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

Ummey Sharaban Tahura & Niloufer Selvadurai *

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.

Keywords: 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

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[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-resultion; 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.

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[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,

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[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

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[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] Ummey 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

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[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 replate 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

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[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 Intelligent*, 119 COLUMBIA LAW REVIEW 1830 (2019).
[48] Deeks, *supra* note 47, at 1832.
[49] Sourdin, *supra* note 2, at1125.
[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

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[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

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[66] *See* Myles Udland, *Want a favourable ruling in court? Catch a judge right after lunch* (2015), https://www.businessinsider.com/court-leniancy-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 Warrier, *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); Warrier, *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]

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[77] Edward Lempinen, *Algorithms are better than people in predicting recidivism, study says*, BERKELY 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 assessment[87] 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 is 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

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[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-

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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 Warrier, *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,

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[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, changed, 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

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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 precent 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

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[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 COMPAS[149] 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 questionaries 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

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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 Expertius 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 project[170] 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 optimist 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 co-ordination 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 unknow. 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

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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.

AN UPGRADED ART MARKET FOR A DIGITAL AGE

Caroline P. Christman*

Abstract: The traditional art market suffers from systemic market failures resulting in inefficiencies. There is no universal system or database to keep track of provenance information. The lack of provenance results in authentication issues, raising risk within the market. Additionally, the physical form of traditional art presents numerous problems including theft and transaction costs. Copyright and trademark laws attempt to address these market failures through regulation and enforcement mechanisms. However, these legal mechanisms are inefficient tools to regulate the art market because they rely on voluntary record keeping and retroactive enforcement through the judicial system. In contrast, blockchain technology, as an efficient regulatory and enforcement system, solves the art market problems that the law cannot fix. This innovative technology can solve the complex legal problems that the art market faces daily. Blockchains are immutable ledgers that store impeccable provenance information. Several blockchains have a native form of artwork—non-fungible tokens (NFTs)—that work seamlessly with the technology. NFTs take the physical aspect out of art, allowing art to exist digitally on the blockchain, where they cannot be damaged, stolen, or forged. Blockchain technology presents a novel solution to the physicality, authenticity, and provenance problems in the art market.

Keywords: NFTs; Blockchain Technology; Art Market Problems

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INTRODUCTION

In 1989, an art collector named Joe Simon-Whelan purchased an Andy Warhol silk-screen painting for $195,000.[1] When Simon-Whelan tried to authenticate the piece in 2001 and 2003, the Andy Warhol Art Authentication Board rejected the painting on both occasions.[2] Simon-Whelan subsequently filed suit for $20 million against the board for allegedly rejecting authentic works "to induce artificial scarcity in the market" for Andy Warhol artwork.[3] After three years of litigation, Simon-Whelan dropped the lawsuit.[4] The Andy Warhol Authentication Board disbanded a year later because of litigation costs—it spent over $2 million in legal fees in 2010 alone.[5] The board's disbanding represents a larger authentication problem in the art market. Authenticators are "heading for the hills" due to high liability risks and litigation expenses.[6] But, authentication is a necessary regulation to prevent fraud and forgery. The art market is begging for a solution to this systemic market failure.

Many problems arise in the traditional art world, which consists of two- and three-dimensional works of art in the physical world, such as paintings, photographs, and sculptures. It is difficult to establish the ownership and transfer history of an artwork—called provenance. No universal system or database exists to keep track of provenance information in the traditional art market. The lack of provenance results in authentication issues. Additionally, the physical form of traditional art presents numerous problems including theft and transaction costs. Problems in the art market are currently addressed through self-regulatory mechanisms, such as authentication experts. However, as the Andy Warhol Art Authentication Board's disbandment illustrates, art authentication and proper provenance are complex problems facing the traditional art market.

Various areas of law unsuccessfully attempt to regulate the art market. As a result, the art market is largely unregulated by the legal system. Copyright and trademark laws are utilized by actors in the art market as regulation enforcement mechanisms. These legal mechanisms are inefficient tools to regulate the art market because they rely on voluntary record keeping and retroactive enforcement through the judicial system. Copyright and trademark law cannot hope to solve the authentication and provenance issues facing actors in the traditional art market.

Blockchain technology, as an efficient regulatory and enforcement tool, solves the art market problems that the law cannot fix. The innovative technology can solve the complex legal problems that the art market faces. Blockchains are immutable ledgers that store impeccable provenance information. Several blockchains have a native form of artwork—non-fungible tokens (NFTs)—that works seamlessly with the technology. NFTs take the physical aspect out of art, allowing art to exist digitally on the blockchain, where they cannot be damaged, stolen, or forged.

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[1] Danielle Rahm, *Warhols, Pollocks, Fakes: Why Art Authenticators Are Running for the Hills*, FORBES (June 18, 2013), https://www.forbes.com/sites/daniellerahm/2013/06/18/warhols-pollocks-fakes-why-art-authenticators-are-running-for-the-hills/?sh=75bc23447e0b; Alan Feuer, *Warhol Foundation Accused of Dominating the Market*, N. Y. TIMES (July 17, 2007), https://www.nytimes.com/2007/07/17/arts/design/17warhol.html?pagewanted=print&_r=1&.

[2] Alan Feuer, *Warhol Foundation Accused of Dominating the Market*, N. Y. TIMES (July 17, 2007), https://www.nytimes.com/2007/07/17/arts/design/17warhol.html?pagewanted=print&_r=1&.

[3] *Id*.

[4] Rahm, *supra* note 1.

[5] *Id*.

[6] *Id*.

The art community has been wrestling with the problems intrinsic to the physical form of traditional artworks for decades. In 1958, Yves Klein's "Void" exhibition at Galerie Iris Clert in Paris sparked the new realist and conceptualist movements in the art world. The Void, displayed to visitors in an empty room inside the gallery, consisted of 101 Zones of Immaterial Pictorial Sensibility that were immaterial, nonphysical artworks. Klein efficiently transferred immaterial artworks to art collectors by exchanging gold for a receipt which detailed the provenance of the piece. Klein's successful exhibit and project was a very early rendition of a nonphysical non-fungible artwork—today's digital NFT. Blockchain technology effectively solves many traditional art market issues including physicality problems, authenticity, and provenance. With the numerous problems this technology solves in the art market, it is no wonder that there have been $31.7 billion worth of NFT transactions on the most well-known NFT marketplace, OpenSea, since its inception in 2017.[7]

The numerous physicality, authenticity, and provenance problems facing the art market create complex legal problems that are not properly addressed by the various applicable areas of law. Instead, blockchain is an innovative technology that presents a novel solution to these regulatory and enforcement problems within the art market. This paper discusses these art market problems and technology solutions and proceeds in four parts. In Part I, the paper describes art market problems that require regulation. Part II explains how legal enforcement mechanisms fail to properly address art market problems. In Part III, the paper explains the characteristics of blockchain technology that make it a valuable tool for art market regulation. The paper compares legal mechanisms and blockchain technology as two tools in the art market regulatory system. Part IV discusses the 1958 traditional art project by Yves Klein that illustrates NFT concepts sixty years ahead of its time and its recreation as an NFT project on the Ethereum blockchain in 2017. Finally, the paper concludes that blockchains are a useful tool to solve art market regulation problems and addresses the potential of blockchain technology to revolutionize the art market.

I. PROBLEMS IN THE TRADITIONAL ART MARKET

The traditional art world presents many problems, such as difficulties in completing transfers and establishing provenance for a piece. Record keeping problems are exacerbated by the art community's culture of intentionally concealing information to preserve anonymity and to manipulate prices. The lack of information and the practical challenges of handling, storing, transferring, and protecting physical artworks create inefficiencies in the traditional art market. Some, but not all, of these problems also arise in the digital art market.

A. Physical Asset Weaknesses

Some of the major problems in the traditional art world are caused by the physical form of traditional art.[8] Physical artworks can be damaged by a plethora of conditions such as fire, water, and light.[9] The art must be stored in a location with the right conditions to preserve the artwork.[10] Theft is another threat to physical artworks, requiring security measures for

[7] *OpenSea NFT Marketplace Statistics*, DAPPRADAR, https://dappradar.com/ethereum/marketplaces/opensea.
[8] *See* Artwork Archive, *The Cost of Maintaining a Fine Art Collection*, https://www.artworkarchive.com/blog/the-cost-of-maintaining-a-fine-art-collection.
[9] *Id*.
[10] Artwork Archive, *supra* note 8.

valuable artworks.[11] Transporting artwork between locations or transferring artwork from an owner to a buyer may be practically difficult, especially if the piece is large, fragile, or must be kept in certain conditions.[12]

The physical form of traditional artworks increases the financial burden on the owner.[13] Storage, security, and conservation efforts are often costly.[14] Owners often insure their art against damage or theft.[15] There can be high transaction costs to transfer the piece and high transportation costs to move the artwork.[16] Transporting a piece of art across national boundaries requires filling out import and export forms, getting approval, and paying import and export tariffs.[17] Furthermore, both parties to a transaction may pay to have the piece appraised and authenticated by professionals.[18]

B. Lack of Information

The art market is inefficient—it suffers from a market failure due to inadequate information. An efficient market transacts at a price that "incorporate[s] all available information."[19] Market failures arise when actors in the market lack information, "caus[ing] buyers and sellers to misallocate resources."[20] "Accordingly, the foundation of an efficient market lies in its ability to provide reliable information . . . so that buyers and sellers can dedicate resources to their wisest, most efficient uses."[21] Often, legal tools are utilized to provide information in markets that foster secrecy by requiring information dissemination or by forbidding the concealment of information.[22]

