JUDGE V ROBOT? ARTIFICIAL INTELLIGENCE AND JUDICIAL DECISION-MAKING

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As technology continues to change the way in which we work and function, there are predictions that many aspects of human activity will be replaced or supported by newer technologies. Whilst many human activities have changed over time as a result of human advances, more recent shifts in the context of technological change are likely to have a broader impact on some human functions that have previously been largely undisturbed. In this regard, technology is already changing the practice of law and may for example, reshape the process of judging by either replacing, supporting or supplementing the judicial role. Such changes may limit the extent to which humans are engaged in judging with an increasing emphasis on artificial intelligence to deal with smaller civil disputes and the more routine use of related technologies in more complex disputes.

I INTRODUCTION

The role of a judge is a complex one. It can incorporate activism, complex interactions with people, dispute settlement, case management, public and specific education activities, social commentary as well as adjudicatory functions that might be conducted with other judges or less commonly in some jurisdictions with lay people (juries).[1] The extent to which judges are engaged in each activity varies across jurisdictions and between judges. Some judges may be more 'responsive' than others, and others may show more emotion and compassion or be oriented towards therapeutic justice – interventions focussed on procedural justice that emphasise 'voice' and respect.[2] Given this variation, it is difficult to determine how developments in artificial intelligence ('AI') may

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1 See Tania Sourdin and Archie Zariski (eds), *The Multi-tasking Judge: Comparative Judicial Dispute Resolution* (Lawbook, 2013).

2 For a broader discussion of the judicial role and responsiveness see Tania Sourdin and Archie Zariski (eds), *The Responsive Judge: International Perspectives* (Springer Nature Singapore, 2018).

reshape the judicial role. However, the writer contends that developments may change the interactive nature of the role, varying the adjudicative function with the potential to remove judges from an adjudicative function altogether. Whilst developments in 'Judge AI' or 'Judicial AI' are in their infancy, there are indicators that it will become more relevant and there are already developments, although somewhat unpopular, to introduce Judge AI in relation to some categories of dispute.[3]

In terms of these developments and those in relation to AI, what will judging involve in the next 10, 20 or 30 years? More specifically, are there aspects of the judicial function that will ensure that judging remains a human activity at least in relation to some categories of dispute? Each of these questions can be informed to some extent by examining recent changes in the context of how lawyers, courts and others are currently using technology. What is abundantly clear is that the roles of those involved in justice and judging is rapidly changing and newer, more disruptive technologies have already reshaped some aspects of the justice system. Whilst the use of technology by lawyers may not immediately result in a transformation of the judicial role, it will no doubt change how some functions are exercised. For example, the shift to increasing use of AI in the form of predictive coding,[4] predictive analytics[5] and machine learning[6] suggests that law firm use of AI is already changing how material is presented to judges and how client risk is assessed.

These developments have not taken place without some controversy. In the United States ('USA'), it was recently noted that predictive coding was already being used to determine whether recidivism was more likely in criminal matters and to assist in making decisions about sentencing.[7] Importantly, many of these current developments may have an impact on judges by removing some task related functions but are unlikely to entirely reshape the judicial function or role. The writer suggests however, that recent developments in AI are likely to have a more profound impact on judges and judging into the future, and this requires us to consider the role of the judge within modern society as well as the significant issues linked to privacy, policy, intellectual property and societal and individual

3 See the strategic approach undertaken in the United Kingdom ('UK'): Ministry of Justice (UK), 'Transforming Our Justice System: Assisted Digital Strategy, Automatic Online Conviction and Statutory Standard Penalty, and Panel Composition in Tribunals' (Government Response Cm 9391, February 2017). The automatic online conviction process that was proposed in the UK has had some detractors and legislation that would enable the creation of the automatic online conviction process and the development of the online court have stalled: see John Hyde, 'Prison and Courts Bill Scrapped', *The Law Society Gazette* (online), 20 April 2017 <https://www.lawgazette.co.uk/news/breaking-prisons-and-courts-bill-scrapped/5060715.article>. See also Prisons and Courts HC Bill (2016–17) [170] (UK) and relevant debate in the House of Commons: United Kingdom, *Parliamentary Debates*, House of Commons, 20 March 2017, vol 623, col 656.

4 Now used in the e-discovery area as discussed later in this article.

5 Predictive analytics is more focussed on predicting outcomes, as discussed later in this article.

6 See Kevin D Ashley, *Artificial Intelligence and Legal Analytics* (Cambridge University Press, 2017) for a more complete description of these processes and systems.

7 See Adam Liptak, 'Sent to Prison by a Software Program's Secret Algorithms', *The New York Times* (online), 1 May 2017 <https://www.nytimes.com/2017/05/01/us/politics/sent-to-prison-by-a-software-programs-secret-algorithms.html?smid=tw-share&_r=0>.

need that are raised by both AI and Judge AI more specifically. This article explores the nature of these developments in the context of the adjudicative role of judges and considers issues that arise when considering Judge AI and which include whether a framework exists that could enable developments to take place and if so, what particular issues arise that relate to legal authority, translating law into code, the use of discretion and understanding of syntax and semantics.

In this regard, 'AI' in this article refers to a field of science, engineering and technology which focuses on the creation of intelligent machines[8] and is an umbrella term which encompasses many branches of science and technology and will often involve the creation of complex algorithms to enable outcomes to be determined. AI can include machine learning, natural language processing, expert systems, vision, speech, planning and robotics.[9] Schatsky, Muraskin and Gurumurthy offer a practical definition of AI, stating that it is 'the theory and development of computer systems *able to perform tasks that normally require human intelligence*'.[10] AI is an evolving concept and over time, technological advances mean that computer programs and systems become more capable of performing tasks and functions. As machines become more capable, routine tasks and functions once considered integral to AI are removed from the definition and no longer perceived to be a novelty, allowing the field to concentrate on the essential, complex functions of intelligence.[11] Importantly, at present, most AI innovation is being led by corporate research and development processes and developments in this sector may have little regard to societal good[12] or the deeper implications of AI innovation, particularly in the justice sector. Judge AI used in this context is more specifically focussed on judicial tasks – particularly adjudication. Furthermore, as noted above, the increasing use of AI to perform complex functions may include developments in affective processing that could emerge in the near future.

As noted, there are already some examples of AI informing human decision-making in the justice sector. In the USA and other jurisdictions,[13] AI is already changing judicial decision-making and, in the legal sector, there are predictive analytics developments that enable predictions to be made regarding the outcome of litigation.[14] The impacts of these technologies are currently emerging in some

8 Michael Mills, *Artificial Intelligence in Law: The State of Play 2016 (Part 1)* (23 February 2016) Legal Executive Institute <http://legalexecutiveinstitute.com/artificial-intelligence-in-law-the-state-of-play-2016-part-1/>.

