

The Challenge of Algocracy in Arbitral Decision-Making

Miami, 28 February 2018

Introduction

1. [SLIDE] The typical lawyer's office in the 21st century looks like this. It is an office on the go; today's lawyers are road warriors: you communicate via e-mail; you no longer receive post-its from personal assistants saying, "while you were out, Mr. Jones called", because Mr Jones texted you on your mobile while you were out; and you participate in video conferences and hearings.
2. [SLIDE] The typical arbitration proceedings right now look exactly like they did 50 years ago: everyone shows up in one place at an appointed time, for in-person hearings before a panel reading hard-copy documents from A5 bundles and annotating them with post-it notes and by hand.
3. Is this scenario obsolete? In several aspects it is. I will shortly give you some examples. Are parts of it worth fighting to preserve, faced with the ineluctable advance of AI, not only in the field of predictive analysis, but also that of prescriptive analysis? That is the more difficult question, and the topic of this talk.
4. How is this scenario obsolete? A couple of examples.

5. One, virtual technology -- Facebook's Oculus Rift,¹ Magic Leap,² Star VR (formerly Infiniteye)³ -- that replicates interpersonal interaction to a startling degree is targeting arbitration proceedings and we are getting ever closer to virtual hearings. The only remaining hurdle is the cost element, which will decrease as the technology develops.
6. Two, many important decisions hinge on accuracy and logic, where human judgment is inevitably fallible, relying as it does on limited experience rather than statistical data, and faulty mental models rather than pure logic. At the game of accuracy and logic, it is incontrovertible that algorithms win over humans.
7. [SLIDE] Algorithms that predict judicial reasoning are being developed. Computer scientists at the University of London have devised software that has accurately predicted the outcome in 79% of 584 cases (that's 461 cases) before the European Court of Human Rights involving torture, degrading treatment and breach of privacy.⁴
8. That percentage is bound to increase with the phenomenon of *deep learning*, the intelligent machines' ability to learn on their own and teach themselves games such as chess and go, develop creative moves novel to the human mind, and beat human world champions.⁵
9. A Working Paper issued in February 2017 by the National Bureau of Economic Research, an American private nonprofit organization, examined how machine learning can be used to predict the probability of bail jumping by defendants awaiting trial.

¹ <https://www.oculus.com/en-us/>

² <http://www.magicleap.com/#/home>

³ <http://www.starvr.com/>

⁴ <https://www.theguardian.com/technology/2016/oct/24/artificial-intelligence-judge-university-college-london-computer-scientists>

⁵ <http://www.bbc.com/news/technology-41668701>

10. The Paper posits that the consistency of prediction by algorithms of a defendant's flight or safety risk could translate into a reduction of crime of 24.8% with no change in jailing rates, or a reduction of jail populations by 42% with no increase in crime rates – an important societal impact.⁶
11. The next question is, we cannot ignore this - what do we do about it? Is there anything about the current arbitration model that is worth preserving in order to keep the integrity of the arbitral process in the face of artificial intelligence? If so, what is it?
12. In other words, does the integrity of arbitration as a dispute resolution process hinge on human characteristics, however fallible? And is that what users want from the process?
13. In this talk I seek to probe your thoughts about how the human mind, and its decision-making capacities, can work hand in hand with AI, drawing upon the considerable potential offered by technology to make the arbitration process more streamlined, more efficient, more modern and attuned to 21st century business; in a word, better.
14. This probe also implies, at a higher level, bigger questions about (1) what values we currently hold and want to preserve in arbitral decision-making; (2) whether more AI in IA means a more legitimate process, or a lesser one. If the values of democracy, due process and fairness which underpin our field translate into a higher margin of inaccurate decisions, or a zigzagging and inconsistent track record such as that which has been widely reproached to investment arbitration, should they remain at the defining core of the process?