There is a major lack of market information in the traditional art market. "The art industry refuses . . . to provide reliable information . . . due in part to the nature of art as a commodity, the culture and history of the market, and the laws governing its trade."[23] Owners and dealers conceal provenance and sale information "to drive up prices artificially."[24] It is difficult to determine the market price of an artwork unless a similar piece was recently, publicly sold.[25] However, most art is transferred in private, without publicly disclosed price information.[26] The lack of information "leads to title problems and . . . reduces trust" in the market.[27] The culture of secrecy leads to transactions at inefficient prices.[28] "Even the most

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[11] Gregory Day, *Explaining the Art Market's Thefts, Frauds, and Forgeries (And Why the Art Market Does Not Seem to Care)*, 16 VAND. J. ENT. & TECH. L. 457, 470 (2014) ("[S]tolen art constitutes the third most commonly traded illicit good.").
[12] Artwork Archive, *supra* note 8.
[13] *Id*.
[14] *Id*.
[15] *Id*.
[16] *Id*.
[17] Art Business Info. For Artists, *International Art Shipping: How to Ship / Export Art to Other Countries*, https://www.artbusinessinfo.com/how-to-ship-art-guide-for-artists.html.
[18] Artwork Archive, *supra* note 8.
[19] Day, *supra* note 11, at 462.
[20] *Id*. at 463.
[21] *Id*. at 464.
[22] *Id*.
[23] *Id*. at 465.
[24] *Id*. at 459-60.
[25] Murray Coleman, *The Pros and Cons of Investing in Art*, WALL ST. J. (Mar. 14, 2014), https://www.wsj.com/articles/SB10001424052702304020104579433253696361022.
[26] *Id*.
[27] *Id*.
[28] Day, *supra* note 11, at 459-60 (quoting Stephen D. Brodie).

diligent art consumer cannot typically access enough reliable information to determine with confidence whether a proposed art deal is a wise investment."[29]

Ownership and authenticity information is crucial for establishing a fair market price. A piece of artwork with strongly supported provenance is more valuable than a piece with less established provenance.[30] For an artwork to have value, the owner must be able to sell the artwork on the market.[31] To execute a legitimate sale, the owner must present enough evidence to convince the buyer that they are the legitimate owner of an authentic artwork.

Buyers are cautious when purchasing a valuable artwork because they risk purchasing a forgery, which is worth much less money than the authentic, legitimate artwork.[32] Forgeries continuously improve in quality as technology advances—artificial intelligence can produce almost identical replicas that may be indistinguishable from the original.[33] "[N]o transaction can ever rise above scrutiny."[34] Authenticators cannot be 100% sure that a piece is authentic—they must make their best, educated decision as an expert with the information they have.[35] Additionally, buyers scrutinize the owner's claim to the artwork. If a buyer, in good faith, purchases stolen artwork, they may have to return the artwork to its rightful owner without a refund.[36] The most compelling way to prove ownership of an authentic artwork is through well-established provenance that states all relevant information about the work's transaction history, such as the date, price, and parties involved.[37] Establishing complete provenance for artwork that is centuries old, when transactions have not been well-recorded, may be impossible.[38] Therefore, the more provenance information provided by the owner to the buyer, the more confidence the buyer has that a piece is authentic. The traditional art market system places ownership rights in the person with the best provenance evidence, without complete confidence that they are the true owner of an authentic artwork.

C. Transfer Issues

Physical artwork transfers are inefficient because of the physical challenges and art market's culture. Transactions can be prolonged and disorganized because owners and buyers often negotiate anonymously through an intermediary or art dealer.[39] The art industry standard is to use middlemen in confidential transactions to reduce the chance "that publicizing . . .

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[29] *Id*. at 461.
[30] *Id*. at 477-78.
[31] Amena Saad, *How Market Value Can Help You Determine the True Worth of Company or Asset*, INSIDER (. 13, 2021), https://www.businessinsider.com/market-value.
[32] See Day, *supra* note 11, at 477-78.
[33] *See* Brandon Lorimer, *MSCHF sells of 1000 copies of Andy Warhol's 'Fairies,'* (Nov. 1, 2021), https://www.art-critique.com/en/2021/11/mschf-sells-off-1000-copies-of-andy-warhols-fairies/ (describing the use of AI to create 999 forgeries of a pen drawing by Warhol which were sold after being mixed with the original piece).
[34] Day, *supra* note 11, at 461 (referring to a well-known private gallery, Knoedler & Company, that sold $40 million worth of forged paintings).
[35] Rahm, *supra* note 1.
[36] John H. Merryman, *The Good Faith Acquisition of Stolen Art*, STANFORD LAW SCHOOL (Oct. 2007), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1025515.
[37] Jodi Heckel, *Provenance Exhibition Shows Challenges of Tracing the Path of Ownership of Artwork*, ILLINOIS NEWS BUREAU (May 9, 2017), https://news.illinois.edu/view/6367/498063.
[38] *Id*.
[39] Coleman, *supra* note 25; Day, *supra* note 11.

collections will invite criminals to steal from them."[40] The culture of secrecy makes it difficult for the laypeople who are not established art market participants to become active in the market.

Artwork transfer inefficiencies include the diversion of profits from artists and owners to middlemen. Galleries, auction houses, and art dealers charge fees for exhibiting and selling artworks.[41] The current transaction system "primarily benefit[s] the big auction houses and the major dealers" which take a cut of the sale price.[42] The middleman fee system reduces the benefit of the transaction for both the owner and the buyer.

While owners may choose to transfer or license duplication rights to others, copies can be made without such a voluntary transfer. Owners risk their artwork being copied, duplicated, replicated, or monetized, without their consent and without receiving any compensation.[43] Duplication is more problematic in the digital art market because digital art can be quickly duplicated with extreme ease—the average internet user can right-click-save an image online. Copyright and trademark laws have developed to provide owners with a tool to enforce their duplication rights.

II. LEGAL METHODS FAIL TO SOLVE ART MARKET PROBLEMS

Although the art market is mostly unregulated, actors in the market can self-regulate by using legal mechanisms to enforce their rights and protect the value of their artwork.[44] Copyright and trademark laws address ownership and duplication problems in the art market by providing legal mechanisms for intellectual property (IP) owners to enforce their rights in a court of law.[45] However, these legal enforcement mechanisms are not effective methods of regulation in the art market.

IP law allows owners to prevent others from copying their artworks. To protect the integrity of their brand, an IP owner may assert a claim against a copier for trademark infringement.[46] Copyright law allows owners to enjoin an infringing party and get money remedies through the judicial system.[47] A copyright confers exclusive rights on the author of the work, including the right to reproduce, adapt, distribute, and publicly display the work.[48] Owning a copyright is "distinct" from ownership of an artwiork because only the copyright owner can assert a legal claim against infringers.[49] A copyright can be transferred from the

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[40] Day, *supra* note 11, at 470.
[41] *See* Sotheby's, *Seller's Commision*, https://www.sothebys.com/en/glossary#:~:text=For%20most%20auctions%2C%20including%20those,10%25%20of%20the%20hammer%20price.
[42] Isaac Kaplan, *Should the Art Market Be More Heavily Regulated?*, ARTSY (May 23, 2016), https://www.artsy.net/article/artsy-editorial-should-the-art-market-be-more-heavily-regulated (quoting Stephen D. Brodie).
[43] Ann A. Andres, *Reproduction Rights for Fine Art*, ART LAW (1999), http://www.tfaoi.com/articles/andres/aa2.htm#:~:text=When%20you%20make%20prints%20of,a%20right%20to%20be%20compensated.&text=Usually%2C%20artists%20will%20grant%20such,prints%20for%20their%20own%20purposes.
[44] *See* 17 U.S.C. §§ 502-505 (1976).
[45] *Id*.; United States Patent and Trademark Office, *Trademark, patent, or copyright*, USPTO (Mar. 31, 2021), https://www.uspto.gov/trademarks/basics/trademark-patent-copyright.
[46] United States Patent and Trademark Office, *supra* note 45.
[47] 17 U.S.C. §§ 501-505 (1976).
[48] 17 U.S.C. § 106 (1976). The author owns the work they created. *See* John Locke, *Two Treatises of Government*, (1689) (Arguing that natural rights of property are in your own body, so you are entitled to the fruits of your own labor).
[49] *See* 17 U.S.C. § 202 (1976).

author to subsequent owners.[50] To provide constructive notice to market participants, the Copyright Act of 1976 requires formal written contracts for all copyright transfers because of the intangible nature of copyrights creating ownership confusion.[51] However, recording the transfer is optional.[52] The written contract requirement makes transfers more expensive by necessitating the involvement of professionals, including lawyers, experts, or advisors. The IP law mechanism does not sufficiently address art market problems in the traditional or the digital art market.

Several issues arise from the application of IP law within the NFT market. First, blockchain art is physically located on thousands of computer "nodes" around the world, placing the art outside of any jurisdiction.[53] Therefore, enforcing copyright and trademark law on NFTs that are owned and transacted by anonymous users across the world may be difficult.

Second, assigning IP rights to the correct owners is difficult for generative art projects. Many NFT projects use generative art as the image for their NFTs.[54] Generative art is computer generated—the developer writes the code in a "smart contract" on the blockchain, instructing the computer to generate a certain number of pieces of art with specific characteristics.[55] A user calls a function on the smart contract to "mint" an NFT.[56] The computer, acting per the user's command, follows the smart contract instructions coded by the developer to generate a piece of art.[57] It is difficult to discern who the author of generative art is for copyright law purposes. The author could be the developer, the computer, or the user. IP law currently assigns rights to the users of generative art.[58] However, this assignment is illogical and should be rethought because the developer may want to enforce trademark law against infringers to preserve their brand name.

Third, the NFT community culture minimizes the importance of IP rights. NFT-native art, which was digital at its inception and is not a reproduction of a traditional artwork, is less likely to have IP rights asserted because of the ethos in the community. The NFT community does not care if people right-click-save their images, in fact, they encourage it. The owner values having the underlying code in their wallet, and any further use of the image associated with their NFT is free marketing.

