

Artificial intelligence and adjudication: some perspectives

by David M Masuhara

I. INTRODUCTION

Information technology continues to advance, transforming virtually all aspects of society. In many areas its rate has outpaced our ability to fully comprehend the implications. Developments in artificial intelligence (Ai) have driven changes to the point where the effects are described, with some pride by those in the field, as “disruptive.”

Futurists such as Richard and Daniel Susskind foresee technology replacing large swathes of humans in virtually all professions (see *The Future of the Professions: How Technology will Transform the Work of Human Experts* (Oxford University Press, 2012)).

The legal world has adopted various forms of technology to respond to the changes to capture efficiencies, and enhance competitiveness. Sophisticated programs have been developed for document generation and review; due diligence reviews; sentiment analysis; legal research, analysis and prediction.

Courts and tribunals have adopted electronic platforms. Online mediation, dispute resolution and adjudication processes have been instituted. Many courts have installed digital case management systems for tracking cases, filing court documents, receiving and storing evidence, recording of proceedings, receiving evidence by video transmissions, and the electronic approval of orders. Interactive online programs guide and assist citizens to the right forms, to complete the forms, and file the same, and quickly in many instances receive approval electronically from a court officer have been installed.

Judges too have adopted technologies to assist them in their work, such as searching for legal information, converting voice to text programs, managing cases, taking notes, and drafting decisions. In a survey of 133 Canadian judges, which I conducted regarding Ai, close to 98 per cent utilise a computer in carrying out their work.

Ai as an assistive tool for the judiciary seems to be viewed favourably by judges. In my survey of Canadian judges, approximately 60 per cent found that such assistance was viewed with such light. There is, however, a concern as to whether such a tool would be an impermissible voice in the deliberation process of a judge. The areas of assistance expressed include: legal research, taking bench notes, analysing evidence and arguments, composing and editing

decisions, discerning whether pleadings disclose a cause of action, analysing documents, analysing scientific, financial and economic evidence, finding reasonable ranges for non-pecuniary damages, and assessing the existence of real and substantial possibilities and contingencies. There was, however, a concern as to whether such a tool would be an impermissible voice.

Considering the developments and commentary, it does not take much to ask whether Ai can be extended from the descriptive and predictive to the prescriptive in the administration of justice. In short, could it be engaged in actual decision making?

My exploration of the question here has been motivated for practical reasons. My responsibilities in court technology issues for the two superior courts in British Columbia and as a member of the B C Court Services Technology Board, have brought me into direct contact with the question. The Technology Board is taking active steps in exploring ways to improve court processes to enhance access to justice through leveraging Ai, including the role of Ai in the adjudicative process.

As part of my exploration, I conducted the above referenced survey of judges across Canada covering 100 questions on technology and Ai. The responses include those from appellate and trial judges, but mainly from the latter. The response indicates that 52 per cent believe that at some point decision-making by Ai will occur at some level.

This article explores, in brief, views which I have been able to identify that would be supportive of Ai in the adjudicative process and those that would not. I have only scratched the surface.

I start with a brief description of judicial decision-making and Ai; and then move on to identifying and discussing the views and offer some comments on what an Ai adjudication system might look like.

The comments and views here are personal, simply my own.

2. JUDICIAL DECISION-MAKING

A helpful description of judicial decision-making to keep in mind has been provided by G Sartori (*Judicial Applications of Artificial Intelligence*, eds Sartori, G and Branting, L):

Judicial decision-making is an area of daunting complexity, where highly sophisticated legal expertise merges with cognitive and emotional competence. Many of the central concepts in the judicial application of the law – such as “justice”, “reasonable care”, and “intent” – are deeply enmeshed in the fabric of human life. Moreover, judicial reasoning combines diverse cognitive skills, such as assessing facts, interpreting texts, making analogies, and engaging in dialectical interactions. Besides its complexity, judicial decision-making is also characterized by its social importance. It is, indeed, the most characteristic moment of legal experience. Individual cases may involve important interests and deep feelings, and their solution impacts upon the expectations of all legal actors and shapes their understanding of the legal system.

In this article I refer to decision-making through Ai as “Ai adjudication.”

3. ARTIFICIAL INTELLIGENCE

3.1 Definition

There is no precise or formal definition of Ai. This is understandable as there is difficulty in even understanding what intelligence is in human terms.

The term Ai was first “coined” at a conference of computer scientists at Dartmouth in 1956. It is attributed to Professor John McCarthy who organised the conference. The proposal submitted for funding states the conference was convened to “find how to make machines that use language, for abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves” (see N Bostrom, *Superintelligence Paths, Dangers, Strategies* (Oxford University Press, 2014)) 5.

For the purposes of this article, I refer to Ai as the ability of a machine to imitate or simulate intelligent human behaviour. It is about using data or information for solving problems.

Ai covers a broad spectrum. At one end is that of “general” Ai, technology that could perform any intellectual task performed by a human. This yet to be attained level is the Holy Grail for computer scientists. At the other end of the scale are technologies which perform tasks in a specific domain and are referred to as “weak” or “narrow” Ai. It is in this latter category where Ai has been developed and embedded in a multitude of everyday devices used by people and in the machinery of industry and commerce. The achievements have gained global attention through high profile applications which include self driving vehicles and computers defeating the best humans in games such as checkers, chess, Scrabble, Jeopardy!, and Go. At the heart of these Ai technologies are machine learning and natural language processing.

In simple terms, machine learning is concerned with algorithms that allow a computer system to learn through finding patterns in data provided. Algorithms are a set of mathematical instructions or rules that help to calculate an answer to a problem. Much of machine learning is supervised

learning in which the system is instructed using training data regarding a subject. However, unsupervised learning, or self organizing systems are becoming common. It is comprised of sets or layers of algorithms whose variables can be adjusted through the “learning” process which involves known inputs to create outputs that are then compared to with a known result and adjusted to improve accuracy.

Natural language processing is focused on developing systems that allow computers to communicate with people using everyday languages. Through natural language processing a computer can read text, hear speech, interpret it, measure sentiment and determine which parts are important. This is enabled through machine learning which permits the processing and analysis of large natural language data. Natural language processing endeavours through statistical models to analyse what is stated and process what was meant. Recent developments in machine learning use advanced formulae to break down language into shorter, elemental pieces, to discern relationships between the pieces and explore how the pieces work together to create meaning.

3.2 Singularity

Many futurists predict the attainment of general Ai within the foreseeable future. This will lead to a technological singularity where computer-based intelligence will exceed human intelligence; or where humans will be able to transcend the limitations of their biological bodies and brains (see eg Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York, Viking Press, 2005) at 167–81). This will spark the acceleration of technological self-growth leading to superintelligence: “Any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest” (N Bostrom, *Superintelligence*, at 22).

In *Homo Deus, a Brief History of Tomorrow*, (Signal, 2015), Yuval Harari writes of powerful digital algorithms designed to improve the world will render liberal notions of free will, individualism, human rights and democracy (things written of by Locke, Rousseau, and Jefferson) obsolete and shown not to be fundamental truths. He observes that Ai will dispel the view that “high intelligence” requires a developed consciousness. Algorithms having access to massive amounts of data will become all knowing oracles, then our agents and finally our sovereign.

