ARTIFICIAL INTELLIGENCE IN THE COURTROOM: THE DELIVERY OF JUSTICE IN THE AGE OF MACHINE LEARNING

RAY WORTHY CAMPBELL*

INTRODUCTION

Science fiction has prepared us for the idea of artificial intelligence ("AI") judges—all knowing, without bias or emotion, able to decide cases on rules rather than human fallibilities. Recent news stories and academic articles predict that AI will play an increasingly important role in judicial chambers, and that perhaps we will see the day when AI judges become reality.[1] Estonia, for example,

*Professor of Law, Peking University of Transnational Law. Thanks are due to all those who have made comments on presentations related to this article, including at LexTech 2018 in Kuala Lumpur, ThinkIn China in Beijing in 2019, and the 2019 United Arab Emirates University Annual Conference "AI and Justice" in Al Ain.

1. Cary Coglianese & David Lehr, *Regulating by Robot: Administrative Decision Making in the Machine-Learning Era*, 105 GEO. L.J. 1147, 1148 (2017) ("It is no longer fanciful to envision a future in which government agencies could effectively make law by robot, a prospect that understandably conjures up dystopian images of individuals surrendering their liberty to the control of computerized overlords."); Eugene Volokh, *Chief Justice Robots*, 68 DUKE L.J. 1135, 1135 (2019) ("[T]he same [artificially intelligent brief writing] technology can be used to create AI judges, judges that we should accept as no

has announced a plan to delegate some lower value claims to an online court powered exclusively by AI.[2] Other countries, including China, have aggressively investigated ways to bring AI into the judicial process.[3]

How realistic is the idea that AI can take over from human judges? Can we expect AI software to take over the role that judges play anytime in the near future?

A realistic view of what role AI can play in the judicial process requires first a look at how AI operates and what functions it can be expected to perform in the near to intermediate term. In addition, in light of the developing field of judicial studies, we must look—as other commentators in this area have not—at the full scope of the judicial function, which goes far beyond just resolving individual cases. Only by matching the real potential of AI with the full range of judicial functions can we give a non-hyperbolic assessment.

Setting aside the possibility of radical technological advances, what we can expect in the near term is for software to play a role supporting—but not replacing—human judges. AI can, in certain cases, predict how a certain case might come out. That, however, falls far short of what judges do. The current capability of AI is limited to specialized tasks, and the roles of judges are so generalized that there is no near-term possibility of AI wholly and satisfactorily displacing judges in high stakes cases.

Even if software is developed to perform generalist capabilities, an uncertain prospect at best,[4] we must still face the issue of whether we are prepared to delegate the creation and application of legal rights and responsibilities to impersonal artificial entities. In this regard it is important to remember that even if AI makes

less reliable (and more cost-effective) than human judges. If the software can create persuasive opinions, capable of regularly winning opinion-writing competitions against human judges—and if it can be adequately protected against hacking and similar attacks—we should in principle accept it as a judge, even if the opinions do not stem from human judgment."); Thomas McMullan, *A.I. Judges: The Future of Justice Hangs in the Balance*, ONEZERO (Feb. 14, 2019), https://onezero.medium.com/a-i-judges-the-future-of-justice-hangs-in-the-balance-6dea1540daaa [https://perma.cc/SP2R-ZBX3] (discussing role of AI in courtrooms); Harmon Leon, *Artificial Intelligence Is on the Case in the Legal Profession*, OBSERVER (Oct. 16, 2019, 8:30 AM), https://observer.com/2019/10/artificial-intelligence-legal-profession [https://perma.cc/2BA2-82DH].

2. Eric Niiler, *Can AI Be a Fair Judge in Court? Estonia Thinks So*, WIRED (Mar. 25, 2019, 7:00 AM), https://www.wired.com/story/can-ai-be-fair-judge-court-estonia-thinks-so [https://perma.cc/CSN6-TGRR].

3. *See* Jinting Deng, *Should the Common Law System Welcome Artificial Intelligence: A Case Study of China's Same-type Case Reference System*, 3 GEO. L. TECH. REV. 223 (2019).

4. Luciano Floridi, *Should We Be Afraid of AI?*, AEON (May 9, 2016), https://aeon.co/essays/true-ai-is-both-logically-possible-and-utterly-implausible [https://perma.cc/AVM7-WF2Y] ("True AI is not logically impossible, but it is utterly implausible.").

the leap to general intelligence, such AI will in no way be human. Put simply, while in some ways as capable as human beings, AI will remain alien in fundamental ways. Whether such an intelligence can fulfill the diverse and fundamental roles played by human judges requires value choices beyond the scope of technology.

I. THE CURRENT CAPABILITIES OF ARTIFICIAL INTELLIGENCE

While AI undoubtedly has the potential to cause profound changes in our lives and economy,[5] on occasion it has been the subject of untethered hype.[6] One way to avoid this pitfall is to stick close to what it is AI does and does not do. AI is not a kind of magic; it is a kind of technology, with the capabilities and limitations inherent in all technologies.

In sticking close to the actual capabilities of AI, one place to start is with a working definition of AI. One widely used definition is: "[a]ny device that perceives its environment and takes actions that maximize its chance of success at some goal."[7]

To meet this definition, an artificially intelligent device does not need to have anything akin to human intelligence. A good example of a minimally artificially intelligent device is the common thermostat, which is used to adjust the temperature in many homes and businesses. The original technology for the thermostat simply involved the binding together of two different metals, which expanded or contracted at different rates as the temperature increased or decreased, causing a curve in the fused metal strips which in turn was used to trigger the appropriate heating or cooling response.[8] The near universal use of thermostats today indicates how useful they are, and it goes without saying that the need to have a human being on hand to adjust the heating and cooling as the temperature changes becomes unnecessary. Nonetheless, no one would argue that a thermostat has consciousness. By the same token, anyone who understands the technological basis for a thermostat understands that it can generally be used to control the

5. *See generally* ERIK BRYNJOLFSSON & ANDREW MCAFEE, RACE AGAINST THE MACHINE: HOW THE DIGITAL REVOLUTION IS ACCELERATING INNOVATION, DRIVING PRODUCTIVITY, AND IRREVERSIBLY TRANSFORMING EMPLOYMENT AND THE ECONOMY (2011); ERIK BRYNJOLFSSON & ANDREW MCAFEE, THE SECOND MACHINE AGE: WORK, PROGRESS, AND PROSPERITY IN A TIME OF BRILLIANT TECHNOLOGIES (2014) (exploring impact of machine learning and other technologies on work and the economy).

6. Jonathan Hill, *An AI Reality Check*, ITPROPORTAL (Jan. 16, 2010), https://www.itproportal.com/features/an-ai-reality-check [https://perma.cc/2Q2F-J2MB].

7. *Artificial Intelligence*, SIYATON (2018), https://siyaton.com/hanaservices/artificial-intelligence [https://perma.cc/5UZB-K3R4].

8 . *Bimetallic Strip*, INTRODUCTION-TO-PHYSICS.COM, https://www.introduction-to-physics.com/bimetallic-strip.html [https://perma.cc/AP69-VE8Y].

heating and cooling devices in a building, but that it could not provide tailored solutions such as bringing an extra sweater to someone who is still somewhat cold or to tuck a child into bed under warm comforters.

An understanding of more advanced current AI technologies can help us to frame them in much the way we have framed the functionality of the thermostat. While significantly more powerful and advanced, these technologies at present have no more consciousness than a thermostat and are similarly limited in the range of what they can do because of the nature of the technologies that underlie them.[9]

There are two main strands to current AI technology.[10] They operate in quite different ways and have quite different capabilities.[11] At present, both are providing useful tools, including in the legal sector.[12]

One strand is the rules-based approach.[13] This approach involves the creation of complex logic trees, involving "if A, then B," kind of commands.[14] Once an event or fact has been characterized, the software will apply the prescribed rule.[15]

This kind of technology represents what Richard Susskind has called GOFAI or "good old fashioned AI."[16] While it reaches limitations when the logic trees become excessively complex or when no consistent logic tree can be constructed, it nonetheless has provided and continues to provide useful tools in the legal sector. For example, this kind of technology underlies many of the document creation products that are used both by lawyers and the lay public, including such products as LegalZoom.[17] This kind of technology more

9. *See generally* Harry Surden, *Artificial Intelligence and Law: An Overview*, 35 GA. ST. U. L. REV. 1305 (2019) (overview of the technologies underlying AI and their applications in the legal sector).

