Case Studies on the Use of AI by Judges and Legal Professionals

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Key topics

- Overview of technology in the legal industry
- AI in the legal industry
- Current uses of AI by courts / judges
- Current uses of AI by legal professionals
  - Document review and analysis
  - Other uses
- Future trends
- Questions
Overview of technology in the legal industry
Legal industry and technology

- Legal industry perhaps slow to adopt new technologies
  - Conservatism
  - Risk averseness
  - Sensitivity and importance of decision-making

- BUT, new technologies can improve legal industry
  - Improved access to justice through more efficient and accessible legal processes
  - Efficient solutions, generating price competition for legal services
  - Possibly, but perhaps still to be decided, improved quality of justice

- Legal industry therefore beginning to utilise new technologies to obtain these benefits
Technology and interrelationships within legal industry

- Fundamental differences between public judicial institutions e.g. courts and private legal entities e.g. law firms and legal professionals
  - Funding
  - Stakeholders
  - Structure and role

- BUT, interrelationships within industry encourage collaborative adoption and improvement of technology

Deployment of new mandatory processes

Proposals and testing of new methods
Current state of technology within legal industry

- eFiling
- Courts / Judges
- Virtual courts
- eBundling
- Online records
- Legal research
- Lawyers
- Case Management
- Remote working
- eDiscovery
AI in the legal industry
Current status of AI in the legal industry

- LawTech or LegalTech has recently attracted greater attention and investment

- BUT, reality is:
  - Current technology (and technology marketed as “AI”) is not really AI; still just sophisticated pre-programmed software

  “In the UK, current forms of lawtech are still more focused on efficiencies and automation than on delivering ‘new types of law.’”

  The Law Society, Lawtech Adoption Research (February 2019)
  https://www.lawsociety.org.uk/support-services/research-trends/lawtech-adoption-report/

  - Law firms have vested interest to market their use / knowledge of AI
  - AI products can take years to develop sufficient accuracy to be deployed in legal industry

- However, still some significant areas where AI is being used
“Big data” and its impact on the development of AI

The rise of AI is due to a combination of the availability of “big data” and an improvement in the ability of computers to process that data.

“Looking 30 years ahead, I think it unimaginable that our legal systems will not undergo vast change.”

Professor Richard Susskind, author of The Future of Law
Ability of AI to process data and impact on legal industry

- New legal issues arising out of data processing itself
  - E.g. data privacy issues

- Different types of disputes because huge amounts of data being processed
  - E.g. cyber-crime

- New ways of detecting wrongdoing
  - E.g. identifying malicious communications or breaches of copyright

- More efficient analysis and review of evidence
  - E.g. eDiscovery

Therefore, big role for AI to play in legal industry
How “big” is “big data”? (I)

<table>
<thead>
<tr>
<th>Format</th>
<th>Example</th>
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<tbody>
<tr>
<td>Megabyte (MB)</td>
<td>3.5 inch floppy disk</td>
</tr>
<tr>
<td>Gigabyte (GB)</td>
<td>TV quality movie file</td>
</tr>
<tr>
<td>Terabyte (TB)</td>
<td>1,000 copies of Encyclopaedia Britannica</td>
</tr>
<tr>
<td>Petabyte (PB)</td>
<td>All US academic research libraries</td>
</tr>
<tr>
<td>Exabyte (EB)</td>
<td>250 million DVDs</td>
</tr>
<tr>
<td>Zettabyte (ZB)</td>
<td>2.3 ZBs is the current size of our data universe</td>
</tr>
</tbody>
</table>
How “big” is “big data”? (II)

- Standard storage box holds 2,000 pages / 10 MB
- iPhone 6 (128 GB) = 12,800 boxes
- Wikipedia (33 TB) = 3.3m boxes
- Gmail (213 PB) = 21.3bn boxes
How are we processing so much data? (I)
How are we processing so much data? (II)
Current uses of Al by courts / judges
The role of courts / judges and sensitivity of using AI

- The importance of the role of courts / judges
  - Decisions on legal liability with social, moral and economic implications
  - Decisions which affect the liberty of humans (particularly in a criminal law context)
  - Interpret and impact moral standards in society

- Decision-making must have integrity, justification and respect for fundamental rights e.g. equality

- Any AI involvement in role of courts / judges is sensitive, particularly if removes human oversight or input
  - Therefore, it needs proper evaluation, testing and monitoring
## Case studies – use of AI by courts / judges

