

THE USE OF ARTIFICIAL INTELLIGENCE IN JUDICIAL DECISION- MAKING: THE EXAMPLE OF CHINA

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Abstract: The paper analyses whether and to what extent AI-assisted judicial decision-making systems uphold the fundamental values that underpin the exercise of judicial discretion. As China is at the forefront of developing systems to simulate judicial thought, the paper explores this issue through the lens of China “smart court”. Beginning by considering how AI-assisted judicial decision making differs from traditional human judicial decision-making, the paper progresses to identify areas of legal concern as to the use of AI in judicial decision-making. Building on this analysis, the paper progresses to examine the use of AI in the China smart court system, including the “automated reason-generation framework” and “deviation analysis” adopted in the smart courts of China. The paper concludes by suggesting that the use of AI in judicial decision-making needs to appropriately calibrate the efficiency gains of automated processes with the need to maintain transparency and accountability, avoid bias and ensure a fair process.

Key Words: AI, Judicial Decision-Making, Judicial Discretion, China, AI-assisted Decision.

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INTRODUCTION

The increased use of artificial intelligence (AI) in the judicial sector raises a critical concern about whether AI-assisted decision-making upholds the fundamental values that underpin the exercise of judicial discretion. In recent years, courts have increasingly adopted AI to improve administrative efficiency and strengthen access to justice.¹ The use of AI to enhance administrative efficiency includes AI systems that support the court in handling and managing documents, digital recording of hearings, and audio-visual links to enable witnesses to present evidence without physical appearance.² E-filing, e-trial and e-case management systems that enable lawyers to access court documents through litigation databases are widely recognised as advancing administrative efficiency.³ However, whilst various countries have adopted AI systems to support decision-making, there is considerable angst surrounding such use. For example, using criminal risk assessment algorithms to predict future risk for misconduct has raised concerns as to accountability, transparency, and fair process.⁴ There is also concern as to whether AI systems that simulate judicial discretion can uphold the fundamental values that underpin judicial decision-making.⁵ Such concerns are accentuated by the fact that laws and policies relating to the use of AI remain relatively informal and yet underdeveloped.

While initially lagging in the adoption of AI in the judicial sector, recent years has seen China transform into a world leader in this field.⁶ The AI development in the judicial sector can be divided into three stages—intelligent perception (mostly as assisting tools), intelligent cognition (supportive tools in decision-making process providing recommendation) and

¹ Katsumi Nitta & Ken Satoh, *AI Applications to the Law Domain in Japan*, 7 *ASIAN JOURNAL OF LAW AND SOCIETY* 471, 471-74 (2020); Yaohuai Jin & Hao He, *An Artificial-intelligence-based Semantic Assist Framework for Judicial Trials*, 7 *ASIAN JOURNAL OF LAW AND SOCIETY* 531 (2020).

² Tania Sourdin, *Judge v. Robot: Artificial Intelligence and Judicial Decision-Making*, 41 *UNIVERSITY OF NEW SOUTH WALES LAW JOURNAL* 1115 (2018).

³ Nitta & Satoh, *supra* note 1, at 483; James Allsop, *Technology and the Future of the Courts*, 38 *UNIVERSITY OF QUEENSLAND LAW JOURNAL* 1 (2019); MONIKA ZALNIERIUTE & FELICITY BELL, *TECHNOLOGY AND JUDICIAL ROLE* 5 (Cambridge University Press 2020); Jennifer K Farrell, *Enhancing Access to Justice in Australian Courts Using Web 2.0 Applications* (June 2017), (unpublished Ph.D. dissertation, Macquarie University) (on file with Macquarie University); This new internet-based court service, HM Online Court would provide online dispute resolution for low value civil claims. It was recommended by the first report of the ODR Advisory Group of the Civil Justice Council (February 2015), <http://judiciary.gov.uk/reviews/online-dispute-resolution>; Bizibody Technology is the leading provider of technology tools and web communications in Singapore. It provides court hearings in such matters as garnishee orders, probate, and bankruptcy, <http://justiceonline.com.sg>; Susan Ledray, *Virtual Services Whitepaper*, *HARVARD JOURNAL OF LAW & TECHNOLOGY* (2013), <http://jolt.law.harvard.edu/symposium/articles/Ledray-VirtualServices.pdf> (last visited Oct. 20, 2020); James J. Prescott, *Improving Access to Justice in State Courts with Platform Technology*, 70 *VANDERBILT LAW REVIEW* 2021 (2017); Tania Sourdin, *Justice and Technological innovation*, 25 *JOURNAL OF JUDICIAL ADMINISTRATION* 99 (2015).

⁴ Law Commission of Ontario, *The Rise and Fall of AI and Algorithms in American Criminal justice: Lessons for Canada* (October 2020), <https://www.lco-cdo.org/wp-content/uploads/2020/10/Criminal-AI-Paper-Final-Oct-28-2020.pdf> (last visited May 26, 2021); Anusha Rao, *Artificial Intelligence poses serious risks in the criminal justice system*, *THE NEWS-LETTER* (2020), <https://www.jhunewsletter.com/article/2020/09/artificial-intelligence-poses-serious-risks-in-the-criminal-justice-system> (last visited May 26 2021); *see also* Harry Surden, *Values Embedded in Legal Artificial Intelligence*, *IEEE TECHNOLOGY AND SOCIETY MAGAZINE*, Mar. 9, 2022, at 68.

⁵ Sourdin, *supra* note 2, at 1116; Francesco Contini, *Artificial Intelligence: A New Trojan Horse for Undue Influence on Judiciaries?* (2019), https://www.unodc.org/dohadeclaration/en/news/2019/06/artificial-intelligence_a-new-trojan-horse-for-undue-influence-on-judiciaries.html (last visited May 26, 2021).

⁶ Changqing Shi, Tania Sourdin & Bin Li, *The Smart Court- A New Pathway to Justice in China?*, 12 *INTERNATIONAL JOURNAL FOR COURT ADMINISTRATION* 4 (2021).

intelligent decision-making (autonomous agents make judgments as robot judges).⁷ The third one is new in the judicial sector, in which China is leading. In 2014, China introduced the concept of the “smart court”, accompanied by a five-year *Reform Outline of the People’s Court* to be implemented during 2019-2023.⁸ In 2017, the first smart court opened in Hangzhou, in China’s court system as robot judges were deployed into service.⁹ At present, Suzhou Intermediate Court of China, also known as “Court 206”,¹⁰ Beijing Internet Court and Hangzhou Internet Court are all operating as smart courts.¹¹ This five-year plan seeks to achieve justice reform through the creation of smart courts that address the problem of high court workloads and limited court resources, thereby increasing efficiency, transparency and access to justice.¹² To achieve these aims, the Supreme People’s Court (SPC) has adopted a variety of technological innovations relating to AI.¹³ In this regard, the SPC aimed to incorporate AI in the local courts to provide litigation and legal literacy.¹⁴ These smart courts are also capable of generating pleadings for litigants, analysing litigation risks and also assisting for case submission electronically.¹⁵ However, while the use of AI has been documented to reduce case disposal time,¹⁶ questions remain as to whether the AI systems can properly exercise judicial discretionary power and uphold the principle of equity.¹⁷

In such a context, the objective of this paper is to analyse whether and to what extent AI-assisted judicial decision-making systems uphold the fundamental values that underpin the exercise of judicial discretion. To explore this issue, the paper will use the central case study of China. The paper will begin by considering the nature of AI and AI-assisted decision-making and consider the policies and procedures implemented in China.¹⁸ While many countries are using AI in the judicial sector in a variety of forms, the initiatives in China are distinctive for the extent of their formal co-ordination. Building on this initial analysis, the paper will then identify potential limitations to the use of AI in judicial decision-making and consider to what extent the policies and protocols implemented by China serve to alleviate these concerns.

⁷ Nyu Wang & Michael Yuan Tian, *Intelligent Justice: AI Implementations in China’s Legal Systems*, in ARTIFICIAL INTELLIGENCE AND ITS DISCONTENTS. SOCIAL AND CULTURAL STUDIES OF ROBOTS AND AI (Ariane Hanemaayer ed., Palgrave Macmillan 2022), https://doi.org/10.1007/978-3-030-88615-8_10.

⁸ The Paper, *The Full Text of the Supreme Court’s “Fifth Five-Year Reform Outline” Authoritative Interpretation* (Feb 27, 2019), https://www.thepaper.cn/newsDetail_forward_3051310 (last visited Aug. 21, 2020).