Lending some credence to these ideas are the warnings from prominent members of the scientific, technology and academic community that the unregulated development of Ai represents an existential threat to humanity. (See for example the open letter in January 2015, “Research Priorities for Robust and Beneficial Artificial Intelligence: An Open Letter”; “The Malicious Use of Artificial Intelligence: Forecasting, Prevention and Mitigation,” report issued by the Future of Humanity Institute, Oxford University, Centre for the Study of Existential Risk, University of Cambridge, 12 October 2016: “Preparing for the Future of Artificial Intelligence”, Executive Office of the President Obama, National Science

and Technology Council, Committee on Technology).

The singularity concept has even found its way into legal academic literature. In a recent article, “The Path of the Law: Toward Legal Singularity”, *University of Toronto Law Journal* 66, no 4 (11 November 2016), 3, Professor Benjamin Alarie expresses his belief in a legal singularity:

The legal singularity will arrive when the accumulation of massively more data and dramatically improved methods of inference make legal uncertainty obsolete. The legal singularity contemplates complete law. The legal singularity is inspired by and different from the idea of the technological singularity popularized by the futurist Ray Kurzweil. The technological singularity refers to the stage when machines themselves become capable of building ever more capable and powerful machines, to the point of an intelligence explosion that exceeds human understanding or capacity to control (technological singularity is akin, then, to superintelligence). The legal singularity contemplates the elimination of legal uncertainty and the emergence of a seamless legal order, universally accessible in real-time. In the legal singularity, disputes over the legal significance of agreed facts will be rare. They may be disputes over facts, but the once found, the facts will map on to clear legal consequences. The law will be functionally complete.

3.3 Advances

Whether or not you agree with the arrival of a singularity and superintelligence, it is clear that advances to date have been significant and to the point where serious investigation and discussion is taking place into whether to provide legal personhood or like status for Ai robots (see for example, the “Report and recommendations of the Committee or Legal Officers to the Commission on Civil Law Rules on Robotics of the European Parliament”, 27 January 2017).

Enabling the advances are the continuation of increases in CPU speed as per Moore’s law (doubling of transistors on an integrated circuit every two years); decreases in data storage costs in a similar fashion consistent with Kryder’s Law; and advances in of machine learning and natural language processing.

Although small in relation to investments in other commercial areas, significant investments have been made in the area of software development in the legal field. Since 2012, \$757 million has been estimated to have been raised by start ups (see S Lohr, “AI is Doing Legal Work. But it Won’t Replace Lawyers, Yet”, *New York Times*, 19 March 2017, <https://www.nytimes.com/2017/03/19/technology/lawyers-artificial-intelligence.html>).

In regard to dispute resolution, online platforms have been developed by businesses and agencies to deal with customer issues. In British Columbia, the first online dispute resolution agency in Canada was established in 2012, the Civil Resolution Tribunal. Through interactive technology parties to a condominium dispute or a small claims dispute are guided through a process where the nature of a complaint is identified,

general advice is available on the claim and possible avenues which can be taken. An online process for providing notice to the other party is provided as well as a non-synchronous online mediation service. A final adjudication process is also part of the regime. It has been recently announced that the scope of the CRT would be expanded to include motor vehicle personal injury claims up to \$50,000. The legislation is at the preparatory stage.

In many states in the United States, predictive programs regarding an individual’s likelihood of reoffending, have been adopted to assist courts in deciding bail. Various governmental agencies are testing the use of Ai in decision-making functions.

Predictive legal software is achieving accurate results in certain areas of the law. This is discussed below.

Ai adjudication, as with other such systems, raises many questions. Is it part of the natural extension of the evolution from oral communications and hand tools, to writing, to the printing press, to the telephone, to the radio, to the television, to the computer? Is it the uncertain tension one reads in the lament in Plato’s *Phaedrus* where Socrates decries the advent of writing and its affect on memory and rhetoric:

For this invention will produce forgetfulness in the minds of those who learn to use it, because they will not practice their memory. Their trust in writing, produced by external characters which are no part of themselves, will discourage the use of their own memory within them. You have invented an elixir not of memory, but of reminding; and you offer your pupils the appearance of wisdom, not true wisdom, for they will read many things without instruction and will therefore seem to know many things, when they are for the most part ignorant and hard to get along with, since they are not wise, but only appear wise.

Are we witnessing the power of inquiry and reason developed during the Age of Enlightenment being sent adrift through computers occupying increasingly the space once an exclusive preserve of and identifier of humans? Are we simply adapting from one source of meaning and authority to another? Are we that which George Dyson describes in his book *Turing’s Cathedral* (Vintage Books, 2012):

Facebook defines who we are, Amazon defines what we want, and Google defines what we think.

Is the code underlying cyber space shaping everything including our view of law? Is the pursuit of Ai solutions just part of the rush to find technological solutions for everything, believing that it will provide the best answers? These are questions and observations to keep in mind.

With this background, I turn to discuss some views I have been able to identify that seem to favour and to disfavour Ai adjudication.

4. PROS

4.1 Access to justice

Perhaps the most readily recognised area in a discussion such as here is the need to provide a significant portion of society with just resolutions to legal disputes on a cost effective and timely basis. This is the access to justice deficiency which countries such as Canada, the US, and the UK have identified as a serious societal concern.

On a global basis, Gillian Hadfield writes in *Rules for a Flat World* (Oxford Press, 2016), at p 3:

Half the planet lives outside of any formal legal framework. The other half operates inside frameworks that have stagnated in the twentieth century—well designed for the nation-based mass-manufacturing economy but badly out of step with the digitized, global environment we now inhabit.

That would be about 4 billion people. Turning to Canada, in “Access to Civil and Family Justice: A Roadmap for Change”, a report in 2013 by the Action Committee on Access to Justice in Civil and Family Matters, the then Chief Justice of Canada, Beverly McLachlin, who established the committee, wrote in the foreword:

As long as justice has existed, there have been those who struggled to access it. But as Canadians celebrated the new millennium, it became clear that we were increasingly failing in our responsibility to provide a justice system that was accessible, responsive and citizen-focused. Reports told us that cost, delays, long trials, complex procedures and other barriers were making it impossible for more and more Canadians to exercise their legal rights.

The report goes on to state that:

The civil and family justice system is too complex, too slow and too expensive. It is too often incapable of producing just outcomes that are proportional to the problems brought to it or reflective of the needs of the people it is meant to serve.

A follow up report in 2016 – “Everyday Legal Problems and the Cost of Justice in Canada: Overview Report” – states that almost half of Canadians over the age of 18 will experience at least one civil or family justice problem over any given three-year period. The study finds that the most common problems identified by Canadians are consumer, debt, and employment matters, followed by neighbourhood, discrimination and family problems. The report laments that, notwithstanding Canada having one of the best legal systems in the world, “unfortunately, most Canadians cannot afford to use it.” The report goes on to say that only 7 per cent of persons with justiciable problems actually appear in court. An American study estimates 70 – 90 per cent of legal needs in society go unmet.

The consequences or costs of citizens not obtaining a legal determination are identified as significant and wide-ranging, and include for example decreasing physical health, high levels of stress and emotional problems, and strains on relationships among family members. Everyday legal problems can result in costs to the basic security of the person in terms of loss of employment or housing. They can also cost the state as the impacts of experiencing legal problems are passed on to

publicly funded services and programmes by way of increased health care costs, employment insurance, social services and housing subsidies arising directly as a result of people experiencing legal problems. There can also be costs to the private sector through impacts such as lost productivity.

The 2016 report considers that within any given three-year period, adult Canadians experience approximately 35,745,000 separate everyday legal problems, and the consequences of the unmet need relates to social assistance, loss of employment, and physical and mental health issues – all as a direct result of experiencing one or more everyday legal problems. The report quantifies the annual costs to the state at approximately \$800 million.