10. *Id.* at 1310.

11. Untangling the strands of AI can be confusing for the non-technologist. For useful guides, see generally Surden, *supra* note 9; *see also* Jack Krupansky, *Untangling the Definitions of Artificial Intelligence, Machine Intelligence, and Machine Learning*, MEDIUM (June 13, 2017), https://medium.com/@jackkrupansky/untangling-the-definitions-of-artificial-intelligence-machine-mtelligence-and-machine-learning-7244882f04c7 [https://perma.cc/ELH2-XAHP].

12. Surden, *supra* note 9, at 1327–36.

13. *Id.* at 1310.

14. *Id.* at 1316–17.

15. *Id.* at 1317.

16. RICHARD SUSSKIND & DANIEL SUSSKIND, THE FUTURE OF THE PROFESSIONS: HOW TECHNOLOGY WILL TRANSFORM THE WORK OF HUMAN EXPERTS 182 (2015).

17. Kurt Watkins & Rachel E. Simon, *AI & the Young Attorney: What to Prepare for and How to Prepare*, ABA (Jan. 16, 2019), https://www.americanbar.org/ groups/intellectual_property_law/publications/landslide/2018-19/january-february/ai-young-attorney [https://perma.cc/74VY-NNU6].

generally underlies what are called "expert systems."[18] Such systems can provide answers to technical questions.

While useful, the rules-based approach faces inherent limitations.[19] First, it requires a problem that can be handled through defined "if A, then B" types of responses. Not all problems fit this model. It also runs into problems when the decision trees required become too complex. Like the unfortunate Mr. Causabon trying to give form to his "Key to All Mythologies,"[20] more than a few rules-based AI developers have found the problem too complex to tame.[21]

The other strand of AI technology currently in use is based upon data analysis.[22] This approach, which involves a subset of machine learning, looks for patterns in large bodies of data.[23] It finds relationships and correlations, from which it can draw conclusions and provide services.[24] This is the kind of AI that underlies products such as translation software, natural language processing, autonomous vehicles, and some document review software.[25]

Data-reliant AI operates by looking for associations. The software assesses how predictive certain factors are, and through iterative analysis hones in on relationships that might not be visible to human analysis.[26]

This software does not apply logical rules in the sense of rules-based systems, or in the way that humans apply logic to solve problems.[27] This software neither understands nor applies logical rules, rather through mathematical analysis of vast amounts of data relationships it can identify these relationships.[28] The software neither knows nor cares why these relationships exist; it simply identifies that they do exist.

Within a narrow area, this kind of pattern recognition and big data analysis can be very powerful, sometimes even exceeding

18. Surden, *supra* note 9, at 1316.

19. *Id.* at 1323.

20. GEORGE ELIOT, MIDDLEMARCH 63 (1871).

21. Arno R. Lodder & John Zeleznikow, *Developing an Online Dispute Resolution Environment: Dialogue Tools and Negotiation Support Systems in a Three-Step Model*, 10 HARV. NEGOT. L. REV. 287, 294 (2005) ("Although some systems operating on small, straightforward legal domains proved successful, the AI & Law community realized that developing legal expert systems was far more complicated than it first appreciated.").

22. Surden, *supra* note 9, at 1310.

23. *Id.*

24. *Id.* at 1312.

25. *Id.* at 1315; Mehedi Hasan, *Top 20 Best AI Examples and Machine Learning Applications*, UBUNTUPIT, https://www.ubuntupit.com/top-20-best-machine-learning-applications-in-real-world [https://perma.cc/TV7R-PLAD]; Josh Markarian, *AI & Machine Learning in Document Review*, TERIS (Feb. 24, 2019), https://teris.com/ai-machine-learning-within-document-review [https://perma.cc/C7SK-XH8C].

26. Surden, *supra* note 9, at 1311.

27. *Id.*

28. *Id.*

human capabilities because of the vast quantities of data that computers can process. It also can identify patterns not easily visible to humans, such as correlations and outcomes that are not contained in any of the stated logical rules that humans often purport to rely upon.

Several factors have led to increasing power of machine learning strands of AI. First, the so-called "datafication" of society has led to the creation of vast pools of data from types of behavior that in earlier eras were not trackable.[29] Mobile telephones provide constantly updated location data, for example, and online shopping and browsing paths leave data trails.

A second factor leading to increased functionality of data reliant AI is that programmers have developed techniques that mimic the way the human brain processes information.[30] These so-called neural networks use various mathematically complex forms of regression analysis to evaluate and weigh data, so as to pass along and overweigh the data most likely to lead to good results.[31]

A third factor is that new chips have been developed that better handle the calculations related to machine learning.[32] Early on, developers found that chips originally designed for video processing in high resolution video games worked well; more recently, chips made with the purpose to interact with AI algorithms have come onto the market.[33]

While data-based AI has become more powerful and more widespread, it is not without its issues. Data reliant machine learning depends upon not just unbiased data, but upon vast collections of data.[34] Put differently it is only possible when sufficiently large bodies of data exist. Datafication has made that possible in many areas, as technologies such as GPS or the Internet create data trails that were not possible in prior eras. Nonetheless, in some areas enough data does not exist, and machine learning cannot find statistically valid relationships.

29. Matt Turck, *A Turbulent Year: The 2019 Data & AI Landscape*, MATTTURCK.COM (June 27, 2019), https://mattturck.com/data2019 [https://perma.cc/36AN-YFPT].

30. *Neural Networks*, SAS INSIGHTS, https://www.sas.com/en_us/insights/analytics/neural-networks.html [https://perma.cc/C3QU-JM7N].

31. *Id.*

32. *What is Tensor Processing Unit (TPU)? How is it Different from GPU?*, RANKRED, https://www.rankred.com/tensor-processing-unit-tpu-different-from-gpu [https://perma.cc/T3SX-6ZGE].

33. *Id.*

34. VIKTOR MAYER-SCHÖNBERGER, BIG DATA: A REVOLUTION THAT WILL TRANSFORM HOW WE LIVE, WORK, AND THINK 6 ("[B]ig data refers to things one can do at a large scale that cannot be done at a smaller one.").

The need for data also creates an inherent conflict between privacy concerns and the goals of machine learning.[35] Privacy advocates often advocate for the non-collection of or a frequent purge of data.[36] On the other hand, those seeking to apply machine learning technology will normally prefer the largest datasets possible.[37]

Another limitation of machine learning AI is that it is inherently backwards looking. In looking at data, it looks at what has happened in order to find relationships. Should key factors change, AI is not well equipped to predict different kinds of future behavior.

Last but not least, it can be difficult and, in some cases, impossible to escape biases inherent in the source's data.[38] The database systems are only as good as the data on which they are based and the algorithms which assess that data.[39] If the data reflects historical bias, machine learning based AI will not judge that bias but will simply incorporate it in the predictions it makes.[40] For example, if human law enforcement officers are subject to biases that cause them to be more likely to arrest and seek convictions of minority members, the AI may predict that minorities are more likely to commit crimes, whether or not the underlying behavior (as opposed to the arrest and conviction rates) is in fact different from majority groups.[41]

Despite these limitations, machine learning based AI has proven very powerful. Outside the area of law, for example, machine learning has allowed AI to take on an open structure quiz game called Jeopardy.[42] IBM's Watson AI product was able to convincingly trounce the world's leading champions, even though, unlike chess, there is no finite set of moves in a Jeopardy game and the subject matter of a Jeopardy game can vary quite widely from topic to topic.[43] AI also enabled AlphaGo to challenge and defeat the

35. Andrew Garberson, *What are Analytics Experts Looking to in 2020 with Data and Privacy?*, MARTECH TODAY (Feb. 28, 2020, 10:52 AM), https://martechtoday.com/what-are-analytics-experts-looking-to-in-2020-with-data-and-privacy-238946 [https://perma.cc/CG8Z-NW8R].

36. *Id.*

37. *Id.*

38. Ignacio N. Cofone, *Algorithmic Discrimination Is an Information Problem*, 70 HASTINGS L.J. 1389, 1402 (2019) (discussing issues involved with bias embedded in big data).

39. *Id.*

40. *Id.*

41. *Id.* at 1403–04.

42. *See* Jo Best, *IBM Watson: The Inside Story of How the Jeopardy-Winning Supercomputer Was Born, and What it Wants to Do Next*, TECHREPUBLIC (Sept. 9, 2013), https://www.techrepublic.com/article/ibm-watson-the-inside-story-of-how-the-jeopardy-winning-supercomputer-was-born-and-what-it-wants-to-do-next [https://perma.cc/5V3G-ZNC8].