The lack of IP law enforcement in the NFT space is exemplified through the numerous projects that release in the crypto commons with a public copyright license (CC0).[59] CC0 projects relinquish all intellectual property rights related to the project that are released into the public domain.[60] CC0 projects view unauthorized uses of their works as free marketing that increase the value of their NFTs. Bored Ape Yacht Club (BAYC) took an IP rights approach similar to CC0, except the developers released the IP rights to BAYC owners and not to the

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[50] 17 U.S.C. § 201(d) (1976).
[51] 17 U.S.C. § 102 (1976).
[52] *Id*.
[53] *See* Ethereum, *What is Ethereum?* (Nov. 30, 2021), https://ethereum.org/en/.
[54] *See* Ethereum, *Non-Fungible Tokens (NFT)* (Nov. 30, 2021), https://ethereum.org/en/nft/.
[55] *Id*.
[56] *Id*.
[57] *Id*.
[58] This is the same solution as British law.
[59] William M. Peaster, *NFTs and CC0*, BANKLESS (Nov. 30, 2021), https://metaversal.banklesshq.com/p/nfts-and-cc0.
[60] *Id*.

public.[61] BAYC is the second most established and valuable NFT project, with a current floor price of 71.5 ETH or over $115,000 at the time of writing.[62] Derivative NFT projects have developed, such as Mutant Ape Yacht Club, which allows Bored Ape owners to create a second NFT that resembles their Bored Ape with mutant characteristics.[63] These Mutant Apes can be sold by the Bored Ape owner, further increasing the value of their Bored Ape.[64]

In contrast to NFT-native art, IP rights are more likely to be asserted against NFTs that replicate art from the traditional art market. For example, Quentin Tarantino, a famous Hollywood director, created NFTs of his handwritten screenplay for Pulp Fiction, one of his most well-known films.[65] The NFT is an image of Tarantino's handwritten notes on the screenplay he wrote.[66] However, Miramax, the movie production company, filed suit claiming that by releasing these NFTs, Tarantino infringed on their copyright over the movie.[67] With the current copyright law system in place, Miramax would likely win this dispute in court, although the parties settled the dispute outside of court in September 2022.[68] However, this is not the most socially desirable outcome because it harms the ability of Tarantino to benefit from his work. The Tarantino NFT case illustrates how the current regulatory system benefits middlemen instead of artists.

Overall, the current legal system regulating the art market is inefficient and does not effectively solve most of the problems in the traditional art market. IP law artificially establishes an owner to an original piece of art and artificially confers on the owner certain rights they can enforce through the judicial system. A court must enforce these rights through the threat of physical or monetary coercion by law enforcement officers. Copyright and trademark laws are tools that regulate the art market. Current legal mechanisms are impractical and not useful when applied to NFTs. Blockchain technology can better solve the art market regulation problems that copyright and trademark law address.

III. BLOCKCHAIN TECHNOLOGY SOLVES MOST ART MARKET PROBLEMS

Blockchain technology is a tool that can improve art market regulation by enabling more efficient and effective self-regulation. In the digital art market, code is law. Reliance on artificial legal enforcement mechanisms is unnecessary because users must follow the rules within smart contracts. The need for the threat of force or monetary coercion to enforce ownership or transfers is eliminated because the rules of the smart contracts make noncompliance impossible. The inherent characteristics of blockchain technology are solutions to traditional art market problems.

NFTs solve most of the problems in the art market without the expense and inefficiency of a centralized enforcement system. NFTs exist on the Ethereum blockchain which is a

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[61] Gabriel Ayuso, *BAYC Copyright Model*, TWITTER (Oct. 2, 2021), https://twitter.com/gabrielayuso/status/1444482868252532743.
[62] BoredApeYachtClub, *Bored Ape Yacht Club*, OPENSEA, https://opensea.io/collection/boredapeyachtclub.
[63] 9056D1, *Mutant Ape Yacht Club*, OPENSEA, https://opensea.io/collection/mutant-ape-yacht-club.
[64] *Id*.
[65] Tarantino NFTs, *The Tarantino NFT Collection*, https://tarantinonfts.com/; Frank Pallotta, *Miramax is suing Quentin Tarantino over 'Pulp Fiction' NFTs*, CNN BUSINESS (Nov. 17, 2021), https://www.cnn.com/2021/11/17/investing/quentin-tarantino-lawsuit-pulp-fiction-nfts/index.html.
[66] *Id*.
[67] *Id*.
[68] Eli Tan, *Quentin Tarantino Reaches Settlement with Miramax in 'Pulp Fiction' NFT Lawsuit*, COINDESK (Sep. 9, 2022), https://www.coindesk.com/business/2022/09/09/quentin-tarantino-reaches-settlement-with-miramax-in-pulp-fiction-nft-lawsuit/.

decentralized network that is similar to the better-known blockchain, Bitcoin.[69] NFTs are code that exists within smart contracts on Ethereum.[70] To own or transfer an NFT, users must interact with its smart contract.[71] Each smart contract is an automated process implemented by coders that "can add tremendous value and efficiency by minimizing effort, error, and risk."[72] A smart contract enables people to agree on a set of conditions that send instructions to a computer that performs a transaction.[73] Smart contracts are tamper-proof, verifiable, and trustless because they are decentralized—they do not rely on a third-party or middleman.[74] However, they are not technically a contract, in a legal sense, and they are not enforced by the judicial system.[75]

The digital artwork associated with an NFT is linked within the NFT's code. The NFT makes the image "a one-of-a-kind object in the world."[76] The image associated with an NFT is useful to represent the code and makes owning and trading NFTs fun for users.[77] However, the value of the NFT is contained in the code, not just the image. NFTs also derive some of their value from their scarcity. NFTs are "entirely revolutionary" because they "have made it possible to digitize scarcity."[78] Scarcity is enforced through smart contracts stating that no more than a certain amount of NFTs can ever be created. People get a "sense of fulfillment" from collecting NFTs because of their scarcity.[79] Photography prints illustrate NFT scarcity concepts. Photographers often release their photographs in a series of prints of the original image. Even though anybody can print the same photograph if it is accessible, the original prints sold by the photographer are the valuable, "real" artworks. Any other printed images may be identical, yet they are not worth much in comparison to the original prints. In the same way, the image that is attached to the NFT code is a unique artwork that is more valuable than copies of the digital image.

Because NFTs exist on the blockchain, they do not require optional participation of owners to track their provenance.[80] Rather, all NFT ownership and transfer information is automatically tracked from the time of its genesis on the blockchain.[81] The Ethereum blockchain ledger stores the token transfer information.[82] Anybody can access the transfer information of a token and independently verify that the token is legitimate by tracing its transfers back in time.[83]

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[69] Ethereum, *supra* note 53; Mitchell F. Chan, *Digital Zones of Immaterial Pictorial Sensibility*, BLUEPAPER 12 (Aug. 2017), https://ipfs.io/ipfs/QmcdKPjcJgYX2k7weqZLoKjHqB9tWxEV5oKBcPV6L8b5dD.
[70] Ethereum, *supra* note 54.
[71] *Id*.
[72] Deborah R. Gerhardt & David Thaw, *Bot Contracts*, 62 ARIZ. L. REV. 877, 879 (2020); Ethereum, *supra* note 53; Chan, *supra* note 69, at 12-13.
[73] Gerhardt & Thaw, *supra* note 72, at 878-79.
[74] Chan, *supra* note 69, at 12-13.
[75] Gerhardt & Thaw, *supra* note 72.
[76] Adam McBride, NFT APE, 18 (2021).
[77] *See* Jeff Lane & Kevin Warburton, *Legal Issues in the Booming Arts Industry – What You Need to Know*, LEXOLOGY (Jan. 28, 2021), https://www.lexology.com/library/detail.aspx?g=0d64c84b-a017-4a9e-9781-7a603f7aac20.
[78] McBride, *supra* note 76.
[79] *Id*. at 20.
[80] Although the actual code comprising NFTs exists entirely on the blockchain, many projects are incorporating in-real-life physical components. For example, when purchasing an NFT, the buyer also receives a t-shirt in the mail.
[81] Ethereum, *supra* note 53.
[82] *Id*.
[83] *Id*.

Furthermore, NFTs provide utility beyond their aesthetic appeal.[84] If a user has an NFT in their wallet on the blockchain, the NFT can act as a membership card to grant access to otherwise closed spaces.[85] To join certain Discords—online chat rooms where people in the NFT community discuss ideas—you must own an NFT from that community.[86] Also, having a profile picture (PFP) on Twitter that is an NFT is a status symbol in the NFT community.[87]

There are several categories of NFT projects on Ethereum that are valuable. NFTs that were coded on the blockchain in 2017 are some of the first NFT projects, making them relatively old. CryptoPunks, CryptoKitties, and Digital Zones of Immaterial Pictorial Sensibility are examples of 2017 NFTs. Just as the first generation of collectible items is the most valuable, these 2017 NFT projects are valuable. Now, there are thousands of NFT projects added on the blockchain each year, but the number of 2017 NFT projects will always be limited to the few dozen from the initial 2017 NFT time period, which makes them scarce and, therefore, valuable.

Generative blockchain art also utilizes scarcity to create value. Generative art's smart contracts create unique art for individual users.[88] The smart contract uses each user's hash—a unique string of numbers and letters—to randomly create an NFT.[89] Since each artwork produced from the smart contract is unique to each hash, the resulting image is unpredictable.[90] Some NFTs will have rare characteristics because the developer coded the smart contract to only assign that characteristic to a small number of NFTs.[91] The resulting NFTs with rare characteristics are the most valuable because of their scarcity.

