herzberg[268]—claimed substantial benefit from the

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260 *See, e.g.*, Price, *supra* note 191.

261 *See supra* notes 207–09 and accompanying text.

262 *See, e.g.*, Nicole Perlroth, Sheera Frenkel & Scott Shane, *Facebook Exit Hints at Dissent on Handling of Russian Trolls*, N.Y. Times (Mar. 19, 2018), https://www.nytimes.com/2018/03/19/technology/facebook-alex-stamos.html [https://perma.cc/6PHT-P6G7] ("The people whose job is to protect the user always are fighting an uphill battle against the people whose job is to make money for the company . . . ." (quoting Sandy Parakilas, former Facebook Platform Operations Manager)).

263 *See supra* notes 252–57 and accompanying text.

264 Forrest, *supra* note 2.

265 Wakabayashi, *supra* note 3.

266 *See supra* text accompanying notes 8, 12.

267 Forrest, *supra* note 2.

268 Wakabayashi, *supra* note 3.

productive activity of the algorithms at issue. As to control, Uber seemed to satisfy all the indicia for its self-driving cars, which it designed,[269] monitored,[270] and modified,[271] and which it could terminate[272] or override.[273]

For Ventra Ionia, the case is more nuanced and would depend on additional facts, which are not publicly available. It does not seem that Ventra Ionia designed the robot that killed Holbrook.[274] It is also unclear whether Ventra Ionia had the power to implement any modifications or could have shut down the robot or overridden its behavior when it attacked. If Ventra Ionia lacked these indicia of control, there would be no case under the beneficial-control account for saying that Ventra Ionia killed Holbrook through its robot. This does not mean, however, that the beneficial-control account would leave Holbrook's husband, who was seeking damages for her death,[275] with no recourse. The corporation that designed or made the robot could be a potential defendant.[276] If some corporation other than Ventra Ionia had the power to monitor, update, and shut down the robot, they could be another potential defendant. In the unlikely case that no corporation had those powers, then Holbrook's husband might sue Ventra Ionia

269 *Members Profile: Uber ATG,* ASS'N FOR STANDARDIZATION AUTOMATION & MEASURING SYS., https://www.asam.net/members/detail/uber/ [https://perma.cc/MH6G-QXNV].

270 Andrew J. Hawkins, *Uber's Self-Driving Cars Are Back on Public Roads, but Under Human Control*, VERGE (July 24, 2018, 3:21 PM), https://www.theverge.com/2018/7/24/17607898/uber-self-driving-car-public-roads-driver-monitoring [https://perma.cc/LZ7L-45BM] ("Uber says it will be using an 'off-the-shelf' system to monitor its drivers, but declined to name the vendor.").

271 Michael Laris, *Nine Months After Deadly Crash, Uber Is Testing Self-Driving Cars Again in Pittsburgh*, WASH. POST (Dec. 20, 2018, 9:01 AM), https://www.washingtonpost.com/transportation/2018/12/20/nine-months-after-deadly-crash-uber-is-testing-self-driving-cars-again-pittsburgh-starting-today/ [https://perma.cc/X9MM-WX8W] ("[After a fatal accident involving a pedestrian,] Uber spent the intervening months scouring its systems—software and human—for shortcomings, and says it has taken numerous steps to fix them before what it says is Thursday's tightly limited relaunch.").

272 Heather Kelly, *Uber Wants to Test Self-Driving Cars Again After Fatality*, CNN BUS. (Nov. 2, 2018, 7:06 PM), https://www.cnn.com/2018/11/02/tech/uber-self-driving-tests/index.html [https://perma.cc/6PDB-VNE2] ("The company shut down all of its self-driving car tests and underwent an internal review and external investigations following the crash in Tempe, Arizona.").