⁶ J Kleinberg; H Lakkaraju; J Leskovec; J Ludwig; S Mullainathan, "Human Decisions and Machine Predictions" (2018) 133:1 *The Quarterly Journal of Economics*, 237-293.
<https://academic.oup.com/qje/article/133/1/237/4095198#109311049>

- 15.[SLIDE] Or should we derive assistance from the instrumental and procedural virtues of algocracy⁷ at the cost of some degree of loss in human control and comprehension?
- 16.The “-cracy” in algocracy has the same meaning as in democracy. Just as democracy is the power or rule of the people, so algocracy describes the phenomenon, no longer science-fiction, where algorithms force human environment and behaviour to change, rather than the other way around – and up to now it has been mainly the other way around.
- 17.It is undisputed that technology up to now has been at the service of the arbitral process, assisting with the accuracy and speed of procedurally repetitive or voluminous tasks. But we have reached a stage where technological development has entered the realm of the substantive, hitherto the preserve of human decision-makers: in addition to the ECtHR algorithm I just referred to, AI is already in existence to, e.g., assess the truth of a witness’s testimony on the basis of an analysis of her voice intonations and facial micro-expressions; and we are not far from technology that will generate in record time a reasoned decision that takes into account and cross-references jurisprudence, each and every document, fact, and all applicable law.
- 18.And there is no dispute that machines can beat us hands down at this game [ANIMAL SLIDES – it takes the human mind some 10-12 seconds to solve the puzzle; it takes the algorithm less than a second]

⁷ The term famously coined by John Danaher, a Lecturer in Law at National University of Ireland Galway, to describe a kind of governance system that is “*organised and structured on the basis of computer-programmed algorithms. (...) a system in which algorithms are used to collect, collate and organise the data upon which decisions are typically made, and to assist in how that data is processed and communicated through the relevant governance system. This can be done by algorithms forcing changes in the structure of the physical environment in which the humans operate (...). Such systems may be automated or semi-automated. Or may retain human supervision and input.*” J Danaher, “The Threat of Algocracy: Reality, Resistance and Accommodation” (2016) 29:3 *Philosophy & Technology* 245-268. <https://philpapers.org/archive/DANTTO-13.pdf>

The OECD Report

[SLIDE]

19. The Organisation for Economic Co-operation and Development (OECD) has just published the results of a study on the impact of automation on human activity. The research measured a set of three cognitive skills – literacy, numeracy, problem-solving with computers – that receive extensive development during compulsory education, and are used by a large proportion of the population every day at work. The research then compares human performance at these skills against the abilities of machines. It surveyed 216,000 adults in 40 OECD countries via a questionnaire.

20. [SLIDE] The Report itself describes the results as “worrying”⁸: The level of competency of two thirds of workers in OECD countries using the literacy, numeracy and digital problem-solving skills is easily matched by computers. Only 13% of workers (one in ten adults) currently perform at a higher level than computers when using these skills on a daily basis. [The remaining 25% did not use those skills at work]

21. We cannot assume that the 13% of higher performers is comprised only of lawyers, which puts some of us in the redundant category.

22. From these findings, the report anticipates that in 10 to 20 years, there will be an overall decrease in demand for those workers whose proficiency with the skills is no better than the capabilities of computers – which is the vast majority of workers.

23. This does not mean that these workers will become unemployed, but it does mean that they will become less valuable for many work tasks, and that will reduce employment in some cases and wages in others.

⁸ S W Elliott (2017), *Computers and the Future of Skill Demand*, OECD Publishing, Paris, at page 3.

24. Consequently, concludes the study, employment prospects for most adults in the next one to two decades will increasingly depend on developing other types of skills alongside the three skills of literacy, numeracy and problem-solving.
25. What are these “other types of skills” for us? This is what I would like to explore further with you for the rest of this talk.

AI and IA

26. Transposing these findings to the field of arbitration, we can make the following observations.
27. For a start, it was not so long ago an unthinkable idea that legal work – that regulated professional work - could become automated. Not only did we lack sophisticated enough software, but indeed routine tasks – legal research, due diligence, disclosure, template contract drafting - were seen as essential training ground for budding lawyers.
28. The automation of several of these tasks is now reality, and a reality welcome by clients, who pay less for a more efficient and more accurate service. This means that AI closes in on the work of junior lawyers, and how we were all traditionally trained to become lawyers. This is forcing law firms to re-think the format of their investment in their younger people, as well as their historical business model.⁹
29. It is also forcing us to think how this development impacts the arbitration process as we know it. We can start by asking, what can we deliver with the assistance of intelligent technology sifting through thousands of pages of documents with uncanny accuracy; and telling us whether or not a witness is being truthful, and what is the arbitration process for: Are we

⁹ “Artificial intelligence closes in on the work of junior lawyers”, The Financial Times, 4 May 2017.

looking to deliver a flawlessly logical, entirely dispassionate outcome? A search for the truth? Unanswerable legal reasoning?