9 Ibid.

10 David Schatsky, Craig Muraskin and Ragu Gurumurthy, 'Demystifying Artificial Intelligence: What Business Leaders Need to Know about Cognitive Technologies' (Report, Deloitte University Press, 2014) 3 (emphasis in original).

11 Ibid.

12 See generally Corinne Cath et al, 'Artificial Intelligence and the "Good Society": The US, EU, and UK Approach' (2017) 24 *Science Engineering and Ethics* 505.

13 For example, in Mexico, the Expertius system is advising judges and clerks 'upon the determination of whether the plaintiff is or is not eligible for granting him/her a pension': see Davide Carneiro et al, 'Online Dispute Resolution: An Artificial Intelligence Perspective' (2014) 41 *Artificial Intelligence Review* 211, 227–8. See also Ashley, above n 6.

14 Cromwell Schubarth, 'Y Combinator Startup Uses Big Data to Invest in Civil Lawsuits', *Silicon Valley Business Journal* (online), 24 August 2016

civil disputes and are forecast to have more significant future impacts[15] and are particularly relevant in the criminal jurisdiction. Judge AI or, more specifically, the impact that AI may have on judging is already raising concerns amongst some senior judicial commentators. In a recent interview, Chief Justice John G Roberts Jr (USA) was asked '[c]an you foresee a day, when smart machines, driven with artificial intelligences, will assist with courtroom fact-finding or, more controversially even, judicial decision-making?' The Chief Justice responded '[i]t's a day that's here, and it's putting a significant strain on how the judiciary goes about doing things'.[16]

II THREE LEVELS OF TECHNOLOGICAL CHANGE

As I have noted in previous work, there are three main ways in which technology is already reshaping the justice system.[17] First, and at the most basic level, technology is assisting to inform, support and advise people involved in the justice system (supportive technology). Second, technology can replace functions and activities that were previously carried out by humans (replacement technologies). Finally, at a third level, technology can change the way that judges work and provide for very different forms of justice (disruptive technology), particularly where processes change significantly and predictive analytics may reshape the adjudicative role.[18] It is at these second and third levels that issues emerge in terms of the impact of technology on the role and function of a judge insofar as the adjudicative function is concerned.

At present, using the taxonomy above, most justice reform that is supported by technology has focussed on the first and second level of technological innovation that may or may not use very simplified forms of AI. For example, more recent technological developments supplement and support the operation of many court-based processes. As a result of this first level of supportive innovation, many people now locate justice services online and obtain information about justice processes, options and alternatives (including legal alternatives) through web-based information systems. People also increasingly locate and obtain legal support and services online, and the growth in online legal

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<http://www.bizjournals.com/sanjose/blog/techflash/2016/08/y-combinator-startup-uses-big-data-to-invest-in.html>. See also 'California Legal AI Co. Gavelytics Aims to Be Case Prediction Local Hero' on *Artificial Lawyer* (14 November 2017) <https://www.artificiallawyer.com/2017/11/14/california-legal-ai-co-gavelytics-aims-to-be-case-prediction-local-hero/>.

15 David Harvey, 'From Susskind to Briggs: Online Court Approaches' (2016) 5 *Journal of Civil Litigation and Practice* 84, 93.

16 Liptak, above n 7.

17 See Tania Sourdin, 'Justice and Technological Innovation' (2015) 25 *Journal of Judicial Administration* 96.

18 This material is drawn from and discussed in more detail in ibid 101–3.

firms who may provide 'unbundled' legal services has been significant over the past three years.[19]

Some web-based information (including digital video), videoconferencing (including internet-based group video calls),[20] teleconferencing and email can supplement, support and replace many face-to-face in-court approaches and could be defined as a second level 'replacement' technological approach. At this second level, justice is supported by technology and in some circumstances this can alter the environment in which court hearings take place.[21] For example, online court processes are increasingly used for some types of disputes and in relation to criminal justice matters (particularly bail applications).[22]

Other technologies may merge into the 'third level' and support negotiation as well as judicial processes by enabling people to access more sophisticated online 'advice' that is supported by AI, or to consider options and alternatives or engage in different ways. Newer developments in legal expert systems that are focussed on predictive analytics support these shifts.[23] In contrast to traditional rational decision-making approaches, some of these more sophisticated technological programs are designed to encourage the development and refinement of a number of options (rather than producing one outcome).[24] These areas of technological innovation, at the 'third level', have the capacity to be more disruptive than previous innovations that supported a 'graft and grow' approach and assumed that judging processes would not change in the context of their basic procedural stages.[25]

In this context, there are some opportunities for AI processes to support judges and potentially supplant them. Initially, however, the impacts are likely to be confined to lower level decision-making. Such advances are not without controversy. For example, in New Zealand, Alistair Knott of the University of Otago's AI and Law project has raised concerns about the use of a computer-based prediction model to handle claims and profile claimants under the country's state accident compensation scheme (Accident Compensation

19 See, eg, Lawyal Solicitors, *About Us* (2017) <https://lawyal.com.au/about-us>. Unbundled legal service provision involves assistance with set tasks; for example, a lawyer may be engaged to assist to prepare some documentation.

20 Group video calls are available through subscription services such as Skype. Users require a high-speed broadband connection and must meet device hardware and software standards. See Skype, *Group Video Calls* (2018) <http://www.skype.com/en/features/group-video-chat/>.

21 See, eg, Julie Soars, 'Draft Procedural Order for Use of Online Dispute Resolution Technologies in ACICA Rules Arbitrations' (Australian Centre for International Commercial Arbitration, 2016) for procedural changes in relation to online dispute resolution in the arbitration area.

22 See generally Emma Rowden, 'Distributed Courts and Legitimacy: What Do We Lose when We Lose the Courthouse?' (2018) 14 *Law, Culture and the Humanities* 263.

23 See Ravel Law, *Ravel* (2017) <http://ravellaw.com/>; Lexmark Australia, *Search and Analytics* (2018) <https://www.lexmark.com/en_au/products/software-old/search-and-analytics.html>.

24 See, eg, iCan Systems, *Smartsettle One* (2018) Smartsettle <http://www.smartsettle.com/home/products/smartsettle-one/>. It has been said that collaborative platforms, such as GroupMindExpress.com, are likely to be used more frequently in large multi-party disputes where information and participants are plentiful: see John Wiley & Sons, *The Internet Encyclopedia*, vol 2 (at 15 April 2004) Applications, 'Online Dispute Resolution' 745.