273 *See* Michael Laris, *Uber Is Bringing Its Testing of Self-Driving Vehicles to D.C. Streets*, WASH. POST (Jan. 23, 2020, 12:45 PM), https://www.washingtonpost.com/local/trafficandcommuting/uber-is-bringing-its-self-driving-vehicle-testing-to-dc-streets/2020/01/23/bb97b226-3e04-11ea-b90d-5652806c3b3a_story.html [https://perma.cc/C2VV-ZY7W] ("There will be a backup driver behind the wheel, with a second safety employee sitting beside them.").

274 *See* Complaint & Jury Demand, *supra* note 10, at 3–4.

275 *See id.* at 2.

276 Indeed, these are the corporations that Holbrook's husband sued. *Id.*

under traditional respondeat superior. The employee at Ventra Ionia who authorized use of the robot without these essential safeguards would have "caused" Holbrook's death through his "wrongful act, neglect, or fault," as required by Michigan's wrongful death statute.[277]

The beneficial-control account seems to check all the boxes for an appealing solution to the algorithmic accountability gap. To begin, it identifies a potential class of defendants from whom victims of algorithmic misconduct may seek redress. In so doing, the account also embraces both of the major values that corporate liability should serve: prevention and fairness. By imposing criteria responsive to both control-based and benefits-based concerns, it cabins the overbreadth that either set of criteria would have on its own.

Though the beneficial-control account of corporate algorithmic conduct is narrower than the control-based and benefits-based accounts, some may still worry that it is overbroad. Jurists might think this for the same reasons that most scholars,[278] myself included,[279] have argued that respondeat superior—from which the beneficial-control account takes its inspiration—is overbroad as a doctrine of corporate liability for employee misconduct. The basic concern is that corporations can be held liable for rogue employee conduct, even if the corporation had reasonable compliance programs that the rogue purposely subverted.[280] Holding corporations liable in such circumstances seems unfair[281] and induces them to implement wasteful (i.e., higher than reasonable) levels of expensive compliance.[282] Could the beneficial-control account offered here be similarly unfair to corporations and induce wasteful levels of precaution that would unduly stymie technological progress?

To show that the beneficial-control account carries no inherent risk of overbreadth, it will help first to add some nuance to the claim

277 MICH. COMP. LAWS § 600.2922(1) (2020).

278 Bharara, *supra* note 89, at 59 ("[T]here is virtually unanimous agreement: corporate criminal liability [under respondeat superior] is extremely broad.").

279 *See* Diamantis, *supra* note 92, at 2057–58.

280 *See* George R. Skupski, Note, *The Senior Management Mens Rea: Another Stab at a Workable Integration of Organizational Culpability into Corporate Criminal Liability*, 62 CASE W. RSRV. L. REV. 263, 273 (2011) ("[R]espondeat-superior-based liability likely creates contrary control incentives due to its creation of constructive strict liability. This effect is best exemplified in cases where a rogue agent acts contrary to corporate policies and well-intentioned efforts to control the subordinate's conduct." (footnote omitted)).

281 *See* Pitt & Groskaufmanis, *supra* note 170, at 1653 ("For the government to recommend—or require—compliance programs and then dismiss them as irrelevant has an inherently inequitable ring.").

282 *See* Diamantis, *supra* note 82, at 360–61.

that respondeat superior goes too far concerning employee misconduct. First, even if respondeat superior is overinclusive as a doctrine of corporate liability, it is also underinclusive. For example, it does not apply in circumstances where corporations take advantage of their size to divide up responsibilities among employees in such a way that, though each employee is fully innocent, what they collectively do amounts to misconduct.[283] Respondeat superior only attributes misconduct from single employees to corporations. If no employee individually did anything wrong, there is nothing to attribute to the corporation.

More important for present purposes, corporate liability generally requires acts and mental states.[284] Although respondeat superior applies to both under current law,[285] we can, and should, analyze its performance concerning acts and mental states separately. It may turn out that respondeat superior, or something modeled after it, works better for one or the other. In that case, the best way forward would be to adopt a bifurcated approach to corporate liability, using one doctrine to define corporate acts and another to define corporate mental states.