43. *Id.*

best player in the game of Go.[44] While Go, like chess, has a finite number of possible moves, the number of possible moves in Go is so vast as to be functionally equivalent to an infinite range of moves for humans and today's computers.[45] Put differently, unlike in chess, a computer playing Go cannot simply identify every possible sequence of moves and incorporate that knowledge in play.[46] Nonetheless, AI was able to dominate the best humans at the game.[47]

Other tasks taken on by machine learning include language translation, facial recognition, tracking and evaluating autonomous physical responses, recognizing spoken and written language in its natural format, and providing appropriate responses.[48] It is worth noting that all of these tasks, impressive as they are, are specialized. While AI can respond to language or even compose music, it does not have the generalized intelligence comparable to that of even a small child.[49]

II. USES OF ARTIFICIAL INTELLIGENCE IN LEGAL SERVICES

Just as thermostats are useful, these AI technologies prove very useful in the legal context.[50] They are able to take over tasks formally performed only by humans.[51] In other cases, they are able to do things that humans cannot do.[52] This has led to expansive claims that AI will supplement if not replace lawyers in many settings.[53]

One area where AI has proven useful is the field of legal research.[54] Statutes and legal decisions provide a kind of data that

44. Cade Metz, *In a Huge Breakthrough, Google's AI Beats a Top Player at the Game of Go*, WIRED (Jan. 27, 2016, 1:00 PM), https://www.wired.com/2016/01/in-a-huge-breakthrough-googles-ai-beats-a-top-player-at-the-game-of-go [https://perma.cc/NYG8-Q5L3].

45. *Id.*

46. *See id.*

47. *Id.*

48. Hasan, *supra* note 25.

49. *See* Alison Gopnik, *Will A.I. Ever Be Smarter Than a Four-Year-Old?*, SMITHSONIAN MAG. (Feb. 22, 2019), https://www.smithsonianmag.com/innovation/will-ai-ever-be-smarter-than-four-year-old-180971259 [https://perma.cc/CX7L-GETQ].

50. *See, e.g.*, Surden, *supra* note 9, at 1329–32.

51. *See id.* at 1329.

52. *See* Harry Surden, *Machine Learning and Law*, 89 WASH L. REV. 87, 88 (2014) ("[T]here may be a limited, but not insignificant, subset of legal tasks that are capable of being partially automated using current AI techniques despite their limitations relative to human cognition."); John Markoff, *Armies of Expensive Lawyers, Replaced by Cheaper Software*, N.Y. TIMES (Mar. 5, 2011), https://www.nytimes.com/2011/03/05/science/05legal.html [https://perma.cc/D2MY-DQC3]; *see also* Da Silva Moore v. Publicis Groupe, 287 F.R.D. 182, 193 (S.D.N.Y. 2012) (accepting computer predictive coding in document review).

53. *See* John O. McGinnis & Russell G. Pearce, *The Great Disruption: How Machine Intelligence Will Transform the Role of Lawyers in the Delivery of Legal Services*, 82 FORDHAM L. REV. 3041 (2014) (arguing that artificial intelligence will transform legal services).

54. *Id.* at 3049.

can be analyzed by current AI technologies.[55] AI enabled research tools help lawyers to more quickly and accurately find relevant law. Some legal research tools provide answers to natural language questions, giving a score that reflects the confidence level that the answer is correct. In addition, these tools can provide a list of sources on which the answer is based. The software can be tasked to continue to search for new materials, providing 24/7 updates should relevant new sources enter the database.

While this sounds amazing—and while the potential is indeed remarkable —at present the reality is somewhat less stunning than it at first may seem. One study compared AI online research tools from various vendors and found that they vary significantly in the cases they produced in response to a search query.[56] In some instances, the search results were relevant but different; in other instances, the software returned irrelevant or incorrect results.[57]

AI is also being used to provide outcome prediction in the event of litigation.[58] Based on reviewing results of prior, similar cases, the software will predict the likelihood that a given judge will rule on behalf of one side or another on a given issue, as well as identify which venues are most likely to lead to success.[59]

Once again, at present the software does not seem to live up to full expectations. No doubt, this is due, in part, to the paucity of available data about actual outcomes, given the tendency of parties to place settlement results under a seal of confidentiality.[60] As noted earlier, AI depends on extensive, un-skewed, and accurate data,[61] and when it comes to litigation results—at least in the United States—this often is unavailable. The software seems more useful in predicting results where outcomes are public, such as in the response to motions, which normally become part of the public

55. Peter Brown, *Waking Up to Artificial Intelligence*, LAW.COM (Feb. 10, 2020, 12:15 PM), https://www.law.com/newyorklawjournal/2020/02/10/waking-up-to-artificial-intelligence [https://perma.cc/SF75-E9CV].

56. Susan Nevelow Mart, *Every Algorithm Has a POV*, 22 AALL SPECTRUM 40, 43 (2017); Susan Nevelow Mart, *The Algorithm as a Human Artifact: Implications for Legal [Re]Search*, 109 L. LIBR. J. 387, 407–08 (2017).

57. *Every Algorithm Has a POV*, *supra* note 56; *The Algorithm as a Human Artifact*, *supra* note 56.

58. Rory Cellan-Jones, *The Robot Lawyers Are Here–And They're Winning*, BBC NEWS (Nov. 1, 2017), https://www.bbc.com/news/technology-41829534 [https://perma.cc/3BX7-5KSC].

59. *Id.* (explaining that in a contest between AI and lawyers to protect the outcome of payment protection mis-selling cases, AI product Case Cruncher Plus generated better results, with 86.6% accuracy versus 66.3% for a panel of expert lawyers).

60. Kate Beioley, *Robots & AI Threaten to Mediate Disputes Better than Lawyers*, FINANCIAL TIMES (Aug. 13, 2019), https://www.ft.com/content/187525d2-9e6e-11e9-9c06-a4640c9feebb [https://perma.cc/XEP4-QDHR].

61. Surden, *supra* note 9, at 1311.

record, but even there, sample size can be factor in achieving statistical reliability.

AI has also been used to facilitate online dispute resolution, responding to the negotiating tactics of human participants.[62] The software responds to bargaining strategies of litigants, providing suggested responses supposedly attuned to the approach of the opposing party.[63] At present, it is difficult to tell whether this functionality has achieved process relevance.

AI has shown strong applications in the area of document review. This takes multiple forms. In the area of mass document review, which is relevant both to large-scale litigation and to large-scale mergers and acquisitions, older forms of document review software have been enhanced by AI.[64] Going beyond some of the limitations inherent in predetermined search queries, this functionality claims to make the first pass of documents called from electronic databases more comprehensive.[65] A different kind of document review involves artificially intelligent examination of complex agreements, highlighting provisions in terms that are nonstandard or appear in a nonstandard way, so that lawyers can focus more efficiently on those points in the document most likely to be significant.

Another interesting application, still in its infancy, is to detect aberrant behavior in corporate settings, enabling more effective legal compliance.[66] AI can sift through massive internal corporate databases, seeking to identify behaviors that differ from ordinary practice.[67] In some cases, the aberrant behavior can lead to identification of illegal activities. For example, the Nasdaq stock exchange has already begun to use AI to detect market abuse, and technology companies offer AI-powered compliance tools to sift large amounts of information.[68]

62. *See, e.g.*, Beioley, *supra* note 60.

63. *Id.*

64. Robert Keeling et al., *Using Machine Learning on Legal Matters: Paying Attention to the Data Behind the Curtain*, 11 HASTINGS SCI. & TECH. L.J. 9 (2020) (explaining how machine learning is used to improve document product through predictive coding versus results by defined searches).

65. *Id.* at 10.

66. *See, e.g.*, Eric Berdeux, *Using Artifical Intelligence to Drive Compliance*, OXIAL, https://www.oxial.com/grc-blog/using-artificial-intelligence-to-drive-compliance [https://perma.cc/A8QJ-DK3P]; *Johannesburg Stock Exchange Will Use AI to Catch Corporate Criminals*, EYETRODIGITAL (Mar. 2, 2020), https://www.eyetrodigital.com/2020/03/02/johannesburg-stock-exchange-will-use-ai-to-catch-corporate-criminals [https://perma.cc/YV78-VFPY].