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>AI replacing judges</td>
<td>• AI undertaking judicial decision-making function</td>
</tr>
<tr>
<td>AI in sentencing / judgments</td>
<td>• Assisting in judgment-writing, including sentencing</td>
</tr>
<tr>
<td>AI assisting in court</td>
<td>• Using AI to assist in judicial process</td>
</tr>
<tr>
<td>AI in semi-judicial functions</td>
<td>• Using AI in other regulatory / judicial functions</td>
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AI replacing judges

- AI used to take decisions which would otherwise be taken by courts / judges i.e. replacing fundamental role of judges

- Very few examples of this and development (and acceptance) likely to be very slow

- Probably only suitable for limited cases e.g.
  - Straightforward civil claims and, possibly, criminal claims
  - Where little to no evidence
  - In scenarios with limited parameters / arguments e.g. traffic offences

- Vital that proper testing is undertaken, with critical (independent) evaluation

- Human oversight will be crucial
Case study 1: AI replacing judges - Estonia

AI receiving considerable attention in Estonia, where used in various contexts in public sector (sometimes referred to as “e-Stonia”)

Ott Velsberg, Government Chief Data Officer, has ambitious project of digitalisation and incorporation of AI into public sector

Currently, testing AI system which approves and generates paperwork for execution of small debts e.g. parking tickets or child benefit cases:
- Very little information disclosed but, in June 2019, 16 live AI cases
- Little or no evidence required in these cases
- 32,000 cases each year, so makes sense to use technology

Not clear whether genuine AI or just automation

AI in sentencing / judgments

- AI is being used to assist judges with discrete parts of their role, in particular in:
  - Analysing facts / evidence of case
  - Comparing with equivalent cases
  - Writing parts of judgment or providing input on sentencing

- Perhaps more justifiable for AI to assist with discrete parts of role because ultimate decision-making left to judge

- BUT, caution required even here:
  - Even discrete parts of judge’s role can have large impact on individuals
  - Oversight by judge does not eliminate underlying issues with AI
Case study 2: AI in sentencing / judgments - US

- In *Wisconsin v Loomis* (2016, US criminal case), defendant Loomis guilty of role in drive-by shooting

- Wisconsin Department of Corrections used “Compas” (algorithm that assessed likelihood of Loomis committing more crimes)

- Compas report allegedly showed high risk of violence and high risk of re-offending. Loomis unable to challenge report.

- Judge gave Loomis long sentence, partly on basis of Compas report

- Loomis appealed to Wisconsin Supreme Court – appeal rejected:
  - Loomis would have got same sentence without Compas report
  - Output of algorithm sufficient level of transparency

Case study 3: AI in sentencing / judgments - China

- Hainan High People’s Court using AI system in cases to formulate written judgment based on review of data from previous cases

- AI system:
  - Relies on natural language processing and deep learning
  - Can be upgraded to reflect new laws and regulations
  - Has been granted 10 patents

- Time taken to formulate written judgments has been reduced by 70%

“The system is popular with those sitting on the bench at the grassroots level, as the state-of-the-art technological achievement can provide experience to young judges and protection to the elderly.”

Wang Chunbao, Vice-President of Qionghai People’s Court (quoted in Science and Technology Daily)

AI assisting judges

- Other examples of AI being used to assist judges, rather than replacing judges or taking responsibility for any part of role e.g.
  - Reviewing / analysing evidence
  - Processing courtroom discussions

- Seems to be logical starting point in introducing AI in courtrooms
  - Allows step-by-step introduction of AI into judicial processes
  - Allows judges (and others) to review AI ability to improve judicial processes

- Decision-making is probably part of judicial process which least requires AI intervention, so caution required before asking AI to do “too much too soon”
Case study 4: AI assisting judges – China

- January 2019, Shanghai No 2 Intermediate People’s Court used “206 system” for first time in criminal trial

- 206 system (now being used in other courts in China):
  - Digitalises courtroom processes e.g. video evidence, witness testimony via video-link more efficient
  - AI transcribes courtroom discussions (and can distinguish between people)

“The 206 system is an integrated AI assistive system for criminal cases. It can help the judge find fact, authenticate evidences, protect the right to appeal and judge impartially on the trial, so as to prevent wrongfully convicted cases.”

Guo Weiqing, President of Shanghai No 2 Intermediate People’s Court (quoted in China Daily)

Source: http://www.chinadaily.com.cn/a/201901/24/WS5c4959f9a3106c65c34e64ea.html
Case study 5: AI assisting judges – Pakistan

- Artificial Intelligence System (AIS) to be launched shortly in Pakistan criminal courts

- Expedition and clearing backlog of cases is important. Still criminal appeals outstanding from 1994.