The beneficial-control account cannot be overbroad as a doctrine of corporate liability since it only purports to answer the first part of the liability inquiry—whether a corporation has acted. Acts alone are generally insufficient to determine whether a corporation is liable for some harm.[286] As a doctrine pertaining only to corporate acts, the beneficial-control account would at most allow courts to identify algorithmic harms with corporate acts. This would show which corporations are *potentially* liable when an algorithm injures someone. For liability to attach, prosecutors and plaintiffs would also need to establish that the corporation acted *culpably*, i.e., that the corporation satisfies any requisite mental state element as well. The beneficial-control account offered here does not purport to say anything about corporate mental states or culpability.

As to the scope of what qualifies as corporate action, the beneficial-control account reaches far beyond respondeat superior; that is the whole point. Were the beneficial-control account adopted, corporations would be liable for injuries that are currently not attributable to them. Whether the beneficial-control account reaches too far be-

283 *See* United States v. Bank of New England, N.A., 821 F.2d 844, 855 (1st Cir. 1987).

284 *See supra* Part I.

285 *See supra* note 84 and accompanying text.

286 *See supra* notes 28–29 and accompanying text.

yond respondeat superior would depend on the theory of corporate mental states with which it is paired. If paired with respondeat superior's approach to corporate mental states, the beneficial-control account could inherit some of the deficiencies for which scholars fault current doctrine. There are superior alternatives to respondeat superior for assessing corporate mental states. William Laufer has proposed a model that looks to industry norms.[287] Pamela Bucy focuses on corporate "ethos."[288] I have offered a method for inferring corporate mental states from corporate acts.[289] Paired with one of these more nuanced accounts of corporate mental states and fault, the beneficial-control account could identify when corporations are truly at fault for their injurious algorithmic actions. Regardless of what the best account of the corporate mind is, the law should not blind itself to algorithmic corporate harms by an overly narrow conception of the body corporate.

IV. Evaluating the Beneficial-Control Account

The corporate law solution to the algorithmic accountability gap proposed here mirrors existing law. It does for algorithmic misconduct what respondeat superior does for employee misconduct—it opens space for holding corporations accountable. By imposing scope of employment and intent to benefit constraints on when employee action is attributable to corporations, respondeat superior effectively asks first whether a corporation had control over and could expect to benefit from employee activity. The beneficial-control account extends this inquiry to the algorithmic context by treating algorithmic activity as corporate action only when the corporation has control over and claims the benefits of the algorithm. This gives the beneficial-control account several attractive advantages over the current state of the law and competing proposals. Still, some challenges linger. I address them below.

A. Advantages

By slotting itself into the existing law of corporate liability, the beneficial-control account offers a comprehensive solution to the al-

287 Laufer, *supra* note 81, at 701 ("Would an average corporation, of like size, complexity, functionality, and structure, engaging in an illegal activity X, given circumstances Y, have the state of mind Z?").

288 Bucy, *supra* note 80, at 1099 ("The government can convict a corporation . . . only if it proves that the corporate ethos encouraged agents of the corporation to commit the criminal act.").

289 *See generally* Diamantis, *supra* note 92 (offering a theory of corporate mens rea motivated by cognitive science).

gorithmic accountability gap. Most other proposals discuss only narrow categories of algorithmic injury, like self-driving car accidents,[290] discrimination in hiring,[291] and stock fraud.[292] The law already has well-developed mechanisms for holding corporations liable for all manner of civil and criminal violations.[293] By translating algorithmic injury into a species of corporate misconduct, the present proposal leverages that existing law to cover every recognizable form of algorithmic injury.