30. Technology also causes us to rethink the tenet of the *intuitu personae*, individual nature of the arbitrator's mandate, and how much of it can be relinquished without delegating the function altogether – much like it has been said that writing one's own awards is the safeguard of intellectual integrity, what happens if technology gets ahead of you, leads you by the hand through evidence and legal research and presents you with an inevitable conclusion?

31. Let us look at one practical example, to take a topic on which there is little consensus in our field - the treatment of allegations of corruption by arbitration tribunals. The current landscape is that we are still having debates about questions such as the applicable standard for proving those allegations; whether there is any *sua sponte* obligation to report to anti-corruption authorities; what sanctions to apply; and although we all agree that corruption is reprehensible, as things stand we have no best practice .

32. What about drawing assistance from an algorithm programmed to recognise red flags in a given set of factual circumstances, and to determine the percentage chance of corruption being, or not being, present? Again, this is not science fiction - something along those lines has already been conceived by researchers at the University of Cambridge, who developed a series of algorithms that mine public procurement data for signs of the abuse of public finances (e.g, an unusually short tender period; low number of bidders in a competitive industry; unusually complex or inaccessible tender documents).¹⁰

¹⁰ https://www.upi.com/Science_News/2015/05/15/Researchers-trawl-public-data-for-signs-of-corruption/3291434397594/

33. Once the algorithm has identified red flags which are indicative of corruption, is there any remaining scope for the human minds on the tribunal to disagree that there was corruption? If so, on what basis does one disagree with accuracy?
34. And if we deliver perfectly accurate legal reasoning, there should be no more need for appeal or review in tomorrow's dispute resolution world. The New York Convention would arguably be obsolete in a computer-driven arbitral process. The justifications for refusing to enforce an arbitral award set forth in Article V of the New York Convention¹¹ largely focus on phenomena that occur as a result of human error – chief amongst which is non-compliance with public policy under Article V(2)(b).

New skills?

35. One answer to these questions may lie in the OECD point about the need to factor in skills other than those that computers can easily match in order to keep the arbitral process humanly relevant. The OECD is not alone in

¹¹ Article V

1. Recognition and enforcement of the award may be refused, at the request of the party against whom it is invoked, only if that party furnishes to the competent authority where the recognition and enforcement is sought, proof that:

(a) The parties to the agreement referred to in article II were, under the law applicable to them, under some incapacity, or the said agreement is not valid under the law to which the parties have subjected it or, failing any indication thereon, under the law of the country where the award was made; or

(b) The party against whom the award is invoked was not given proper notice of the appointment of the arbitrator or of the arbitration proceedings or was otherwise unable to present his case; or

(c) The award deals with a difference not contemplated by or not falling within the terms of the submission to arbitration, or it contains decisions on matters beyond the scope of the submission to arbitration, provided that, if the decisions on matters submitted to arbitration can be separated from those not so submitted, that part of the award which contains decisions on matters submitted to arbitration may be recognized and enforced; or

(d) The composition of the arbitral authority or the arbitral procedure was not in accordance with the agreement of the parties, or, failing such agreement, was not in accordance with the law of the country where the arbitration took place; or

(e) The award has not yet become binding, on the parties, or has been set aside or suspended by a competent authority of the country in which, or under the law of which, that award was made.

2. Recognition and enforcement of an arbitral award may also be refused if the competent authority in the country where recognition and enforcement is sought finds that:

(a) The subject matter of the difference is not capable of settlement by arbitration under the law of that country; or

(b) The recognition or enforcement of the award would be contrary to the public policy of that country.

making this point. PwC and the McKinsey Institute, to name only two organisations that have recently issued reports on the societal impact of AI, also place a spotlight on intangible human attributes in charting the way forward.

36. Let us therefore look at equity, empathy, common sense, fairness, and trust. All of us in the arbitration field know the importance of these intangible features in our work. They are part and parcel of being human and of resolving human disagreements and disputes.
37. That's all very well – but are these attributes not also open to cognitive and unconscious bias? Is the point of computer accuracy not precisely to neutralise the prejudices that the human mind harbours?
38. Apparently not. As the phenomenon expands we are finding out that Artificial Intelligence itself is not immune to bias. Algorithmic bias and algorithmic opacity are emerging as important issues.¹² As technology advances, regulators are now considering requirements that companies should be asked to provide an explanation for decisions reached by automated systems, many of which end up programming themselves, through deep learning, in ways that even their human creators do not fully grasp.¹³
39. [SLIDE] The Economist, in a recent special report on the topic, posits that the technology of face recognition – already in use to tell whether or not a witness is telling the truth - might lead to ingrained forms of discrimination, not unlike the human unconscious bias phenomenon. Thus, “[e]mployers can already act on their prejudices to deny people a job. But facial recognition could make such bias routine, enabling firms to filter all job applications for ethnicity and signs of intelligence and sexual preference.