25 Sourdin, 'Justice and Technological Innovation', above n 17, 97.

Corporation ('ACC')).[26] In Mexico, simpler administrative decision-making is already being supported by AI. For example, the Mexican Expertius system is currently advising judges and clerks 'upon the determination of whether the plaintiff is or is not eligible for granting him/her a pension'.[27] There are, however, important issues about whether such processes will be supported in the context of judicial decision-making and as Harvey has noted, 'what is at stake [in developing Judge AI] is continued confidence in and adherence to the rule of law'.[28]

Although AI processes have emerged over the past 50 years,[29] until the last decade they have been mainly directed at processes outside the justice sector. More recently, within the justice area they have been directed at technical as well as legal analysis. AI programs are likely to initially focus on tasks or part of the analytical function undertaken by judges and it is clear that the AI already utilised in document discovery has the potential to transform some judicial work. Current document discovery programs utilise predictive coding to read and analyse millions of pages of discovered documents and are able to select relevant material in a fraction of the time that human labour would require.[30] Such programs could also be used to search through legal documentation in civil disputes, and commentators have predicted that the use of intelligent machines will increase in the legal sector – being used for the generation of legal documents and the prediction of legal outcomes (predictive analytics).[31] There are many advantages in that such AI programs are more time and cost efficient than humans and can work without stopping for sleep or breaks.[32] As noted above, outside of the legal profession, automated computer systems have also become prolific within government administration. These automated systems can process transactions, progress applications and make decisions without human input.[33]

III THE IMPACT OF ONLINE COURTS AND ONLINE DISPUTE RESOLUTION

There are other pressures relating to technology that are causing a rethink of the judicial role and are linked to the creation of new court environments. In this

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26 See University of Otago, *Artificial Intelligence and Law in New Zealand* <http://www.cs.otago.ac.nz/research/ai/AI-Law/index.html>.

27 See Carneiro et al, above n 13, 227.

28 Harvey, above n 15, 95.

29 For a history of the development of Artificial Legal Intelligence, see Pamela N Gray, *Artificial Legal Intelligence* (Brookfield, 1997) ch 2.

30 Sourdin, 'Justice and Technological Innovation', above n 17, 103.

31 John O McGinnis and Russell G Pearce, 'The Great Disruption: How Machine Intelligence Will Transform the Role of Lawyers in the Delivery of Legal Services' (2014) 82 *Fordham Law Review* 3041, 3041.

32 Ibid.

33 Justice Melissa Perry, 'iDecide: Administrative Decision-Making in the Digital World' (2017) 91 *Australian Law Journal* 29, 30.

regard, there has been a growing focus on online courts and what they may provide.[34] These pressures are partly a response to growing evidence of unmet legal aid, concerns about access to justice more generally and the growth in large scale online dispute resolution systems which are already being used to support some court and tribunal systems.[35] Such changes are arguably leading to the 'democratisation of justice' and although they are not oriented towards Judicial AI, they may support the development of Judge AI by essentially building a framework which enables Judge AI to be used. At present, few of these proposals engage with Judge AI and are ordinarily focussed on increasing online activity. For example, proposals for the creation of an online court have gained traction in recent years. These developments essentially involve replacing a physical court and litigation process with an online alternative that encourages the resolution of a dispute but retains the stature and powers of a physical court of law.[36]

The UK Civil Justice Council recommended the introduction of Her Majesty's Online Court for civil disputes under the value of £25 000.[37] It was intended that the Court would operate with a tiered system: the first tier would allow disputants to evaluate their problems though inputting information into an online system which would categorise their issues, provide information about their rights and entitlements, and suggest options available to resolve the dispute.[38] This tier encourages parties to resolve the dispute on their own on the basis of the information provided by the system. The second tier involves online facilitators reviewing information and documents provided by the disputants and assisting with the resolution of the matter by mediating, advising, or encouraging negotiations.[39] This tier is reminiscent of court-connected alternative dispute resolution ('ADR'). The third and final tier was to involve online adjudication by the judges of the court based on electronic submissions, online pleadings and arguments, and telephone conference facilities.[40] This determination could be binding and enforceable, with the same force as a decision made in a physical courtroom. Lord Justice Briggs suggested a similar model be introduced.[41] This proposal also called for the possibility of face-to-face hearings in the third tier as an absolute last resort,[42] and included details about how the Online Court would allow litigants to appeal a decision into the mainstream court system.[43] Lord Justice Briggs noted that the court would need its judges to adopt a less

34 See Ministry of Justice of the Government of the United Kingdom and Her Majesty's Courts and Tribunal Service, 'Transforming Our Justice System' (Policy Paper, September 2016).

35 See, eg, Tyler Technologies, *Modria* (2018) <https://www.tylertech.com/solutions-products/modria>; Civil Resolution Tribunal, *Civil Resolution Tribunal* (2018) <https://civilresolutionbc.ca/>.

36 Harvey, above n 15, 85.

37 Online Dispute Resolution Advisory Group, 'Online Dispute Resolution for Low Value Civil Claims' (Report, Civil Justice Council, February 2015) 6–7.

38 Ibid 19.

39 Ibid 19–20.

40 Ibid 20.

41 Lord Justice Briggs, 'Civil Courts Structure Review: Interim Report' (Report, Judiciary of England and Wales, December 2015) 76; Lord Justice Briggs, 'Civil Courts Structure Review: Final Report' (Judiciary of England and Wales, July 2016) 58.

42 Briggs, 'Interim Report', above n 41, 78.

43 Ibid 86.

adversarial and more investigative approach.[44] In England and Wales, the plans to introduce Judge AI in relation to some categories of dispute were dropped in 2017 (less controversial but significant measures associated with the introduction of online dispute resolution referred to above are proceeding).[45]

Chief Justice Warren of the Supreme Court of Victoria has suggested another model where technology is supportive: the distributed courtroom.[46] A physical courtroom remains central in this model, but the participants are replaced by life-size screens or holographic projections to enable judges, lawyers, jury members and parties to *appear* in court from any location of convenience. This model is facilitated through online videoconferencing technology, such as Skype, but still preserves the option of a physical space for the court, and the option of physically attending court. Should such courts be effectively implemented, the foundations for a move to an AI judge would be already in place. An AI judge at the centre of an online court program would allow litigants to provide the system with information remotely, and have a decision dispensed from within the program itself.

Similarly, developments in Online Dispute Resolution ('ODR'), a form of ADR where parties use the internet and technology to help resolve their dispute cheaply and efficiently, might also support and enable the development of AI by creating the machinery or platform within which it could eventually flourish. In ODR, disputants are not required to meet in person, as the ODR process can happen remotely through an internet connection. AI decision-making is already being used within the field of ODR. These systems are labelled expert systems, which are programmed by experts in the field and possess rule-based algorithms to assist the program to make decisions based on information received from the parties.[47] Legg explains that these processes 'collect facts from users through interview-style questions and produce answers based on a decision-tree analysis'.[48]

In the Netherlands, an advanced ADR program called Rechtwijzer incorporates ODR components that could be used to assist couples in the separation or divorce process. Rechtwijzer asks questions about the parties and their relationship, and provides options based on this input information.[49] The program also 'provides information, tools, links to other websites and personal

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44 Ibid 78.