NFT value is also generated from social consensus. Whatever people in society agree is valuable, has value. For example, U.S. Dollar bills are pieces of paper that hold value because people in society agree that they are valuable and will accept them as a form of payment. "As long as enough people agree that there is value to [NFTs], there is value."[92] NFT PFPs are valuable because they confer social status. Although PFPs derive some value from their aesthetic appeal, the real value is being able to verify that you own the unique NFT in your profile picture. Twitter now verifies NFT PFPs.[93] Once a user verifies that they have the NFT in their blockchain wallet, Twitter displays the user's PFP as a hexagon, rather than the usual circle.[94]

Blockchain technology and NFTs can solve most of the problems in the art market. NFTs eliminate the physical asset weaknesses inherent in the traditional art market. Blockchain's decentralized and open-access ledger provides near-perfect market information.

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[84] *See* Ron Jaradat, *The Utility NFT Classification Guide*, MEDIUM (Sep. 30, 2021), https://medium.com/liquiditeam/the-utility-nft-classification-guide-c4e4be55009e.
[85] *Id*.
[86] *Id*.
[87] *See* Despina Karpathiou, *Bragging Rights: Twitter Previews Verification Badge for NFT Profile Pics*, COINTELEGRAPH (Sep. 30, 2021), https://cointelegraph.com/news/bragging-rights-twitter-previews-verification-badge-for-nft-profile-pics.
[88] Brian Droitcour, *Generative Art and NFTs*, ART NEWS (Mar. 11, 2021), https://www.artnews.com/list/art-in-america/features/generative-art-and-nfts-1234586572/.
[89] *Id*.
[90] *Id*.
[91] *Id*.
[92] McBride, *supra* note 76, at 111.
[93] Will Gottsegen, *Twitter Launches NFT Profile Picture Verification*, COINDESK (Jan. 20, 2022), https://www.coindesk.com/business/2022/01/20/twitter-launches-nft-profile-picture-verification/.
[94] *Id*.

The platforms built on top of Ethereum adopt the NFT community's values, reducing the effect of middlemen on transfers in the market. Overall, blockchain technology addresses most of the problems in the art market, making it a tool to increase efficiency and benefit market participants more than the current art market regulatory system.

A. Digital Asset Strengths

Digital art on the blockchain has characteristics that make it more secure than physical art. NFTs cannot be duplicated, copied, or forged without easy detection.[95] Even if a user saves the image from an NFT, any user can check the blockchain's immutable transaction ledger to verify the authenticity of the NFT.[96] To simplify this verification process for people who do not understand computer code, centralized sources check and verify NFTs.[97] Furthermore, digital art is secure. NFTs exist forever and cannot be destroyed or stolen.[98] Digital art does not need to be kept in special conditions or conserved because it cannot be damaged. Digital art has no transportation costs since transfers are completed entirely online. Theft is impossible unless the owner loses or unintentionally gives away their private key. The digital form of NFTs solves many problems and impracticalities created by the physical form of art in the traditional art market.

The digital form of NFTs significantly reduces the financial burden of owning and transferring physical artworks. With digital art, paying for storage, transportation, and conservation is eliminated. Insurance for damage or theft of digital artwork is also unnecessary. Digital art can be transferred across national borders with ease and without import and export processes and tariffs. Furthermore, paying for authentications and appraisals are unnecessary, since the information provided by these experts is easily accessible on the blockchain to anyone with a computer.

Although most financial burdens from the physical art market are reduced, two remain: transaction costs and security costs. First, Ethereum charges gas fees for the block space required to execute a transaction on the blockchain.[99] While high gas fees reduce liquidity in the market for lower-priced items, Ethereum developers have launched Ethereum 2.0 which reduces gas fees by scaling the blockchain to enable more transactions at a lower cost.[100] Ethereum 2.0 greatly reduced gas prices and the associated environmental impact when it was implemented in 2022.[101] Second, users can take additional measures to ensure the security of digital art on the blockchain. If an owner wishes to protect their NFTs, they can purchase a hardware wallet to secure their digital assets. For example, a Ledger hardware wallet costs around $120 and provides a secondary layer of protection from theft.[102] Overall, the practical and financial burdens of owning and transacting NFTs are much lower than in the traditional art market.

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[95] *See* Ethereum, *supra* note 54.
[96] *Id*.
[97] For example, OpenSea and Twitter.
[98] Even if the thousands of computers that comprise the blockchain stopped working, there are the equivalent of screenshots of the blockchain ledger that would enable users to recreate it perfectly, without losing their property.
[99] Vitalik Buterin, *Ethereum Whitepaper*, ETHEREUM, (2013) https://ethereum.org/en/whitepaper/.
[100] ETHEREUM (Ethereum 2.0 will change the way that transactions occur on the blockchain from proof of work to proof of stake (POS).) https://ethereum.org/en/eth2/.
[101] When Ethereum moves to POS, the negative environmental impact of the technology will drop by 99.95%.
[102] LEDGER, https://www.ledger.com/.

B. Transparent Information

Blockchains' decentralized ledgers provide nearly perfect information transparency for an efficient art market. Blockchains enable true, verifiable, universally recognized, trustless digital ownership and transfers.[103] NFT transfers cannot take place without recording the information of the owner, buyer, item, time, and price on the blockchain, resulting in nearly perfect provenance.[104] Blockchains eliminate most of the transfer inefficiencies that arise because of anonymity and secrecy in the traditional art market while maintaining anonymity in the NFT art market. Blockchain technology's decentralized and transparent ledger solves the authenticity and provenance issues that exist in the traditional art market.

Blockchain Art Collective exemplifies how blockchain technology improves provenance efforts.[105] The Blockchain Art Collective attempts to solve provenance and authenticity issues by providing a sticker made of tamper-evident material that owners attach to physical pieces of art.[106] By registering the sticker with the piece of art on the blockchain, a person confirms the artwork's authenticity.[107] Once registered on the blockchain, the physical piece of art is forever tied to its online identity which cannot be altered.[108] Every subsequent transfer of the artwork can be recorded on the blockchain, providing a secure and transparent record of provenance.[109] An owner can purchase the Blockchain Art Collective's starter kit and instructions on their website for $20.[110] The Blockchain Art Collective provides the tools to solve provenance and authentication issues for physical artworks, but its effectiveness is limited by optional participation in record keeping and placing a physical sticker on an artwork. However, Blockchain Art Collective takes a step in the right direction away from traditional record keeping and toward decentralized and secure blockchains that provide better provenance information.

Transparent provenance provides extensive price information in the NFT market. While traditional art market transactions occur behind closed doors, digital art transactions happen transparently on blockchain platforms.[111] On OpenSea, buyers and sellers can filter NFTs by price and can compare the listed prices and most recent sale prices of similar NFTs to assess fair prices for listing and buying.[112] OpenSea's marketplace is much more transparent and efficient than traditional art marketplaces because of the low transaction cost to find price information.

C. Efficient Transfers

Transactions on blockchains are more efficient and benefit individual actors more than the traditional art market by reducing the power of middlemen.[113] Blockchains provide the capability for anonymous peer-to-peer transfers and intermediaries in the NFT community have different values than middlemen in the traditional art market. Competition between platforms

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[103] *See* Ethereum, *supra* note 53.
[104] *Id*.
[105] BLOCKCHAIN ART COLLECTIVE, https://blockchainartcollective.com/.
[106] *Id*.
[107] *Id*.
[108] *Id*.
[109] *Id*.
[110] *Id*.
[111] OPENSEA, https://opensea.io/.
[112] While traditional art market transactions occur behind closed doors, digital art transactions happen transparently on blockchain platforms like OpenSea.
[113] McBride, *supra* note 76, at 19.

to provide an NFT marketplace and the community value to charge a 2.5% take rate, keeps intermediary fees low.[114]

For example, OpenSea offers a huge increase in efficiency and decreased costs for transactions of art compared to the traditional art market. OpenSea speeds up NFT transfer negotiations. On OpenSea, owners of NFTs display a gallery of their artworks and can list their NFTs for sale at any price or keep their NFT delisted, meaning it cannot be purchased.[115] Buyers can sort through different NFT projects to find one they want to buy.[116] A buyer can purchase the NFT at the listed price or can put an offer on a listed or delisted NFT.[117] The owner can accept or reject that offer.[118] By cutting out art dealers, the OpenSea platform enables efficient negotiation and transfers of NFTs.

OpenSea also increases financial benefits to NFT artists. In the traditional art market, for a typical sale, Sotheby's takes 10% of the price of the item sold at auction.[119] Additionally, the buyer must pay Sotheby's 25% of the price of the item they bought in addition to the full price of the item.[120] Altogether, the owner selling artwork at Sotheby's gets 90% of the purchase price, the buyer pays 125% of the purchase price, and Sotheby's receives 35% of the purchase price. In contrast, OpenSea takes only 2.5% of the purchase price.[121] OpenSea allows NFT artists to set up to a 10% royalty fee for each subsequent transaction of their NFT on the secondary market, enabling artists to continually benefit as their art appreciates over time.[122] The NFT artist gets 97.5% of the purchase price *and* up to 10% of all future sales. The buyer pays 100% of the purchase price and OpenSea receives 2.5% of the purchase price. OpenSea's more efficient marketplace significantly reduces the high take rate of the middleman and transfers it to the NFT artist.

Blockchains also present unique transfer capabilities that are practically impossible in the traditional art world, such as airdrops. Since wallet addresses are publicly available, project creators can send an "airdrop" of NFTs to their following or a giveaway winner. Themanymatts project created another unique transfer method by allowing people to scan a near-field communication (NFC) chip, which enables wireless communication between devices, that the project creator, Matt, had surgically embedded in his hand.[123] When scanned with a phone, the NFC chip transfers a manymatt NFT to the phone.[124] Additionally, if a person finds a manymatt sticker, scans it, and direct messages it to Matt on Twitter, he will airdrop them an

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[114] OPENSEA, *supra* note 112.
[115] *Id*.
[116] *Id*.
[117] *Id*.
[118] *Id*.
[119] SOTHEBYS, *Glossary, Seller's Commission*, https://www.sothebys.com/en/glossary#:~:text=For%20most%20auctions%2C%20including%20those,10%25%20of%20the%20hammer%20price.
[120] SOTHEBYS, *Buyer's Premium Chart* (Feb. 1, 2021), https://www.sothebys.com/1-february-2021-buyers-premium.pdf. However, this percentage decreases to 20% for items sold for more than $400,000, and to 13.9% for items sold for more than $4,000,000. *Id*.
[121] OPENSEA, What are OpenSea's fees? (November 2021), https://support.opensea.io/hc/en-us/articles/1500011590241-What-are-OpenSea-s-fees-.
[122] *Id*.
[123] THEMANYMATTS, https://themanymatts.lol/; LIFE AUGMENTED, *What is an NFC Chip?,* https://www.st.com/content/st_com/en/support/learning/st25-education/nfc-chip.html.
[124] THEMANYMATTS, *supra* note 124.