¹² <https://www.technologyreview.com/s/608248/biased-algorithms-are-everywhere-and-no-one-seems-to-care/>

¹³ <https://www.technologyreview.com/s/604087/the-dark-secret-at-the-heart-of-ai/>

(...) Moreover, such systems may be biased against those who do not have white skin since algorithms trained on data sets of mostly white faces do not work well with different ethnicities.”

40. The article also wonders whether “*continuous facial recording and gadgets that paint computerised data onto the real world might change the texture of social interactions, (...) from a set of commitments founded on trust to calculations of risk and reward derived from the information a computer attaches to someone’s face.*”¹⁴

41. In a system where litigants get to choose their tribunal, trust in decision-makers underpins what we do, and it sounds trite to even say so. But what the OECD study and other similar research tells us is that we can no longer afford to take that trust for granted.

42. As things stand now, Big Data’s biggest challenge is to win human trust. Studies show that human beings tend to trust human judgment over algorithms even whilst they are made aware that algorithms perform better. Studies also show that human beings forgive human mistakes, but not an algorithm’s mistakes, because they expect the algorithm to be perfect every single time.

43. On this score we are – for now at least – one step ahead of intelligent machines.

44. We cannot be complacent about this, however.

45. Given the emerging phenomenon of algorithmic bias, our challenge is for human decision-makers to fight for winning and retaining litigants’ trust, and their loyalty, on human terms. This might mean reigning in the computers’ considerable speed and accuracy in performing routine tasks

¹⁴ <https://www.economist.com/news/leaders/21728617-life-age-facial-recognition-what-machines-can-tell-your-face>

and allowing the virtues of fairness, common sense, honesty and empathy to come to the fore as the human part of the equation.

46.[Illustration: ICJ Judgment 2 February 2018 *Costa Rica v Nicaragua* – flexible approach to the burden of proving environmental damage where science is not quite there yet. Equitable considerations that are eminently the product of the human mind]

47.How we do this, what makes a decision-maker worthy of trust, and what are the criteria for his or her selection, are questions for another talk. But lately we have been running a trust deficit in international arbitration, most publicly in investment arbitration, but also more broadly in the commercial field.

48.There are those colleagues who say that this is exaggerated, that the investment arbitration backlash is *sui generis*.

49.I say, please beware. AI no longer gives us space to think in this manner. Many tenets of the arbitral process are being questioned and criticised by users, and we have not always been as proactive as we should have in taking a long hard look at weaker aspects and addressing them. AI is giving us that opportunity of winning human trust back, and fostering loyalty in the international arbitration process.

50.It also means making sure that we, the humans, keep insisting that we understand how algorithms arrive at the decisions that they take. If legitimacy is defined by general acceptability, reasonable rejectability, and publicity, then it is paramount that reliance on AI to assist in accurate decision-making be informed by an understanding of how far that help goes, and the exact point at which human decision takes over.

51.The intelligibility of algorithms is therefore a paramount issue for arbitral decision makers. It is also one that experts say may well be unworkable in

practice, as intelligent machines develop what has been called a web of “invisible barbed wires” that initially lure humans into surrendering to the greater technical capacity of machines – who would not wish to have more efficient cheaper more accurate results – and then find that we can no longer follow the machine’s deeper, more complex thought process as it carries on “deep learning”.

52. There is one last factor worth pondering, and it is one that is exercising the minds of not only scientists, but Silicon Valley – that of brain computer interface. A not unimportant current of thought is emerging to the effect that, if humans are going to coexist with AI rather than be sunjugated by it, then humans will need to impose their values by upgrading their capabilities – telepathic communication, say, or instant skill acquisition – and much remains unknown about how the human brain works and the depths of its possibilities.¹⁵

53. I would urge us not to dismiss this as geeky folly and to follow these developments closely, and with an open mind, if we are serious about the future of this field. I have no wish to be alarmist. There is scope for an intelligent way of tackling these challenges. But ignoring them is not an option.