It notes that the legal profession is to a large extent not accessible for a large sector of our society because of cost. In many communities, which largely are remote and smaller, there are few lawyers and courts are a long distance away. Legal aid is limited, largely allocated to criminal cases.

The report describes the access to justice problem as at a near crisis level. From my survey of judges, a majority believe that Ai could enhance access to justice.

4.2 Cultural and paradigm shift

In terms of the need for a change in approach, the 2016 report argues for:

a shift in focus from process to outcomes. We must be sure our process is just. But we must not just focus on process. We should not be preoccupied with fair processes for their own sake, but with achieving fair and just results for those who use the system. Of course fair process is important. But at the end of the day, what people want most is a safe, healthy and productive life for themselves, their children and their loved ones.

The two aforementioned reports speak of a need for a “cultural shift” and a “paradigm shift.” It is clear that the courts as constituted presently are unequipped to deal with the identified level of unmet demand and would be overwhelmed if they were expected to help resolve all of the everyday legal problems experienced by the public.

On the supply side, increases in judicial positions and more courthouses to address the demand is not realistic. In fact, because of perceived benefits of technology presently in place or in development, the system appears to be contracting physically.

While it is apparent the reports did not contemplate adjudication by Ai as a solution, it is indisputable that an Ai solution would fit given the dramatic language of “paradigm shift” and “cultural shift” and the level of concern expressed in the reports that an Ai solution would fit.

4.3 Proportionality

The “crisis” condition description in the access to justice discussion places focus on proportionality. The principle has

been accepted in Canada. A the fairly recent case of *Hryniak v Maudlin* [2014] SCR 89, a decision of the Supreme Court of Canada, the court endorsed the principle of proportionality – a principle that has been in operation in British Columbia for many years before that decision. The case involved a civil fraud in which millions of dollars was claimed and proven in a summary trial procedure – ie through affidavits. In approving the summary procedure, the court stated:

Even where proportionality is not specifically codified, applying rules of court that involve discretion “includes ... an underlying principle of proportionality which means taking account of the appropriateness of the procedure, its cost and impact on the litigation, and its timeliness, given the nature and complexity of the litigation” (Szeto v Dwyer, 2010 NLCA 36, 297 Nfld & P.E.I.R. 311, at para 53).

The court went on to state:

Increasingly, there is recognition that a culture shift is required in order to create an environment promoting timely and affordable access to the civil justice system. This shift entails simplifying pre-trial procedures and moving the emphasis away from the conventional trial in favour of proportional procedures tailored to the needs of the particular case. The balance between procedure and access struck by our justice system must come to reflect modern reality and recognise that new models of adjudication can be fair and just.

The court added:

the best forum for resolving a dispute is not always that with the most painstaking procedure.

4.4 Law is about prediction

One of the key qualities of a properly functioning system of law is predictability. This quality, along with fairness, forms the basis of Professor Lon Fuller’s well-known postulation of eight fundamental principles of legality found in the *The Morality of Law* (Yale University Press, 1964).

At the core of Ai are mathematical formulae – algorithms. They can be simple or deep layers of statistical calculations. The distillation of the adjudicative process to probability formulae would seem abhorrent to many. However, arguably the concept argues to be consistent with the views expressed by the leading voice of American realism, Oliver Wendell Holmes, who along with other realists was critical of legal formalism and favoured focusing on outcomes rather than the reasons. In other words, what judges did and not what they said. His most famous writings lend support for the statistical approach, for example:

The life of the law has not been logic; it has been experience.

“The Common Law”

What constitutes law? You will find some text writers telling you that it is something different from what is decided by the courts of Massachusetts or England, that it is a system of reasons, that

it is a deduction from principles of ethics or admitted axioms or what not, which may or may not coincide with the decisions. But if we take the view of the bad man we shall find that he does not care two straws for the axioms or deductions, but that he does want to know what the Massachusetts or English courts are likely to do in fact. I am of his mind. The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by the law. . .

“The Path of the Law”

For the rational study of the law the blackletter man may be the man of the present, but the man of the future is the man of statistics and the master of economics.

“The Path of the Law”

These passages, arguably, support the view that legal analysis in the conventional sense is not the only route to a good decision. Powerful algorithms could equally meet the task. Certainly, the process engaged is analogous to what a human lawyer does. They are both engaged in “mining” either data or the law.

4.5 Law is a mystery

In a related vein to prediction is the question of whether we actually know why a judge reached a particular decision. In any given case there could be competing or conflicting legal principles, contradictions, ambiguities, lacunas, vague terms and the exercise of discretion.

Given the varied jurisprudential views, it is arguable that it is difficult to accept that there exists a single correct answer to a problem. The source of law is would be uncertain in any event. This is supported when one views the varying streams in jurisprudence from Socrates, Coke, Blackstone, Bentham, Holmes, Hart Sacks, and Dworkin, to name a few. There are the tensions between legal realism and legal formalism; and those between positive law and natural law. There are also the divergences, convergences, and conflation between all four (see Posner, *The Problems of Jurisprudence* (Harvard University Press, 1990)) at p11. Arguably then, an Ai decision falling within the realm of a reasonable outcome including uncovering factors or variables to date unidentified should be acceptable.

Adding to this is the essentially established view that judges like the rest of the population are influenced by biases and use faulty heuristics in decision-making: see for example, C Guthrie, J J Rachlinski, A J Wistrich, “Inside the Judicial Mind”, (2001) 86 Cornell L Rev 777; C Guthrie, J J Rachlinski, A J Wistrich, “Can Judges Ignore Inadmissible Information? The Difficulty of deliberately disregarding”, (2005) 153 U Penn L Rev 1251; and C E Jones, “The Troubling New Science of Legal Persuasion: Heuristics and Biases in Judicial Decision-Making” (2013) 41 Advoc Q 49).

In my survey of judges, 53 per cent believed that there may be unconscious biases in their decisions.

The leading studies of research psychologists, Daniel

Kahneman and Amos Tversky, identify the multitude of errors humans make in decision making. You will know about their work if you have read Michael Lewis's popular books, *Money Ball* and *The Undoing Project*. Kahneman, now a Nobel prize winner, in his recent book *Thinking Fast and Slow* (Farrar, Straus and Giroux, 2011) itemises and describes the vast number of biases and heuristics that impact judgment, namely: Affect Heuristic; Anchoring Heuristic; Availability Heuristic; Representativeness Heuristic; Commitment Heuristic; Belief Bias; Confirmation Bias; Optimism Bias; Hindsight Bias; Framing Effect; Loss Aversion; Narrative Fallacy; Regression Fallacy; Planning Fallacy; Halo Effect; The Law of Small Numbers; and WYSIATI – What You See Is All There Is – so we discount or ignore what we don't know.

Commentators point to the inability to examine the processes that operate within a computer's inner workings as the basis to dismiss the validity of technology in decision-making. However, to most in society, and particularly the most disadvantaged, the law under any condition is complex and opaque. From the procedural to the substantive, seemingly for every principle one can find an opposing one; or for every term that is clear – there can be found an adjoining ambiguity. Opacity in the present law is as present to the masses as would an Ai-based adjudication system. Though there can be great opacity in computer systems, it is fair to say that the same could be said of human decision-making.

Many commentators assert that while human adjudicators provide legally framed reasons for a particular decision, that there are unexpressed reasons, either conscious or unconscious, that truly underlie a decision. The school of American Realism illuminates this theory from the conscious side.

