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LEX EX MACHINA: THE LIMITS OF LAW’S COMPUTABILITY

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APPLYING AI TO LAW: LEGAL SERVICES MARKET

- Law is stubborn and change adverse.
  - ‘Billable Hours’ model means speed = less money.
- Computers changed how work was done, but not the business model. Customer experience hasn’t changed much in 50 years.
- Now undergoing deep transformation with automation of legal tasks and the ‘cognitive domain’ of lawyers/judges.
APPLYING AI TO LAW: LEGAL EXPERT SYSTEMS (LES)

- **1970s-80s:** Commercial success of ES in ‘hard’ domains (medicine) assumed they would work in ‘easy’ domain of law.
  - **Assumption 1:** If you knew the rules and gathered some lawyers together it was trivial to formalise their expertise.
  - **Assumption 2:** There was a ‘core’ to law and legal advice that could be mathematically formalised.

- Neglected that law is agonistic, dynamic, contingent, and principles develop through confrontation and LES failed.
APPLYING AI TO LAW: LEGALTECH

- **LegalTech**: Use of Big Data and AI/ML to assist with legal services and the work done by lawyers.
  - **Lawyers**: Legal Research, Case Management, Due Diligence, Electronic Discovery, Contract analysis, Litigation Risk.
  - **Legal Administration**: Billing, administrative, secretarial services.
- **In principle**: levels the playing field for small firms and sole practitioners who cannot compete with large firms, and is globalising the legal services market.
APPLYING AI TO LAW: LEGALTECH

- Commodification of Legal Services made it synonymous with ‘The Law’, validating the Chicago law and economics model (rational choice, game theory, behavioural economics)

- Alternative Legal Services Providers (ALSP) increasingly do the expensive and time-consuming ‘in-house’ work.
  - **RocketLawyer**: Provides a suite of advice and services (wills, divorce, tenancy agreements, GDPR audit, employment)
  - **Chatbot Lawyers**: Provide initial advice and dispute resolution.
Chatbot lawyer overturns 160,000 parking tickets in London and New York

Free service DoNotPay helps appeal over $4m in parking fines in just 21 months, but is just the tip of the legal AI iceberg for its 19-year-old creator

An artificial-intelligence lawyer chatbot has successfully contested 160,000 parking tickets across London and New York for free, showing that chatbots can actually be useful.

Dubbed as “the world’s first robot lawyer” by its 19-year-old creator, London-born second-year Stanford University student Joshua Browder, DoNotPay helps users contest parking tickets in an easy to use chat-like interface.

The program first works out whether an appeal is possible through a series of simple questions, such as were there clearly visible parking signs, and then guides users through the appeals process.

The results speak for themselves. In the 21 months since the free service was launched in London and now New York, Browder says DoNotPay has taken on 250,000 cases and won 160,000, giving it a success rate of 64% appealing over $4m of parking tickets.
APPLYING AI TO LAW: LEGALTECH

- UK LegalTech Market: £26bn; US Market: $400bn
- LegalTech investment pales in comparison to other ‘techs’ because market is small—but societal impact enormous.
  - Growth drivers: increasing costs, ‘flattening’ market, time pressure from clients, firms demanding ‘tech savvy’ lawyers, big firms starting in-house AI labs.
- Massive increase in documents (emails) to be reviewed, this work sucks, and AI/ML automates the grunt work.
Bias
Transparency
Explainability
APPLYING AI TO LAW: ALGORITHMIC DECISION-MAKING (ADM)

- ADM deployed in public and private sector contexts (i.e. finance, medicine, courts)
  - **Proponents:** ADM is more accurate, less biased, efficient.
  - **Detractors:** ADM are ‘weapons of math destruction’ that entrench bias under a cloak of neutrality.
- Loaded terms like ‘fairness’, ‘explainability’, ‘bias’ and ‘transparency’ have led to a boom in technical research to mitigate them.
APPLYING LAW TO AI: ALGORITHMIC BIAS

- Bias has many meanings, but generally implies ‘unfair’ or ‘unjust’ decisions.

- Both deeply subjective legal concepts, and no immutable formula for identifying them—this is the basis of justice.