45 See Hyde, above n 3. For current developments see Richard Johnstone, 'HM Courts and Tribunals Service's Susan Acland-Hood on Digital Courts, Making Big Changes and Her Whitehall Hammock', *Civil Service World* (online), 6 October 2017 <https://www.civilserviceworld.com/articles/interview/hm-courts-and-tribunals-service%E2%80%99s-susan-acland-hood-digital-courts-making-big>; Sir Terence Etherton MR, 'Civil Justice after Jackson' (Speech delivered at the Conkerton Memorial Lecture, Liverpool Town Hall, 15 March 2018) which explores the recent use of online approaches and also considers the risks in the context of 'open' justice.

46 Chief Justice Marilyn Warren, 'Embracing Technology: The Way Forward for the Courts' (2015) 24 *Journal of Judicial Administration* 227, 232.

47 Michael Legg, 'The Future of Dispute Resolution: Online ADR and Online Courts' (2016) 27 *Australasian Dispute Resolution Journal* 227, 228.

48 Ibid.

49 Esmée A Bickel, Marian A J van Dijk and Ellen Giebels, 'Online Legal Advice and Conflict Support: A Dutch Experience' (Report, University of Twente, March 2015) 5.

advice' which encourages the parties to resolve their dispute between themselves.[50] If resolution is not reached, the final step involves Rechtwijzer providing the parties with information and contact details of professional third parties such as mediators, legal representatives, and other dispute resolution processes.[51] Evaluations of Rechtwijzer found participants were satisfied with their experiences,[52] but a majority still felt the need to have a third party check over the agreement made through the system.[53] Whilst Rechwijzer will largely be replaced by a new system and online arrangements into the future, its creators have noted that the primary obstacle in terms of the success of such ODR arrangements relate to the incapacity of courts, lawyers and government to fully embrace these types of innovations.[54]

These developments in ADR also suggest that the further introduction of AI systems into legal practice is likely. If these techniques can be used effectively within the field of ADR, then it follows that the introduction of AI programs into the court system is also feasible. Designers and implementers may draw on the experiences of these ADR programs to help perfect any AI judge programs, or alternatively AIs more specifically designed to assist judicial officers and learn from failures and successes in relation to such arrangements.

IV THE REPLACEMENT OF JUDGES?

As noted above, newer technologies can assist people to resolve disputes at an earlier time or refine the issues that need to be presented to judges. For example, technology can assist people to develop options and use AI to develop alternatives, and can be used to run evaluative, advisory and determinative processes. In this regard, some disruptive technologies are linked to Artificial Legal Intelligence ('ALI') which can be viewed as a system that has the capacity to render expert legal advice or decision-making.[55]

The impact of AI on the justice system is significant as it has the capacity to be blended with existing adjudicatory or non-adjudicatory processes, and there have been questions raised about whether these processes will have an impact on the role of lawyers and judges as technology replaces some human decision-making and analysis processes.[56] It seems well accepted that the impact outside

50 Ibid 4.
51 Ibid.
52 Ibid 22.
53 Ibid 31.
54 See Maurits Barendrecht, 'Rechtwijzer: Why Online Supported Dispute Resolution Is Hard to Implement' on Roger Smith, *Law, Technology and Access to Justice* (20 June 2017) <https://law-tech-a2j.org/odr/rechtwijzer-why-online-supported-dispute-resolution-is-hard-to-implement/>.
55 Richard Susskind, *The Future of Law: Facing the Challenges of Information Technology* (Clarendon Press, 1996) 120–1. Expert systems and knowledge-based systems may be used in 'solving problems, offering advice, and undertaking a variety of other tasks' in a legal context. This is in direct support of the author's in-text proposition that ALI may present 'a system that has the capacity to render expert legal advice or decision-making': at 121
56 Significant shifts in the justice landscape are predicted by Susskind. See Richard Susskind, *Tomorrow's Lawyers: An Introduction to Your Future* (Oxford University Press, 2nd ed, 2017); Susskind, above n 55,

the justice sector is likely to be significant and there are numerous predictions that AI together with other advances will mean that many current employment arrangements will no longer exist in 20 years with many current tasks being replaced by AI supported processes.[57] However, there has so far been little discussion about more senior legal sector roles and whether these developments (and the creation of Judge AI) will mean that judicial work will change with some judges being completely replaced by newer technologies.

Clearly some aspects of judicial work will be conducted by technological processes into the future, particularly where AI systems can be built. In this regard, legal information and AI systems can already use sophisticated 'branching' and data searching technology to create elaborate decision trees that can suggest outcomes to disputes.[58] In addition, more evolved AI supports systems which do not just emulate human intelligence but create additional and different intelligent systems – neural networks.[59] Essentially, what takes place is that the system asks a number of questions or uses existing data about users and poses questions about the dispute to enable an accurate description of the dispute to be built. The computer then forms a conclusion by applying the law to the dispute description. It does this by applying rules for specific sets of facts. Finally, the computer can perform tasks based on the description given.[60] This process may enable indicative decisions or even final decisions to be expressed. Such systems can be continuously updated and reflective in that machine learning enables systems to improve and be constantly revised with new data sets.

However, does this mean that judges will be replaced by technology? Arguably not, or at least not initially. This is partly because there are so many factors that impact on judicial decision-making. The Australian Law Reform Commission has noted that such factors include induction and intuition, as well as the capacity to assess the social impact of decisions.[61] However, if technologies can support decision-making (by, for example, enabling more accurate potential outcome identification by participants) they may play an increasing role in some forms of dispute (particularly in the family area)[62] and can support judicial processes and the making of decisions (by, for example,

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120. See also Richard Susskind, *Transforming the Law: Essays on Technology*, *Justice and the Legal Marketplace* (Oxford University Press, 2000).

57 Tony Dolphin (ed), *Technology*, *Globalisation and the Future of Work in Europe: Essays on Employment in a Digitised Economy* (Institute for Public Policy Research, 2015) 45.

58 See Ashley, above n 6.

59 See, eg, N B Chaphalkar, K C Iyer and S K Patil, 'Prediction of Outcome of Construction Dispute Claims Using Multilayer Perceptron Neural Network Model' (2015) 33 *International Journal of Project Management* 1827.

60 Issues relating to the inferences that may be made based on descriptive data and instructive description are considered in Sandra Wachter and Brent Mittelstadt, 'A Right to Reasonable Inferences: Re-thinking Data Protection Law in the Age of Big Data and AI' (2019) *Columbia Business Law Review* (forthcoming).

61 Australian Law Reform Commission, *Technology: What It Means for Federal Dispute Resolution*, Issues Paper No 23 (1998) 101.

62 See Legal Services Society, *Separation*, *Divorce & Family Matters* (2018) MyLawBC <http://mylawbc.com/paths/family/>.

producing a draft or template decision that can then be considered by a human judge).