An early example where the mystery and artificiality in law is expressed takes place in interactions between King James I and Sir Edward Coke in relation to the Case of Prohibitions. In that case, the King had rendered judgment in a land dispute. The case then came before Sir Edward Coke, Chief Justice of the Court of Common Pleas, who overturned the king. When the king asserted that as king he should be able to deliver judgments as his natural reasoning powers were as good as judges, Coke explained that the king did not have the authority to do so, as it was the domain of the court and until the king had gained sufficient knowledge of the law, he had no right to interpret it. Such knowledge “demanded mastery of [here it is] an artificial reason and judgment in law...”

Blackstone in *Commentaries* refers to judges as the “depositories of the laws, the living oracles.” Richard Posner comments that the reference by Blackstone to oracle, which in Greek mythology is “as merely a passive transmitter, of divine utterances” is apt given that Blackstone viewed the common law as a set of customs of immemorial antiquity which had been submerged by the Norman conquerors under the oppressive institutions of feudalism, and that the task of the modern English judge was to scrape away the Norman incrustations with which the common law had been overlaid, and restore it to its pristine Saxon form (see R Posner, *The Economics of*

Justice (Harvard University Press, 1981) 25). Posner asked “did Blackstone have any but the haziest idea of Saxon laws and legal institutions? Did the judges of his time really adopt so archaeological a view of their functions?”

In more recent times, legal scholars, political scientists and other social scientists have explored different theories as to how judicial decisions are made. They include attitudinal or ideological; strategic; organisational; psychological; in addition to legal. Each having some influence. With these different individualistic factors operating, it is not difficult to conclude that the law is a mystery.

It is notable that predictive systems seem to indicate there could be non-legal factors playing a larger role in the outcome of cases. Such observations are made by the developers of two predictive programs, CaseCruncher and Blue J Legal, discussed below.

4.6 Certain models of law are being modelled with levels of accuracy greater than lawyers

Predictive models in specific areas of law are achieving notable levels of accuracy. An example is that of an Ai program named CaseCruncher Alpha, which won a challenge against 100 commercial London lawyers. Both lawyers and CaseCruncher Alpha were given the basic facts of over 750 of PPI (payment protection insurance) mis-selling cases and asked to predict whether the Financial Ombudsman would allow a claim. CaseCruncher scored an accuracy of 86.6 per cent. The lawyers scored an accuracy of 62.3 per cent.

Interestingly, the developers note that the result “suggests that there may be factors other than legal factors contributing to the outcome of cases” and that that “further research is necessary to establish this proposition beyond the specific parameters of this experiment” (see <https://www.case-runch.com/index.html#progress-bars3-o>).

A commercial Ai predictive software program has been developed in Canada by Blue J Legal. The focus has in large part been in respect to specific issues in tax law. The system is described by the developers in Benjamin Alarie, Anthony Niblett, & Albert H Yoon, “Using Machine Learning to Predict Outcomes in Tax Law” (2016) 58(3) *Canadian Business Law Journal* 231-54.

One question the system is designed to determine is whether a worker is an independent contractor or an employee, a significant question under the Income Tax Act. The legal test involves the examination of various factors surrounding the context of the worker's position with the company.

Blue J Legal boasts that their testing shows 90 per cent accuracy in prediction. The developers' description of what the neural networks do in the program is notable:

But how do courts weigh these variables to arrive at their decision? How do the different variables interact with each other? To put it simply, we do not know. We don't use a simple formula. That

is, we don't simply count the factors that favour one classification and weigh them against the factors favouring the other. Nor do we use standard regression techniques that require us to set the structure of the relationship between all the variables and the predicted outcome. Instead, we let the computer find the right answer. We use machine learning technology to figure out the best way to assign weights to each of our variables and to figure out how the different variables interact with each other. This task is practically impossible for a human. Neural networks find hidden connections between the variables that we, as empirical modelers, do not specify and – probably – could not have identified even with unlimited time and resources using conventional approaches to legal research.

It is argued that with the ability to utilise large data sets that this aggregation de-biases or negates the errors or biases of individuals.

The use of electronic search and retrieval systems in document discovery is now common place. Courts have recognised the necessity for such tools and that such systems match or exceeds that of manual searches by humans. Research supports this view (see eg M Grossman and G Cormack, “Technology Assisted Review in Electronic Discovery”, in *Data Analysis in Law*, ed Ed Walters (Taylor & Francis, 2018)).

Contract review is another example. LawGeex in a recent study described a contest between 20 experienced US corporate lawyers and the LawGeex Ai algorithm. The test was to spot issues in five non-disclosure agreements related to business deals. The Ai algorithm achieved an average of 94 per cent accuracy compared to the lawyers' average of 85 per cent. In the five instances the Ai Algorithm scored at 92 per cent, 95 per cent, 95 per cent, 100 per cent and 91 per cent; the lawyers scored 84 per cent, 85 per cent, 86 per cent, 86 per cent, and 83 per cent. In addition to accuracy, the Ai algorithm completed its review in 26 seconds to complete all five; the average for the lawyers was 92 minutes, the shortest being 51 minutes and the longest being 156 minutes (see “Comparing the Performance of Artificial Intelligence in Review of Standard Business Contracts” (LawGeex, February 2018)).

4.7 Technology can improve regulation of human behaviour

In a recent article, “Regulation by Machine” (<https://ssrn.com/abstract=2855977>), Professors Alarie, Niblett, and Yoon argue that machine-learning technologies can improve the regulation of human behaviour as follows:

First, machine learning can help streamline the administration of law. Machine learning algorithms can help predict outcomes of court cases. This will allow regulators to provide faster, more consistent, and more reliable rulings. We provide an example of how machine learning can apply to the regulation of tax laws.

Second, machine-learning algorithms can become the law. Machine learning can be used to not only reflect the law, but also to refine and improve the law. Machine learning algorithms can predict consequences of human behavior. This will facilitate the development of laws that are context-specific, tailored to every

possible scenario. Such advances will fundamentally change the structure of law. In light of this added predictive power, some human activities that are currently governed by ex post litigation will be governed by ex ante regulation. Machine learning will thus be used to refine the law and reduce errors.

In a similar view, Anthony Casey and Anthony Niblett foresee technology replacing the need for rules and standards, and the related trade-offs between the two in terms of certainty and calibration will be rendered unnecessary. The authors predict a new form of law; the “microdirective will emerge to provide all of the benefits of both rules and standards without costs of either. These microdirectives will provide *ex ante* behavioural prescriptions finely tailored to every possible scenario” (see Anthony J Casey and Anthony Niblett, “The Death of Rules and Standards” 92:1401 *Indiana Law Journal* 1402, and Anthony J Casey and Anthony Niblett, “Self Driving Laws” (2016) 66 *U Toronto LJ* 429).

4.8 We are algorithms

The view that humans can all be distilled to mathematical equations is not a new idea. This view is discussed by Y Harari in *Homo Deus, A Brief History of Tomorrow*. He describes all organisms as algorithms-data processors, and as such can be represented mathematically (see p 113). He notes the power of ideological fictions which have led to the supremacy of humans and that such fictions “will rewrite DNA strands; political and economic interests will redesign the climate; and the geography of mountains and rivers will give way to cyberspace” (p 151).