⁹ Nu Wang, “Black Box Justice”: Robot Judges and AI-based Judgment Processes in China’s Court system, in 2020 IEEE INTERNATIONAL SYMPOSIUM ON TECHNOLOGY AND SOCIETY 58; Wang & Tian, *supra* note 7.

¹⁰ Jin & He, *supra* note 1, at 531-34.

¹¹ George G Zheng, *China’s Grand Design of People’s Smart Courts*, 7 ASIAN JOURNAL OF LAW AND SOCIETY 567 (2020).

¹² THE SUPREME PEOPLE’S COURT, CHINESE COURTS AND THE INTERNET JUDICIARY 59 (2019); Dominique Hogan-Doran SC, *Computer Says “No”: Automation, Algorithms and Artificial Intelligence in Government Decision-Making*, 13 THE JUDICIAL REVIEW 345 (2017).

¹³ Shi, Sourdin & Li, *supra* note 6, at 8.

¹⁴ Baker McKenzie, *AI in Courts Paves Way for Efficiency, Consistency in China*, CHINA BUSINESS DIGEST, May 14, 2018, <https://law.asia/ai-in-courts-paves-way-for-efficiency-consistency-in-china/>. (last visited July 28, 2021).

¹⁵ *Id.*

¹⁶ D. Chen & C. Wang, *What Hangzhou Internet Court Has Brought to Us in the Past Two Years*, XINHAU NET LEGAL DAILY, Aug. 15, 2019, http://www.zj.xinhuanet.com/2019-08/15/c_1124877777.htm. (last visited Oct. 16, 2020).

¹⁷ Davide Carneiro, et al., *Online Dispute Resolution: An Artificial Intelligence Perspective*, 41 ARTIFICIAL INTELLIGENCE REVIEW 211 (2014).

¹⁸ Benjamin Minhao Chen & Zhiyu Li, *How will Technology Change the Face of Chinese Justice?*, 34 COLUMBIA JOURNAL OF ASIAN LAW 56 (2020).

I. COMPARATION BETWEEN HUMAN JUDICIAL DISCRETION AND AI-ASSISTED DECISION-MAKING

A. The Concept of AI in the Judicial Sector

There are considerable debates as to the precise definition and scope of the term “AI”.¹⁹ Generally AI is a part of the statistical and machine learning that AI uses to mimic human intelligence.²⁰ Gasser and Almeida argue that AI is not a single technology, but rather a “a set of techniques and sub-disciplines ranging from areas such as speech recognition and computer vision to attention and memory, to name just a few”.²¹ The High-Level Expert Group defines AI to be a combination of software and hardware systems designed by humans and given a complex goal, which act in the physical or digital dimension by perceiving their environment through data acquisition. This involves interpreting the structured or unstructured data collected, reasoning on the knowledge, or processing the information derived from the data, and deciding the best action(s) to take to achieve the given goal.²² Such policy discourse has also been translated into legislation. The *John S. McCain National Defense Authorization Act for Fiscal Year 2019*, for instance, defines “AI” to be

- (1) Any artificial system that performs tasks under varying and unpredictable circumstances without significant human oversight, or that can learn from experience and improve performance when exposed to data sets.
- (2) An artificial system developed in computer software, physical hardware, or other context that solves tasks requiring human-like perception, cognition, planning, learning, communication, or physical action.
- (3) An artificial system designed to think or act like a human, including cognitive architectures and neural networks.
- (4) A set of techniques, including machine learning that is designed to approximate a cognitive task.
- (5) An artificial system designed to act rationally, including an intelligent software agent or embodied robot that achieves goals using perception, planning, reasoning, learning, communicating, decision making, and acting.²³

Thus, AI includes machine learning, natural language processing, logical inferencing, artificial neural networks, text analytics, image recognition, expert systems, vision, speech,

¹⁹ Stefan Larsson, *On the Governance of Artificial Intelligence through Ethics Guidelines*, 7 *ASIAN JOURNAL OF LAW AND SOCIETY* 439 (2020); Harry Surden, *Ethics of AI in Law*, in *THE OXFORD HANDBOOK OF ETHICS OF AI* 722 (Markus D. Dubber, Frank Pasquale & Sunit Das eds., Oxford University Publication 2020).

²⁰ Mohammad Mushfequr Rahman, *Should I Be Scared of Artificial Intelligence?*, in *ARTICLE 2536*, *ACADEMIA LETTERS* (2021), <https://doi.org/10.20935/AL2536>; Wang & Tian, *supra* note 7, at 206.

²¹ Urs Gasser & Virgilio A. F. Almeida, *A Layered Model for AI Governance*, 21 *IEEE* 59 (2017); Larsson, *supra* note 19, at 439; *see also* Joshua A. Gerlick & Stephan M. Liozu, *Ethical And Legal Considerations of Artificial Intelligence and Algorithmic Decision-Making in Personalized Pricing*, 19 *JOURNAL OF REVENUE AND PRICING MANAGEMENT* 86 (2020); Vidushi Marda, *Artificial Intelligence Policy in India: A Framework for Engaging the Limits of Data-Driven Decision-Making*, 376 *PHIL. TRANS. R. SOC. A* 1 (2018), <http://dx.doi.org/10.1098/rsta.2018.0087>; Catherine Nunez, *Artificial Intelligence and Legal Ethics: Whether AI Lawyers Can Make Ethical Decisions*, 20 *TULANE JOURNAL OF TECHNOLOGY AND INTELLECTUAL PROPERTY* 191 (2017).

²² HIGH-LEVEL EXPERT GROUP ON ARTIFICIAL INTELLIGENCE, EUROPEAN COMMISSION, *A DEFINITION OF AI: MAIN CAPABILITIES AND DISCIPLINES: DEFINITION DEVELOPED FOR THE PURPOSE OF THE AI HLEG’S DELIVERABLES 6* (2019 a).

²³ *John S. McCain National Defense Authorization Act for Fiscal Year 2019 (US) s 238 (g)*. *See* Library of Congress (2021).

planning and robotics.²⁴ For the purposes of the present article, ‘AI’ is defined as the creation of intelligent systems involving the use of sophisticated algorithms to generate outcomes.²⁵

In the judicial sector, AI is used in two distinct ways. Firstly, prescriptive rule-based AI systems are used to inform, support, and advise the various entities involved in the litigation process to advance administrative efficiency and promote access to justice. Secondly, sophisticated machine learning models are used to simulate the exercise of discretion and apply rules to complex factual circumstances to generate a decision, which is also known as intelligent decision making.²⁶ The focus of the present paper is this second more sophisticated use of AI. Recently, the Correctional Offender Management Profiling for Alternative Sanctions (COMPAS) and Public Safety Assessment (PSA) become the most popular framework for the use of AI in decision-making process in the legal sector.²⁷ Secondly, AI is used as an automated problem-solving mechanism based on logic and legal reasoning.²⁸ This is a more sophisticated AI use that not merely applies rules but can engage in complex processes of information analysis and reasoning to reach conclusions, make predictions and suggest recommendations.

B. The Nature of Judicial Discretion

To critically analyse the use of AI in the judicial decision-making process, it is valuable to begin by considering the role of the judge in the judicial decision-making process. The contribution that judges make to society is beyond the mere application of rules, they provide a responsive and responsible human framework to settle cases and uphold the rule of law.²⁹ An important element of such decision-making is the exercise of judicial discretion. Judicial discretion appertains when the laws are ambiguous or not sufficiently specific. It evolves to ensure fairness and equitable relief considering individual cases and circumstances.³⁰ Therefore, the human justice delivering process yield deeper acceptance and greater public satisfaction.³¹

The nature of judicial discretion has been the subject of intense legal analysis. Lord Justice Bingham famously framed this discretion as “an issue falls within a judge’s discretion if being governed by no rule of law, its resolution depends on the individual judge’s assessment of what it is fair and just to do in the particular case.”³² Ahron Barak views discretion as

²⁴ Catherine Zhu & Louis Lehot, *United States: Artificial Intelligence Comparative Guide*, MONDAQ (2021) <https://www.mondaq.com/unitedstates/technology/1059776/artificial-intelligence-comparative-guide#:~:text=Despite%20AI's%20ubiquity%20across%20every,the%20United%20States%20to%20date> (last visited May 27, 2021); Law Commission of Ontario, *supra* note 4; Larsson, *supra* note 19, at 441; Jin & He, *supra* note 1, at 531; Rahman, *supra* note 20, at 1.