67. Berdeux, *supra* note 66; *Johannesburg Stock Exchange Will Use AI to Catch Corporate Criminals*, *supra* note 66.

68. *See, e.g.*, Lauren McMenemy, *How Do You Control Insider Trading?*, DILIGENT INSIGHTS (Aug. 14, 2019), https://insights.diligent.com/insider-trading/how-control-insider-trading [https://perma.cc/APX5-RZPN].

Another potential use of AI in corporate settings lies with asset and contract management.[69] The modern multinational corporation typically has vast quantities of assets of various kinds, ranging from patents to office supplies. The same company will often have massive quantities of contracts with suppliers and customers, often involving different languages and different legal systems. The sheer quantity of the assets and the contracts, as well as their tendency to change or terminate on short notice, makes traditional human-based management difficult. AI suggests the possibility to manage such situations more effectively.

Partly due to regulatory barriers, AI usually does not replace lawyers but serves as a tool they use in the course of practice.[70] It is beyond doubt that the technology has proved useful to many lawyers in many settings, reducing the amount of human lawyer time complete a task.[71] There are those who argue that in the near future this will fundamentally reshape the way lawyers work, impacting how many lawyers are needed.[72]

In other settings, AI has taken on a role where it directly provides services to users. In these cases, the AI products replace lawyers in settings where lawyers would have been unable to effectively provide services at the price levels involved.[73] The most economically significant example is LegalZoom, which provides a wide variety of legal forms, ranging from wills to leases, to millions of end-users in the United States and elsewhere.[74] In terms of volume of customers and volume of transactions, LegalZoom outpaces any one law firm.[75] Other end-user offerings provide solutions for tasks as minor as contesting parking tickets or as major as ending a marriage.[76]

69. Penny Crosman, *'Human, Please Look at This': Nasdaq Using AI to Spot Abuses*, AMERICAN BANKER (Nov. 15, 2016, 1:10 PM), https://www.americanbanker.com/news/human-please-look-at-this-nasdaq-using-ai-to-spot-abuses [https://perma.cc/WWL7-7UTF].

70. *See* Ray Worthy Campbell, *Rethinking Regulation and Innovation in the U.S. Legal Services Market*, 9 N.Y.U. J.L. & BUS. 1, 43–45 (2012).

71. Steve Lohr, *A.I. Is Doing Legal Work. But It Won't Replace Lawyers, Yet.*, N.Y. TIMES (Mar. 19, 2017), https://www.nytimes.com/2017/03/19/technology/lawyers-artificial-intelligence.html [https://perma.cc/22DU-NL5Z].

72. *Id.*

73. *Id.*

74. Amit Chowdhry, *How LegalZoom Provides Businesses With Affordable Legal Assistance*, FORBES (Oct. 9, 2017, 12:30 PM), https://www.forbes.com/sites/amitchowdhry/2017/10/09/how-legalzoom-provides-businesses-with-affordable-legal-assistance/#7dbae3c032de [https://perma.cc/5CRT-R8BM].

75. *Id.*

76. Ariel Darvish, *Legal Chatbots: Advancing Technology and Lawyers of the Future*, FORDHAM J. CORP. & FIN. L.: BLOG (May 23, 2018), https://news.law.fordham.edu/jcfl/2018/05/23/legal-chatbots-advancing-technology-and-lawyers-of-the-future [https://perma.cc/SC4Q-QZUW].

In short, AI and other technologies look poised to have an enormous impact on legal services.[77] The question naturally arises: can AI replace judges? While the work of judges in many ways overlaps with the work of lawyers, there are fundamental differences. To approach the question of whether AI can replace judges, we must next look at what judges do.

III. THE FUNCTIONS FULFILLED BY JUDGES

In order to understand what AI can or cannot do in judicial chambers, it is essential to first consider what the work of judges consists of. Many of the current discussions of AI in the judicial context oversimplify the role of judges. Judges do far more than simply issue decisions and resolve cases; looking to the use of autonomous agents in the judicial setting requires an examination of the full range of judicial roles.

As one scholar in the field of judicial studies notes:

> The task of identifying the core role of courts is, perhaps surprisingly, controversial and difficult. Not only do courts occupy a strange place in the social order (at once service provider, governor, and administrator), we often want inconsistent things from the judge – both responsive justice and predictable order. Ideas of the role of courts are bound up in matters of constitutionalism, method, jurisprudence (legal theory), accountability, and political theory more generally. Pulling one thread seems only to reveal another gap that needs filling, exposing another debate, another controversy. One cannot discuss the role of the court without considering also these interrelated issues.[78]

It should first be noted that judges serve substantially different roles in different judicial systems. One comparative scholar writes:

77. SUSSKIND & SUSSKIND, *supra* note 16, at 66 ("[W]e predict that the legal world will change 'more radically over the next two decades' than 'over the last two centuries'.[sic.]"). *But see*, Dana Remus & Frank Levy, *Can Robots be Lawyers? Computers, Lawyers, and the Practice of Law*, 30 GEO. J. LEGAL ETHICS 501, 504 (2017). ("[T]he details are critical for understanding the kinds of lawyering tasks that computers can and cannot perform. The details explain, for example, why document review in discovery practice is more amenable to automation than in corporate due diligence work, and why the automation of Associated Press sports stories and short memos on questions of law do not suggest the imminent automation of legal brief-writing."). *See also*, Milan Markovic, *Rise of the Robot Lawyers?*, 61 ARIZ. L. REV. 325, 349 (2019) ("Artificial intelligence is changing legal practice, as it is other human domains, but most legal tasks that occupy lawyers' days do not lend themselves to automation. The rise of intelligent machines should induce anxiety only among segments of the legal profession that provide routinized and formulaic solutions for clients.").

78. JOE MCINTYRE, THE JUDICIAL FUNCTION: FUNDAMENTAL PRINCIPLES OF CONTEMPORARY JUDGING 4–5 (2019).

> What is the goal of courts and judges in civil matters in the contemporary world? It would be easy to state the obvious and repeat that in all justice systems of the world the role of civil justice is to apply the applicable substantive law to the established facts in an impartial manner, and pronounce fair and accurate judgments. The devil is, as always, in the details. What is the perception of an American judge about his or her social role and function, and does it correspond to the perception of the judge in the People's Republic of China? What are the prevailing opinions on the goals of civil justice in doctrine and case law of Russia and Brazil? Do courts in Hong Kong and in Hungary understand in the same way the need to balance accuracy and speed of court procedures, or to take into account public interests when adjudicating civil disputes?[79]

Beyond the judges themselves, the court systems within which they operate aim to accomplish different goals, ranging from correcting inappropriate governmental activity to promoting social harmony.[80]

One obvious line of division is between so-called common law and civil law court systems. For example, the United States is a common law system, and judges are entrusted with roles in that system that do not apply in typical civil law systems. The obverse also applies—judges operating in the inquisitorial, civil law systems have duties imposed upon them that differ from those of common law judges. Even though there are those who have observed a convergence among the various systems, they remain distinct enough that speaking of judges without regard to the specific national system would constitute an error.

The US also varies from many other systems, perhaps less obviously, in the role courts play in regulatory governance. The US system of "adversarial legalism" shifts to the courts policy decisions that in other systems are made by comparatively more robust bureaucratic ministries.[81] Congress also has often shifted to the courts

79. Alan Uzelac, *Goals of Civil Justice and Civil Procedure in the Contemporary World*, *in* GOALS OF CIVIL JUSTICE AND CIVIL PROCEDURE IN CONTEMPORARY JUDICIAL SYSTEMS: 3–4 (2014).

80. *See id.* at 7 ("Moreover, the implementation of social goals may also play a role at the level of system design, as the state may encourage or discourage the use of civil justice (or its use in a particular way) for reaching the other, external goals (i.e. private enforcement of public law rights, as is the case in the USA; correcting inappropriate government activity, as is the case in Brazil; or achieving social harmony, as is the case in China).").

81. ROBERT A. KAGAN, ADVERSARIAL LEGALISM: THE AMERICAN WAY OF LAW 58 (2nd ed. 2019) ("In sum, whereas European polities generally rely on hierarchically organized national bureaucracies to hold local officials and business firms accountable to national policies, the U.S. federal government, politically impeded from exerting direct

enforcement of regulatory schemes through statutes,[82] and in other cases the system of tort law effectively does the same.[83]

Even within a system, judges at different courts at different levels play quite different roles. For example, the role of a magistrate judge in the United States in federal court is different from the role of an article 3 judge in the United States District Court, which in turn is different from the role of a judge sitting on the relevant Court of Appeals for that federal district court.[84] No one would find a day in traffic court interchangeable with a day in the U.S. Supreme Court. Not only does the day-to-day work differ, but the role of the courts within the overall system differ substantially, with some resolving small disputes in assembly line fashion while others fashion or interpret fundamental law.