Harari asserts that:

The idea that humans will always have a unique ability beyond the reach of non-conscious algorithms is just wishful thinking. The current scientific answer to this pipe dream can be summarised in three simple principles:

1. *Organisms are algorithms. Every animal – including Homo sapiens – is an assemblage of organic algorithms shaped by natural selection over millions of years of evolution.*
2. *Algorithmic calculations are not affected by the materials from which you build the calculator. Whether you build an abacus from wood, iron or plastic, two beads plus two beads equal four beads.*
3. *Hence there is no reason to think that organic algorithms can do things that non-organic algorithms will never be able to replicate or surpass. As long as the calculations remain valid, what does it matter whether the algorithms are manifested in carbon or silicon?*

One of the questions in my survey of judges was whether they had ever seen algorithm. Most said they had not (they had, but they just have not realised it). One colleague jokingly said that it was a new kind of dance music- perfect pitch, perfect beat, flawless rhythm, but no soul like Aretha, no coolness like Miles, and no tragedy like Janis. The comment reveals the

sense of human distinctiveness which resonates with our sense of personhood.

However, this human-centric view is being challenged. Harari points out that, “[a]rt is often said to provide us with our ultimate (and uniquely human) sanctuary”. But that “it is hard to see why artistic creation will be safe from algorithms”. He states that “art is not the product of some enchanted spirit or metaphysical soul but rather of organic algorithms recognising mathematical patterns,” which should but rather of organic algorithms recognising mathematical patterns,” which non-organic algorithm could master. An example of this in a music project he recounts in his book (pp 324-25):

David Cope is a musicology professor at the University of California in Santa Cruz. He is also one of the more controversial figures in the world of classical music. Cope has written programs that compose concertos, chorales, symphonies and operas. His first creation was named EMI (Experiments in Musical Intelligence), which specialised in imitating the style of Johann Sebastian Bach. It took seven years to create the program, but once the work was done, EMI composed 5,000 chorales à la Bach in a single day. Cope arranged a performance of a few select chorales in a music festival at Santa Cruz. Enthusiastic members of the audience praised the wonderful performance, and explained excitedly how the music touched their innermost being. They didn't know it was composed by EMI rather than Bach, and when the truth was revealed, some reacted with glum silence, while others shouted in anger.

EMI continued to improve, and learned to imitate Beethoven, Chopin, Rachmaninov and Stravinsky. Cope got EMI a contract, and its first album — Classical Music Composed by Computer sold surprisingly well. Publicity brought increasing hostility from classical-music buffs. Professor Steve Larson from the University of Oregon sent Cope a challenge for a musical showdown. Larson suggested that professional pianists play three pieces one after the other: one by Bach, one by EMI, and one by Larson himself. The audience would then be asked to vote who composed which piece. Larson was convinced people would easily tell the difference between soulful human compositions, and the lifeless artefact of a machine. Cope accepted the challenge. On the appointed date, hundreds of lecturers, students and music fans assembled in the University of Oregon's concert hall. At the end of the performance, a vote was taken. The result? The audience thought that EMI's piece was genuine Bach, that Bach's piece was composed by Larson, and that Larson's piece was produced by a computer.

4.9 Economic and financial justification

The development and adoption of Ai adjudication can be justified on an economic basis. I do not intend to develop a detailed business case here. However, in the Canadian Forum on Civil Justice report referenced earlier, the cost to the state arising as a consequence of the unmet need relates to social assistance, loss of employment, and physical and mental health issues is estimated to be \$800 million annually.

In Canada, the federal costs for the superior and appellate court judiciary are approximately \$550 million per year based on the online information of the Commissioner for Federal Judicial Affairs. The annual provincial costs in British Columbia of the judiciary, excluding the cost of facilities supporting the judiciary, of approximately \$115 million. There are 10 provinces and three territories in Canada.

Even if you were to take half, a quarter, or even tenth of the societal costs, it does not take much to see that Ai adjudication can be justified.

5. CONS

I now turn to those views that militate against the notion.

5.1 Humanity and dignity in decision-making

Technology evokes strong reactions. To many there is an abhorrence to machines being put forth to perform tasks that are inherently human. The idea of a machine sitting in judgment ignores the vital distinction between information processing on one hand and thinking and reasoning on the other. Computers do not think nor reason. They employ mathematical equations to interpret data not human principles. It is also pointed out that computers do not have the benefit of the wide range of human experience including: joy, hate, love, sympathy, empathy, fear, confusion, generosity, avarice, admiration and the shades around each; and abstractions such as irony, metaphor, paradox, trust, and sarcasm; nor sensations of touch whether from violence or tenderness or other causes. In short, computers as powerful in processing as they are still mindless.

One of the early voices reflecting these sentiments is that of Joseph Weizenbaum, a pioneer in computer science, who in his 1975 book *Computer Power and Human Reason, from Judgement to Calculation*, made the blunt statement that:

there is a difference between man and machine, and ...there are certain tasks which computers ought not be made to do, independent of whether computers can be made to do them.

He notes that: “Since we do not have ways of making computers wise, we ought not now to give computers tasks that demand wisdom”. Weizenbaum notes the “embrace” of the “mechanization of reason and of language”, and cautions (p 253):

The rhetoric of the technological intelligentsia may be attractive because it appears to be an invitation to reason...it urges instrumental reasonings, not authentic human rationality. It advertises easy and “scientifically” endorsed answers to all conceivable problems. It exploits the myth of expertise. Here too the corruption of language plays an important role. The language of the artificial intelligentsia, or the behaviour modifiers, and of the systems engineers is mystifying. People, things, events are “programmed,” one speaks of “inputs” and “outputs,” of feedback loops, variables, parameters, process, and so on, until eventually all contact with concrete situations is

abstracted away. Then only graphs, data sets, printouts are left. And only “we,” the experts, can understand them.

In succumbing to the invitation, Weizenbaum and many others decry the cost as the loss of our liberty and our humanity. Our conduct and behaviours will be increasingly governed by all of the systems engaged in our daily lives. Computer code will be the law.

Recognition of this concern can be seen in the attempts by some governments to address the problem. A leader is the European Union Parliament which has passed regulations which deal with privacy rights, including the right for a person not to be subject to automated decisions based on profiling. The right was reflected originally in Article 15 of the Data Protection Directive (DPD) and is now largely reflected in Article 22 of the General Data Protection Regulation (GDPR), which came into effect in May 2018. The latter reads:

1. *The data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her.*
2. *Paragraph 1 shall not apply if the decision:*
 - a) *is necessary for entering into, or performance of, a contract between the data subject and a data controller;*
 - b) *is authorised by Union or Member State law to which the controller is subject and which also lays down suitable measures to safeguard the data subject’s rights and freedoms and legitimate interests; or*
 - c) *is based on the data subject’s explicit consent.*
3. *In the cases referred to in points (a) and (c) of paragraph 2, the data controller shall implement suitable measures to safeguard the data subject’s rights and freedoms and legitimate interests, at least the right to obtain human intervention on the part of the controller, to express his or her point of view and to contest the decision.*
4. *Decisions referred to in paragraph 2 shall not be based on special categories of personal data referred to in Article 9(2)1), unless point (a) or (g) of Article 9(2) applies and suitable measures to safeguard the data subject’s rights and freedoms and legitimate interests are in place.*

As Mendoza and Bygrave note by reading the explanatory notes to the predecessor provisions, “we can discern not just fear about humans letting machines make mistakes but a concern to uphold human dignity by ensuring that humans (and not their ‘data shadows’) maintain the primary role in ‘constituting’ themselves.” (See “The Right not to be Subject to Automated Decisions based on Profiling”, University of Oslo Faculty of Law Legal Studies Research paper Series No 2017010, p 7).