NFT.[125] Now his followers try to find him or his stickers in the physical world, adding a unique in-person interaction to his project.

Blockchain and digital art solve most problems that arise in the traditional art market. Blockchain technology presents a useful tool for the regulation of ownership and transactions in the art market. NFT transactions on the blockchain reduce transaction costs and are extremely efficient. To further illustrate NFTs' beneficial concepts, this paper next analyzes a traditional art project by Yves Klein that was the precursor to the first NFT which explores the concept of ownership of an intangible asset. Finally, the paper will explore Mitchell Chan's recreation of Yves Klein's project in digital form on Ethereum.

IV. THE ZONES OF IMMATERIAL PICTORIAL SENSIBILITY

Yves Klein conceptualized the first NFT in 1958 in Paris, France.[126] The Zones of Immaterial Pictorial Sensibility (Zones) project by Klein illustrates the concept of NFTs, confronting immateriality, concepts of ownership, and the underlying motivations in the NFT market.

Earlier in his career, Klein became famous for his "monochrome paintings of deep, hypnotic blue."[127] He registered the color with the National Institute of Industrial Property in France as "International Klein Blue."[128] On April 28, 1958—Klein's 30th birthday—he held an exhibition at the Galerie Iris Clert in Paris which around 3,000 people attended.[129] The exhibition experience began when attendees saw the windows of the Galerie Iris Clert painted blue.[130] Next, attendees walked inside the gallery by going through a blue curtain, seen below.[131]

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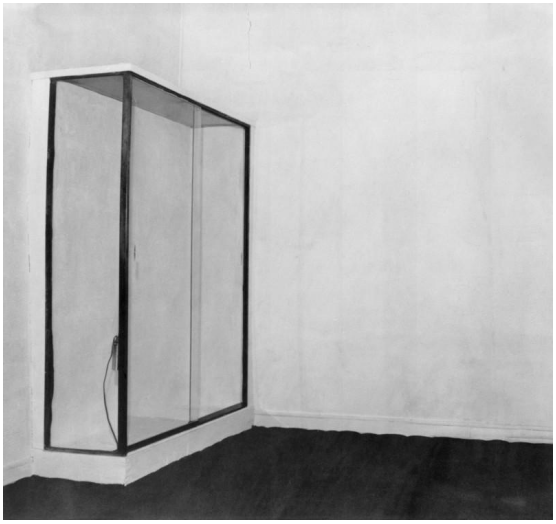
[125] *Id*.
[126] Chan, *supra* note 69, at 2.
[127] *Id*. at 2.
[128] *Id*. at 5.
[129] *Id*. at 5-6.
[130] *Id*.
[131] *Id*.; *Entrance of the Gelerie Iris Clert during the opening of the "Void" exhibition*, YVESKLEIN.COM (Apr. 28, 1958), https://www.yvesklein.com/en/ressources/index?sb=_created&sd=desc&s[]=22#/en/ressources/view/photo/458/entrance-of-the-galerie-iris-clert-during-the-opening-of-the-void-exhibition?s[]=22&sb=_created&sd=desc.

Once inside, they were handed a blue cocktail before entering the exhibit of the Zones.[132] There, attendees were confronted with a "small, empty white room" displaying Klein's immaterial artwork, seen below.[133]

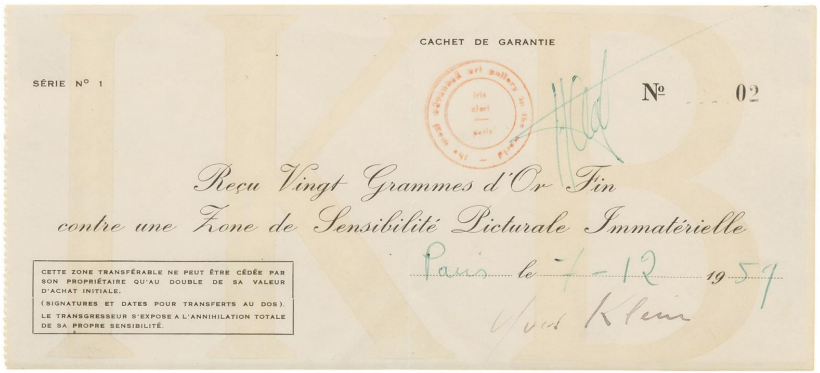


The Zones consisted of an empty space that was "imbued with the sensibility" of International Klein Blue.[134] This art exhibition explored the "relationship between experience and material[ity]."[135] Klein sought to transcend "the practical and sensorial limitations of the physical form" by manifesting his artwork in an immaterial form.[136] He believed that an art experience could be "created and communicated" without using physical materials.[137] With the Zones project, Klein claimed to "have overcome the problematics of art."[138] Klein argued

[132] Chan, *supra* note 69, at 5-6.
[133] *Id.*; *The "Immaterial Pictural Sensibility"*, YVESKLEIN.COM (Apr. 28, 1958), https://www.yvesklein.com/en/ressources/index?sb=_created&sd=desc&s[]=22#/en/ressources/view/article/11/the-immaterial-pictural-sensibility?s[]=22&sb=_created&sd=desc.
[134] Chan, *supra* note 69, at 3.
[135] *Id.*
[136] *Id.* at 5.
[137] *Id.* at 3.
[138] *Id.* at 2 (quoting Yves Klein, Preparation and Presentation of the Exhibition on April 28, 1958).

that "the immaterialization of the invisible and intangible canvas . . . act[s] upon the sensible vehicles or bodies of the gallery visitors with much more effectiveness than ordinary, physical, representational pictures."[139] The presentation of different forms of blue as attendees entered the exhibit represented the transition from experiencing the color blue "in its material state to its immaterial state."[140] International Klein Blue went from physical paint to fabric dye, to liquid, and then to the "metaphysical sensibility," which completed the "progression of immaterialization."[141]

Purchasing a Zone "was a work of performance art in itself."[142] In exchange for pure gold, Klein gave buyers an immaterial Zone and a paper receipt, out of a receipt book, as proof of the transaction, seen below.[143]



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[139] *Id*. at 16 (quoting Yves Klein).
[140] *Id*.
[141] *Id*. at 18.
[142] *Id*. at 7.
[143] *Id*. at 2, 7, 23 (citing Yves Klein, Ritual for the Relinquishment of the Immaterial Pictorial Sensitivity Zones, 1957-1959); *Receipt Book for the Zones of Immaterial Pictorial Sensibility. Series 5.*, YVESKLEIN.COM (1959), https://www.yvesklein.com/en/ressources/index?s[]=6&sb=_created&sd=desc&s[]=21#/en/ressources/view/artwork/16616/receipt-book-for-the-zones-of-immaterial-pictorial-sensibility-series-5?s[]=6&s[]=21&sb=_created&sd=desc; *Receipt to Jacques Kugel for transfert of a Zone of Immaterial Pictorial Sensibility. Series n°1, Zone n°02*, YVESKLEIN.COM (Dec. 7, 1959), https://www.yvesklein.com/en/ressources/index?s[]=6&sb=_created&sd=desc&s[]=21#/en/ressources/view/artwork/16617/receipt-to-jacques-kugel-for-transfert-of-a-zone-of-ssimmaterial-pictorial-sensibility-series-n1-zone-n02?s[]=6&s[]=21&sb=_created&sd=desc.

Klein offered 101 Zones for sale in eight series.[144] The first, Series 0, contained thirty-one receipts.[145] The following seven, Series 1-7, each had ten more receipts.[146] Series 1 Zones were priced at twenty grams of gold, worth about $25 in 1958 and $1,100 today.[147] Each subsequent series released doubled the price of the Zones offered for sale.[148] Klein clarified that the Zones are transferable and that he expected the Zones to be sold for no less than double the original price on the secondary market.[149]

Once the gold was exchanged for the receipt, the buyer owned the Zone but did *not* own the "authentic immaterial value" of the artwork.[150] According to Klein, for the buyer to truly own the artwork, the sensibility of International Klein Blue had to become part of their spirit.[151] To attain true immaterial ownership, Klein offered buyers the opportunity to engage in a ritual that took place on the Pont au Double bridge over the River Seine in Paris.[152] The beginning of a ritual that occurred on February 10, 1962, transferring immaterial ownership to Michael Blankfort can be seen below.[153]

To complete the ritual, the buyer would burn the receipt for their Zone.[154] In doing so, the buyer destroyed their material ownership of the Zone by destroying the evidence that they owned the Zone. Then, Klein would throw half of the gold the buyer had paid to purchase the

144 Chan, *supra* note 69, at 24-25.
145 *Id*.
146 *Id*.
147 *Id*.
148 *Id*.
149 *Id*. at 23, 31 (citing Yves Klein, Ritual for the Relinquishment of the Immaterial Pictorial Sensitivity Zones, 1957-1959).
150 *Id*. at 7.
151 *Id*.
152 *Id*.
153 *Transfer of a Zone of Immaterial Pictorial Sensibility to Michael Blankfort*, YVESKLEIN.COM (1962), https://www.yvesklein.com/en/ressources/index?s[]=6&sb=_created&sd=desc&s[]=21#/en/ressources/view/photo/3575/transfer-of-a-zone-of-ssimmaterial-pictorial-sensibility-to-michael-blankfort?s[]=6&s[]=21&sb=_created&sd=desc.
154 Chan, *supra* note 69, at 7.