The beneficial-control account has several advantages that are familiar to discussions of respondeat superior. By attributing algorithmic injuries to corporations when the corporations are in control, the beneficial-control account makes good on its preventive ambitions. A corporation that exhibits the various indicia of control over an algorithm is in the best position to design it carefully to reduce the risk of injury, monitor its performance for injuries it may be causing, modify its code to prevent the injury from recurring, and, if necessary, pull the plug. By requiring that corporations claim the substantial benefits of an algorithm before attributing the algorithmic activity to the corporation, the law would stand by its commitments to fairness and justice. Pairing benefits with liabilities ensures that the costs of algorithmic injury fall where they can best be borne, both financially and morally.

Indeed, the familiarity of the beneficial-control account is one of its chief advantages. The few other comprehensive proposals for closing the algorithmic accountability gap would require dramatic reimagining of existing law (e.g., developing a mechanism for "punishing robots")[294] or wholesale creation of new law (e.g., developing a new fiction of algorithmic personhood).[295] These proposals are long on grandiose vision, but they are short on realistic prospects. Respondeat superior is judge-made law, and its expansion into the law of corpo-

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290 *See, e.g.*, Geistfeld, *supra* note 195, at 1611–13.

291 *See, e.g.*, Bornstein, *supra* note 17, at 527, 533–37.

292 *See* Gregory Scopino, *Do Automated Trading Systems Dream of Manipulating the Price of Futures Contracts? Policing Markets for Improper Trading Practices by Algorithmic Robots*, 67 FLA. L. REV. 221, 273–93 (2015).

293 *See supra* Part I.

294 *See, e.g.*, Mulligan, *supra* note 32, at 588–89 ("If it turns out that punishing robots provides the right kind of psychological benefit to humans following an injury, we should punish robots.").

295 *See* Matthew U. Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies*, 29 HARV. J.L. & TECH. 353, 399 (2016) ("A related idea would be to establish something akin to the legal fiction of corporate personhood, where AI systems would be capable both of owning assets and of being sued in court.").

rate liability has largely been a judge-led process.[296] If, as argued here, the same principles that motivated respondeat superior in the first place could justify its extension to algorithms, judges just might spring for it.

The beneficial-control account departs from the structure of respondeat superior in one important respect. Respondeat superior generally applies both to corporate acts and corporate mental states.[297] The beneficial-control account limits itself to acts. This is important for two reasons. First, it opens the possibility of adopting a more defensible account of corporate fault. The beneficial-control account only says when algorithmic injuries are attributable to a corporation. That is generally not enough to hold a corporation liable. Ordinarily, before imposing liability, the law also requires that the defendant was somehow at fault, evidenced by a culpable mental state accompanying the injury.[298] By near universal agreement, respondeat superior is a very poor measure of corporate fault.[299] Better proposals are available,[300] some of which are tailored to the algorithmic context.[301] The second reason it is important that the beneficial-control account only attributes actions and not fault is that it avoids the perils of strict liability. By also requiring that genuine corporate fault, however measured, accompany algorithmic injury, the beneficial-control account strikes a balance between potential corporate defendants and potential plaintiffs. It caters to the public's interests in innovation and recompense, without giving decisive and paralyzing preference to either. Lawmakers already struck this equilibrium by requiring fault in the first place.[302] The beneficial-control account seeks to preserve the equilibrium.

B. Challenges

The beneficial-control account faces two main challenges. The first regards implementation. As discussed above,[303] the inquiry into whether a corporation exercised beneficial control over an algorithm is fact intensive. Uncovering and introducing evidence that pertains to the various indicia of control over and monetization of an algorithm

296 *See supra* notes 101–03 and accompanying text.

297 *See supra* notes 165–67 and accompanying text.

298 *See supra* notes 28–29 and accompanying text.

299 *See* Bharara, *supra* note 89, at 59.

300 *See supra* notes 287–88.

301 *See* Diamantis, *supra* note 30, at 900.

302 *See supra* notes 28–29 and accompanying text (discussing that strict liability is rare).