²⁵ Sourdin, *supra* note 2, at 1116. “Algorithms” are instructions for solving a problem or completing a task through computer code. Lee Rainie & Janna Anderson, *Code-dependent: Pros and Cons of the Algorithm Age*, PEW RESEARCH CENTER, (Feb 8, 2017), <http://www.pewinternet.org/2017/02/08/code-dependent-pros-and-cons-of-the-algorithm-age/> (last visited June 17, 2021). Miriam C Buiten, *Towards Intelligent Regulation of Artificial Intelligence*, 10 EUROPEAN JOURNAL OF RISK REGULATION 43 (2019).

²⁶ MONIKA ZALNIERIUTE & FELICITY BELL, *TECHNOLOGY AND JUDICIAL ROLE 2* (Cambridge University Press 2005); Wang, *supra* note 9, at 58.

²⁷ Nitta & Satoh, *supra* note 1, at 472.

²⁸ *Id.*

²⁹ Sourdin, *supra* note 2, at 1124.

³⁰ Ummei Sharaban Tahura, *Can Technology Be a Potential Solution for a Cost-Effective Litigation System in Bangladesh?*, 42 JUSTICE SYSTEM JOURNAL 185, 185-86 (2021).

³¹ Tim Wu, *Will Artificial Intelligence Eat the Law? The Rise of Hybrid Social-ordering Systems*, 119 COLUMBIA LAW REVIEW 2003 (2019).

³² The Right Hon Lord Justice Bingham, *The Discretion of the Judge*, 5 THE DENNING LAW JOURNAL 28 (1990).

choosing one from more alternatives within the legal purview.³³ He argues that not all legal problems have a single solution. Maurice's view is that when there is no fixed principle then the judges lie on discretion.³⁴ Professor Ronald Dworkin echoes the view. However, he confines the discretion at the time of deciding "hard cases" when the statutory laws are not clear.³⁵ Justice Bingham suggests that the judges have no discretion either in findings fact or ruling on the law.³⁶ He argues "the judges exercise their discretion at the time of choosing a course of action, orders, penalties or remedies to determine the fact and ruling on the law." In comparison, Justice Barak notes that deciding the facts is the first place where discretion started.³⁷ Dworkin argues that judges apply discretion at the time of the decision-making process following the principles of policy and principle of arguments.³⁸ Thus, the judicial decision-making process is not dependent on a single input but involves the consideration of wider social and moral values, providing wider contextual understanding for the decision-making process.

The exercise of judicial discretion is especially critical when legislative enactments are not prescriptive or determinate. As it is not possible for the legislature to foresee every incident and enact laws accordingly, judicial discretion is often needed when applying statutes and regulations.³⁹ In such cases, judges have discretion to apply the law to the facts and reach a decision.⁴⁰ Chief justice John Marshall notes the limitations of judicial discretion, stating "courts are the mere instruments of the law and can do nothing. When they are said to exercise discretion, it is a mere legal discretion, discretion to be exercised in discerning the course prescribed by law; and when that is discerned, it is the duty of the court to follow it. Judicial power is never exercised for the purpose of giving effect to the will of the judge, always for the purpose of giving effect to the will of legislature or in other words to the will of the law."⁴¹ Lord Camden further warns of the need to responsibly exercise judicial discretion, asserting that "the discretion of a judge is said to be the law of tyrants; it is always unknown; it is different in different men; it is casual and depends upon constitution, temper, and passion. In the best it oftentimes caprice, in the worst it is very vice, folly and passion, to which human nature is liable."⁴²

Thus, the concern remains as to whether human values, society and culture would be digitalized, computerised and learned by AI through codes reflecting social and ethical responsibilities.

C. The Differing Mental Processes of Human and AI-Assisted Decision-Makers

The nature of the "mental process" involved in AI systems differs markedly from the cognitive process of human beings. In *Pintarich v Deputy Commissioner of Taxation*, the court

³³ Aharon Barak, *A Judge on Judging: The Role of a Supreme Court in a Democracy*, 116 HARVARD LAW REVIEW 34 (2002).

³⁴ Maurice Rosenberg, *Judicial Discretion of the Trial Court, Viewed From Above*, 22 SYRACUSE LAW REVIEW 638 (1972).

³⁵ Ronald Dworkin, *Hard Cases*, 88 HARVARD LAW REVIEW 1103, 1103-09 (1975).

³⁶ Bingham, *supra* note 32, at 28.

³⁷ AHARON BARAK, *JUDICIAL DISCRETION* 13 (Yale University Press 1989).

³⁸ Dworkin, *supra* note 35, at 1059-60.

³⁹ Stephen M Waddams, *Judicial Discretion*, 1 OXFORD UNIVERSITY COMMONWEALTH LAW JOURNAL 59 (2001).

⁴⁰ Judge Thomas A Zonay, *Judicial Discretion: Ten Guidelines for Its Use*, June 21, 2015, <http://www.judges.org/judicial-discretion-ten-guidelines-for-its-use/>. (last visited July 30, 2021).

⁴¹ *Osborn v. Bank of United States*, 22 U.S 738 (1824).

⁴² In the case of *Hindson and Kersey*, How, St. Tr (1680) 8 p. 57.

held that a “mental process” is a pre-requisite for a legally effective decision and that the computer system in question did not have the requisite mental process.⁴³ Arguably, the same logic should apply to judicial decision-making.⁴⁴ Hyden suggests that AI systems do undertake a mental process, having a “neuron network” that it involves two distinct phases.⁴⁵ Firstly, there a learning phase in which data sets are gathered and trained. This is followed by a second application phase where the system is trained to apply what it has learned.⁴⁶ Thus, AI need data to be functional. The High-Level Expert Group further suggests that AI systems display “intelligent behaviour” by analysing their environment and taking actions, with some degree of autonomy, to achieve specific goals.⁴⁷ AI have the ability to learn for themselves detecting from a massive data set.⁴⁸ In marked contrast, Sourdin argues that judicial functions require human intelligence and that computer programs, to date, have not been able to replat these functions or to interact with people with the same degree of compassion, emotion, or agile responsiveness.⁴⁹ Thus, AI is beyond fatigue, boredom or emotions that makes them efficient and effective.⁵⁰

Moreover, while AI decision-making systems make decisions by seeking similarities of case facts, human judges consider every case on an independent basis. In this respect, Shi, Sourdin and Li argue that there is a risk that the “independence of judges” could be undermined by the combined intentions of programmers, software engineers, information technology companies and other entities.⁵¹ It is still a debate about whether AI can be a legal personality containing rights and obligations.⁵² This is demonstrated by the use of algorithmic assessment in the criminal justice system to predict the likelihood of an offender re-offending.⁵³ While the criminal justice system determines a sentence, based on the amount of harm caused and the theory of proportionality,⁵⁴ the AI sentence is largely determined by the theory of recidivism depending on the likelihood of future harm.

The mental process of human decision-makers and AI systems also differ as to the scope of the material considered and the relevant temporal parameters. In the human decision-making process, the judge only has access to the client’s legal data. In contrast, AI decision making systems have access to all data entered by programmers and analysts, in addition to what is available to the judge. Moreover, while human judges consider both past and future events, AI judging largely depends on past events as embodied in the data sets used to train the AI system. In some cases, a formulated algorithm, based on past events, may not be appropriate to address the matters before the decision-maker. AI searched data to identify patterns to

⁴³ *Pintarich v. Deputy Commissioner of Taxation*, FCAFC 79 (2018) (the dissent of Kerr J)

⁴⁴ Zalnieriute & Bell, *supra* note 3, at 20.

⁴⁵ Hakam Hyden, *AI Norms, Big Data and the Law*, 7 ASIAN JOURNAL OF LAW AND SOCIETY 410 (2020).

⁴⁶ *Id.* However, Hyden acknowledges that while algorithms can apply data to reach decisions, they do not typically incorporate societal changes.

⁴⁷ High-Level Expert Group on Artificial Intelligence, *supra* note 22, at 1 (2019b); Ashley Deeks, *The Judicial Demand for Explainable Artificial Intelligence*, 119 COLUMBIA LAW REVIEW 1830 (2019).

⁴⁸ Deeks, *supra* note 47, at 1832.

⁴⁹ Sourdin, *supra* note 2, at 1125.

⁵⁰ Rahman, *supra* note 20, at 2.

⁵¹ Shi, Sourdin & Li, *supra* note 6, at 17.

⁵² Paulius Cerka, Jurgita Grigiene & Gintare Sirbikyte, *Is it possible to grant legal personality to artificial intelligence software systems?*, 33 COMPUTER LAW AND SECURITY REVIEW 685 (2017).

⁵³ Nigel Stobbs, Dan Hunter & Mirko Bagaric, *Can Sentencing Be Enhanced by the Use of Artificial Intelligence?* (2017), <https://eprints.qut.edu.au/115410/10/CLJprooffinal25Nov2017.pdf> (last visited May 21, 2021).