- Legal Bias: Where a decision is materially impacted by including irrelevant factors or failing to include relevant ones.
Underfitting

Fit

Overfitting
Wisconsin v Loomis (2016)

Loomis asserted that the use of COMPAS risk assessment violated his right to due process on three grounds:

1) Violates a defendant’s right to be sentenced on accurate information because the proprietary nature of COMPAS (and trade secret protection) prevented him from assessing its accuracy;

2) Violates a defendant’s right to an individualised sentence;

3) Improperly used gendered assessments in determining sentencing.
Bias in Criminal Risk Scores Is Mathematically Inevitable, Researchers Say

ProPublica’s analysis of bias against black defendants in criminal risk scores has prompted research showing that the disparity can be addressed — if the algorithms focus on the fairness of outcomes.

by Julia Angwin and Jeff Larson, Dec. 30, 2016, 4:44 p.m. EST

The racial bias that ProPublica found in a formula used by courts and parole boards to forecast future criminal behavior arises inevitably from the test’s design, according to new research.
Algorithmic sentencing shows data can be used to ‘encode’ politics and make institutional forces invisible.

Use of code for controlling and regulating social activity presents deep normative challenges for the law.

- **Supiot**: “Governance by the Numbers” – Defining quantitative metrics and imposing them on the world.

- Goal: ‘reducing the diversity of beings and things’ to ‘create a total market which seeks to encompass all of human kind and all the products of the planet.’ (Supiot 2012)
ALGORITHMIC TRANSPARENCY: ADM UNDER THE GDPR

- Article 13(2)(f) GDPR arguably contains a ‘right to explanation’ by ADM:

  “…the controller [of personal data] shall, at the time when personal data are obtained, provide the data subject with the following further information necessary to ensure fair and transparent processing: [...] the existence of automated decision-making, including profiling… and, at least in those cases, meaningful information about the logic involved, as well as the significance and the envisaged consequences of such processing for the data subject.”

- What is meaningful information? Providing raw code? A bespoke description of every step a model used to produce an output?
ALGORITHMIC TRANSPARENCY: ADM UNDER THE GDPR

“Logic involved” indicates drafters had ‘non-intelligent’ systems in mind where a logic tree could ‘reverse engineer’ an output.

Possible for complex but static systems, but with ML/DL/neural networks it becomes very difficult—law is not static.

Recital 71: “… processing [of personal data] should be subject to suitable safeguards, which should include specific information to the data subject and the right to obtain human intervention, to express his or her point of view, to obtain an explanation of the decision reached after such assessment and to challenge the decision.”
ALGORITHMIC TRANSPARENCY: SLEIGHT OF HAND?

- Framing transparency as a technical problem presumes that ‘de-biasing’ the ‘black box’ is enough: it isn’t.

- Focus on transparency/explainability diminishes fundamental questions about power, politics and the rule of law.

- Ideal of an ‘unbiased’ ADM localises harm to technical criteria that can be adjusted, missing the wider point.

- ‘Governance by Numbers’ allows technical experts to become the unaccountable architects of society.
Towards the Legal Singularity
TOWARDS THE LEGAL SINGULARITY

- ADM dispenses with justice by substituting quantitative ‘evidence’ or algorithmic reasoning for juridical reasoning.
- Some yearn for ‘RoboJudges’ to erase problems of bias and improve efficiency of law.
- Reformulates failed neo-liberal ideals into surveillance capitalism—ubiquitous data capture for behaviour modification is the solution to social problems.
- Justice must be seen to be done. Where does algorithmic justice take place? Is it justice?
What is a legal system?
What does a legal system do?
What parts are truly computable?
What is lost in translation?
Digitalisation allows tacit and innate knowledge to become coded and computable.

Jacquard Loom (1804) transformed the knowledge of silk-weavers into a mechanised/programmable process.

AI and Big Data enable knowledge transformation over a much wider rider range of social applications.

‘Legal singularity’ – where computation surpasses the cognitive capabilities of lawyers and judges and eliminates legal uncertainty, resulting in a ‘complete law’.
TOWARDS THE LEGAL SINGULARITY

- Human lawyers have cognitive and moral abilities surpassing machines.
  - **Advantage:** reasoning capacity and ability to reach ‘good enough’ conclusions with incomplete information.
- Law schools teach us to read cases, identify important principles, and construct conjectures about how novel fact patterns might be addressed in future.
- Lawyers reason by analogy to different areas of the law—relationships between moral principles and legal principles, drawing upon intuition, experience, etc.
Towards the Legal Singularity: Legal Reasoning and AI

- How do we assess computational limits in relation to legal reasoning and the ability of AI/ML to replicate core aspects of the legal system?

  - **Similarities**: Both involve information retention, adaptive learning, and error correction.

- More than superficial resemblances, but what are the limits to replacing human reasoning with computation?

- Legal Singularity sees human autonomy as irrelevant and perpetuates a view hostile to self-determination—solution is ‘governance by numbers’.
Law is rarely applied exact same way to specific facts, and exact outcomes are rarely a certainty.