These types of technology have already been trialled[63] and have, so far, been the subject of limited extension because of connectivity, cultural, technological storage and access issues. Many of these issues are, however, declining in importance as humans become more technologically connected, and better able to store data. The increasing role that such processes will play may result in the possible diversion of more court-related disputes to ADR[64] and may also result in the replacement of more simple court decision-making processes by removing humans altogether (who may play an appellate or review function only). In this regard, the ability for AI decisions to be appealed or reviewed by human decision-makers is often cited as a necessary component of any automated decision-making system.[65]

Such changes raise issues about the role of courts and judges in the future as well as raising challenging issues about how data is managed, categorised, and where and how executive and judicial functions are carried out and separated. In addition, as has been the case in the USA, there are issues about intellectual property ('IP') and who may have control and input into outsourced Judge AI and how transparent algorithms are (see later discussion).

In addition, judges do much more than adjudicate or reach an outcome in relation to a dispute. They play a key role in case management and in the settlement of civil disputes. Judicial commentary informs how society can operate and many judges also play a role in an educative sense, both informing litigants and lawyers about approaches to be taken and also contributing to civic education at a broader level. Proponents of the view that judges can be replaced by AI are arguably missing the point in relation to what judges contribute to society which extends beyond adjudication and includes important and often unexamined issues relating to compliance and acceptance of the rule of law.

V AN AI JUDGE?

In terms of more simple adjudicatory functions it is clear that the task of performing many judicial functions requires human intelligence, and computer programs have yet to be developed to replace these functions or to interact with people with compassion, emotion or agile responsiveness. However, could advances in technology one day replace human judges in the courtroom with an

63 See John Zeleznikow and Emilia Bellucci, 'Family_Winner: Integrating Game Theory and Heuristics to Provide Negotiation Support' in Danièle Bourcier (ed), *Legal Knowledge and Information Systems – JURIX 2003: The Sixteenth Annual Conference* (IOS Press, 2004) 21; John Zeleznikow et al, 'Bargaining in the Shadow of the Law: Using Utility Functions to Support Legal Negotiation' (Paper presented at International Conference on Artificial Intelligence and Law, New York, 4–8 June 2007) 237–46.

64 See Monidipa Fouzder, 'Briggs: Online Court Will Take the "A" Out of "ADR"', *The Law Society Gazette* (online), 26 September 2016 <http://www.lawgazette.co.uk/law/briggs-online-court-will-take-the-a-out-of-adr/5057914.fullarticle>.

65 Perry, 'Administrative Decision-Making in the Digital World', above n 33.

AI programmed to preside over hearings and dispense more complex judgments and in what way might more affective technologies assist or support this work?

Harvey gives a simplified description of the process an AI judge would be required to take, using the example of algorithms already present in legal databases.[66] These databases employ natural language processing to assist with the sourcing of relevant material based on search terms. An AI judge would be required to go further than these databases, by reducing returned sources to a manageable and relevant sample and then deploying tools to compare these sources of law to a present case and engaging in analysis to make a determination of the outcome.[67] Harvey explains that this final step requires 'the development of the necessary algorithms that could undertake the comparative and predictive analysis, together with a form of probability analysis to generate an outcome that would be useful and informative'.[68] However, human judge decision-making is largely retained in Harvey's model.

Experiments have been conducted using AI computer programs to predict the outcomes of cases based on textual information (predictive analysis). Aletras and colleagues developed a program that textually analysed decisions relating to breaches of human rights in the European Court of Human Rights to discover patterns in judgments.[69] The program learnt these patterns, and was able to predict the outcome of cases presented to it in textual form with 79 per cent accuracy on average.[70] This is an example of machine learning, where the computer system was able to 'analyse past data to develop rules that are generalisable going forward'.[71] As noted, machine learning allows computer programs to learn complex tasks through experience, rather than through hand-crafted computer functions.[72] Surden notes that machine learning may run into some limitations in the development of effective AIs that can predict legal outcomes. Machine learning techniques are only useful where analysed information is similar to new information presented to the AI.[73] Should an AI program be presented with a novel case where no similar precedent exists, it may not be well-suited in making a prediction or coming to an outcome.[74] These issues may also arise where the sample size of previous cases is not large enough for the computer program to discover patterns and create effective generalisations.[75]

However, as AI researchers have had a number of clear successes outside of the legal field, these successes suggest that predictive analysis even where there

66 Harvey, above n 15, 93.
67 Ibid.
68 Ibid 94.
69 Nikolaos Aletras et al, 'Predicting Judicial Decisions of the European Court of Human Rights: A Natural Language Processing Perspective' [2016] (October) *PeerJ Computer Science* 1, 15–16.
70 Ibid 11.
71 Harry Surden, 'Machine Learning and Law' (2014) 89 *Washington Law Review* 87, 105.
72 Ibid 89; David Silver et al, 'Mastering the Game of Go with Deep Neural Networks and Tree Search' (2016) 529 *Nature* 484, 489.
73 Surden, above n 71, 105.
74 Ibid.
75 Ibid 105–6.

are significant variations in terms of novelty can be 'learned'. Recently, Google's DeepMind researchers successfully trained an AI program, AlphaGo, to play the complex game of Go at a higher level than the European master of the game by training the neural networks of the program 'directly from gameplay purely through general-purpose supervised and reinforcement learning methods'.[76] There are also many examples in the medical field with AI now increasingly being used for diagnostic purposes and in relation to some human functions.[77] While the law is more complex than any game, these successes suggest that Judge AI is able to learn how to apply the law by reading legislation and case law, and that applying these principles to factual circumstances is feasible. Given the developments in non-law areas and the rapid expansion of AI (and investment in this field), it seems likely that the development of more sophisticated Judge AI is probable within the next decade. More sophisticated Judge AI emerges as a more viable option as machine learning merges with more sophisticated predictive analytical processes.[78]

VI ISSUES THAT ARISE WITH THE DEVELOPMENT OF AN AI JUDGE

Apart from the issues that are relevant in terms of the overall function of judges in our society, there are some specific factors that are especially relevant in the context of the development of AI and the adjudicative function of judges. Overall these factors suggest that AI can replace some adjudicative functions, however, the issues that emerge are whether this is appropriate and under what circumstances human judges should retain most adjudicative functions.

A Legal Authority

One initial issue is whether a computer program or automated process possess the legal authority to make decisions in place of a human judge. In the context of an automated system delivering administrative decisions, Justice Perry raises questions such as *who* makes the decision, and who possesses the legal authority to make such a decision.[79] Is it the computer programmer, the policymaker, the human decision-maker or the computer or automated system itself?