⁵⁴ Mirko Bagaric, *Injecting Content into the Mirage That Is Proportionality in Sentencing*, 25 NEW ZEALAND UNIVERSITIES LAW REV 411 (2013).

predict.⁵⁵ Unlike AI judge, a human judge can be persuaded through reasoned legal argument.⁵⁶ Arguably, AI cannot mimic general human cognition and intelligent while human often understand intents, emotions and implied assumptions.⁵⁷ Today's AI technology cannot think, reason or engage in arbitrary like human.⁵⁸

Thus, AI can be useful support for human decision-making process through analysing big data. It can be designed to deal independently with simple matters or some particular cases, for example tax law or traffic law violation. However, where it involved some complicated matters that demand social values and choice, it would be better to use AI as assisting tools to human, rather independent decision maker.

II. LEGAL CONCERNS AS TO THE USE OF AI IN JUDICIAL DECISION-MAKING

Despite its adoption by China and a variety of other nations around the world, there are a variety of continuing issues relating AI-assisted judicial making. The objective of the subsequent section is to critically analyse such concerns, most notably as to consistency, bias, transparency, accountability, and fair process.

A. Matter of Consistency

A variety of scholars have suggested that consistency is one of the leading benefits of AI-assisted judicial decision-making.⁵⁹ It has been said that human judges are more inconsistent than AI systems when deciding cases as decisions can be shaped by personal values, preferences and irrelevant extraneous factors.⁶⁰ For example, in the area of sentencing, Warrier notes that differences in opinion and sentencing decisions between judges can be due to unrelated factors.⁶¹ The severity of sentencing can also vary according to a judge's choices, which can in turn depend on their personality, social values and experiences. Stobbs notes that some judges prefer minimum punishment while others favour the maximum term.⁶² In *Rees v The Queen*⁶³, Justice Garling observes that inconsistent sentences are "likely to lead to an erosion of public confidence in the integrity of the administration of justice."⁶⁴ Chief Justice Spigelman argues that the absence of consistency threatens the maintenance of the rule of law.⁶⁵ In addition to personal values and preferences, environmental factors can also influence human decision-making. For example, in a 2015 study by Bank of America Merrill Lynch found that judges are more lenient in sentencing in the morning and just after lunchtime, and that they are

⁵⁵ Yash Raj Shrestha, Shiko M. Ben-Menahem & Georg von Krogh, *Organizational Decision-Making Structures in the Age of Artificial Intelligence*, 61 CALIFORNIA MANAGEMENT REVIEW 69 (2019).

⁵⁶ Andrew C. Michaels, *Artificial Intelligence, Legal Change, and Separation of Powers*, 88 UNIVERSITY OF CINCINNATI LAW REVIEW 1084 (2020).

⁵⁷ Rahman, *supra* note 20, at 3.

⁵⁸ Surden, *supra* note 19, at 723; Harry Surden, *Artificial Intelligence and Law: An Overview*, 35 GEORGIA STATE UNIVERSITY LAW REVIEW 1308 (2019).

⁵⁹ Stobbs, *supra* note 53, at 19; W. Ji, *The Change of Jurisdiction in the Era of Artificial Intelligence*, 1 ORIENTAL LAW 520 (2018).

⁶⁰ Chen & Li, *supra* note 16, at 2.

⁶¹ *Id.*

⁶² Stobbs, *supra* note 51, at 10.

⁶³ *Rees v. The Queen*, NSWCCA 47 (2012).

⁶⁴ Stobbs, *supra* note 51, at 19.

⁶⁵ Chief Justice Spigelman J, *Sentencing Guideline Judgments*, 11 CURRENT ISSUE IN CRIMINAL JUSTICE 5, 5-7 (1999).

more likely to impose a harsher sentence at the end of the day or before lunchtime.⁶⁶ Extraneous matters, such as when a judge take breaks or a portion of the facts, can also impact decisions.⁶⁷ Due to variabilities of human judicial activities has shaken the public confidence.⁶⁸ Therefore, AI has largely been considered to be provide a higher degree of consistency in decision-making. However, it can be argued that in legal system judges' performances are subject to peer review and the use of the appeal mechanism is less frowned upon consistency can be understood in a more nuanced way than the consistency detected by AI.

B. Algorithmic Bias

Countervailing such benefits as to consistency, is a concern as to algorithmic bias. As AI does not codify the solution rather the solution is inferred via machine learning algorithms and complex data.⁶⁹ The algorithmic outcome reflects the mindset of the code writer. It is largely dependent on how it is designed, who wrote the code, how the code is maintained and cleaned. Further, bias in the selection of the data sets that train the AI system can lead to biased outcomes.⁷⁰ The objectivity of an AI system hence depends on the writing of the program, the processes for collecting and analysing data.⁷¹ After analysing 7000 COMPAS decisions, a ProPublica report suggests that machines are biased against black.⁷² In another case, Google Ads for targeted advertising was found gender bias.⁷³ Further, a Science Advances study, demonstrated that COMPAS accuracy was only a marginally higher than humans 65% and 62% respectively.⁷⁴ The seminal inaccuracy was also found in a number of other studies, including Lin et al.⁷⁵ They compared human predictions of recidivism using COMPAS and "Level of Service Inventory-Revised" (LSI-R) assessment while risk assessing and found algorithms were better than human by low margin. Pixelplex notes in AI can be identified in different ways and found that the bias in algorithms is largely dependent on how the data is trained including insertion and interpretation.⁷⁶ In contrast, a study conducted by researchers at Stanford University and the University of California at Berkeley discovered that risk assessment tools are considerably better than humans at clarifying the complexity of the

⁶⁶ See Myles Udland, *Want a favourable ruling in court? Catch a judge right after lunch* (2015), <https://www.businessinsider.com/court-leniency-improves-after-judges-eat-2015-11> (last visited July 18, 2021); Pixelplex, *Artificial Intelligence in Criminal Justice System* (2021) <https://pixelplex.io/blog/artificial-intelligence-criminal-justice-system/> (last visited May 21, 2021).

⁶⁷ Rishabh Warriar, *Analyzing the Use of Artificial Intelligence in Criminal Sentencing through the Loomis Decision*, THE CRIMINAL LAW BLOG CCLSNLUJ (Apr. 14, 2020), <https://criminallawstudiesnluj.wordpress.com/2020/04/14/analysing-the-use-of-artificial-intelligence-in-criminal-sentencing-through-the-loomis-decision/> (last visited May 21, 2021).

⁶⁸ Ji, *supra* note 59, at 520.

⁶⁹ Eirini Ntoutsi et al., *Bias in Data-Driven Artificial Intelligence System - An Introductory Survey*, WIRES DATA MINING KNOWLEDGE DISCOVERY (2020), <https://doi.org/10.1002/widm.1356>.

⁷⁰ Ales Završnik, *Criminal Justice, Artificial Intelligence Systems, and Human Rights*, 20 ERA FORUM 580 (2020).

⁷¹ Pixelplex, *supra* note 66.

⁷² Julia Angwin, Jeff Larson, Surya Mattu & Lauren Kirchner, *Machine Bias*, ProPublica (May 23, 2016), <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing> (last visited June 17, 2021); Law Commission of Ontario, *supra* note 4.

⁷³ Amit Datta, Michael Carl Tschantz & Anupam Datta, *Automated experiments on ad privacy settings*, [2015] 1 Privacy Enhancing Technologies 92, 92–112. Ntoutsi et al., *supra* note 69.

⁷⁴ Julia Dressel & Hany Farid, *The Accuracy, Fairness, and Limits of Predicting Recidivism*, 4 SCIENCE ADVANCES (2018), <https://advances.sciencemag.org/content/4/1/eaao5580> (last visited June 17, 2021).

⁷⁵ Zhiyuan "Jerry" Lin, Jongbin Jung, Sharad Goel & Jennifer Skeem, *The Limits of Human Predictions of Recidivism*, 6 SCIENCE ADVANCES (2020); Warriar, *supra* note 67.