Preamble 2 to the DPD notes:

(2) *Whereas data-processing systems are designed to serve man; whereas they must, whatever the nationality or residence of natural persons, respect their fundamental rights and freedoms, notably the right to privacy, and contribute to economic and social progress, trade expansion and the well-being of individuals;*

There are exceptions stated in Article 22 and the extent of the reach of the provision is under scrutiny; however, it is a recognition of a serious societal concern.

5.2 *Opacity and big data*

The lack of transparency in the systems is a major concern when it comes to Ai. The lack of transparency arises because the technology is considered proprietary. While the justification makes sense commercially, this need for confidentiality does nothing to instill confidence in those concerned with Ai decision-making, and particularly those directly affected.

In *Weapons of Math Destruction* (Crown, 2016) Cathy O’Neill provides numerous examples of the victimisation of individuals by unreflective opaque algorithmic programs. There is the highly-regarded teacher who is fired due to a low score on a teacher assessment tool; the college student who couldn’t get a minimum wage job at a grocery store due to his answers on a personality test; and the people whose credit card spending limits were lowered because they shopped at certain stores. She notes the use of algorithms designed for one purpose but used for another not contemplated in the design.

In *Black Box Society* (Harvard University Press, 2015) Frank Pasquale points out the negative effect on reputations, businesses, and economies of unregulated algorithms. He ironically points out at p 191, the irony that while our society today is described as being in the “Information Age”, where “data is becoming staggering in its breadth and depth, yet often the information most important to us is out of our reach, available only to insiders.” Trade secrecy protection, he observes, has replaced the original declaration of openness of algorithms to assuage the natural suspicion of society, effectively creating a property right in an algorithm without requiring its disclosure. See also: *F Pasquale, Prediction, Persuasion and the Jurisprudence of Behaviourism* (2018) Suppl UTLJ 63.

A May 2016 study in *Propublica* addressed the significant concerns in racial bias in risk assessments. Complicating the issue was the private risk assessment firm maintaining that its program and calculations were proprietary.

The case of *Loomis v Wisconsin*, 881 N.W. 2d 749 (Wis 2016), illuminates the lack of transparency issue, and the court’s validation of it. Mr Loomis was charged with five criminal counts related to a drive-by shooting. He denied participating in the shooting but admitted that he had driven the car involved later in the evening. He pleaded guilty to two of the less severe charges. For sentencing a pre-sentence report that included the results from a cloud-source risk assessment program was prepared. The trial court considered the assessment in sentencing and sentenced Mr Loomis to six years imprisonment. Mr Loomis filed a motion post conviction arguing that the court’s reliance

on the risk assessment violated his due process rights. Loomis argued that the courts use of the assessment infringed his right to an individualised sentence and his right to be sentenced on accurate information. The assessment provides data relevant only to particular groups and the methodology used is a trade secret. Mr Loomis's appeals failed. The rational appears to be that since the assessment used only publicly available data and data provided by Mr Loomis, the court concluded that Mr Loomis could have denied or explained any information that went into making the report and therefore could have verified the accuracy of the information used in sentencing. The decision made no reference to the confidential aspect of the methodology. Leave to appeal to the US Supreme Court was denied.

Underlying the concern is the observation that while the programmers behind an algorithm may be expert programmers, they may have no idea about the subject matter that they are attempting to model. Obviously, algorithms themselves do not understand the impact of their functionality. An interesting website to visit and see the extent to which you can find examples of ridiculous correlations is that of TylerVigen.com.

Overcoming transparency however is not enough. Transparency can be overwhelmed or defeated by complexity. An example is the already mentioned system of Blue J Legal, where the developers admit that they do not know how their system determines how the different variables interact in their algorithms. Similarly, the developers of CaseCruncher suspect but are unable to verify that non-legal factors have weight in their predictive model.

Jenna Burrell writes in "How the machine 'thinks': Understanding opacity in machine learning algorithms", *Big Data & Society* [<https://doi.org/10.1177/2053951715622512>], first published 6 January 2016:

The claim that algorithms will classify more "objectively" (thus solving previous inadequacies or injustices in classification) cannot simply be taken at face value given the degree of human judgment still involved in designing the algorithms, choices which become built-in. This human work includes defining features, pre-classifying training data, and adjusting thresholds and parameters.

Enabling systems built on machine learning are large stores of data in which algorithms search for patterns of statistical significance. Such patterns are then used to make decisions regarding queries about an individual in a multitude of circumstances, such as in assessing an applicant for insurance coverage, an accused for bail or sentencing, a worker for employment, a student for entry to college, or an applicant for a loan.

The concern regarding predictions premised on non-individualised aggregated data is eloquently described by Mirriele Hildebrandt. She writes reliance on such data renders "us transparent in a rather counterintuitive manner. We become transparent in the sense that the profiling software

looks straight through us to 'what we are like', instead of making transparent 'what or who we are'."

5.3 *Devolution of standards to rules*

Concern also is raised that as a consequence of the influence of adapting law to being amenable to coding, the essence of the law with its flexibility and sensitivity to adjust for new circumstances will be forsaken for expediency.

5.4 *Calcification and evolution of the law*

On a related note is the observation that if the autonomous system is simply making decisions on historic information, then the law would calcify and not advance. On the other side of the coin, the question that arises in how can it be permissible for an autonomous system to make law. How is it that a system that does not think or reason or have any sense of human experience can have any legitimacy in developing the law?

5.5 *Accountability and liability*

Accountability of present judges is achieved through the disciplinary process contained in legislation. Present day judges can be questioned and rebuked for employing inappropriate biases and utilising invalid heuristics – consciously or unconsciously. It is not clear how an autonomous entity would be subject to the same standard and requirements, as the system is only as good as the programming.

Legal liability is an open question and is illuminated by the discussion on the topic in relation to self-driving cars. There are a vast number of issues to be resolved. Perhaps, in a court system, the judicial immunity provisions applicable to judges would apply.

The European Commission appears to be leader in addressing the question of liability for robots and artificial intelligence. In 2017 MEPs stressed the need for draft legislation to clarify liability issues, especially for self-driving cars and also asked the Commission to consider creating a specific legal status for robots in relation to liability. Ideas such as providing legal personhood to such entities is one idea which has been floated.

I also understand that just recently a three-year review has been initiated to be conducted by the Law Commission of England and Wales, and the Scottish Law Commission, which will look at how traditional laws need to be adjusted to take account of issues including self-driving vehicles not having a human at the wheel or even a steering wheel.

Different liability tests have been discussed, as have been the parties who may be sued such as the manufacturer of the vehicle, and the manufacturer who created the autonomous car technology or technologies.

5.6 *Absence of empirical evidence*

Quantitative and empirical studies by scores of law academics and political scientists over a half century have not resulted in a clear model. While various theories of the factors

which influence judges have been posited, the results have been indeterminate. If the experts who have spent their careers cannot find success, how is then that some computer will?