303 *See supra* Section III.C.

will require a significant commitment of resources from litigants and courts.[304] This is complicated by the fact that multiple corporations may exercise different types of control over or claim different benefits from the same algorithm.[305] Furthermore, applying the control and benefit tests requires drawing lines in grey areas to determine when the control exercised and the benefits claimed are "substantial" enough for liability. This sort of vagueness injects a fair measure of unpredictability into the process that brings its own costs to litigants, both present and prospective.[306]

Any attempt to trivialize these litigation and uncertainty costs would be disingenuous; however, they must be juxtaposed with the costs of alternatives. The challenge is to navigate the perennial tension between easier to implement, bright-line rules and harder to implement, vague standards.[307] Rules are predictable but inflexible.[308] They can, at best, only roughly correlate to more complex underlying economic or justice values that the law seeks to promote.[309] This means that rules will inevitably dictate counterproductive results where they fail to track the subtler contours of value. Standards, by contrast, are less predictable but more flexible, which allows the law to hew more closely to its goals.[310] The decision between applying a rule or a standard turns on how the rule's costs of error compare to the standard's uncertainty and administrative costs.[311] Sometimes, as in strict products liability, rules are preferable for weighing corporate liability.[312] In

304 Infantino & Wang, *supra* note 204, at 354.

305 *See supra* notes 253–57 and accompanying text.

306 *See* Andrew Morrison Stumpff, *The Law Is a Fractal: The Attempt to Anticipate Everything*, 44 LOY. U. CHI. L.J. 649, 676 (2013) ("The usual operating assumption seems to have been that because uncertainty is costly, the existence of a rule for every situation will always reduce transaction costs."); Richard A. Posner, *Savigny, Holmes, and the Law and Economics of Possession*, 86 VA. L. REV. 535, 565 (2000) ("Uncertainty is costly in itself . . . .").

307 *See generally* Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557, 562–67 (1992) (analyzing rules and standards by looking at costs and compliance).

308 Posner, *supra* note 306, at 565 ("Rules [generally] abstract a few relevant facts from the welter of circumstances of each actual case and make the selected facts legally determinative.").

309 *Id.* ("[Rules produce] an imperfect fit . . . resulting in some outcomes that are erroneous from the standpoint of the substantive principle . . . .").

310 Kathleen M. Sullivan, *Foreword: The Justices of Rules and Standards*, 106 HARV. L. REV. 22, 66 (1992) ("Standards, by contrast, are flexible and permit decisionmakers to adapt them to changing circumstances over time.").

311 Duncan Kennedy, *Form and Substance in Private Law Adjudication*, 89 HARV. L. REV. 1685, 1689 (1976) ("The choice of rules as the mode of intervention involves the sacrifice of precision in the achievement of the objectives lying behind the rules.").

312 *See* David G. Owen, *Rethinking the Policies of Strict Products Liability*, 33 VAND. L. REV. 681, 684–85 (1980) ("[Some rationales behind strict products liability include that a] majority of product accidents not caused by product abuse are probably attributable to the negligent

other cases, lawmakers have decided that standards make more sense, e.g., by requiring "proximate causation" for tort claims against corporations,[313] by requiring "reckless disregard" in workplace safety suits,[314] and by evaluating corporate books' for "reasonable assurances" against foreign bribery.[315]

There are various possible rule-like alternatives to the beneficial-control test, but they entail unacceptably high costs that the beneficial-control test avoids. One possible approach is to maintain the status quo, which effectively dictates that algorithmic injury in itself can never qualify as corporate action. In this Article, I argued extensively against the present law, which effectively immunizes corporations against liability for algorithmic injuries unless there is some culpable human employee in the loop. This limits corporations' incentives to ensure their algorithms are safe and encourages them to move hastily toward automation as a risk management strategy.[316] When corporations can externalize the costs of an activity which otherwise benefits them, we should expect them to do so. This leaves victims without recourse, effectively subsidizing corporate profits with victims' injured bodies, pocketbooks, and dignity.