⁷⁶ Pixelplex, *supra* note 66.

criminal justice system and providing more accurate decisions.⁷⁷ This study further revealed that human predictions are perfect when a small number of data is involved, if there are large data the machine surpass than human.⁷⁸ Also, in some tests, the accuracy of humans and algorithms is 60% and 90%, respectively. So, despite the controversy around algorithm-based tools, research studies have shown that risk assessment tools provide more accurate and precise results than human judgment in contexts resembling real criminal justice settings.⁷⁹

Algorithms facilitate predictive justice. It is argued that predictive justice would be a substitution of the norm of application.⁸⁰ No doubt AI score would strongly dominate judge's individual decision. However, there is also a significant body of scholarship on how bias can undermine judicial decision-making. AI prediction can easily be (considered) false because it essentially relies on probability inference.⁸¹ That is how both AI and human cognitive systems employ the same Bayesian predictive method. As Warrier notes, human beings bring with them human biases and can in many circumstances be found to be more biased than a machine.⁸² On the contrary, Marda argued that data-driven decision making is susceptible to inaccuracies, discriminatory outcomes, biasness due to various limitations through the decision-making process.⁸³ Thus, it can be argued that biasness are inescapable in law and AI may possess the same biasness as their programmer may inherit.

C. Insufficient Transparency, Accountability and Fair Process

Lack of transparency has also been raised as a concern when AI systems are used in the judicial decision-making process. Ananny and Crawford argue that automated decision-making systems lack transparency and present a threat to an individual's dignity and control as they make evaluations about individuals without revealing the rationale for such decisions.⁸⁴ When a human judge draws any decision, they typically explain the reasons behind the decision. In contrast, this process is absent in algorithmic decisions. Gacutan and Selvadurai further note that as the internal logic of machine learning algorithms is typically opaque, the absence of a right to explanation can weaken an individual's ability to challenge such decisions.⁸⁵

⁷⁷ Edward Lempinen, *Algorithms are better than people in predicting recidivism, study says*, BERKELEY NEWS, Feb. 14, 2020, <https://news.berkeley.edu/2020/02/14/algorithms-are-better-than-people-in-predicting-recidivism-study-says/> (last visited June 17, 2021).

⁷⁸ See also Surden, *supra* note 19, at 733.

⁷⁹ Pixelplex, *supra* note 66.

⁸⁰ Paris Innovation Review, *Predictive Justice: When Algorithms Pervade the Law* (June 9, 2017), parisinnovationreview.com/articles-en/predictive-justice-when-algorithms-pervade-the-law (last visited June 2, 2021). Although the use of AI through predictive policing became more famous, it raised concerns due to lack of transparency and understanding of predictive models, accountability problems. See Albert Meijer & Martijn Wessels, *Predictive Policing: Review of Benefits and Drawbacks*, 42 INTERNATIONAL JOURNAL OF PUBLIC ADMINISTRATION 1031 (2019), DOI: 10.1080/01900692.2019.1575664.

⁸¹ Tzu-Wei Hung & Chun-Ping Yen, *On the person-based predictive policing of AI*, 23 ETHICS AND INFORMATION TECHNOLOGY 167 (2021).

⁸² Warrier, *supra* note 67.

⁸³ Marda, *supra* note 21, at 16.

⁸⁴ Mike Ananny & Kate Crawford, *Seeing Without Knowing: Limitations of the Transparency Ideal and its Application to Algorithmic Accountability*, 20 NEW MEDIA & SOCIETY 975 (2016); Joshua Gacutan & Niloufer Selvadurai, *A Statutory Right to Explanation for Decisions Generated Using Artificial Intelligence*, 28 INTERNATIONAL JOURNAL OF LAW AND TECHNOLOGY 197 (2020).

⁸⁵ *Id.* at 195.

A variety of cases have considered the issue of transparency in the context of access to reasons for judgment. In *State v Loomis*,⁸⁶ the defendant Loomis was charged with “attempting to flee a traffic officer and operating a motor vehicle without the owner’s consent”. While sentencing the defendant, the trial court took the help of COMPAS, an AI risk assessment tool that predicts recidivism on factors like the defendant’s criminal history, level of education and so on. COMPAS churned out a score, predicting the possibility of recidivism. Based on the assessment given by COMPAS, Loomis was sentenced to six years in prison plus probation. Despite the fact that Loomis did not know the reason for his conviction as the decision-making process had not been explained, the Supreme Court of Wisconsin upheld the decision of the trial court, stating that the decision was made on the basis of a proper risk assessment⁸⁷ In contrast, in *Kansas v. Walls*,⁸⁸ the Court of Appeals of the State of Kansas decided that the defendant should be allowed access to the complete diagnostic LSI-R assessment, which the court relied on deciding what probation conditions to impose on him.⁸⁹

Connected to concerns as to transparency are to whether AI-assisted decisions have the requisite degree of accountability. The primary concern relates to who will be accountable for the decision-making process. Wisser suggests that if algorithms usurp judges’ decision-making power, then the developers or creators of automated systems should be responsible, similarly to a judge, for explaining their decisions “in written, protracted, published opinions”.⁹⁰ Deeks therefore, argues that the judges should challenge an explanation from algorithmic decision on a case-by-case basis.⁹¹ In contrast, Hyden argues that algorithms are so seductive that we often do not notice how they filter information; not even the programmers are aware of it.⁹² Grankvist notes that the algorithms appear to have the same unwritten rules that have always applied to upper-class service staff.⁹³ They never draw attention, never make noise and are never visible. Algorithms have learned what the master wants and will provide these services without the master having to tell them.⁹⁴ Lack of transparency may drive towards a system that is less accurate than it technically be. Buiten further argues that clarity and accuracy are useful for preventing errors.⁹⁵

When algorithms provide recommendations or scores to judges, concerns have been raised as to the ability of judges to properly assess the merits of the recommendations and make an informed decision. Shrestha et al. argues for hybrid decision making structures where algorithmic decisions works as input to human decision making.⁹⁶ In this context, Pixelplex

⁸⁶ *State v. Loomis* – (2016) WI 68, 371 Wis. 2d 235, 881 N.W.2d 749; K Freeman, *Algorithmic injustice: how the Wisconsin Supreme Court failed to protect due process rights in state V. Loomis*, 18 NC J. LAW TECHNOL 75–106 (2016); Francesco Gualdi & Antonio Cordella, *Artificial Intelligence and Decision-Making: the question of Accountability*, PROCEEDINGS OF THE 54TH HAWAII INTERNATIONAL CONFERENCE ON SYSTEM SCIENCES 2302 (2021).

⁸⁷ In appealing to the United States Supreme Court, the Court denied the writ of certiorari, thus declining to hear the case, on 26 June 2017. See *Loomis v. Wisconsin*, 881 N.W.2d 749 (Wis. 2016), *cert. denied*, 137 S.Ct. 2290 (2017).

⁸⁸ *State of Kansas v. John Keith Walls*, pp. 116, 027, The Court of Appeals of the State of Kansas (2017).

⁸⁹ Završnik, *supra* note 70, at 574.

⁹⁰ Leah Wisser, *Pandora’s Algorithmic Black Box: The Challenges of Using Algorithmic Risk Assessments in Sentencing*, 56 AMERICAN CRIMINAL LAW REVIEW 1811 (2019).

⁹¹ Deeks, *supra* note 47, at 1830.

⁹² Hyden, *supra* note 45, at 416.

⁹³ *Id.*; see also <http://pergrankvist.se/perspektiv> (last visited May 31, 2021).

⁹⁴ Hyden, *supra* note 45, at 416.

⁹⁵ Miriam C Buiten, *Towards Intelligent Regulation of Artificial Intelligence*, 10 EUROPEAN JOURNAL OF RISK REGULATION 58 (2019).

⁹⁶ Yash Raj Shrestha, Shiko M. Ben-Menahem & Georg von Krogh, *Organizational Decision-Making Structures in the Age of Artificial Intelligence*, 61 CALIFORNIA MANAGEMENT REVIEW 74 (2019).

notes that judges can be overly influenced by the AI determined score.⁹⁷ It becomes highly difficult for human decision-maker to refute an algorithmic recommendation or score.⁹⁸ Freeman argues that AI recommendations are commonly rated positively by judges despite their being aware that such recommendations may be inaccurate, incomplete, or even wrong.⁹⁹ Larsson further argues that data-dependent AI should not be developed in technological isolation without continuous assessments from the perspective of ethics, cultures, and law.¹⁰⁰

In contrast to opaque and unpredictable algorithms, judicial accountability is ensured through public legal system mechanisms. While technological systems designed by private companies who are not bound by accountability to the public, judicial decision-making is largely transparent and accountable.¹⁰¹ While machine bias is often hard to detect and unpredictable, judicial corruption or biasness are open to public debate. While China, USA and several other countries are seeking to improve algorithmic accountability through technological due process, algorithmic transparency, technical accountability, data literacy, bias, and equity, it remains a continuing area of concern.¹⁰²

Such lack of accountability can undermine a fundamental pillar of the criminal justice system, the defendant's the right to effectively challenge a decision.¹⁰³ More specifically, the use of AI in the criminal justice system raises potential concerns regarding Article 6 of the European Convention on Human Rights (ECHR)¹⁰⁴ and Article 47 of the Charter of Fundamental Rights of the European Union.¹⁰⁵ Article 6 of the ECHR guarantees the defendant the right to participate effectively in the trial and includes the presumption of innocence, the right to be informed promptly of the cause and nature of the accusation, the right to a fair hearing and the right to challenge the evidence produce against him or her.¹⁰⁶ If a AI systems merely generates a score, the defendant cannot challenge it, as the AI system does not reveal the reasons behind the score. In the above discussed *State v Loomis*, Loomis had not been informed of the methodology used to determine his risk.¹⁰⁷ Gacutan and Selvadurai note that the European Union's *General Data Protection Regulation* enables an individual to seek "meaningful information" about the logic involved in making a decision.¹⁰⁸ In the present context, it would be useful to formalise and extend such a right to AI assisted judicial decision-

⁹⁷ Pixelplex, *supra* note 66.