Zone into the River Seine.[155] Simultaneous performance of these steps in the ritual transferring immaterial ownership to Dino Buzzati on January 26, 1962 can be seen below.[156]

After the ritual was complete, the buyer truly owned the artwork and could not transfer the work further.[157] Klein performed this ritual at least three times with buyers.[158] Klein kept detailed notes on the rituals, exemplified by the image below of his notebook, showing the ritual transferring immaterial ownership to Michael Blankfort.[159]

[155] *Id*. at 7-8.
[156] *Transfer of a Zone of Immaterial Pictorial Sensibility to Dino Buzzati. Series n°1, Zone 05.*, YVESKLEIN.COM (Jan. 26, 1962), https://www.yvesklein.com/en/ressources/index?s[]=6&sb=_created&sd=desc&s[]=21#/en/ressources/view/artwork/941/transfer-of-a-zone-of-ssimmaterial-pictorial-sensibility-to-dino-buzzati-series-n1-zone-05?s[]=6&s[]=21&sb=_created&sd=desc.
[157] Chan, *supra* note 69, at 7, 33.
[158] *Id*. at 8.
[159] *Transfer of a "Zone of Immaterial Pictorial Sensibility" to Michael Blankfort, Pont au Double, Paris*, YVESKLEIN.COM (Feb. 10, 1962), https://www.yvesklein.com/en/ressources/index?s[]=6&sb=_created&sd=desc&s[]=21#/en/ressources/view/artwork/640/transfer-of-a-zone-of-ssimmaterial-pictorial-sensibility-to-michael-blankfort-pont-au-double-paris?s[]=6&s[]=21&sb=_created&sd=desc.

Klein's ritual contemplated issues surrounding the conceptualization of ownership:

> Klein distinguished between two related but fundamentally different types of ownership: the absolute ownership of the thing, and the legal ownership of the deed to the thing. In different terms, we could say he separated the ownership of spiritual use value and material exchange value. In Klein's project, it is impossible for a collector to have both.[160]

Klein's ritual made the absolute ownership of artwork mutually exclusive from its legal ownership. Buyers could not own both the receipt that had value on the art market and the true sensibility of the artwork at the same time.

The traditional art community regards Klein's Zones project as "an important early example of conceptual art that challenged notions of materiality, ownership, and the rituals of exchange," and in the blockchain art community, it is considered the inception of the NFT.[161] There are many similarities between Klein's Zones project and NFTs. He conceptualized an idea many decades before its time. The immaterial ownership that Klein's work sought to achieve embodies the form of NFTs as digital, rather than physical art. Klein's ritual has an equivalent function on the blockchain where users can "burn" tokens, deleting the code that comprises a token.[162] Additionally, Klein's release of the project in series, starting with Series 0, is ahead of its time. NFT projects are often released in series starting at zero because computer code begins counting at zero instead of one. Klein's series established scarcity in an intangible object, enforced by Klein through the receipts he issued, just as NFTs establish scarcity in digital images through a smart contract. Also, the price schedule of doubling the price for each subsequent series release is a commonly used pricing mechanism for NFT

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160 Chan, *supra* note 69, at 3.
161 *Id*.
162 CoinMarketCap, *Glossary, Burn/Burned* https://coinmarketcap.com/alexandria/glossary/burned.

projects, meant to reward those who support the project early. In numerous ways, Klein's project was extremely futuristic and is very similar to many NFT projects on Ethereum.

Yves Klein's Zones of Immaterial Pictorial Sensibility were recreated by an artist, Mitchell Chan, in an NFT project from 2017 called Digital Zones of Immaterial Pictorial Sensibility (Digital Zones).[163] Chan's Digital Zones project shows how blockchain technology can be used as a tool to improve certain aspects of traditional artworks and achieve artistic goals that are not possible in the traditional art market.

Chan sold Digital Zones as Ethereum tokens called IKBs, which stands for International Klein Blue. Chan's goal was "to create digital reproductions of Yves Klein artworks—specifically, empty digital spaces imbued with an immaterial artistic sensibility—that are then sold as a[] [non-fungible] token on the Ethereum blockchain."[164] Chan imbued the Digital Zones with the color blue seen on the northern coast of Prince Edward Island in Canada, on the Atlantic Ocean horizon on a clear day about three hours before twilight.[165]

While the Zones and Digital Zones projects are very similar, Chan's Digital Zones project takes the immateriality that Klein strived for a step further. The Digital Zones exist in a digital space rather than a physical gallery like the Galerie Iris Clert.[166] The digital space is imbued with the pictorial sensibility like Klein's exhibit.[167] The project was originally presented on a website with a blank screen, seen below.[168]

The blank screen scrolls down for 101 screen lengths, representing the 101 Digital Zones, just as there were 101 Zones.[169]

Chan's Digital Zones can only be purchased using Ethereum's token, Ether, which is digital.[170] Using Ether to pay for Digital Zones further immaterializes the project beyond what

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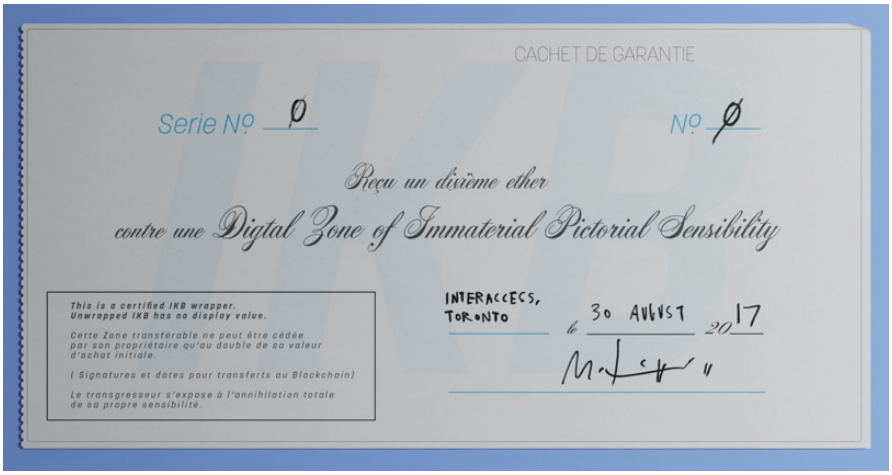
[163] Chan, *supra* note 69, at 3.
[164] *Id*. at cover page.
[165] *Id*. at 19.
[166] *Id*.
[167] *Id*.
[168] Mitchell F. Chan, *Presentation of the* Digital Zones of Immaterial Pictorial Sensibility*, with hardware wallet*, DIGITAL ZONES OF IMMATERIAL PICTORIAL SENSIBILITY BLUEPAPER (2017), https://ipfs.io/ipfs/QmcdKPjcJgYX2k7weqZLoKjHqB9tWxEV5oKBcPV6L8b5dD.
[169] Chan, *supra* note 69, at 20.
[170] *Id*. at 26, 29.

Klein accomplished with his Zones project. The pricing mechanism for the Digital Zones recreates Klein's gold pricing system with Ether.[171] Just like Klein released Zones in series, Chan released eight series of Digital Zones, with thirty-one Digital Zones in the first series, and ten more Digital Zones in each subsequent series.[172] He sold the first series of IKBs for 0.1 ETH which was worth about $30 in 2017 and $120 today.[173] Following Klein's example, Chan expects IKBs to be sold on the secondary market at no less than double their original purchase price.[174]

The transfer of a Digital Zone to a buyer is openly documented on the Ethereum blockchain rather than with a receipt like Klein used.[175] The transaction is digital and has no physical, material aspect. However, Chan included an image of a receipt that is associated with each IKB NFT, seen below.[176]



Chan also recreated Klein's ritual in the Digital Zones project. The IKB smart contract enables a buyer of a Digital Zone to call a function that performs the ritual to become a true immaterial owner of the IKB.[177] When the ritual function is called, the IKB is burned and half of the ETH the buyer used to buy the IKB is given to a miner of the block on which the ritual is called.[178] However, because of the perfect provenance on the blockchain, the true immaterial owner of the burned IKB can prove they own it because the blockchain ledger records when the burning function is called. Chan's ritual is performed entirely online and without Chan's presence, although he offers to meet buyers in person to perform the ritual near a body of water.[179] Chan recreates the mutually exclusive ownership dilemma that Klein's ritual established, illustrating that market or legal ownership is transferable but true immaterial ownership is not.

By using the Ethereum blockchain for his project, Chan more closely achieved the immateriality that Klein desired. For example, Klein wanted buyers to be able to buy Zones from him anonymously, but that could not be easily accomplished before the existence of

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171 *Id*.
172 *Id*. at 28.
173 *Id*. at 29.
174 *Id*.
175 *Id*. at 26-27.
176 *Id*.; Mitchell F. Chan (@mitchellfchan), *IKB Cachet de Garantie*, Twitter (Apr. 28, 2021, 10:59 AM), https://twitter.com/mitchellfchan/status/1387421212960305154?lang=en.
177 Chan, *supra* note 69, at 29-30.
178 *Id*. at 30 (Chan burned a Serios 0 Digital Zone).
179 *Id*.

blockchain technology.[180] Digital Zones are always purchased anonymously since blockchains have inherently anonymous users. Furthermore, Ethereum transfers Digital Zones efficiently because users can make and accept offers, payments, and transfers online. For every subsequent sale from an owner to a buyer on the secondary market, Chan receives 10% of the sale price.[181] Chan uses the blockchain as an enforcement mechanism to collect a royalty fee that continually rewards him as the value of his work increases over time. The Digital Zones project also improves on the Zones project because Chan's smart contract forever limits the number of IKB NFTs to 101 pieces that cannot be forged.[182] The Digital Zones project illustrates the numerous ways that NFTs improve the art market through immateriality, pristine provenance records and transfer efficiencies.