Rule-like alternatives that would modify the status quo would entail different, but equally disqualifying costs. I have already mentioned the possibility that the law could hold corporations strictly liable for the injuries their algorithms cause. This approach, however, risks unduly depressing algorithmic innovation, which could permanently

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acts or omissions of manufacturers at some stage of the manufacturing or marketing process, yet the difficulties of discovering and proving this negligence are often practicably insurmountable. . . . Negligence liability is generally insufficient to induce manufacturers to market adequately safe products. . . . Sellers almost invariably are in a better position than consumers to absorb or spread the costs of product accidents. . . . The costs of injuries flowing from typical risks inherent in products can fairly be put upon the enterprises marketing the products as a cost of their doing business, thus assuring that these enterprises will fully 'pay their way' in the society from which they derive their profits.").

313 David A. Fischer, *Products Liability—Proximate Cause, Intervening Cause, and Duty*, 52 Mo. L. Rev. 547, 548 (1987) ("Proximate cause doctrines are playing an increasingly important role in strict product liability cases . . . . ").

314 Williams Enters. Inc., 13 BNA OSHC 1249 (No. 85-355, 1987) (requiring "evidence of such reckless disregard for employee safety" for liability under Occupational Safety and Health Act of 1970, 29 U.S.C. §§ 651–678).

315 15 U.S.C. § 78m(b)(2)(B) (requiring corporations to "devise and maintain a system of internal accounting controls sufficient to provide reasonable assurances" of legal compliance).

316 *See* Mihailis E. Diamantis, *The Problem of Algorithmic Corporate Misconduct*, N.Y.U. Program on Corp. Compliance & Enf't: Compliance & Enf't (Sept. 16, 2019), https://wp.nyu.edu/compliance_enforcement/2019/09/16/the-problem-of-algorithmic-corporate-misconduct/ [https://perma.cc/AJW5-52V2].

handicap U.S. economic development vis-à-vis foreign competitors. A strict liability approach is also an incomplete solution. In a world where algorithmic development, ownership, licensing, use, and modification are all carried out by different corporate actors, a strict liability approach must still determine to *which corporation* an algorithm belongs. In a sense, then, a strict liability account just passes the buck on a question that the beneficial-control account answers directly.

Somewhere between all (the strict liability approach) and nothing (the status quo) are multiple rule-like variations of the beneficial-control test. It is possible that "substantial control" in the test could be replaced with one or two prespecified indicia of control and substantial benefit could be replaced with a bright-line dollar threshold. The concern here is that any effort at line drawing will be an immediate invitation to corporate gamesmanship that would defeat the whole purpose of modifying the status quo. Powers over and monetization of an algorithm can be parceled out in an indefinite number of ways; motivated corporate actors are sure to find ways to retain effective control and benefit while sidestepping any bright-line rule. Additionally, the space of algorithmic innovation is evolving so fast that it is doubtful any rigid legal test would remain relevant for long. A multifactored standard like the beneficial-control test has the flexibility to evolve alongside technological developments.

On the point of technological developments, I should note one important limitation of the beneficial-control test. Although it can go a long way to closing the algorithmic accountability gap for today and for the foreseeable future, there are possible long-term developments that would necessitate further legal change. By drawing on corporate law and its extensive liability framework, the beneficial-control account presumes, as is the case today,[317] that a corporation is behind every significant algorithm. Technologists and science fiction authors envision a future world where this may not be the case, where algorithms may be self-forming, self-executing, and operate under the control and for the benefit of no one.[318] The freestanding, autonomous algorithm raises what some have called the "[h]ard" problem of algorithmic accountability because there is no one, corporate or natural, to hold to account in the algorithm's stead.[319] In such a future, the

317 *See, e.g.*, Dvorsky, *supra* note 50.

318 *See* Stephan Talty, *What Will Our Society Look Like When Artificial Intelligence Is Everywhere?*, SMITHSONIAN MAG. (Apr. 2018), https://www.smithsonianmag.com/innovation/artificial-intelligence-future-scenarios-180968403/ [https://perma.cc/MH2H-QGWT].