⁹⁸ M.L Cummings, *Automation Bias in Intelligent Time Critical Decision Support Systems*, AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS (2014), <http://web.mit.edu/aeroastro/labs/halab/papers/CummingsAIAAbias.pdf> (last visited July 20, 2021).

⁹⁹ Freeman, *supra* note 86, at 75–106; *see also* Surden, *supra* note 4, at 69.

¹⁰⁰ Larsson, *supra* note 19, at 448.

¹⁰¹ Zalnieriute & Bell, *see supra* note 3, at 19; *see also* Corinne Cath, *Governing artificial intelligence: ethical, legal and technical opportunities and challenges*, PHIL. TRANS. R. SOC. A 1 (2018).

¹⁰² Law Commission of Ontario, *supra* note 4, at 31; Kira Hessekiel, Kim Eliot, James Tierney, Jonathan Yang, & Christopher T. Bavitz, AG TECH FORUM BRIEFING BOOK: STATE ATTORNEYS GENERAL AND ARTIFICIAL INTELLIGENCE (Harvard Law School 2018), <https://www.semanticscholar.org/paper/AGTech-Forum-Briefing-Book%3A-State-Attorneys-General-Hessekiel-Kim/a4587b266a3637cf25ae56f2eba6aac6232bff75> > (last visited June 22, 2021).

¹⁰³ Warrior, *supra* note 67; Wisser, *supra* note 90, at 1811; Zalnieriute & Bell, *supra* note 3, at 11.

¹⁰⁴ Convention for the Protection of Human Rights and Fundamental Freedoms (European Convention on Human Rights).

¹⁰⁵ Charter of Fundamental Rights of the European Union 2012.

¹⁰⁶ *See* Završnik, *supra* note 70, at 576.

¹⁰⁷ *Loomis v. Wisconsin*, 881 N.W.2d 749.

¹⁰⁸ Gacutan & Selvadurai, *supra* note 84, at 194.

making so as to properly calibrate efficiency and consistency gains of AI systems with defendant's right to participate effectively in the trial.¹⁰⁹

III. EXPERIENCE FROM CHINA

A. The Introduction of "Smart Courts" in China

Although China was delayed in introducing legal technology in the judicial sector, it has progressed significantly more quickly than most other jurisdictions.¹¹⁰ Wang and Tian argue that it is possible as the ratio on trusted AI view is higher in the East Asia than Western Country.¹¹¹ Another reason is the imbalance between the growing number of cases and insufficient work forces, which made it difficult to ensure the timely administration of justice in China.¹¹² Hence, China started incorporating technology in support of case management to reduce case delay and costs.¹¹³ Subsequently, it expanded these measures to the adoption of sophisticated technology to establish a series of "smart courts". In 2017, the State Council articulated a national strategy for making China a global leader in artificial intelligence.¹¹⁴ The "New Generation Artificial Intelligence Development Plan" predicts that China will emerge as the global innovation centre for artificial intelligence by 2030.¹¹⁵

The three leading smart courts in China, Suzhou Intermediate Court of China (Court 206), Beijing Internet Court and Hangzhou Internet Court, have been connected with local courts to build an intelligent trust and ecosystem.¹¹⁶ These interconnection have developed a national e-evidence platform underpinned by a blockchain, supporting evidence authentication and examination for future hearings.¹¹⁷ Since May, 2018, the 206 Court system has been trialled in several provinces and cities in China.¹¹⁸ The stated aim of this intelligent court is to "make full use of technologies such as the internet, cloud computing, big data, artificial intelligence and so on, to promote the modernisation of trial system and judgment capability."¹¹⁹ In this court, the AI process begins with electronic filing. When the litigants submit their complaints, the filers scan the relevant materials to generate electronic file. The relevant filing information is automatically recognized and backfilled with intelligent applications.¹²⁰ At the trial stage, examination and cross examination is based on electronic files that broadcast and synchronously and uniformly display materials before the trial bench and the parties.¹²¹ At the witness deposition, synchronised transcription, with speech recognition that can accurately identify and automatically annotate the speakers in the court,

¹⁰⁹ Završnik, *supra* note 70, at 577.

¹¹⁰ Shi, Sourdin & Li, *supra* note 6, at 2.

¹¹¹ Wang & Tian, *supra* note 7, at 205.

¹¹² *Id.*

¹¹³ *Id.* at 8.

¹¹⁴ The Notice of the State Council, *Distributing the New Generation of Artificial Intelligence Development Plans*, (promulgated by the State Council, July 8, 2017, effective July 20, 2017).

¹¹⁵ Chen & Li, *supra* note 18, at 57.

¹¹⁶ Shuai Zhang & Bin Zhou, *Suzhou Mode of Intelligent Trial*, 7 ZHEJIANG PEOPLE'S CONGRESS MAGAZINE 35–8 (2017); Chen & Li, *supra* note 18, at 4; Zheng, *supra* note 11, at 578.

¹¹⁷ *Id.*

¹¹⁸ Jiang Wei, *China Uses AI Assistive Tech on Court Trial for the First Time*, CHINA DAILY, Jan. 24, 2019.

¹¹⁹ Yu Ziru & Chen Zhiyuan, *Smart Courts Allows Information to Cover More Ground and the People to Run Less*, XINHUA NET, Mar 12, 2017.

¹²⁰ Jin & He, *supra* note 1, at 532.

¹²¹ *Id.* at 532-33. According to developer iFlyTek, as of November 2020, its speech recognition algorithm is now used by over 10,000 courts in 31 provinces. See also Chen & Li, *supra* note 18, at 3-5.

transform spoken language into written legal language.¹²² AI based automated tools have also been incorporated in the judicial trial process through voice recognition, image classification, and text processing.¹²³ Apart from that, guide robots are deployed in many local courts in the cities of Beijing, Chengde, Shijiazhuang, Jixi, Quanzhou, to guide lawyers and litigants to the right locations for fee payments or file submissions.¹²⁴ Early AI deployments in China's courts primarily targeted time consuming, repetitive, and communicative tasks to improve operational efficiency in these courts and allows human judges to focus more on evidence evaluation and investigation, which are the core value of trials.¹²⁵ Thus, the intelligent court system in Suzhou Intermediate Court is an integrated solution covering the whole process of litigation.¹²⁶

Court 206 embodies significant aspects of AI-assisted judicial decision-making. In the first phase, AI technologies are used to extract information from relevant legal texts to provide legal-fact information framework for judgment generation and sentencing prediction.¹²⁷ This encompasses legal fact extraction and verification from electronic case files. Further, the system generates a "trial reason". This trial reason consists of two parts, fact verification and related law/regulation application. The first part seeks to replicate the process by which judges identify the laws and regulations which are applicable to the facts before them. This is described as the Court 206 system's "automatic reason-generation" framework.¹²⁸ The AI technology helps find the similarities between cases to maintain a decision-consistency.¹²⁹ The framework matches relevant laws and regulations to the facts and circumstances and then generates "reasons for judgment". The reasons include the reasons for the benchmark sentencing as well as the reasons for pronouncing the sentence. Finally, the reasons for conviction are classified and form a starting point for conviction and sentencing.¹³⁰

B. The Automatic Reason-Generation Framework

The automatic reason-generation framework in use in China's smart courts, namely Court 206, Beijing Internet Court and Hangzhou Internet Court,¹³¹ adopt a variety of processes to address the above discussed problem of consistency. As Jin and He state, "combined with multidimensional data and deep-learning algorithms, the automatic reason-generation framework can identify semantic embedding vectors from legal facts, sentencing circumstances, and laws/regulations, and fully mine the potential semantic information of data to ensure that the judgment reasons contain rich logical relations."¹³² In the matching process, the semantic similarity matching between legal facts and laws/regulations operate to mimic a judge's logical inference, thus aiming to enhance the intelligence of the reasoning process. The

¹²² Jin & He, *supra* note 1, at 532-33; *see also* Suzhou Intermediate People's Court, *Work Report of Suzhou Intermediate People's Court*, 5 Sep. 2019.