- Principal use of AIS is to assess facts of current case and provide information on similar cases in past to assist judge in deciding current case (including sentence)

- Some cases already heard online in Pakistan

AI in law enforcement

- AI now also being used in frontline law enforcement e.g.:
  - Surveillance
  - Predictive policing
  - Digital detection

- Used in varying degrees across jurisdictions

Example – Singapore robotic police force

In Singapore, patrol robots (outdoor robotics surveillance system, ORSS) being used to assist police officers. ORSS can:
- Transmit live video feed to police command post
- Identify sound anomalies e.g. screams or gunshots

ORSS uses AI-powered navigation and mapping algorithms to assist

Source: https://govinsider.asia/innovation/meet-singapores-robotic-police-task-force/
AI in law enforcement – use of robotics

- Robotics increasingly used in law enforcement

- “Artificial Intelligence and Robotics for Law Enforcement”, UNICRI / INTERPOL paper notes benefits of AI to law enforcement, but emphasises ethical considerations:
  - Fairness, accountability, transparency and explainability
  - Respect for citizens’ rights, particularly around privacy

Source:
http://www.unicri.it/news/files/ARTIFICIAL_INTELLIGENCE_ROBOTICS_LAW%20ENFORCEMENT_WEB.pdf

“Artificial Intelligence and Robotics for Law Enforcement”, UNICRI / INTERPOL
First Global Meeting on the Opportunities and Risks of Artificial Intelligence and Robotics for Law Enforcement (Singapore, July 2018)
Current uses of AI by courts / judges

Overview
Overview of “LegalTech” world

- In Europe alone:
  - 248 start-up companies involved in “LegalTech” in 2019
  - Many of these companies are using AI technology
  - 54 of these companies are involved in “Documents & Contracts”
Areas of focus for legal professionals

- **Documents & Contracts**: contract management, document review, smart contracts
- **Knowledge**: legal research
- **Risk**: cyber-security, regulatory compliance
- **Litigation**: online dispute resolution, litigation analysis
- **People & Resources**: recruitment, training of legal professionals
- **Finance & Operations**: time recording, analysis of time, practice management
- **Matters**: case management, electronic filing systems
- **Rights Management**: IP rights management
- **Consumer Services**: harnessing technology to provide legal services generally
Current uses of AI by courts / judges

Document review / analysis
Document review for legal professionals

- Documents (including contracts) form a large part of legal professionals’ role
  - Drafting and reviewing contracts in transactional work
  - Reviewing documents in contentious matters

- Legal problems are endemic and invariably require reviewing documents / evidence in order to establish what went wrong and to seek the truth

% of people who have experienced a legal problem in last 2 years

Source: Global Insights on Access to Justice 2019, World Justice Project
The (human) cost of document review (I)


- Example of “medium-sized” case used for review:
  - 500 GB data = 7.5 million documents / 26.25 million pages
  - Processing = £332,500 / AED 1.5 million
  - Hosting for 8 months = £266,000 / AED 1.2 million

- If all documents reviewed by human (assuming 30 documents reviewed per hour and charge-out rate of £250 / AED 1,125 per hour), then:
  - 1 lawyer would need **28.5 years** to review all documents
  - Cost of £62.5 million / AED 282 million
The (human) cost of document review (II)

- Techniques are available to reduce the size of the evidence pool and to focus on key documents

- Assuming 7.5 million documents becomes 500,000 documents (and same assumptions):
  - 1 lawyer would need **695 days** to review all documents
  - Cost of **£4.2m / AED 18.9 million**
The (human) cost of document review (III)

- Techniques may not be reliable anyway – they are “linear” rather than dynamic e.g. using keywords:
  - Best guess
  - Difficult to exhaustively identify all relevant evidence with keywords
  - False positives
Using AI to identify relevant evidence (I)

Specifically, a supervised machine learning platform:

- Training System
  - Not relevant
  - Relevant
  - Relevant
  - Not relevant

- Predictive Model (based on new data)
  - Relevant
  - Not relevant
Using AI to identify relevant evidence (II)

- Also referred to as “continuous active learning” or “predictive coding”

- Approved by the English courts in *Pyrrho Investments Ltd v MWB Property Ltd* [2016] EWHC 256 (Ch) where:
  - Dispute involved 3 million documents
  - Cost of manual review was predicted to be millions of pounds
  - Parties agreed on the use of software

- In 2016, predictive coding involved:
  - Lawyers identifying pool of relevant documents ("seed set")
  - Feeding the seed set into the machine learning platform
  - Platform categorising documents by relevance compared with seed set
  - Lawyers sample checking to ensure categorisation accurate
Using AI to identify relevant evidence (III)

- In 2019, predictive coding now even more advanced:
  - No more seed sets
  - Lawyers review documents and platform learns from decisions made on each document