Legislators have removed some of the complexities of this issue. For example, a decision made under the *Therapeutic Goods Act* by a computer

76 Silver et al, above n 72, 489.

77 See, eg, A N Ramesh et al, 'Artificial Intelligence in Medicine' (2004) 86 *Annals of the Royal College of Surgeons of England* 334; Meg Tirrell, 'From Coding to Cancer: How AI Is Changing Medicine', *CNBC* (online), 11 May 2017 <http://www.cnbc.com/2017/05/11/from-coding-to-cancer-how-ai-is-changing-medicine.html>; Daniel B Neill, 'Using Artificial Intelligence to Improve Hospital Inpatient Care' (2013) 28(2) *IEEE Intelligent Systems* 92.

78 See Ashley, above n 6, where these broader developments are explored in the context of existing systems.

79 Perry, 'Administrative Decision-Making in the Digital World', above n 33, 31.

program is deemed to have been made by the Secretary.[80] How such a deeming provision would fare in court litigation remains uncertain.

Justice Kirby, writing in 1999, noted that the need for the public and open nature of adjudication may present difficulties with the adoption of electronic courts:

> The right to see a judicial decision-maker struggling conscientiously, in public, with the detail of a case is a feature of the court system which cannot be abandoned, at least without risk to the acceptance by the people of courts as part of their form of governance.[81]

Without a public, open forum for the administration of the state's judicial powers, would the exercise of these powers be accepted by the populace? Chief Justice Warren argues that they would: few people attend court hearings in person, and information and news is sourced more and more from online media including social media.[82] Furthermore, an online court system featuring AI adjudication programs would not be considered out of place in an increasingly connected and online society.

B Translating Law into Code

Commentators have raised the issue of how to accurately translate the law into codes, commands and functions that a computer program can understand.[83] Legal language is nuanced and often requires contextual understandings (see discussion below). Computer programmers and IT professionals rarely have legal qualifications or experience, nor are they policy or administrative experts. However, it is these professionals who are tasked with translating legislation and case law into computer codes and commands to allow an autonomous process to make decisions. These sources of law – whilst complex on their own – also operate within the context of statutory presumptions and discretionary judgments. Ensuring these intricacies are properly coded into an autonomous process is challenging. Because of these challenges, commentators note that more regulatory areas of the law may be better suited to being transformed into computer code.[84]

Similarly, these codes will need to be constantly updated due to frequent amendments, new case decisions, and complex transitional provisions.[85] Autonomous systems will also require the capacity to apply the law from various points in time, to ensure that cases are decided on the laws that applied at the relevant time the actions occurred. These challenges can potentially be met by

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80 *Therapeutic Goods Act 1989* (Cth) s 7C(2).

81 Justice Michael Kirby, 'The Future of Courts: Do They Have One?' (1999) 8 *Journal of Judicial Administration* 185, 188.

82 Warren, above n 46, 233.

83 Perry, 'Administrative Decision-Making in the Digital World', above n 33, 32.

84 Chief Justice T F Bathurst, 'iAdvocate v Rumpole: Who Will Survive? An Analysis of Advocates' Ongoing Relevance in the Age of Technology' (Speech delivered at the 2015 Australian Bar Association Conference, Boston, 9 July 2015) 4 [13].

85 Perry, 'Administrative Decision-Making in the Digital World', above n 33, 32.

including lawyers and policymakers in the creation and updating of these computer programs.[86]

C Discretionary Judgments

Many judgments within the legal system involve an element of discretion. Computer programs operate based on logic, where input information is processed via programmed algorithms to arrive at a predetermined outcome.[87] Such rigidity is arguably incompatible with discretionary decisions. Discretionary decisions may need to take into account community values, the subjective features of parties, and any other surrounding circumstances that may be relevant.

Justice Perry suggests that legislators and administrators will replace discretionary principles with more black-and-white provisions in the pursuit of greater efficiency through increased automated decision-making.[88] These amendments would simplify the law and make it more determinative to enable computers to better process the law.[89] Such amendments may result in unfair or arbitrary decisions due to the lack of individualised justice and discretion, and a lack of nuance in the law.

At the same time, there are issues with current forms of judging and bias. As I have noted previously,[90] judging can be influenced by a range of factors that arguably would not be present where AI is involved (although as noted above, AI processes can also result in outcomes that are influenced by bias). As those in the access to justice movement have noted, the outcome of court adjudication can clearly be influenced by many factors, including the quality of representation, the resources available to the litigant and the quality of the decision-making and surrounding rights based framework.[91] In addition, adjudicative decision-making can be influenced by a range of factors that can influence substantive justice.[92] These include a range of impacts on the decision-maker that include:

- when and what a person has eaten;[93]
- the time of day;[94]
- how many other decisions a person has made that day (decision fatigue);[95]

86 Ibid.
87 Ibid 33.
88 Ibid.
89 Andrea Roth, 'Trial by Machine' (2016) 104 *Georgetown Law Journal* 1245, 1266.
90 See Tania Sourdin, 'Decision Making in ADR: Science, Sense and Sensibility' (2012) 31(1) *Arbitrator & Mediator* 1.
91 For further discussion see Tania Sourdin, 'The Role of the Courts in the New Justice System' [2015] *Yearbook on Arbitration and Mediation* 95.
92 Sourdin, 'Decision Making in ADR', above n 90, 1.
93 See John Tierney, 'Do You Suffer from Decision Fatigue?', *New York Times* (online), 17 August 2011 <http://www.nytimes.com/2011/08/21/magazine/do-you-suffer-from-decision-fatigue.html?_r=2&pagewanted=1>, referring to a study of parole board decision-making reported in Shai Danziger, Jonathan Levav and Liora Avnaim-Pesso, 'Extraneous Factors in Judicial Decisions' (2011) 108 *Proceedings of the National Academy of Sciences of the United States of America* 6889.
94 Ibid.
95 Ibid.

- personal values;[96]
- unconscious assumptions;[97]
- reliance on intuition;[98]
- the attractiveness of the individuals involved;[99]
- emotion.[100]

The extent to which these factors influence judges is unknown, but it is likely that even if a judge becomes aware of these factors, they are likely to underestimate their impact.[101] This is partly because we are more likely to exaggerate information about our own personal qualities that we perceive as positive and less likely to accept information that raises any questions about our positive characteristics.[102]

Issues about technology and bias are also present and there are concerns that replacing humans with AI will not necessarily result in a reduction in bias where discretion is relevant. Some forms of AI that are currently in use have already demonstrated that there can be significant risks in using AI in terms of bias and that programmers and others can replicate bias without intending to do so. These issues have suggested that algorithms can produce unwanted results and promote racism and inaccurate outcomes.[103] In addition, using Judge AI has the potential to reduce the capacity of the justice process to deal with people within courts with dignity and then respond in a human way (which may incorporate emotion and compassion). Developments in affective technology[104] suggest that it is feasible that technologies will be developed that are able to recognise and

96 Richard Chisholm, 'Values and Assumptions in Judicial Cases' (Paper presented at the National Judicial College Conference: Judicial Reasoning – Art or Science?, Canberra, 7–8 February 2009). See also Victor D Quintanilla, 'Different Voices: A Gender Difference when Reasoning about the Letter Versus Spirit of the Law' (Paper presented at the Law and Society Conference, Honolulu, June 2012).