In *What's Law Got to Do with It* (Stanford University Press, 2011), Charles Geyh has assembled a series of contributions from authors who write on the various schools of thought, and notes that the influences on judicial decision-making are complex and multivariate and that decision-making does not neatly fit into any one of the models that have been identified (see the discussion above under the heading “Law is a mystery”). Geyh notes in the introduction that the views contained in the collection include the assertion that judicial independence reinforces the perspective that judges as a result of the various influences are at “liberty to implement their own priorities by acting on their ideological preferences; indulging in strategic gamesmanship; pandering to their favoured audiences; or satiating their self interest” undermines the rule of law”; and conversely, that judicial independence “permits judges to apply the law as it protects the judge from extraneous influences – this then upholds the rule of law rather than denigrate it.” He notes that the “legal model” described by academics is not a model at all but little more than “a list of law-related factors that judges say matter to them when they make decisions. Without specifying under what circumstances or subject to what limitations those factors influence judicial decision, such factors, by themselves, lack the explanatory or predictive qualities of a model.”

The reality here is that legal matters are not analogous to science. As Posner in the *Problems of Jurisprudence* explains:

Unlike scientific ideas – which experimental, statistical, predictive, and observational procedures of modern science, together with the technical capability of embodying and thereby testing scientific theories enable many scientific ideas to be reasonably held with a degree of confidence that enables them to be called “true” without a sense of strain, rather than merely convenient to believe.

In the US, considerable efforts have gone into predicting outcomes from the US Supreme Court each judicial term by court observers, students, legal academics and practitioners. Ironically, despite the enormous legal talent and expertise applied to predicting Supreme Court, the “FiveThirtyEight” politics blog by Oliver Roeder, found that the best predictor of US Supreme Court decisions was “some random guy in Queens” three years running.

The blog states:

Jacob Berlove, 30, of Queens, is the best human Supreme Court predictor in the world. Actually, forget the qualifier. He’s the best Supreme Court predictor in the world. He won FantasySCOTUS three years running. He correctly predicts cases more than 80 percent of the time. He plays under the name “Melech” — “king” in Hebrew.

Berlove has no formal legal training. Nor does he use statistical analyses to aid his predictions. He got interested in the Supreme Court in elementary school, reading his local paper, the Cincinnati

Enquirer. In high school, he stumbled upon a constitutional law textbook.

“I read through huge chunks of it and I had a great time,” he told me. “I learned a lot over that weekend.”

Berlove has a prodigious memory for justices’ past decisions and opinions, and relies heavily on their colloquies in oral arguments. When we spoke, he had strong feelings about certain justices’ oratorical styles and how they affected his predictions.

One law professor’s methodology described in the blog was to poll legal experts on the outcomes; some political scientists drew up classification trees, largely based on an attitudinal approach. Their results were 59 per cent and 75 per cent respectively. The “random” guy from Queens attained an above 80 per cent success rate.

As a final point on this topic, Posner in *Overcoming Law* (Harvard University Press, 1995) states at p 36:

The problem with law (with ethics too) as a system of reasoning is that in a pluralistic society it lacks cogent techniques for resolving disagreement. If everyone in our society just happened to agree that laws which forbid abortion infringe constitutional liberty (just as everyone in the relevant community believes that moving a rook diagonally is a violation of the rules of chess), this would be a true proposition of contemporary American Law. But if enough rational persons disagree – and disagreement with this proposition cannot itself be deemed a sign of irrationality, as might disagreement with the proposition that it is considered wrong in our society to torture children or that the earth revolves around the sun – there is no method of resolving their disagreement other than by force or some equivalently nonanalytic method of dispute resolution, such as voting. There are no tests, procedures, protocols, algorithms, experiments, computations, or observations for determining which side in the dispute is right. Some arguments can be rejected as bad, but enough good arguments remain on both sides to leave the issue suspended in indeterminacy (see Chapter 5). One can expect, therefore, that political, self-interested, traditional, habitual, or other truth-independent considerations will play a far larger role in explaining the content, character, and acceptance of legal ideas than they play in the case of modern science, where the relevant community agrees on the criteria for verification.

For commentary in a Canadian setting see PJ Carver “Reality Check: on the Uses of Empiricism”, 21 Can JL & Jurisprudence 447 (2008).

5.7 Due process concerns

Due process is a cornerstone to a just legal system. The general concern regarding automated decision-making is that in many instances there are few systemic safeguards such as timely and informative notice of hearing; an ability to know the case to be met; a fair and impartial hearing; an opportunity to respond; an ability to question those advancing a contrary case; access to legal counsel; a public record of the decision; public attendance; reasons for decision; and an ability to appeal or seek judicial review. These requirements arise from Professor Lon Fuller’s

well-known eight fundamental conditions for legal rules and decision-making systems, namely: they must be: sufficiently general; publicly promulgated; sufficiently prospective; clear and intelligible; free of contradiction; sufficiently consistent over time; not impossible to comply with: and administered so that individuals can abide by them.

Concerns regarding Ai largely arise in decision-making in areas such as in job applications, credit applications, insurance and benefits applications, job performance, no-fly lists, etc. However, there is concern that *ex ante* decisions in a legal setting may be a future possibility. Further, as earlier mentioned, some courts have not recognised the right to full inquiry into a predictive algorithm even with in circumstances of an individual's liberty is at stake, as was the case in *Loomis v Wisconsin*.

It would seem that a further refinement to Fuller's criteria should include the ability to fully contest, including the disclosure of, and the inner workings and logic of, an autonomous system, when one has been subjected to such a system.

Due process is also arguably undermined by the movement through predictive technologies to an *ex ante* environment. This is already occurring in a number of instances as pointed out above; though as mentioned there is some favourable discussion in the literature that speak positively of *ex ante* Ai micro directives which would prescribe appropriate behaviour in all circumstances.

This jurisprudential shift from the present *ex post facto* system of remedies to the preventative system could as Ian Kerr states "fundamentally alter the path of law, significantly undermining core presumptions built into today's retributive and restorative models of social justice." He fears that such a shift "could quite plausibly risk a "total failure' of several of Fuller's eight principles of legality." (See I Kerr, *Prediction, Pre-emption, Presumption: the Path of Law after the Computational Turn, in Privacy, Due Process and the Computational Turn*, eds M Hildebrandt and K de Vries (Routledge, 2013).

5.8 Demise of legal institutions

The basis of this concern is the fear that to the extent any Ai is adopted it will lead to the erosion of our laws and institutions. Cynics say that once shortcuts are found, Ai systems would be extended without thought of the devaluating consequences on our present legal institutions.

Some have pointed out that with a somewhat workable Ai system, policy-makers could use it as a basis to eliminate or reduce the influence of courts in circumstances where the judiciary is viewed as politically bothersome to a government's policy initiative. Government criticism of the courts in this regard is not uncommon.

5.9 De-skilling

The loss of human competencies is a concern. In a world where easy access to Ai systems becomes the norm, the ability

to inquire, problem-solve, and resolve disputes will atrophy. The general ability for the population to resolve problems will be taken over by technology. Human expertise in legal knowledge and skill will diminish, leaving autonomous self-learning systems to apply, interpret and evolve the law. Legal skills will become a lost art - recall here Socrates's lament above. See also; M Hildebrandt, "Law as Computation in the Era of Artificial Legal Intelligence: Speaking law to the Power of Statistics" (2018) 68: Suppl UTLJ 12.