Statutes are interpreted according to different linguistic interpretations, reliance on precedent, situational factors, individual judge's principles.
Legal arguments are not easily formalised using mathematical logic. This is largely why LES failed.

Constitutional law issues require simultaneously balancing well-established state interests against individual rights.

Getting this right sometimes requires extra-legal considerations difficult to represent logically in an expert system.
Legal Indeterminacy

Law is adversarial and agonistic.

Many cases have strong arguments for both sides on a single point.

Determining the 'right' answer may depend on a majority vote among expert judges, as in the case of an appeal.
DEEP LEARNING AND THE LEGAL SYSTEM

- DL organises data into an ontology of hierarchical concepts, with complex concepts built out of simpler ones.

- Through recursion a system ‘learns’ and errors are purged—most often via a technique called backpropogation.

- Law also has strategies to store and retain information, legal concepts are ordered hierarchically with higher-level ones interacting with lower-level ones.

- Legal system ‘learns’ by retaining information, correcting errors through claimant-led litigation, appeals, and statutory reversals of dysfunctional rules—but also from failure.
Structural resemblances are more than superficial and objections less fundamental than they first seem.

Hierarchical ordering of legal concepts means widely framed clauses like ‘reasonableness’ or ‘good faith’ operate symbiotically with lower-level ones, and specific case facts.

The law is essentially algorithmic in nature; depending on the interaction of concepts at different levels of generality.

Legal decision-making is structurally similar to Artificial Neural Networks using dynamic and relative weights to generate new inputs, error correct, and output reliably.
LEX EX MACHINA: HYPOTHESIS

- For AI to replace legal reasoning it must translate linguistic and conceptual categories into mathematical functions.

- Even with advances in NLP this isn’t straightforward.

- Debates over ‘smart’ and ‘semantic’ contracts indicate there is flexibility in natural language to express juridicial forms that cannot be mathematically formalised.

  Hypothesis: Natural language, precisely because of its imprecision, recursive nature, and defeasibility is superior for expressing complex information about the social world and more adaptable to new information.
LEX EX MACHINA: HYPOTHESIS

- ML remains backwards looking and error prone due to lock-in and dependence on historical data; cannot ‘innovate’ in the juridical sense.

- ML has relatively few, and comparatively inaccessible, options for error correction and public scrutiny.

- Despite efforts to ensure algorithmic transparency and explainability, AI remains more opaque than law.

- Justice must be seen to be done. This keeps the legal system accountable and facilitates public trust.
THE LEGAL SINGULARITY HYPOTHESIS

- ‘Legal singularity’ implies a complete legal system: content and application of rules specified ex ante no matter how changeable the social circumstances.

- Assumes law will exist in perpetual equilibrium between facts and norms, with no indeterminacy or uncertainty.

- Resolves problem of law’s incompleteness and contingency by eliminating ‘messy’ human reasoning as basis for dispute resolution, allocating powers, rights and responsibilities.

- Undermines core principles of a liberal democratic order by substituting a ‘rule by algorithm’ for the ‘rule of law’.
LEX EX MACHINA: RULE OF LAW IMPLICATIONS

- Technology is never neutral—assumes that technology and law are separate in that one is based on subjective norms and the other objective facts.

- Techno-regulation of social behaviours presumes legal ‘rules’ are objective and uses data as the basis for a normative computational legal order.

- Law is inherently subjective but negotiated in the public domain—it should remain there as much as possible.

  - Feenberg: ‘Technology must be brought into the public sphere where it increasingly belongs’ (Critical Theory of Technology, 2009)
LEX EX MACHINA: RULE OF LAW IMPLICATIONS

- Contestation and re-interpretation of legal norms is essential to the moral authority of law as social institution.

- To work ML/DL reduces uncertainty about the effects of its own behaviour, receives feedback, and reconfigures itself until a ‘goal’ is reached—*but social facts are highly indeterminate*.

- Complexity benefits law and encourages ‘genetic diversity’ so it ‘evolves’ over time—ML would ossify legal reasoning.

- Shift from juridical reasoning to algorithmic reasoning takes Occam’s Razor to jurisprudence and social context of law.
LEX EX MACHINA: RULE OF LAW IMPLICATIONS

- ‘Legal Singularity’ implies a totalitarian view where human behaviour becomes completely predictable and reinforces the surveillance capitalism model.

- There is a role for AI in law on the legal services side, but need for scepticism and restraint in legal adjudication.

- Risk is LegalTech developers (and Silicon Valley) codifying what the law is—*not a job for the private sector.*

- Magical thinking and a totalising vision of AI in society to ‘escape the human condition’ must be resisted, and ‘ethics’ or ‘principles’ are not proxies for law.