Keeping in mind that functions differ by court, it nonetheless is instructive to look at some of the roles courts fulfil in various settings. This includes the tasks involved in deciding individual cases. Israeli Supreme Court Justice Aharon Barak, who was fully aware of the broader range of judicial functions, identified three functions included within this role: fact determination, law determination, and law application.[85] Beyond Barak's triad, the broader roles include not just deciding cases, and in doing so necessarily sometimes adapting the law to new circumstances, but fulfilling functions as diverse as educating participants on the judicial process and projecting to the public the power of the state.

controls. mobilized a distinctly American army of enforcers—a decentralized array of private advocacy groups and lawyers and federal district court judges."); see also VARIETIES OF LEGAL ORDER: THE POLITICS OF ADVERSARIAL AND BUREAUCRATIC LEGALISM (Thomas F. Burke & Jeb Barnes eds. 2017) for a comparative exploration of Kagan's insights.

82. *See generally* SEAN FARHANG, THE LITIGATION STATE: PUBLIC REGULATION AND PRIVATE LAWSUITS IN THE UNITED STATES (2010) (analyzing U.S. practice of delegating regulatory enforcement to courts); Stephen B. Burbank & Sean Farhang, *Class Actions and the Counterrevolution Against Federal Regulation*, 165 U. PA. L. REV. 1495, 1496 (2017) ("Research in multiple disciplines has established that the role of litigation and courts in the creation and implementation of public policy in the United States has grown dramatically."); Richard L. Marcus, *Reining In the American Litigator: The New Role of American Judge*s, 27 HASTINGS INT'L & COMP. L. REV. 3, 7 (2003) ("A final feature of the American experience that bears on this overall picture of the crusading pursuer of right is the distinctive American reliance on private enforcement of public norms.").

83. Samuel Issacharoff, *Regulating After the Fact*, 56 DEPAUL L. REV. 375, 377 (2007).

84. *Court Role and Structure*, U.S. COURTS., https://www.uscourts.gov/about-federal-courts/court-role-and-structure [https://perma.cc/3NWH-V23G].

85. Aharon Barak, *The Role of a Supreme Court in a Democracy*, 53 HASTINGS L.J. 1205, 1205 (2002) ("The role of the judiciary is to adjudicate disputes according to law. Adjudication involves three functions: fact determination (done mostly by the trial court), law application and law determination."); see generally Aharon Barak, *A Judge on Judging: The Role of a Supreme Court in a Democracy*, 116 HARV. L. REV. 16, 98–99, 110–12 (2002), for an explication of Justice Barak's broader views on how judges mediate between legal text and societal issues.

Not mentioned in Barak's triad, but critically important to both the role and acceptance of courts, is that judges make possible the participation of the public in the process of justice, as parties, as spectators, and in some cases in some systems, as jurors. Judges and courtrooms are the link between those individuals affected and the results. Studies have consistently shown that participation, a sense of having one's say and being heard, matters greatly to public acceptance of courts, sometimes outweighing whether a favourable result was obtained.[86]

Another function played by many courts involves explanations of the process to attorneys, litigants, and the public. All judicial settings operate according to set and often complicated rules, both formal and understood, and explaining these rules can be an important function of the judge. The classic comedic movie, *My Cousin Vinny*, provides many examples of how judges must play this role.[87] In the movie, we see the judge explaining the process at levels ranging from court room process to the clothing that lawyers are expected to wear.[88] In today's world, where many courts are burdened with pro se litigants, this function has become all the more important as courts cannot depend on the participants before it to be repeat players who have had an occasion to learn the formal and informal rules in previous proceedings.[89] In some jurisdictions, it is up to the court to educate parties and representatives on issues ranging from where to stand, what to wear, or how to properly fill out court required paperwork.

One function played by many courts is assessing facts. Regardless of whether the court operates in a civil system, and regardless of whether the jury is involved, judges often must review and evaluate evidence and other factual matters.[90] This process, as anyone who has ever taken a course in evidence will understand, can be remarkably complex. Questions arise as to whether evidence is sufficiently probative, and also as to whether it might in some way proved misleading or prejudicial.[91] In addition, in modern judicial

86. Tim Wu, *Will Artificial Intelligence Eat the Law? The Rise of Hybrid Social-Ordering Systems*, 119 COLUM. L. REV. 2001, 2022 (2019) ("The empirical studies conducted by [Tom] Tyler and others suggest that when litigants feel they have a voice and are treated with respect, they tend to be more accepting of decisions, even adverse outcomes.") (citing Tom R. Tyler, *Procedural Justice and the Courts*, 44 CT. REV. 26, 30–31 (2007)).

87. MY COUSIN VINNY (Palo Vista Productions 1992).

88. *Id.*

89. See Mark Andrews, *Duties of the Judicial System to the Pro Se Litigant*, 30 ALA. L. REV. 189, 189 (2013).

90. *See id.* at 194.

91. FED. R. EVID. 403 ("The court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair

systems with the mass of documents and digital data that could be brought into court, issues of economy and cost-effectiveness must be considered when evidence is evaluated. When decisions are to be rendered, the quality of the work done in accepting and evaluating evidence is critical to the accuracy of the outcome.

Fulfilling the function of evaluating evidence, courts must be capable of dealing with the myriad types of evidence that might be presented in the course of resolving a dispute. For example, courts often are expected to observe the behavior of witnesses and determine whether they are credible and to be believed.[92] Courts are also expected to review and understand documents that are presented in a larger context.

In civil law, in some countries with inquisitorial systems courts have the additional role of determining what evidence should be sought out and brought into the process.[93] In common law systems, this function generally is played by the litigants and their counsel, but in inquisitorial systems the judge plays a much greater role in determining which witnesses should be called and what questions should be put to them.[94] This implies an ability to look outside the courtroom itself and identify which of many potential lines of inquiry are most likely to illuminate the truth.

Courts also often are asked to create documents. In some cases, the task of creating such documents is repetitive and formulaic. For example, in the course of ordinary business, courts must issue numerous scheduling orders and other simple documents that are required for the flow of judicial work to proceed. At the same time, many documents prepared by the court are complex and not formulaic or repetitive at all. An example of these sorts of documents would include memoranda resolving a novel legal issue that has been presented to the court for decision. A competent judge operating at any but the lowest level court must be capable of generating both kinds of documents.

Courts must identify and correctly apply legal doctrine. Routinely, legal issues are presented to courts, and the court must resolve those issues within the controlling context of the facts before the court. This includes not just being able to identify the correct rule but being able to apply it to diverse fact situations. As anyone who has ever taught law students can attest, the ability to learn

prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence.").

92. *See, e.g.*, United States v. Jones, 356 F.3d 529, 537–38 (4th Cir. 2004) (trial court's determination of witness credibility virtually unreviewable).

93. John H. Langbein, *The German Advantage in Civil Procedure*, 52 U. CHI. L. REV. 823, 824 (1985) ("My theme is that, by assigning judges rather than lawyers to investigate the facts, the Germans avoid the most troublesome aspects of our practice.").

94. *Id.*

and memorize a rule does not translate automatically to the ability to apply the rule reliably and insightfully, yet this is what we expect competent judges to do. They must ascertain the relevant legal rules and understand how differing factual settings, including the passage of time or changes in the meta-environment, can impact whether and how the rule should be applied.

In applying law, we expect judges to be able to correctly apply the law regardless of how specific the rule is. Put differently, we expect judges to be able to correctly apply legal doctrine whether it is presented in the form of relatively specific rules or more flexible standards.

We also expect judges to be able to understand and have fluency in applying indirect analogies.[95] Very commonly, judges are asked to consider whether the fact situation before them is like or unlike factual situations that are facially different in many important ways. This application of analogies can take many forms and can be quite complicated. For example, in considering a new legal argument, courts are often asked to consider whether a rule applicable in a somewhat different setting should provide guidance by analogy, or whether a different rule applied in another setting should provide the requisite analogy. Furthermore, in considering whether a jury trial was required when union members asserted a breach by the union leadership, the Supreme Court looked at whether the situation was more analogous to legal malpractice or breach of fiduciary trust, neither of which was strictly on point.[96] The analogies can be even more meta and abstract, however, and involve fundamental value decisions. Courts may be asked to consider whether given behavior is as reprehensible or as blameworthy as quite different behavior in other settings.