54. [SLIDE Star Trek] I cannot end a talk on AI and technology without making reference to Star Trek, a visionary series on many aspects of this fifty years ago.

55. [SLIDE SPOCK] In the immortal words of the Vulcans, Live long and prosper.

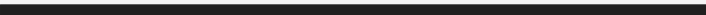
Thank you.

¹⁵ “Technology Quarterly: Brain-computer interfaces”, *The Economist*, January 6th-12th 2018.




ALGOCRACY IN ARBITRATION

Sophie Nappert
MIAS Membership Meeting
Miami, 28 February 2018





Predicting Judicial Reasoning

- Software has accurately predicted the outcome in 461 of 584 cases before the European Court of Human Rights
 - Machine learning can be used to predict the probability of bail jumping by defendants awaiting criminal trial
 - 24.8% reduction of crime
 - 42% reduction in jail population
- 

“Algocracy”

- *A system in which algorithms are used to collect, collate and organise the data upon which decisions are typically made, and to assist in how that data is processed and communicated through the relevant governance system. This can be done by algorithms forcing changes in the structure of the physical environment in which the humans operate.*
 - J Danaher, “The Threat of Algocracy: Reality, Resistance and Accommodation” (2016) 29:3 *Philosophy & Technology* 245-268
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Barn owl or apple?



Sheep dog or mop?



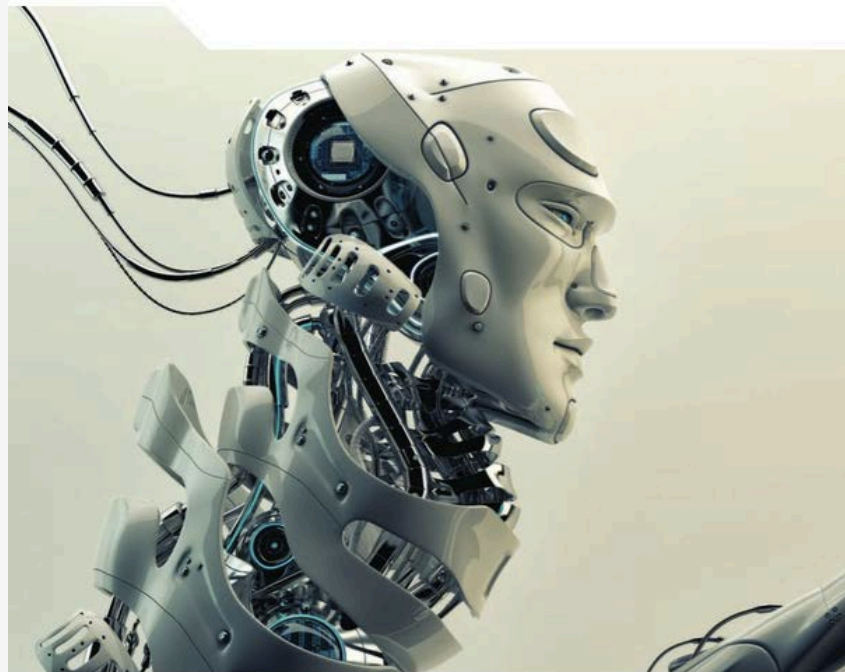
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Educational Research and Innovation

Computers and the Future of Skill Demand

Stuart W. Elliott



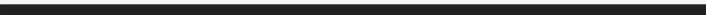
Literacy

- 216,000 adults
- 40 countries


Numeracy

*Digital
problem-
solving*

- Computers match competency level of **2/3 of workers**
- Computers remain below competency level of **13% of workers**




The Question of Trust

- “[e]mployers can already act on their prejudices to deny people a job. But facial recognition could make such bias routine, enabling firms to filter all jobs applications for ethnicity and signs of intelligence and sexual preference.”
 - “continuous facial recording and gadgets that paint computerised data onto the real world might change the **texture of social interactions,** (...) from a set of **commitments founded on trust** to calculations of risk and reward derived from the information a computer attached to someone’s face.”
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Dr. McCoy: *We're all sorry for the other guy when he loses his job to a machine. When it comes to your job, that's different. And it always will be different.*^[L]_[SEP]

Spock: *Computers make excellent and efficient servants, but I have no wish to serve under them, Captain. The starship also runs on loyalty to one man. And nothing can replace it, or him.*

Star Trek, the Original Series (*The Ultimate Computer*, 1968)







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