97 Justice Keith Mason, 'Unconscious Judicial Prejudice' (2001) 75 *Australian Law Journal* 676, 680.

98 Justice Michael Kirby, 'Judging: Reflections on the Moment of Decision' (1999) 18 *Australian Bar Review* 4, 19.

99 Maria Agthe, Matthias Spörrle and Jon K Maner, 'Does Being Attractive Always Help? Positive and Negative Effects of Attractiveness on Social Decision Making' (2011) 37 *Personality and Social Psychology Bulletin* 1042. The researchers in this area suggest that there may be a bias away from attractive same-sex individuals and a bias towards attractive other sex individuals.

100 Hayley Bennett and G A (Tony) Broe, 'Judicial Neurobiology, Markarian Synthesis and Emotion: How Can the Human Brain Make Sentencing Decisions?' (2007) 31 *Criminal Law Journal* 75, 84–6.

101 Timothy D Wilson and Daniel T Gilbert, 'Explaining Away: A Model of Affective Adaptation' (2008) 3 *Perspectives on Psychological Science* 370.

102 For an interesting discussion of this phenomenon, see David Brooks, *The Social Animal: The Hidden Sources of Love*, *Character, and Achievement* (Random House, 2011) 220.

103 See Sam Levin, 'A Beauty Contest was Judged by AI and the Robots Didn't Like Dark Skin', *The Guardian* (online), 9 September 2016 <https://www.theguardian.com/technology/2016/sep/08/artificial-intelligence-beauty-contest-doesnt-like-black-people?CMP=share_btn_tw>. See also Mitch Smith, 'In Wisconsin, a Backlash against Using Data to Foretell Defendants' Futures', *New York Times* (online), 22 June 2016 <http://www.nytimes.com/2016/06/23/us/backlash-in-wisconsin-against-using-data-to-foretell-defendants-futures.html?_r=0> regarding the use of algorithms in relation to recidivism.

104 For an interesting overview on affective technology, see Wikipedia, *Rosalind Picard* (17 May 2018) <https://en.wikipedia.org/wiki/Rosalind_Picard>, quoting Rosalind Picard, *Affective Computing* (MIT Press, 1997) 93–4.

respond appropriately to human emotion and potentially do so more accurately than humans.

D Syntax and Semantics

Along similar lines, the use of AI in law may be confronted by the philosophical distinction between syntax and semantics. Searle famously noted that computer programs possess syntax (a formal structure of operation), but do not possess semantics (meaning behind these operations).[105] Digital technology processes information in the form of abstract symbols, namely ones and zeros. The technology possesses the ability to process and manipulate these symbols, but it does not understand the meaning behind these processes. In other words, the machine does not understand the information that it is processing. This can be contrasted with the human mind, which can understand the information that it processes.

This issue means that computer programs will be able to simulate human ways of thinking, but it will be some time before they can truly duplicate human ways of thinking.[106] Arguably however, as the information that is required for human decision-making becomes more complex (that is, involves a number of complex data sources),[107] humans will have no option but to rely on forms of AI when making decisions.

VII TECHNOLOGY SUPPORTING JUDGES

As noted above, whilst AI has the potential to replace current human judicial functions in terms of some aspects of adjudicative work, technological advances are more likely to support human judges in their judicial work. In this regard, a number of commentators have noted that the goal of the development of AI systems should be to complement current human work, allowing for greater efficiencies, rather than total replacement of humans.[108] At times, these developments suggest that 'co-bots' rather than robots will play a more important role in Judge AI.

AI programs that can produce a decision based on information input could be used to assist human judges, rather than replace them. These systems could produce a draft judgment based on the system's determined outcome.[109] A human judge could then use this draft judgment to produce their own reasons, allowing for human oversight over the computer program, and enabling discretionary or

105 John Searle, 'Can Computers Think?' in David J Chalmers (ed), *Philosophy of Mind: Classical and Contemporary Readings* (Oxford University Press, 2002) 669, 671.

106 Ibid 673.

107 The information that may be considered by a judge has expanded in recent years. See, eg, Jason Tashea, 'New York Considers "Textalyzer" Bill to Allow Police to See if Drivers Were Texting Behind the Wheel', *ABA Journal* (online), October 2016 <http://www.abajournal.com/magazine/article/newyork_distracted_driving_textalyzer_bill/>.

108 Surden, above n 71, 101.

109 Sourdin, 'Justice and Technological Innovation', above n 17, 102. See also Ashley, above n 6.

social considerations to be made that may be beyond the capacity of the computer program.

A further technological advancement that may assist judges in their work is transhumanism. Although sounding like a concept out of the pages of science fiction, the philosophy and science of transhumanism is aimed at 'fundamentally improving the human condition through applied reason, especially by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities'.[110] Advances in this may allow the judges of the future to integrate computer circuits and programs into their bodies, or modify their physical or genetic makeup, to increase their intelligence and memory, increase their ability to manage and process information, and reduce the occurrence of fatigue.[111]

VIII CONCLUSIONS

Perhaps the larger question is not 'if' technologies will reshape the judicial function but 'when' and to what extent. In this regard, disruptive technology is already reshaping the business of litigation.[112] There are also significant changes in the way that courts are working. Technology is already being used by tribunal[113] and court[114] systems to provide support, intake and advisory processes

110 Nicholas Agar, 'Whereto Transhumanism? The Literature Reaches a Critical Mass' (2007) 37(3) *The Hastings Center Report* 12, 12.

111 See, eg, Daniel McIntosh, 'Human, Transhuman, Posthuman: Implications of Evolution-by-Design for Human Security' (2008) 4(3) *Journal of Human Security* 4, 10.

112 See, eg, Maggie Tamburro, 'The Future of Predictive Coding – Rise of the Evidentiary Expert' on IMS ExpertServices, *BullsEye* (26 June 2012) <https://www.ims-expertservices.com/bullseye/june-2012/the-future-of-predictive-coding-rise-of-the-evidentiary-expert/> for an analysis of computer-assisted document coding and review, often referred to as 'predictive coding'. The analysis of large sets of data is likely to have a 'game-changing' impact. The technology collapses the time (and costs) needed to review millions of pages of discovered material and to identify relevant aspects without devoting massively costly person hours. For example, branching technology that is not rule-based was used in a project of the Intelligent Computing Systems Research, conducted by La Trobe University and Victoria University (called 'Split-Up'). The project, led by Professor Zeleznikow and which determined that there are 94 factors relevant for a percentage split decision, was directed at applying AI to assist in calculating the division of property in family law proceedings: see Victoria University, *Professor John Zeleznikow* (2018) <http://www.vu.edu.au/contact-us/john-zeleznikow>. Split-Up, a hybrid rules-based neutral network system that grew out of this research, offers advice on how a property is likely to be distributed if the matter was to be determined by a court. It has been trialled by some judges, judicial registrars and registrars of the Family Court of Australia, as well as legal practitioners, mediators and counsellors. A more advanced approach, which is oriented at supporting negotiation, is called Family_Winner: see Zeleznikow and Bellucci, above n 63; Zeleznikow et al, above n 63.