Judges are also expected to operate in ways that are consistent with the overall governance and delivery of justice in their system. Put differently, litigants and the public expect that the nature of decision-making and justice will not vary fundamentally based on personnel but will have at some level consistency based on the governing legal system. In settings where judicial discretion is permitted, achieving this requires judges to be aware of and sensitive to the overall practice. In areas where judicial discretion is limited, it requires judges to categorize the behavior before them in ways that are sufficiently consistent with the categorizations given by other

95. Cass R. Sunstein et al., *Symposium: Legal Reasoning and Artificial Intelligence: How Computers "Think" Like Lawyers,* 8 U. CHI. L. SCH. ROUNDTABLE 1, 19–20 (2001) (arguing that reasoning by analogy is a critical aspect of judging, which at present computers cannot do).

96. *See generally* Chauffeurs, Teamsters and Helpers, Local No. 391 v. Terry, 110 S. Ct. 1339 (1990).

judges so that the nondiscretionary results are consistent. These also are complex tasks.

In common law systems, judges also play an important role in creating law. The decisions reached, and the reasons given for those decisions, help create new law that will be applied in future cases. This involves not just the application of existing rules, but identifying whether and how a rule should be extended, limited, distinguished, or avoided with an exception based on the facts and circumstances of the current case. Not just the result, but the way in which the result is presented and explained, will have an impact on parties not present before the court.

In creating and applying law alike, it has long been recognized that judges do something different than simply applying formulaic rules. In the classic expression of Justice Holmes:

> The life of the law has not been logic: it has been experience. The felt necessities of the time, the prevalent moral and political theories, intuitions of public policy, avowed or unconscious, even the prejudices which judges share with their fellow-men, have had a good deal more to do than the syllogism in determining the rules by which men should be governed.[97]

In resolving both individual cases and developing new law, courts must balance equitable and societal interests.[98] Rigid adherence to rules must be balanced with the potential for equity or mercy in each situation. Clear deterrence must be balanced with the opportunity to take into account unique or special facts in the particular case. In some cases, the balancing will involve social and moral decisions.

As Justice Cardozo recognized, for human judges the balancing of the various considerations is both inherently personally and inextricably rooted in individual human experiences.

> There is in each of us a stream of tendency, whether you choose to call it philosophy or not, which gives coherence and direction to thought and action. Judges cannot escape that current any more than other mortals. All their lives, forces which they do not recognize and cannot name, have been tugging at them—inherited instincts, traditional beliefs, acquired convictions; and the resultant is an outlook on life, a

97. OLIVER WENDELL HOLMES JR., THE ANNOTATED COMMON LAW: WITH 2010 FOREWORD AND EXPLANATORY NOTES 1.

98. Similar issues can arise in other legal roles, such as the duty of prosecutors to seek justice and not just convictions. *See* Stephen E. Henderson, *Should Robots Prosecute and Defend?*, 72 OKLA. L. REV. 1 (2019) (arguing that the value balancing involved in prosecutorial discretion should preclude AI prosecutors).

> conception of social needs, a sense in James's phrase of "the total push and pressure of the cosmos," which, when reasons are nicely balanced, must determine where choice shall fall. In this mental background every problem finds its setting. We may try to see things as objectively as we please. None the less, we can never see them with any eyes except our own.[99]

Judges also play important roles that go beyond resolving individual cases. Perhaps the most important is projecting the power and legitimacy of the state to the public. There is a reason that courthouses are imposing buildings that often look like ancient temples and not at all like strip mall convenience stores or payday check outlets. There was a time when dispute resolution was a function of the sovereign directly,[100] and courts have never lost touch with the need to assert the dignity of the state as a core part of their function. An important function of courts is to communicate the authority of the state to resolve disputes among citizens and to impose binding, sometimes harsh, resolutions of those disputes. In all systems, the acceptance by the public of the legitimacy of the courts in the state represents an important goal of the way the judicial process is carried out.

In asking whether AI can play the role of judges, we must ask to what degree AI can play the full role of judges. Being a judge requires much more than legal drafting or even reaching an accurate resolution of a case. It will require that AI courts can enable public participation, give participants a sense of being fairly heard, bridge across different legal doctrines with on point analogies, balance the mechanical application of rules with Solomonic intuition,[101] and will vindicate the legitimacy not just of the courts, but of the governmental system within which they reside.

IV. THE USES OF ARTIFICIAL INTELLIGENCE IN JUDGING

In light of the foregoing, we can examine to what extent AI can support or displace judges. Rather obviously, AI can do for judges many of the same tasks AI does for lawyers. For example, just as AI accelerates legal research for lawyers, can accelerate legal research for judges. At present, again as is true with lawyers, it would be unwise to completely trust the results of AI legal research, but

99. BENJAMIN N. CARDOZO, THE NATURE OF THE JUDICIAL PROCESS 2 (Andrew L. Kaufman ed., Quid Pro Law Books 2010) (1921).

100. FREDERICK POLLOCK & FREDERIC WILLIAM MAITLAND, THE HISTORY OF ENGLISH LAW 79 (Liberty Fund 2d ed., 2010) (1895).

101. MCINTYRE, *supra* note78, at 88–92.

in many cases, it can whittle down the body of law that needs to be examined.

AI also will certainly play a role in the drafting of routine documents. Much of the work of courts is repetitive and amounts even in high-level courts to glorified form completion. Such matters as scheduling or show cause orders can be relegated AI without grave risk.

AI can also play a helpful role in terms of communicating with the public. In some areas of China, for example, AI robots greet visitors to the courthouse in some areas and help guide them to the appropriate location.[102] Over time, this kind of guidance can become more sophisticated and more helpful. There is no reason AI cannot help litigants produce legal forms that are in accord with the requirements of the court and guide the litigants with regard to the court process for case submission and development.

AI voice recognition also can be used already to create real time transcripts of testimony court proceedings.[103] At times, it is helpful for courts to review a written record of what transpired in the day's proceedings, and AI can provide this with reasonable accuracy at low cost, with any questionable transcription subject to human review against the audio recordings.

One controversial role AI has already played assisting judges in determining whether prisoners should be released pretrial, and at what level bail should be set.[104] Criminal risk assessment tools, such as the software COMPAS, use algorithms to predict a person's recidivism.[105] Researchers have found racial disparities in the software's determinations even though the software does not use race as a data point.[106] This proves to be a major concern to litigants and courts since they are unable to review the proprietary algorithm to

102. *See* Xin Wen, *Robot Gives Guidance in Beijing Court*, CHINA DAILY (Oct. 13, 2017, 7:03 AM), https://www.chinadaily.com.cn/china/2017-10/13/content_33188642.htm [https://perma.cc/X885-33TW]; Monisha Pillai, *China Now Has AI-Powered Judges: Is AI Arbitration the Future?*, RADII: DAILY DRIP (Aug. 19, 2019), https://radiichina.com/china-now-has-ai-powered-robot-judges/ [https://perma.cc/7LY7-V7XF] ("This virtual judge, whose abilities are based on intelligent speech and image synthesizing technologies, is to be used for the completion of 'repetitive basic work' only, according to the Beijing Internet Court's official statement on the move. That means she'll mostly be dealing with litigation reception and online guidance.").

103. Laura Stotler, *Courtside Solution Uses AI to Automate Court Transcription*, FUTURE OF WORK NEWS (Oct. 24, 2019), https://www.futureofworknews.com/topics/futureofwork/articles/443571-courtside-solution-uses-ai-automate-court-transcription.html [https://perma.cc/2HFG-JHXZ].

104. *See* Megan T. Stevenson & Christopher Slobogin, *Algorithmic Risk Assessments and the Double-edged Sword of Youth*, 96 WASH. U. L. REV. 681 (2018).

105. Julia Dressel & Hany Farid, *The Accuracy, Fairness and Limits of Predicting Recidivism, in* SCIENCE ADVANCES 1 (Jan. 2018).

106. *Id.*

further explore its accuracy and fairness.[107] Although judges can in theory disregard the recommendation of the software, there is a tendency to rely on the "black box" to provide answers.[108] The use of proprietary algorithms and potentially suspect datasets in such functions will remain a controversial topic for some time to come.