CONCLUSION

There are many problems in the traditional art market. IP law attempts to address some of these problems such as ownership and transfer issues. However, blockchain technology can solve more art market problems by using digital assets, with transparent information, that can be efficiently transferred between market participants. NFTs empower artists and individual owners, revolutionizing the current art market system.[183] Individuals can use NFTs to invest in young artists in return for a piece of their future earnings. Artists can sell NFTs directly to their fans and generate recurring revenue by setting up subscription models or collecting royalty fees on secondary sales without ceding undue amounts of power, ownership rights, or fees to a middleman.[184] NFTs revolutionize the art market and they can revolutionize other ownership systems in society, as well.[185]

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[180] *Id*.
[181] *Id*.
[182] *Id*. at 26.
[183] McBride, *supra* note 76, at 100-101.
[184] *Id*. at 105.
[185] *See id*. at 19 (suggesting that NFTs will overhaul the current music industry).

ARTIFICIAL INTELLIGENCE (AI) IN SCIENCE: IS THE SCIENTIST OR AI LIABLE WHEN A BELIEVER'S HUMAN RIGHTS ARE VIOLATED?

Judith Massia*

Abstract: Artificial Intelligence (AI) may appear to be one of the newest and most talked about areas of science amidst the current 4th Industrial Revolution (4IR), but it has, in fact, been under development since the beginning of time, from Arabic Alchemy to (Jewish) Talmudic scholar Rabbi Judah Loew ben Bezalel's 16th century interpretation of Golem. More recently discussed only in the realm of science fiction movies, AI has now comfortably and securely entered the highest circles of academia, industry, and government. However, experts have only just begun to look at the impact of AI on human rights violations and God. As AI and technology become integral parts of our working lives, this essay aims to answer the question of whether the scientist or AI will be held liable when a Believer's human rights are violated (physical and psychological violations) and whether the European Union's Directive 85/374/EEC legislation is adequate in tackling this currently very niche issue.

Keywords: Artificial Intelligence (AI); Religion; Shintoism

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INTRODUCTION

Although the concept of Artificial Intelligence (AI) seems central to the zeitgeist of the 4th Industrial Revolution (4IR), it has, in fact, been in development since the beginning of human recorded time. From religious traditions of Shintoism[1] (an ancient indigenous Japanese religion) to Arabic alchemy[2] to Talmudic scholar Rabbi Judah Loew ben Bezalel's 16th century interpretation of Golem (a creature made of clay who later gains life),[3] AI has been pondered through ages. Yet, no generally accepted definition exists.[4] In its most basic sense, AI refers to "the ability of a machine to perform cognitive functions we associate with human minds, such as perceiving, reasoning, learning, interacting with the environment, problem solving, and even exercising creativity."[5] By giving life to non-living things, people and religions have long explored the role of non-living entities in relation to human beings. (Even Mary Shelley's infamous 1818 novel, *Frankenstein* explored the dangers of giving non-living things human life forms through galvanism[6] and alchemy – the AI of their day). The phrase "4IR" was coined by Professor Klaus Schwab to describe the fourth stage of technological progress, of which we are now in the middle.[7] The 4IR consists of automation, robotics, big data, machine learning and AI. And it's in the field of science where AI is making the most prominent and noticeable technological advances. AI technology now makes life for the visual impaired easier with tools for image recognition helping people better navigate both the Internet and the real world.[8] AI plays varied functions in these applications. AI systems can be *descriptive* as they tell you what happened; *diagnostic* as they tell you why something happened; *predictive* as they forecast what will (statistically) happen; and *prescriptive* in being capable of performing actual decision-making and implementation.[9]

It has become trite to consistently discuss whether AI is "good" for society or not.[10] Good or bad, AI is here to stay, and we must now find legal solutions (not just have legal discussions) on how to solve the very real legal and ethical problems AI brings with. Thankfully, AI's legal liability conversation has now entered the highest circles of academia, industry and government. AI legal cases are currently thin on the ground (non-existent in most countries)[11] so for the moment, we must rely on international and domestic law, treaties, think tanks and government-backed research to find solutions. Experts are now also beginning to

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[1] THE CAMBRIDGE COMPANION TO MODERN JAPANESE CULTURE, 5 (Yoshio Sugimoto ed., 1 ed. 2009).

[2] In the ninth century, Arabic alchemists became interested in producing not only metals and minerals, but also artificially creating plants, animals, and even people. These practices, known as *Takwin*, influenced European alchemy and science. See ABŪ AL-QĀSIM AL-`IRĀQĪ (D. C. 1280), THE SOURCES OF TRUTHS AND THE EXPLICATION OF PATHS (`UYŪN AL-ḤAQĀ'IQ WA ĪḌĀḤ AL-ṬARĀ'IQ).

[3] Edan Dekel & David Gantt Gurley, *How the Golem Came to Prague*, 103 THE JEWISH QUARTERLY REVIEW 241 (2013).

[4] Iria Guiffrida, *Liability for AI Decision-Making: Some Legal and Ethical Considerations*, 88 FORDHAM LAW REVIEW 439, 441 (2019).

[5] *Id.*

[6] Generation of electric current by chemical action

[7] https://www.weforum.org/about/the-fourth-industrial-revolution-by-klaus-schwab (last visited Feb. 22, 2023)

[8] *Id.* at 14.

[9] Guiffrida, *supra* note 4.

[10] Tamas Cser, *Is AI Good for Society?—The Good, The Bad & The Ugly* (Dec 4, 2018) https://www.functionize.com/blog/ai-in-society-the-good-bad-and-ugly/ (last visited Nov. 24, 2022); Forbes Technology Council, *14 Ways AI Will Benefit Or Harm Society* (Mar 1, 2018) https://www.forbes.com/sites/forbestechcouncil/2018/03/01/14-ways-ai-will-benefit-or-harm-society/?sh=1c5ad2784ef0 (last visited Nov. 24, 2022); Samuel Fosso Wamba et al., *Are we preparing for a good AI society? A bibliometric review and research agenda*, 164 TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 120482 (2021).

[11] Numbers countries including all 54 African countries, India, Russia etc.

look at the impact of AI on human rights (but not yet its relationship with God and a Believer). International human rights treaties, such as the European Convention on Human Rights (ECHR) (1953) (which is interpreted into domestic law, such as England and Wales' Human Rights Act (1998)) lay down obligations which their signatories are bound to respect and fulfil; accordingly, member states must refrain from interfering with rights and take positive actions to fulfil their enjoyment. Whilst none of the conventions currently explicitly apply or mention "AI or machine learning", their broad and general scope would cover most of the issues and challenges identified.[12] Human rights is a broad term which encompasses family life, private life, religion, sexual orientation, etc.; nonetheless, this essay will steer towards physical and psychological human rights violations. As AI and technology become integral parts of our working lives, this essay aims to answer the question of whether the scientist or AI form will be held liable when a Believer's[13] human rights are violated.

I. IS THE SCIENTIST OR AI LIABLE?

With the aforementioned technological advances, AI raises unprecedented ethical challenges for both the legal and scientific worlds (and at their intersection.) The current answer is that there is typically a "shared" or "distributed" responsibility between robot designers, engineers, programmers, manufacturers, investors, sellers, and users;[14] none of these agents can be indicated as the ultimate source of action.[15] Liability issues around the use of AI could be addressed under the purview of civil or criminal liability. Author J.K.C Kingston[16] discusses AI and legal liability—both whether criminal liability could ever apply, to whom it might apply, and, under (tort) law, whether an AI program is a product that is subject to product design legislation (product liability, e.g., in cases of design or manufacturing failures) or a service to which the tort of negligence applies.[17]

This is an interesting separation because under current laws, an AI robot cannot commit a crime, first and foremost because it's not a legal person,[18] and secondly because for a crime to be committed, there needs to be two factors present: a*ctus reas* and *mens rea.*[19] When an AI robot kills someone, the *actus reas* (the action) can be easily proved, but the *mens rea* (the thought/intention) of the AI robot is harder to prove. Additionally, even if all these hurdles were overcome and the AI robot was arrested (as an AI robot was recently in Switzerland)[20] and subsequently charged and imprisoned, what would the judicial and rehabilitation objectives

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[12] Rowena Rodrigues, *Legal and human rights issues of AI: Gaps, Challenges and Vulnerabilities*, 4 JOURNAL OF RESPONSIBLE TECHNOLOGY 100005, 4 (2020).

[13] A 'Believer' in this essay is refers to an individual that follows any religious denomination

[14] https://www.europarl.europa.eu/RegData/etudes/STUD/2020/634452/EPRS_STU(2020)634452_EN.pdf (last visited Feb. 22, 2023).

[15] *Id.* at 6.

[16] J. K. C. Kingston, *Artificial Intelligence and Legal Liability*, *in* RESEARCH AND DEVELOPMENT IN INTELLIGENT SYSTEMS XXXIII 269 (Max Bramer & Miltos Petridis eds., 2016), http://link.springer.com/10.1007/978-3-319-47175-4_20 (last visited Feb. 22, 2023).

[17] Rodrigues, *supra* note 13, at 6.

[18] Ugo Pagallo, *Vital, Sophia, and Co.—The Quest for the Legal Personhood of Robots*, 9 INFORMATION 230, 1 (2018).

[19] *Actus Reas*—a guilty act, and *Mens Rea*—a guilty mind. See LOUISE TAYLOR, ELLIOT & QUINN'S CRIMINAL LAW 13 (12th ed. 2018).