5.10 Inability to find facts

The resolving of conflicting narratives is a critical aspect of the truth-seeking function. At present, no technology exists that can reliably and acceptably make the multitude of assessments in finding facts. Creditability is often a critical assessment. Complexity of the exercise can be seen in the description by Dillon J of the court in which I sit, in *Bradshaw v Stenner*, 2010 BCSC 1398:

186 *Credibility involves an assessment of the trustworthiness of a witness' testimony based upon the veracity or sincerity of a witness and the accuracy of the evidence that the witness provides (Raymond v Bosanquet (Township) (1919), 59 S.C.R. 452, 50 D.L.R. 560 (S.C.C.)). The art of assessment involves examination of various factors such as the ability and opportunity to observe events, the firmness of his memory, the ability to resist the influence of interest to modify his recollection, whether the witness' evidence harmonizes with independent evidence that has been accepted, whether the witness changes his testimony during direct and cross-examination, whether the witness' testimony seems unreasonable, impossible, or unlikely, whether a witness has a motive to lie, and the demeanour of a witness generally (Wallace v Davis (1926), 31 O.W.N. 202 (Ont.H.C.); Farnya v Chorny, [1952] 2 D.L.R. 354 (B.C.C.A.) [Farnya]; R v S(R D), [1997] 3 S.C.R. 484 at para 128 (S.C.C.)). Ultimately, the validity of the evidence depends on whether the evidence is consistent with the probabilities affecting the case as a whole and shown to be in existence at the time (Farnya at para 356).*

187 *It has been suggested that a methodology to adopt is to first consider the testimony of a witness on a 'stand alone' basis, followed by an analysis of whether the witness' story is inherently believable. Then, if the witness testimony has survived relatively intact, the testimony should be evaluated based upon the consistency with other witnesses and with documentary evidence. The testimony of non-party, disinterested witnesses may provide a reliable yardstick for comparison. Finally, the court should determine which version of events is the most consistent with the "preponderance of probabilities which a practical and informed person would readily recognize as reasonable in that place and in those conditions" (Overseas Investments (1986) Ltd v Cornwall Developments Ltd (1993), 12 Alta. L.R. (3d) 298 at para 13 (Alta. Q.B.)). I have found this approach useful.*

As fragile and susceptible this human approach to fact-finding may be, machine learning and natural language processing is not at the level necessary for fact-finding.

5.11 Constitutional limits/Charter of Rights and Freedoms

Any notion of adopting Ai adjudication is confronted by the fact that the courts are an essential arm of a constitutional government based on the rule of law. When considered in this context, the idea of autonomous Ai agents applying, interpreting and evolving the law seems untenable. It is antithetical to a representative government.

This can be readily seen in Canada, where since the adoption of the Canadian Charter of Rights and Freedoms in 1982, as part of the constitution, the Supreme Court of Canada has been active in opining on a wide array of rights and freedoms of Canadians enshrined in the Charter of Rights and Freedoms.

Section 1 of the Charter guarantees the rights and freedom set out in its subject only to such reasonable limits prescribed by law as can be demonstrably justified in a free and democratic society.

A wide area of freedom and rights have been tested in the courts since the inception of the Charter such as in the area of religion; thought, belief, opinion; expression; the press; assembly; association mobility; the vote; right to life; liberty and security; security against unreasonable search or seizure; right to counsel; and the right to be tried within a reasonable time.

An important feature of the Charter is the right to be tried by a jury in criminal proceedings where the penalty is for five years imprisonment or more. Though not in the Charter, it should also be noted that there exists the right to have trial by jury in many civil matters in many provinces. By definition, trial by jury involves human judgment.

The Supreme Court regularly makes significant decisions involving the Charter and other areas affecting individuals and society. These cases can be found in family law, administrative law, treatment of prisoners, aboriginal law, assisted suicide, language rights, tort and contract law.

Such critical areas involving such important individual rights, liberties and societal values for most could hardly be entrusted to some Ai adjudicator.

5.12 Unacceptability of Ai interpreting and evolving the law

As mentioned above throughout, the notion of laws being interpreted, or uncovered, or newly invented through Ai would be an abdication of self-determination by humans.

No one can deny the benefits that technology has contributed to our world. Skeptics over the years who have doubted the extent of technology exceeding human performance in many domains have been proven wrong. Advances in Ai technology will continue. The technology will push further into the space occupied by humans. There are clear concerns regarding the impacts, particularly for human liberty, autonomy and the rule of law. At the highest level of court, the issues do not lend themselves to formulation.

6. DISCUSSION

Although there are many concerns over the role of Ai, there are clear access to justice needs which an Ai system properly designed could play a role in addressing. The legal profession unfortunately has been unable to meet the challenges presented, largely because it would not be remunerative. There are calls for a cultural shift and a paradigm shift in the administration of justice. Attention to proportionality and an outcomes-based approach has been called for and endorsed. Many of the concerns that I have identified are not insurmountable. In terms of transparency, steps can be taken to ensure that systems are open to scrutiny; unacceptable biases can be eliminated from code; where facts are in issue, the system could be designed to screen where the differences arise between relevant facts and the non-relevant; if fact-finding on critical points is required, the system could flag it for referral to a human fact finder; and the system could be designed to explain accurately the decision reached.

Accountability and liability concerns are under active discussion and potential solutions have been identified. Further, in future, given advances in understanding human nature and the increasing processing power of computers to access the vast and growing stores of data, fact-finding through Ai may well prove to be better than that of humans.

Where technology's march into the area of legal adjudication stalls is in the arena of public acceptability and in the recognition that the superior courts are an essential arm of government premised on the rule of law. The key function of deciding rights, correcting wrongs, interpreting the law and evolving the law is a one reserved for humans in the same way as all other arms of government.

So then are we to be content with the status quo in the face of significant access to justice needs?

Considerable public discussion would be required, but there could be a role in a limited but wide area. This would be in the resolution of the everyday justiciable problems identified in the earlier mentioned access to justice reports. At this level, the types of problems likely can be resolved by established and settled legal principles in which significant policy considerations that attract the attention of the senior courts would not be active. To the extent that a problem did, a system could be designed to flag it and deem the case inappropriate for resolution by the system. At this basic level, modeling would be less complicated given the lesser uncertainty.

If materially relevant facts are in dispute then it seems that fact-finding would be required at present by a human fact finder. A possible scenario would be one where a community worker trained in the area of justiciable problems and basic fact-finding could be engaged to find facts to be provided for Ai adjudication. Such a system could be described as "distributed justice," in that the resolution of everyday justiciable problems would be at the everyday level.

Obviously, significant public discussion on such a system

would be required before implementation. The system might look as follows:

- (a) online dispute resolution through mediation or adjudication;
- (b) the system would be based on machine learning/natural language or could be rules-based;
- (c) the system would be developed through subject matter experts in specific areas of law, including lawyers, academics and judges working with programmers;
- (d) the system would be open code and transparent, monitored and tested continuously;
- (e) the system would be inquiry based, that is the system would query the litigants in addition to the parties questioning the others;
- (f) participants would be informed throughout that the adjudicator was an Ai system;
- (g) if the system determined that it could not find critical facts, then the fact- finding function would be undertaken by a trained community level individual;
- (h) the system would produce results with an explanation;
- (i) disputants would have a right of review or appeal to a human tribunal; and
- (j) the system would be administered under the authority of the court.

7. CONCLUSION

There are views that are supportive and those that are unsupportive of the use of Ai in areas held to be the exclusive domain of humans. While Ai adjudication has possibilities, there are significant issues and public debate and consultation are required. There may be a limited role. Ai adjudication could have a role in dealing with everyday justiciable civil problems which are usually by definition smaller in quantum, do not involve questions involving significant public policy issues, and involve legal principles that are settled. Such a system could address the significant unmet need that has been identified and which have significant social costs. Close examination is required with the recognition that rapid disruptive forces are overtaking the territory once exclusively considered the exclusively the domain of humanity.

The Hon Mr Justice David M Masuhara

Supreme Court of British Columbia