AI can also be used to make sure that the resolution of a dispute by a particular court is in line with the results reached by other courts on similar facts and similar legal issues. Again, China has pioneered this, with its Same Type Case Reference System program comparing similar factual and legal situations so as to give guidance not just to the trial court but those who review the trial court's actions.[109] Although China is nominally a civil law country, this process arguably has the effect of bringing something like *stare decisis* to Chinese jurisprudence, as courts are required to reach results consistent with other courts that face the same issue and similar facts.[110] Again, however, the argument can be made that prior bias and prior errors in approaching issues are only perpetuated by such an approach. In China's case, the counterargument is that while China has made extraordinary progress in building a professional judiciary since the age of Opening Up and Reform began in 1978, it still must contend with many poorly trained and poorly educated judges.[111] Use of artificial software that relies on a body of cases that are considered to have reached the right result provides a level of supervision that draws efficiently on the achievements of the system's best trained judges.

In all these settings, AI is being used primarily to assist judges in their tasks. Put differently, in these settings AI is doing nothing that a staff of clerks or court officials cannot do instead. While understaffed and overworked courts may find the assistance of AI tools helpful, the work of the judge herself may not be fundamentally changed.

What about situations where AI is used for interface directly with the public and replace interaction with the judge? There are some situations where this has begun to happen. Examining these settings helps put a sharper light on those judicial roles that AI can and cannot fill in the near future.

Some of these settings involve AI-rendered decisions of cases. In this regard, it is worth remembering that alternatives to

107. *See id.*
108. *Id.* at 681.
109. *See* Deng, *supra* note 3, at 224.
110. *Id.* at 240.
111. Ray Worthy Campbell & Fu Yulin, *Moving Target: the Regulation of Judges in China's Rapidly Evolving Legal System*, *in* REGULATING JUDGES: BEYOND INDEPENDENCE AND ACCOUNTABILITY 105, 109–10 (Richard Devlin & Adam Dodek, eds.,Elgar 2016) (while rapid progress has been made by 2007 only two thirds of China's judges had undergraduate college degrees, not all of them in law).

judicially rendered decisions have always existed. The field of alternative dispute resolution has gained increasing visibility in recent years, with arbitration, mediation, and other forms of dispute management that operate outside the judicial process becoming more and more part of the overall dispute resolution landscape.

Over past years, many sophisticated algorithmic platforms have joined the ADR world, in some cases spun off from their original function resolving disputes in online communities and marketplaces.[112] This in turn has given rise to a new term—ODR, or online dispute resolution—and academic discussions about the issues raised by and the potential of these tools.[113] Algorithmic tools have played a role in this environment from the beginning, and notwithstanding the profoundly human emotional and social aspects of mediation,[114] it seems likely going forward that increasingly sophisticated AI will play a major role in powering these tools. It is expected by many that ODR tools powered by technology will play a major role in providing practical alternatives to traditional courts in ways

112. *See* Susan Nauss Exon, *Ethics and Online Dispute Resolution: From Evolution to Revolution*, 32 OHIO ST. J. ON DISP. RESOL. 609, 614–15 (2017).

113. *See* David Allen Larson, *Artificial Intelligence: Robots, Avatars, and the Demise of the Human Mediator*, 25 OHIO ST. J. ON DISP. RESOL. 105, 110 (2010) ("Artificial intelligence devices are proliferating and, like it or not, increasingly will become a greater part of dispute resolution and problem solving processes."); David A. Larson, *Brother, Can You Spare a Dime? Technology Can Reduce Dispute Resolution Costs When Times Are Tough and Improve Outcomes*, 11 NEV. L.J. 523, 559 (2011) ("Dispute resolvers and problem solvers can look to the health care industry for examples of how artificial intelligence devices can assume complex tasks. When these devices are given responsibility for tasks that require patience and repetition, for instance, both neutrals and parties will benefit from the cost savings."); Scott J. Shackelford & Anjanette H. Raymond, *Building the Virtual Courthouse: Ethical Considerations for Design Implementation, and Regulation in the World of ODR*, 2014 WIS. L. REV. 6165 (2014) (reviewing history and design issues related to ODR, including the issues raised by incorporating algorithmic or AI powered tools); Anthony J. Fernandez & Marie E. Masson, *Online Mediations: Advantages and Pitfalls of New and Evolving Technologies and Why We Should Embrace Them*, 81 DEF. COUNS. J. 395 (2014) (reviewing types of automated online dispute resolution, including types not involving AI); Ethan Katsh & Colin Rule, *What We Know and Need to Know about Online Dispute Resolution*, 67 S.C. L. REV. 329, 343 (2016) ("Eventually ODR may be the way we resolve most of the problems in our lives, with algorithmic approaches even more trusted than human powered resolutions."); Robert J. Condlin, *Online Dispute Resolution: Stinky, Repugnant or Drab*, 18 CARDOZO J. CONFLICT RESOL. 717, 724–33 (2017) (reviewing various types of ODR, including those powered by AI); Ayelet Sela, *Can Computers Be Fair? How Automated and Human-Powered Online Dispute Resolution Affect Procedural Justice in Mediation and Arbitration,* 33 OHIO ST. J. ON DISP. RESOL. 91 (2018) (examining impact of automated ODR on procedural justice goals).

114. *See* Eileen Barker, *Emotional Literacy for Mediators*, MEDIATE, https://www.mediate.com/articles/ebarker1.cfm [https://perma.cc/XG6X-CR39] (arguing that mediators must be adept at navigating the emotional language of conflict).

that will help ease the access to justice crisis.[115] In some cases that has already happened.[116]

In this regard, it is worth asking whether AI when it is used to render decisions is serving as just another form of ADR or actually taking the place of judges. As is evident from the discussion about the judicial function, courts play roles that go far beyond resolving the individual dispute.[117] When we talk about AI judges, we need to look at the full set of roles courts and judges play.

There are different models that can be used for bringing AI directly into the judicial decision process without *ex ante* human guidance.[118] One approach, which seems to be that anticipated in Estonia, is to delegate only low value cases to AI, with the possible use of a *de novo* appeal to a human judge.[119] While providing potentially enforceable opinions, this arguably amounts more to a form of AI powered mediation, with the litigants free to pursue their legal claims if they are unhappy with the AI generated result.[120] Note, however, that this may differ from traditional mediation in that simply walking away may not be an option if the AI decree is enforceable—the disappointed litigant will need to invest in and commit to a human-driven judicial process in order to escape the decree.[121]

A second approach, exemplified by the use of AI in courts in China, would be to limit AI to specific kinds of 'easy' cases where the decision parameters are simple and clear.[122] In Zhejiang province, for example, several thousand dangerous driving and theft cases have been initially decided by AI software, subject to review by a human judge.[123] The large sample of similar cases and well-defined determinants of outcome have made this possible.[124] Over

115. China already has implemented an ODR court. *See* Alice Mingay, *Size Matters: Alibaba Shapes China's First "Court of the Internet,"* MERICS BLOG: EUROPEAN VOICES ON CHINA (OCT. 17, 2019), http://www.merics.org/en/blog/size-matters-alibaba-shapes-chinas-first-court-internet [https://perma.cc/T78T-G3HR]; *see also* SUSSKIND & SUSSKIND, *supra* note 16, at 70 (discussing application of ODR systems such as Modria, Cybersettle, and Resolver).

116. *See* Tara Vasdani, *From Estonian AI Judges to Robot Mediators in Canada, U.K.*, THE LAWYER'S DAILY, https://www.lexisnexis.ca/en-ca/ihc/2019-06/from-estonian-ai-judges-to-robot-mediators-in-canada-uk.page [https://perma.cc/KY2S-WQ77] (documenting how an AI mediator facilitated the settlement of a small claim).

117. *See* MCINTYRE, *supra* note 78, at 4–5.

118. *See* Richard Re & Alicia Solow-Niederman, *Developing Artificially Intelligent Justice*, 22 STAN. TECH. L. REV. 242, 253–54 (2019) (demonstrating that adjudication processes can follow a simple "legal algorithm").

119. *See* Vasdani, *supra* note 116.

120. *Id.*

121. *Id.*

122. *See* Deng, *supra* note 3, at 275–76.

123. *Id.*

124. *Id.* at 276. ("In the Zhejiang province, there have been around 5,000 cases of dangerous driving or theft decided with machines in which the machines extracted

time, should experience show that these cases really are as easy as believed, the level of human review could conceivably be dialled down.