<table>
<thead>
<tr>
<th>Project Size</th>
<th>Coded Relevant</th>
<th>Coded Not Relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>78,604 originally</td>
<td>2,892 manually-selected</td>
<td>53,536 manually-selected</td>
</tr>
<tr>
<td>78,604</td>
<td>5,677</td>
<td>72,928</td>
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The future of AI and evidence: NLP

Natural language processing: sub-field of AI which allows machines to understand and interpret human language in the way we use it.
The future of AI and evidence: sentiment analysis

- Sentiment analysis: identifying and categorising opinions expressed in text to determine whether author’s attitude is positive, negative or neutral.
The future of AI and evidence: communications analysis

- More sophisticated communications analysis based on NLP
The future of AI and evidence: image recognition

- Image recognition: classification of images based on machine learning

Object and scene detection

Recognition automatically labels objects, concepts and scenes in your images, and provides a confidence score.

<table>
<thead>
<tr>
<th>Results</th>
<th></th>
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<tbody>
<tr>
<td>Person</td>
<td>99.8 %</td>
</tr>
<tr>
<td>Human</td>
<td>99.8 %</td>
</tr>
<tr>
<td>Bench</td>
<td>99.3 %</td>
</tr>
<tr>
<td>Furniture</td>
<td>99.3 %</td>
</tr>
<tr>
<td>Building</td>
<td>99 %</td>
</tr>
<tr>
<td>Architecture</td>
<td>99 %</td>
</tr>
<tr>
<td>Office Building</td>
<td>98.8 %</td>
</tr>
<tr>
<td>Convention Center</td>
<td>96.8 %</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>91.8 %</td>
</tr>
<tr>
<td>Town</td>
<td>91.1 %</td>
</tr>
<tr>
<td>Urban</td>
<td>91.1 %</td>
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Current uses of AI by legal professionals
Overview
Contract automation

- Using machine learning and NLP, AI platforms can undertake mass review of contracts

- This allows:
  - Extraction of information
  - Identification of missing or defective clauses
  - Risk analysis

- Example: Seal Contract Discovery tool, within 48 hours:
  - Reviewed 200,000 documents
  - Identified 7,000 contracts and 2,500 specific clauses within contracts
  - Identified confidential contracts on public servers
  - Identified contracts with unusual governing law / jurisdiction clauses

Intellectual property searches

- AI platforms can analyse potential patent claim and undertake mass search of registered patents to establish similarity (and therefore prospects of having patent successfully registered)

Example: Teqmine
- Uses machine learning and NLP to review information and analyse patents already registered for similar products

Source: https://teqmine.com/solutions/technology-scan/
Intelligent legal research

- Legal research assisted in recent years by digitisation of legal material e.g. court judgments, commentary, legal textbooks etc.

- AI platforms now being developed to exploit this digitisation. Research may well be quicker; query whether it is “better”?

- **Example**: study by National Legal Research Group, Inc (USA) comparing AI-powered research platform (Casetext CARA A.I. vs. keyword-based research platform). Lawyers said:
  - AI platform 24.5% quicker
  - AI platform results were 21% more relevant
  - 75% of lawyers preferred AI platform

Intelligent legal research – example

- **ROSS intelligence?** ([https://rossintelligence.com/what-is-ai.html](https://rossintelligence.com/what-is-ai.html))
  - NLP – to understand the nature of the question being asked
  - Machine learning – platform trained with over 1 million questions and answers (provided by lawyers)
Future Trends
How could AI be used in the future in the legal industry?

- **In courtrooms:**
  - Potentially in replacing judges by taking legally-binding decisions
  - More likely to continue to assist judicial processes, with an emphasis on efficiency e.g. speeding up review of evidence

- **In legal industry generally:**
  - Improving efficiency of tasks undertaken by lawyers, particularly in areas where currently time-intensive e.g. document review, contracts
  - In providing actual legal services i.e. replacing lawyers for small jobs

“70% of the law could be carried out by robots and all legal documents will be automated within a decade”

Joshua Browder, founder of DoNotPay chatbot (Legal Futures Innovation Conference, 2017)
Issues affecting the adoption of AI in the legal industry

- Quality of legal advice detrimentally affected?
  - Regulation may be required e.g. Monetary Authority of Singapore principles on use of AI in financial advice:

- Unfair competition
  - E.g. large corporations able to harness technology and “price out” smaller firms

- Lawyers keeping up-to-date with technological developments

Lawyers should “keep abreast of changes in the law and its practice, including the benefits and risks associated with relevant technology”

American Bar Association guidance on competence
Questions?
Thank you