319 *See* Abbott & Sarch, *supra* note 39, at 328–29.

beneficial-control test would be of little help. The law needs a solution to the algorithmic accountability gap now, and the beneficial-control account offers an account suited to circumstances as they exist today. If the algorithmic accountability gap reopens in the future, we will know what that future looks like then and will be in a better place to develop a solution suited to those times. At that point, some of the proposals that I set aside in this Article, like the possibility of recognizing algorithms as legal persons, may no longer seem so far-fetched.

Conclusion

In the coming years, the algorithmic accountability gap will grow to a chasm unless the law takes proactive measures to close it. The stories of Elaine Herzberg and Wanda Holbrook will not remain one-off parables of law's inability to deliver justice. Whether we are prepared to recognize it or not, algorithms have injured us all by distorting stock markets, engaging in anticompetitive collusion, misusing personal information, and discriminating against us.[320] The law must find some sweeping accountability mechanism for algorithmic injury if it is to have any chance of protecting us in the coming age of automation.

This Article has focused on one obstacle the law must overcome to close the algorithmic accountability gap: figuring out how to fit algorithms into the existing liability regime, which requires injurious action. Algorithms are not agents or people under the law, so the concept of action is inapplicable.[321] The proposed solution adapts fixtures of corporate law to the algorithmic context. Although algorithms are not legal people capable of acting, corporations are. Today's most impactful algorithms are closely tied to the corporations who develop and use them for their own ends. If the law were to recognize that corporations can act through their algorithms, it would not matter that algorithms are incapable, in the eyes of the law, of acting alone. Injuries caused by corporate algorithms would become injuries caused by corporate action. The victims of those injuries could then seek justice from the corporations who control and profit from the algorithms.

Historically, the law limited its understanding of corporate action to employees,[322] but that limit obscures deeper legal principles. The inner logic of the law of corporate liability turns on prevention and

320 *See supra* notes 4–6 and accompanying text.

321 *See* United States v. Athlone Indus., Inc., 746 F.2d 977, 979 (3d Cir. 1984); Pagallo, *supra* note 127, at 349.

322 *See supra* Part I.

fairness. In order to prevent corporations from injuring people, the law only holds corporations liable when they control the source of the injury.[323] In order to ensure fairness, the law only burdens the corporation with victims' losses when the corporation sought to benefit from the injurious conduct.[324] For most of corporate history, human employees were the only obvious loci of corporate control and benefit. Today, as algorithms replace employees at an increasing rate, they too are sources of injury over which corporations exercise control and from which they benefit.

The proposed "beneficial-control account" treats algorithmic injury as a species of corporate action when the corporation has control over and seeks to benefit from the underlying algorithm. This gives victims a potential corporate defendant from whom to seek justice. When a corporation controls an algorithm, the potential for liability will encourage it to exercise greater care in designing, monitoring, and modifying the algorithm going forward. This will result in fewer algorithmic injuries. When a corporation seeks to benefit from the algorithm, holding the corporation accountable is fair even though doing so will otherwise burden innocent corporate stakeholders.

Although this Article has concentrated on what the law of corporate liability could do to help close the algorithmic accountability gap, corporate law itself has some significant skin in the game. As discussed above, corporate law was largely developed for a past world in which anything corporations did, they did through human employees. That world is quickly becoming a quaint anachronism. But there is nothing quaint about what this means for corporate liability. As the balance between manpower and automation continues to tip precariously in favor of the efficiency, accuracy, and power of algorithms, the model of corporate liability premised on injurious human conduct will slide into obsolescence. Without some way to hold corporations to account for algorithmic harms, they will increasingly find themselves unfettered from the disciplining influence of public and private suit. Though the solution proposed here comes from corporate law, it is also a solution that corporate law desperately needs.

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323 *See supra* note 166 and accompanying text.

324 *See supra* note 167 and accompanying text.