China's use of AI in courts also illustrates the limitations of AI. As previously noted, machine learning requires vast amounts of data.[125] Such data is not always available. For example, China's ambitious similar case AI system sought to model intentional murder.[126] It failed in significant part because too few intentional murder cases existed to provide an adequate sample.[127] The problem was complicated because intentional murder presents in a multiplicity of ways, making recognition and characterization more difficult.[128]

In the US system, the issue of data presents an even larger problem than in China, especially in civil cases. As has been well noted, the phenomenon of the 'vanishing trial' means that few cases reach trial, with many of those cases reaching voluntary settlements instead.[129] However, the fragmented and outdated US docket systems make it a surprisingly difficult task to figure out even what percentage of cases settle, much less to determine on what terms.[130] Efforts to predict future results based on past results run into the issue that in many settled cases we simply don't know what the prior results were.[131]

The Chinese experience suggests that even for suggesting outcomes, not all cases are suitable for AI. In order to get to statistically significant results there must be a large pool of cases with a limited number of factors that can affect outcomes.[132] Even in a

factors and recommended resolutions under human judges' supervision. This represents more than seventy percent of the cases that fell within the scope of simplified procedures. Because of their frequent occurrences and limited types of fact patterns, models can easily be built, and machines can easily be trained for cases involving these crimes. This approach saves significant human effort in resolving these types of cases.").

125. *See* Surden, *supra* note 9, at 1311.

126. *See* Deng, *supra* note 3, at 275.

127. *Id.*

128. *Id.*

129. *See* Marc Galanter, *The Vanishing Trial: An Examination of Trials and Related Matters in Federal and State Courts*, 1 J. EMPIRICAL LEGAL STUD. 459, 460 (2004).

130. Theodore Eisenberg & Charlotte Lanvers, *What Is the Settlement Rate and Why Should We Care?*, 6 J. EMPIRICAL LEGAL STUD. 111, 113 (2009); *see* Theodore Eisenberg, *The Need for a National Civil Justice Survey of Incidence and Claiming Behavior*, 37 FORDHAM URB. L.J. 17, 23 (2010).

131. This opacity with regard to ultimate outcomes contrasts with the copious reporting of interim legal decisions. If a defendant files a motion to dismiss that is denied in federal court, the odds are good that the decision can be found in a case reporter. That provides voluminous data for legal research. If the case then settles in light of the court's decision, the odds are quite high that the settlement terms are not reflected in any order of dismissal and may well be sealed behind a voluntary confidentiality agreement. In turn, that means that finding reliable, unskewed data on how cases actually resolve is a difficult task.

132. *See* Deng, *supra* note 3, at 276.

country as committed to capturing data in its judicial system as China, not all kinds of cases are amenable.[133]

There may be some courts where AI could effectively resolve cases—and some of these high-volume, assembly-line courts might be improved from the experience with human judges. One professional responsibility scholar has described the high-volume Chicago courts that handle landlord tenant and personal debt matters as akin to a "no man's land."[134] Arguments, if even made, were not considered by the judges.[135] Cases proceeded on an impersonal basis that all too often negatively affect the low-income individuals pulled into those courts.[136] AI might be an improvement.

But, in those settings where courts act like courts—legal arguments are made by lawyers, those arguments are considered by judges, evidence is developed and carefully weighed—we come up against a limitation of AI that goes to the heart of what courts do. In these kinds of courts, a generalized intelligence is required, and at present AI has not achieved anything beyond narrowly specialized capabilities.[137]

Even if AI develops generalized intelligence, one wonders if it is possible or desirable to have AI programs represent the majesty and legitimacy of the state. One argument against this is purely practical and relates to whether AI has or can achieve sufficient accuracy to serve fairly as a judge.[138] Key in this argument are the issues of bias in the data or the algorithms which can skew results based on big data. Keeping in mind that AI methods are often cloaked in confidentiality, even when they would be comprehensible to humans who wish to review them, determining whether AI results are sufficiently fair is a non-trivial challenge.[139]

Another objection would remain even if AI decision making reached parity with human judges. As noted, many judicial decisions require balancing of interests and concerns, and go far afield from simply applying a readily applied legal rule.[140] Some would

133. *Id.* at 275 (noting that adjudicating murder cases, for example, has proven difficult given that facts and circumstances in those cases are too numerous to model).

134. *See* Steven Lubet, *Professionalism Revisited*, 42 EMORY L.J. 197, 204–05 (1993).

135. *Id.* at 205.

136. *Id.*

137. *See* Surden, *supra* note 9, at 1309.

138. *See* Tom C.W. Lin, *Artificial Intelligence, Finance, and the Law*, 88 FORDHAM L. REV. 531, 531 (2019) (reviewing the "perils and pitfalls of artificial codes, data bias, virtual threats, and systemic risks relating to financial artificial intelligence").

139. *See* Surden, *supra* note 9, at 1314 (suggesting that AI through machine learning can self-program with little input from humans).

140. *See* Henderson, *supra* note 98.

claim that it is morally objectionable for AI to make such decisions.[141]

Yet another objection has to do with whether the public will ever have the necessary respect and even reverence for algorithmic decision makers.[142] Courts, as noted, represent the majesty and power of the state, and in all systems, it is an important role of courts to reaffirm the legitimacy of the system in which the courts operate.[143] A court that seems no more august than TripAdvisor or Siri may not fulfil that function. That said, this is an issue that might change across generations. As forthcoming generations become increasingly familiar and comfortable with AI in other settings, and perhaps increasingly cynical about the motivations and methods of human decision makers,[144] the gap in between AI and human judges may shrink or even reverse.

At one level, AI is an alien form of intelligence, and will be even if it achieves generalized capabilities—no more like humans than reptilian visitors from another galaxy would be.[145] To have such an intelligence create and extend laws, despite being so far removed from being a member of the body politic, comes up against the legitimacy of the judicial system.[146] Whether our societies are ready to accept that involves issues far beyond technological capability.

CONCLUSION

AI will continue to play a role in the judicial system. Courts will continue to use AI as a force multiplier in order to allow more work to be done with limited resources. Some systems are also using AI to generate at least tentative outcomes in low stakes cases; this can also be expected to continue. Beyond that, the limitations of today's AI play a role. AI presently is well suited to highly

141. *See* Arno R. Lodder & John Zeleznikow, *Developing an Online Dispute Resolution Environment: Dialogue Tools and Negotiation Support Systems in a Three-Step Model*, 10 HARV. NEGOT. L. REV. 287, 291 (2005) ("One reason for [not having artificial intelligence take over the role of judging], mainly uttered by lawyers, is that allowing computers to make judgments is morally undesirable.").

142. *See* Re & Solow-Niederman, *supra* note 118, at 276 (suggesting that greater involvement of AI in the legal system may lead to alienation and consequent negative effects).

143. *See* Frederick Pollock & Frederic Maitland, *The History of English Law Before the Time of Edward I*, 183 EDINBURGH R. 428, 432 (1896).

144. Re & Solow-Niederman, *supra* note 118, at 245 ("As AI capabilities improve, the perceived distinctiveness of human expertise and insight may decline—and human judgment calls may even come into disrepute.").

145. *See* Oliver Rozynski, *We Are Creating the Alien*, MEDIUM: TOWARD DATA SCIENCE (May 20, 2019), https://towardsdatascience.com/we-are-creating-the-alien-878921e0c3e8 [https://perma.cc/EK6U-7ENM].

146. One issue that has come up is whether AI judges violate the doctrine of role reversibility—that judges should be subject to the same rules they decree and apply. *See* Kiel Brennan-Marquez & Stephen E. Henderson, *Artificial Intelligence and Role Reversible Judgment*, 109 J. CRIM. L. & CRIMINOLOGY 137, 140 (2019).

specialized tasks, but judging in a complex case is a highly generalized task. AI needs to develop general intelligence—something that may or may not be achieved—before AI can possibly step into such judging roles. Even if it does, we will run into other issues closely related to the role judges play in society, such as projecting the power and legitimacy of the state. AI, even if it achieves general intelligence, will remain a form of alien intelligence, fundamentally different from human intelligence and also subject to neither the rules nor experiences that apply to humans in the judicial system. The question is not whether AI judges can research legal questions or even make legal awards consistent with what other courts issue. The question is more fundamental. Will we as a society ever be willing to delegate fundamental rule-making powers and assign assertion of the legitimacy of the state to such non-human entities?