¹²³ Jin & He, *supra* note 1, at 531.

¹²⁴ Wang, *supra* note 9, at 62.

¹²⁵ YADING CUI, *ARTIFICIAL INTELLIGENCE AND JUDICIAL MODERNIZATION* 122 (Springer 2020).

¹²⁶ Since the deployment of the intelligent trial system, the judge's transactional work has been divested by about 40%, the clerk's transactional work has been reduced by about 50%, and the average trial efficiency of cases has been increased by about 30%. In 2019, Justice Qian Du, President of Hangzhou Internet Court noted that within its two years of operation, the court had delivered approximately 20,000 judgements and the average hearing time for each case had been saved by 65% compared to face-to-face hearings. *See* Chen & Wang, *supra* note 16; Shi, Sourdin & Li, *supra* note 6, at 11.

¹²⁷ Jin & He, *supra* note 1, at 535.

¹²⁸ *Id.* at 539.

¹²⁹ Shi, Sourdin & Li, *supra* note 6, at 9.

¹³⁰ Jin & He, *supra* note 1, at 539.

¹³¹ Zheng, *supra* note 11, at 567.

¹³² Jin & He, *supra* note 1, at 539.

AI process also undertake analysis to draft judgement based on previous decision on the similar fact. This AI-supported smart court management aims to speed up evidence submission and classification, transfer of case files between different courts.¹³³ Thus, China's smart court system, originating from the 1990s and evolving to the present, aims to provide greater access to justice, balancing workload, and human resources, reducing unreasonable delay and ensuring a transparent judicial system.¹³⁴

The automatic reason-generation framework also seeks to harness the benefits of AI provided guidance and prediction in managing litigation risk,¹³⁵ while upholding accountability, consistency, and fair process. The smart courts in China prioritise maintaining consistency in the autogenerated decision making process, seeking to ensure automated aspects of findings are supported by fact. For example, the system can conduct a "deviation analysis" of draft judgments by comparing relevant evidence in the matter at hand with the processing and evaluation of evidence in prior decisions. In a manner similar to which analysis of judicial precedent by human decision makers upholds case consistency, this deviation analysis seeks to identify potential gaps between findings and facts to support reasoned and consistent decision-making.¹³⁶ Further to avoid the problem of an increased dependency on AI decisions decreasing innovation in judicial decision-making power, the system dominance should be controlled to resist the loss of subjectivity.¹³⁷ Thus, focused instrumental rationality without value may lead humanity to abyss of irreversible disaster.¹³⁸

However, while the smart court system embeds a variety of safeguards to support consistency and fair process, there are continuing areas of legal concern. A primary concern relates to explainability. The automatic reason-generation framework in China does not explain the process of generating decision. Neither developers nor users can observe the operations and processes of the machine learning which is the "black box" nature of the system algorithms.¹³⁹ This lack of explanation raises the question of fair process and transparency. The legal literature regarding AI decisions notes that this algorithmic process leads to a lack of clarity.¹⁴⁰ Professor Benjamin states that the Chinese smart court has not achieved full transparency, suggesting that the process still involves bureaucratic sluggishness and noncompliance of the court decision.¹⁴¹ Liebman et al. found, from field work data, that lawyers routinely note that the cases they have handled which involve politically well-connected parties are frequently missing from online databases.¹⁴² In this connection, they mentioned about three types of bias in China smart court - administrative censorship, incentive bias, and diligence bias.¹⁴³ Though these are more about are about decisions that are made available online. Ji recommends that

¹³³ Mimi Zou, "Smart courts" in *China and the future of personal injury litigation*, JOURNAL OF PERSONAL INJURY 4 (2020).

¹³⁴ Tahura, *supra* note 30, at 184.

¹³⁵ McKenzie, *supra* note 12.

¹³⁶ Claire Cousineau, *Smart Courts and the Push for Technological Innovation in China's Judicial System*, Apr. 15, 2021, <https://www.csis.org/blogs/new-perspectives-asia/smart-courts-and-push-technological-innovation-chinas-judicial-system>.

¹³⁷ Zheng, *supra* note 11, at 579.

¹³⁸ *Id.*

¹³⁹ Wang & Tian, *supra* note 7, at 208.

¹⁴⁰ Gacutan & Selvadurai, *supra* note 84, at 198.

¹⁴¹ Tim Wang, *Transparency, AI, and the Future of Chinese Courts: A Discussion with Professor Benjamin Liebman*, COLUMBIA JOURNAL OF TRANSITIONAL LAW, Mar 13, 2021.

¹⁴² Liebman, Benjamin L., Margaret E. Roberts, Rachel E. Stern & Alice Z. Wang, *Mass Digitization of Chinese Court Decisions: How to Use Text as Data in the Field of Chinese Law*, 21ST CENTURY CHINA CENTER RESEARCH PAPER NO. 2017-01 20 (2017).

¹⁴³ *Id.*

judges and data-processing company should make decision jointly and this will strengthen judicial accountability within the system.¹⁴⁴ He further argues that the present algorithmic trial makes judges incapable of being responsible, weakening judicial authority and accountability.

Based on how China is adopting AI in the court system, Liebman et al. also found problems with transparency and access.¹⁴⁵ They note that certain smart courts in China are more diligent in disclosing documents and processes than others. For example, in 2013, the SPC set a rule governing public release of court opinion containing some exemptions, such as, cases involving state secrets or person's privacy, juvenile criminal cases, disputes concluded through mediation, and other documents deemed "inappropriate" to publicise.¹⁴⁶ Eventually, their restriction became shortened, which was reflected in 2016 rules. Argumentatively, the promotion of AI and big data by the SPC is, in part, to exert control from the top. The SPC is keen to strengthen oversight to address concerns about local patronage, corruption, and sheer incompetence. Access is a vital issue in the justice delivery process. If the high technology prevents people from accessing the court or legal process, it creates a variety of inequities. Hence, before introducing high technology in the legal sector, it is important to ensure equal access. This concern is equally applicable to China's smart court. Shi, Sourdin and Li suggest that the large population in China cause some unique challenges that related vast need for access to justice.¹⁴⁷ That the intelligent transformation would align with the traditional values of judiciary to be more transparent, efficient and people centric.¹⁴⁸

C. International Perspectives

Before concluding, it is useful to place these developments in China within the broader international context and consider how such systems are also seeking to adopt the efficiencies of judicial decision-making while mitigating the problems discussed in section 2 (above). In the USA, judges are also using machine predictions of recidivism or risk-assessment tools to judicial decision-making. The COMPAS¹⁴⁹ and PSA are the most notable algorithmic tools used in the US criminal justice system.¹⁵⁰ COMPAS is used in sentencing criminal defendants to assess the risk of re-offending to make decisions as to bail. While both employing AI, these two tools act in a different way. COMPAS collects data on various aspects of an offender's behaviour and links them with recidivism.¹⁵¹ Analysing the data, the system then produces a score for recidivism and violent recidivism. The system also uses a set of questionnaires to predict or examine criminal's risk. It is relevant to note that COMPAS is based entirely on past data and not on any subjective or opinion-based factors.¹⁵² In COMPAS, the methodology of risk assessment is not revealed. Therefore, the defendant does not know why he is sentenced or why not. PSA also used to predict the rates of recidivism, violent recidivism in a different way. PSA's prediction is based on nine risk factor, age at current arrest, current violent offence, pending charge at the time of the offence, a prior misdemeanour conviction, prior felony conviction, prior violent crime conviction, prior failure to appear at a pre-trial hearing in the

¹⁴⁴ Ji, *supra* note 59, at 525.

¹⁴⁵ Liebman et al., *supra* note 142, at 15.

¹⁴⁶ *Id.* at 8.

¹⁴⁷ Shi, Sourdin & Li, *supra* note 6, at 3.

¹⁴⁸ *Id.* at 5.

¹⁴⁹ Chen & Li, *supra* note 18, at 4; Zalnieriute & Bell, *supra* note 3, at 7.

¹⁵⁰ Pixelplex, *supra* note 66.

¹⁵¹ Warrier, *supra* note 67.