113 For example, in British Columbia, Canada, a new Civil Dispute Tribunal is intended to operate using an online platform so that disputants will make initial contact and commence proceedings through an online format; see *Civil Resolution Tribunal Act*, SBC 2012, c 25. It is intended that processes used by the Tribunal will be mainly online, at least initially. Online supported negotiation and supported online dispute resolution are features of the system together with adjudication, with most cases decided 'on evidence and arguments submitted through the tribunal's online tools. However, when necessary, the adjudicator will have discretion to conduct a telephone or video hearing'. See Karim Benyekhlef and Nicolas Vermeys, *ODR and the (BC) Courts* (28 May 2012) Slaw <http://www.slaw.ca/2012/05/28/odr-and-the-bc-courts/>.

that are intended to assist disputants to negotiate more effectively without having court staff or other practitioners involved. In the near future, many courts will continue to build and extend online platforms and systems that support filing, referral and other activities.[115] These changes create a framework in which Judge AI can be fostered.

Policy approaches that increasingly result in the transfer of lower value matters or categories of disputes (such as insurance disputes) to tribunals and commissions suggest that judicial work is likely to continue to change over the next 20 years, and it is probable that AI is initially likely to play a more prominent role in tribunals and other decision-making contexts before being used in courts. However, these changes mean that the impact in respect of Judge AI is more likely to be significant, at least initially, in relation to smaller civil claims as AI support systems that are focussed more on predictive analytics spread throughout the administrative decision-making arena and are aided by online court platforms.[116] If Judge AI (or perhaps 'Adjudication AI') is to be restricted initially to smaller claims, there are questions about where it might stop and how larger, more complex disputes will be dealt with and the extent to which judicial oversight will be maintained. In this regard, in non-legal domains, it seems that humans appear to be relatively comfortable with the replacement of some human functions by AI and robots. In some domains, there are clear advantages to using AI which can be more accurate, faster and cheaper than using humans. Will the same approach be adopted in respect of Judge AI? It seems likely that it will,

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114 In Northern Ireland, the Northern Ireland Courts and Tribunal Service now offers an online process in respect of small claims. A specialised Civil Processing Centre operates according to time-based and other rules to make orders, although final adjudication remains a face-to-face option: see Business Development Group, 'Small Claims Online: A Users Guide' (Northern Ireland Courts and Tribunals Service, May 2011) <https://www.justice-ni.gov.uk/sites/default/files/publications/justice/Small%20Claims%20Online%20User%20Guide.pdf>.

115 For further detail on the new online court websites in New South Wales see, eg, *NSW Online Registry: Courts and Tribunals* (2018) <https://onlineregistry.lawlink.nsw.gov.au/content/nsw-supreme-district-local-courts-online-registry>; Michaela Whitbourn, 'NSW Government Trials Online Court for Civil Cases in Sydney', *The Sydney Morning Herald* (online), 9 August 2015 <http://www.smh.com.au/nsw/nsw-government-trials-online-court-for-civil-cases-in-sydney-20150807-giuig2.html>. The Federal Court of Australia has had an e-courtroom and has been expanding online lodgement services for some years: see Federal Court of Australia, *eCourtroom* <http://www.fedcourt.gov.au/online-services/ecourtroom>.

116 Significantly, the UK Civil Justice Council ('CJC') report on 'Online Dispute Resolution for Low Value Civil Claims' recommends building a new dedicated internet-based court service for civil disputes with a value of less than £25 000: see Online Dispute Resolution Advisory Group, above n 37, 3. The report distinguishes between two approaches for incorporating ODR into the justice system:

> The first involves the application of technology to improve what is already in place today. In this way, IT is grafted onto existing working practices and so replaces or perhaps enhances current systems … The second use of IT in the courts is to enable the delivery of services in entirely new ways. When this is the aim, it encourages new and imaginative thinking and urges reformers to start afresh, with a blank sheet of paper.

The CJC essentially recommends considering more disruptive technologies in the second approach, stating, at 4, that:

> We propose new ways in which justice can be administered through the use of ODR techniques. This is therefore in contrast with many projects that are currently in progress in the civil justice system – those that fall into our first category and are seeking to systematize the traditional operation of the courts.

particularly if decisions are made on a cost and time basis (rather than considering the broader benefits that human judges may bring to the justice system).

Any shift towards Judge AI clearly raises many issues which have so far been the subject of limited commentary.[117] Some initial issues relate to the exercise of discretion and to what extent judges should – not could – be replaced by AI.[118] It is also important to understand that judges do far more than make decisions. They manage cases, provide a responsive and human framework, settle cases, manage court systems and processes as well as playing an important public and educative function. Drawing the boundaries of acceptable Judge AI requires consideration of ethical questions,[119] as well as questions about who produces algorithms and Judge AI and the extent to which discretion and oversight will be maintained within the judiciary.

In addition, it may be unhelpful to maintain that Judge AI will only ever stand apart in some way from judges. As noted above, many technology futurists suggest that it is likely that humans will not necessarily be replaced by AI. Instead, human intelligence is likely to be supplemented by technological advances. This approach suggests that judges may remain human but be 'supplemented'; that is, have their intelligence and analytical functions supported by AI. These enhancement approaches raise issues about judicial appointment, workload and retention and broader questions about how judges contribute to society, as well as the importance of responsive judging and a need to better understand and explore the impact that people experience when a human judge deals with their concerns.

117 See some recent discussion in Richard Susskind, Submission No AIC0194 to the House of Lords Select Committee on Artificial Intelligence, *Artificial Intelligence – Challenges for Policymakers*, 6 September 2017 <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/artificial-intelligence-committee/artificial-intelligence/written/69715.html>.

118 See Justice Melissa Perry, 'iDecide: The Legal Implications of Automated Decision-Making' (Speech delivered at the Cambridge Centre for Public Law Conference: Process and Substance in Public Law, University of Cambridge, 15–17 September 2014).

119 Issues about robot ethics are currently the subject of some limited discussion. See Hannah Devlin, 'Do No Harm, Don't Discriminate: Official Guidance Issued on Robot Ethics', *The Guardian* (online), 18 September 2016 <https://www.theguardian.com/technology/2016/sep/18/official-guidance-robot-ethics-british-standards-institute?CMP=share_btn_tw>.