¹⁵² Stobbs, *supra* note 53, at 39; *see also* Markarian v. The Queen, 228 CLR 357 [135] (2005); [2005] HCA 25; Maxi Scherer, *Artificial Intelligence and Legal Decision-Making: The Wide Open? A Study Examining International Arbitration*, 36 JOURNAL OF INTERNATIONAL ARBITRATION 550 (2019).

past two years, prior failure to appear at a hearing more than two years ago, and prior sentence to incarceration.¹⁵³ COMPAS keeps the method of determining an offender's risk confidential, while PSA publishes the factors and methods it uses.¹⁵⁴ PSA, thus, allows the judge to analyse the strengths and weaknesses as pre-trial risk assessment tool. Whatever the tools are, these risk assessments system abandons the principle of proportionality between crime and punishment and disregards the principle of equity.

Australia has also initiated a variety of AI based systems. The Judicial Information Research System (JIRS) is used to support judges in criminal sentencing.¹⁵⁵ Inductive inferencing systems and neural networks generate sentencing decisions based on a statistical analysis of previous sentencing decisions. Each of these approaches requires large numbers of previously decided cases to generate justifiable sentencing outcomes in undecided cases, and luckily sentencing is one of the few areas of law where a huge corpus of decisions exists. As a result, sentencing is extremely well-suited to the application of these sorts of analyses.¹⁵⁶ Risk and needs assessments are now regularly used in Australia in a variety of contexts. The most common use of risk and needs assessments in Australia is by corrections departments on offenders who have been sentenced to a term of prison.¹⁵⁷ The score of this risk assessment thus assists the judges to determine the sentencing amount.¹⁵⁸ Though the judges are not compelled to decide based on the AI assessment, they are largely influenced by the score. Unlike a human, the benefit of these AI algorithms is that it reduces subconscious bias in the decision-making process.¹⁵⁹ Also these assessments are used especially in traffic violence cases.

In addition to the USA and Australia, a variety of nations around the world are adopting AI in judicial decision-making. The Singapore judiciary has similarly embraced an Intelligent Courts Transcription System for generating written records of oral proceedings in real time.¹⁶⁰ The United Kingdom (UK) has introduced an online dispute resolution (ODR) system for low value civil claims,¹⁶¹ as well as an internet-based court service for civil disputes with a value of less than £25,000. Decisions of these courts are largely based on electronically submitted papers and telephone conferences and result in online adjudication.¹⁶² For criminal cases, an "automatic online conviction" proposal has also been in place in the UK since 2017.¹⁶³ The Brazilian Superior Tribunal of Justice has launched Sócrates, an initiative to automate the search for relevant legal materials.¹⁶⁴ The Estonian Ministry of Justice is similarly considering

¹⁵³ Pixelplex, *supra* note 66.

¹⁵⁴ *Id.*

¹⁵⁵ Janet B L Chan, *A Computerised Sentencing Information System for NSW Courts*, 7 *COMPUTER LAW AND PRACTICE* 147 (1991); Zalnieriute & Bell, *supra* note 3.

¹⁵⁶ Cliff Kuang, *Can A.I. be Taught to Explain Itself*, *The New York Times Magazine*, Nov. 21, 2017, <https://www.nytimes.com/2017/11/21/magazine/can-ai-be-taught-to-explain-itself.html>.

¹⁵⁷ In New South Wales alone in 2008/2009, nearly 38,000 assessments of this nature were completed. *See* I. WATKINS, *THE UTILITY OF LEVEL OF SERVICE INVENTORY – REVISED (LSI-R) ASSESSMENTS WITHIN NSW CORRECTIONAL ENVIRONMENTS* (NSW Department of Corrective Services, Jan. 29, 2011).

¹⁵⁸ Stobbs, *supra* note 53, at 38.

¹⁵⁹ *Id.*

¹⁶⁰ Kee Oon, *State Courts: 2020 and Beyond*, (Singapore State Courts, Mar 8, 2019), *State Courts: 2020 and Beyond*. Singapore State Courts, Mar 8, 2019.

¹⁶¹ Sourdin, *supra* note 3, at 99-100.

¹⁶² *See also* The ODR Advisory Group of the Civil Justice Council (February 2015).

¹⁶³ Zalnieriute & Bell, *supra* note 3.

¹⁶⁴ Projeto-piloto do Sócrates, Programa de inteligência artificial do STJ, é esperado para-Agosto (Pilot Project of Sócrates, STJ's Artificial Intelligence Program, is Expected for August 2019).

using a “robot judge” to process small claims.¹⁶⁵ In Canada, a new British Columbia Civil Resolution Tribunal will operate an online platform for initial contact and proceedings commencement.¹⁶⁶ In Ireland, the Northern Ireland Courts and Tribunal Service offer an online process for small claims for online proceedings,¹⁶⁷ although final adjudication remains a face-to-face option.¹⁶⁸ In Mexico, the Mexican Expertus system advises judges and clerks on legal and technical analysis.¹⁶⁹ The Japan National Institute of Informatics’ Advanced Reasoning Support for Judicial Judgment by Artificial Intelligence project¹⁷⁰ is developing a system that supports advanced reasoning using AI and a system that analyses argumentation more accurately.¹⁷¹ However, the system is yet to be implemented via the court system. Some are optimistic that machine-human hybrid would do better than human-only legal system.¹⁷² However, a machine only decision-making system would still raise the concern to explain the reason behind the decision. Thus, while many countries are adopting AI in the judicial sector in a variety of forms, the initiatives in China are distinctive for the extent of their formal coordination and maturity. The smart court system developed by China provides a formal overarching framework for the use of AI in the judicial sector.

CONCLUSION

New and innovative technologies typically offer both promise and peril. It is difficult to trust the unknown. This is certainly the case with the use of AI in judicial decision-making. AI provides the benefits of cost-effective and time-efficient decision-making in the justice system.¹⁷³ Many applications of AI technology are beneficial, and indeed have enhanced judicial efficiency through digital filing, discovery, and trial.¹⁷⁴ However, despite its benefits, AI-enabled processes in the judicial sector raise a variety of legal concerns. The algorithmic decision-making process needs to be consistent, transparent, and fair and avoid bias.¹⁷⁵ The adoption of appropriate and effective AI-enabled judicial decision-making systems has hence proven to be highly challenging.¹⁷⁶ In such a context, the example of China is highly instructive. Examining the processes and safeguards enacted in the China smart court system provide valuable insights into both the challenges of adopting AI technologies in the judicial sector and how such challenges can be overcome. In particular, the automated reason-generation framework and deviation analysis applied in the smart courts of China provide useful options for governance. As nations around the world seek to determine the nature and extent of appropriate automation in judicial decision-making and seek to design systems that

¹⁶⁵ *Can AI Be a Fair Judge in Court: Estonia Thinks So*, WIRED (2019), <https://www.wired.com/story/can-ai-be-fair-judge-court-estonia-thinks-so/>.

¹⁶⁶ British Columbia Ministry of Justice, *Online Civil Dispute Tools to Save Time, Money* (2012), http://www2.news.gov.bc.ca/news_releases_2009-2013/2012JAG0068-000600.htm (last visited July 29, 2021); Sourdin, *supra* note 3, at 104.

¹⁶⁷ Northern Ireland Courts and Tribunals Service, *Small Claims Online: A Users Guide*, <http://www.courtsni.gov.uk/SiteCollectionDocuments/Northern%20Ireland%20Courts%20Gallery/Online%20Services%20User%20Guides/Small%20Claims%20Online%20User%20Guide.pdf> (last visited July 29, 2021).

¹⁶⁸ Sourdin, *supra* note 2, at 1114-33.

¹⁶⁹ Carneiro et al., *supra* note 17, at 227-28.

¹⁷⁰ E-LEN, NATIONAL ORDINANCE DATABASE POWERED BY ELEN (Kagoshima University 2017) <https://elen.ls.kagoshima-u.ac.jp/> (last visited Dec. 5, 2019).

¹⁷¹ Nitta & Satoh, *supra* note 1, at 487.

¹⁷² Tim Wu, *supra* note 31, at 2004.

¹⁷³ Sourdin, *supra* note 3, at 101; Stobbs, *supra* note 53.

¹⁷⁴ Zalnieriute & Bell, *supra* note 3, at 19.

¹⁷⁵ Završnik, *supra* note 70, at 579.

¹⁷⁶ Zheng, *supra* note 11, at 579; Dressel & Farid, *supra* note 74.

calibrate efficiency with accountability, transparency and justice, the example of the China smart court system is a useful model to consider.