[20] Swiss Police Release Robot That Bought Ecstasy Online, THE GUARDIAN, Apr. 22, 2015, https://www.theguardian.com/world/2015/apr/22/swiss-police-release-robot-random-darknet-shopper-ecstasy-deep-web (last visited Dec. 3, 2021).

be of imprisoning an autonomous machine that does not age, feel remorse or miss its loved ones?[21]

Shortcomings associated with shared responsibility are compounded by the lack of algorithmic transparency, a significant issue at the forefront of legal discussions on AI. Author Cath states that given the proliferation of AI in high-risk areas, "pressure is mounting to design and govern AI to be accountable, fair and transparent."[22]The lack of algorithmic transparency is problematic in many areas; for example, people who were denied jobs, refused loans, put on no-fly lists, or denied benefits without knowing "why that happened other than the decision was processed through some software."[23] Accessibility to information about the functionality of algorithms is often intentionally poor due to commercial competition and intellectual property protection and this barrier only exacerbates the problem.[24]

However, the idealistic answer of a "shared" or "distributed" responsibility (which falls under Directive 85/374/EEC) is insufficient. That is to say that Directive 85/374/EEC *legislation is inadequate in terms of resolving this issue.* One reason is that the legislation creates its own problem: it dilutes the notion of responsibility altogether. If everybody has a part in the total responsibility, no one is fully responsible;[25] therefore, avoiding the potential paralyzing difficulties in attributing responsibility is a major challenge where the ethics and legal liability of AI are concerned.[26]

II. ALTERNATIVE SOLUTIONS

To avoid the current potential lack of responsibility that scientist face when it comes to scientific innovations in regards (and before any cases reach the courts), lawmakers and government advisers have come up with various solutions. One solution is to develop techniques to anticipate the impacts of robotic development as much as possible[27] and subsequently implement legislation to deal with issues when they arise. Another solution put forward is to deal carefully with the inevitable occurrence of unexpected implications by considering the societal introduction of AI technologies as a 'social experiment' that needs to be conducted with great care,[28] and thus implement legislation to protect society given the aforementioned social experiment basis. The European Parliament released a draft report in 2016[29] highlighting civil rules on AI. The report confirmed that under current rules, AI cannot be held liable – any issues that arise have to be traced back to a human.[30] The report did mention Directive 85/374/EEC as the only EU legal legislation that in any way references 'damage' done by AI, but the report highlighted that this directive is inadequate as it deals with the robot as a product (such as a TV or kettle) and does not deal with the advanced human

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[21] We Could Soon Face a Robot Crimewave … The Law Needs to Be Ready, THE CONVERSATION, Apr. 11, 2017, https://theconversation.com/we-could-soon-face-a-robot-crimewave-the-law-needs-to-be-ready-75276 (last visited Dec. 3, 2021).
[22] Corinne Cath, *Governing Artificial Intelligence: Ethical, Legal and Technical Opportunities and Challenges*, 376 PHIL. TRANS. R. SOC. A. 20180080 (2018).
[23] *Id.* at 4.
[24] Rodrigues, *supra* note 13, at 6.
[25] *Id.* at 6.
[26] *Id.* at 6.
[27] *Id.* at 6.
[28] *Id.* at 6.
[29] COMMITTEE ON LEGAL AFFAIRS, EUROPEAN PARLIAMENT, *DRAFT REPORT with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL))*, https://www.europarl.europa.eu/doceo/document/JURI-PR-582443_EN.pdf?redirect (last visited Feb. 22, 2023).
[30] *Id.*

rights infringements and other legal liabilities that a more sophisticated robot can introduce. However, Section 29 of the report advised the parliament that any liability attributed to AI should not be restricted and should not restrict its liability in any shape or form. The report also introduced the potential idea of setting up an insurance type scheme; the obligatory insurance would mirror other insurance schemes:

> as is already the case, for instance, with cars, nevertheless, that unlike the insurance system for road traffic, where the insurance covers human acts and failures, an insurance system for robotics could be based on the obligation of the producer to take out an insurance for the autonomous robots it produces …. such an insurance system could be supplemented by a fund in order to ensure that reparation can be made for damage in cases where no insurance cover exists; calls on the insurance industry to develop new products that are in line with the advances in robotics.[31]

Whether these measures alone will be sufficient to protect AI and scientists against human rights lawsuits remains to be seen as there are still many unanswered issues. For example, the EU conclusion that AI is not a legal person is too dismissive an answer and is a very anthropocentric stance.[32] It lacks self-realization that legal systems have long since granted commercial businesses legal status even though they are essentially artificial entities[33] made up mostly of logos, trademarks, patents and copyrights. Additionally, others arguing for granting robots legal personality state it would prevent "the debates over slavery" that "remind us of uncomfortable parallels with the past."[34] Moreover, the European Parliament's insurance proposal scheme addresses the financial compensation for human rights abuses but doesn't define how possible psychological or other harder to measure consequences will be addressed.

III. AI, GOD, AND A BELIEVER'S HUMAN RIGHTS VIOLATIONS

The topic of psychological or other more difficult to measure damages (such as emotional and spiritual) is important to explore and forms the focal point of this essay. As mentioned in the introduction, AI has been in development since the earliest days of human society, from the religious traditions of Japanese Shintoism (Shinto believes in the kami, a divine power that can be found in all things) to Arabic alchemy to Jewish Talmudic. Simultaneously, the 2nd century theory of Gnosticism explored the concept of 'knowing God' through religious experiences[35]—experiences which at times are hard to rationalize and acutely explain. When the two ancient paths of Gnosticism and AI collide in the 4IR, the lesser discussed topic of AI and God emerges. (It's important to note the irony here: religion is where AI began, but it is within religion that modern AI is least discussed). Nevertheless, today scientists are developing AI robots to mimic the place that God has in people's lives.[36] But knowing God is (again) ironically also one of the most complex areas of AI because it involves more than just entering algorithms into a computer. "Religious AI", this essay predicts, will be at the forefront of pushing AI boundaries as it needs to go beyond just what has been entered

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[31] *Id.*
[32] Pagallo, *supra* note 19, at 2.
[33] Pagallo, *supra* note 19, at 1.
[34] Pagallo, *supra* note 19, at 2.
[35] Stephan A. Hoeller, *The Gnostic World View: A Brief Summary of Gnosticism*, http://gnosis.org/gnintro.htm (last visited Sept. 26, 2021).
[36] Jason Alan Snyder, *God in the Machine—Artificial Intelligence, Coronavirus, Racism and Religion* (June 27, 2020) https://medium.com/swlh/god-in-the-machine-5aa80c54f0ef (last visited Dec. 13, 2021).

by its computer scientist. "Religious AI" must be able to understand, think and interpret for themselves, free of unconscious bias.[37]

The world of AI has developed rapidly in the last twenty years with the production of AI machines that are able to think and interpret for themselves. The dangers of AI's ability to think freely coincide with this essay's discussion of human rights violations and violations to human bodies (specifically, the mind and spirit). Emotional and spiritual developments in AI over the last twenty years have including: Cupid[38] (where scientists have developed neural networks modeled to mimic the way human brain works to develop emotions, subsequently training AI to recognize images, patterns, or numbers and then apply what it has learned. This evolutionary technology is being closely followed by dating websites to better match their clients in the elusive search for love), the Waterfall[39] Model (AI can easily read pages of text, but understanding subtext is more complex. Waterfall allows for this subtext to be understood), and lastly and most importantly: Move37. Until recently, AI lacked original thought – until a breakthrough was achieved by Move37 in 2016: AI company DeepMind's machine (named AlphaGo) played chess champion Lee Sodel in a game of Go. The ancient board game of Go is one of the most complex games ever devised and was considered a challenge for AI. AlphaGo played professional Go player Sodel in a high-profile game watched by millions. During the match, AlphaGo played a series of original and creative moves[40] (especially on its 37th move, later coined "Move37") that led to its 4-1 win and transformed thinking about the game. This breakthrough in AI original thought is now being developed further by DeepMind and other companies. The above innovations (subtext, emotion and original thought) are now being developed to mimic the human relationship to God. The legal question, then, must be asked: what will happen when AI violates these innovations in its emotional and spiritual relationship with a human, resulting in human rights infringements? Recall that this is a violation protected by Article 5 of the Universal Declaration of Human Rights (1948) ("No one shall be subjected to torture or to cruel, inhuman or *degrading treatment* or punishment"). The idea of religious exploitation by AI is not far-fetched; after all, money hungry and morally bankrupt pastors and televangelists have reigned supreme for the last twenty-five years and are ever growing in the YouTube/social media era.[41] So; if, as concluded above, Directive 85/374/EEC falls far short when it comes to regulating physical AI, suffice to say it is also inadequate with regard to policing emotional and spiritual well-being.

Despite the shortcomings of the aforementioned solutions (such as social experiment status), remedies are still worth exploring (especially in the absence of more concrete alternatives). This is particularly true if we, as a society, value the advancement of scientific knowledge and scientific breakthroughs; that is to say, the benefits of AI in the scientific and medical world should be valued more than the negative legal ramifications when it fails. Furthermore, an insurance scheme is the most feasible means of addressing AI's shortcomings (with the added element of therapeutic support for mental and spiritual damages). But make no mistake about it: in order for these solutions to gain momentum and eventually make their way into legislation there will be a need for stronger cooperation between state actors, including governments, parliaments, the judiciary, law enforcement agencies, private companies,

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[37] Such as race and gender biasness. Joy Buolamwini, *AI, Ain't I A Woman*, https://www.youtube.com/watch?v=QxuyfWoVV98 (last visited Sept. 26, 2021).

[38] The Barbican, *AI: More Than Human Exhibition* (London England Attended Aug. 16, 2019)

[39] *Id.*

[40] To achieve this original thinking AlphaGo used amongst other things; The Monte Carlo tree search (MCTS) is a heuristic search algorithm for some kinds of decision processes, most notably those employed in game play.

[41] https://www.youtube.com/watch?v=PL26wc3YNcU Catch Her If You Can (last visited Feb. 22, 2023).

academia, NGOs, international organizations, and finally, the public at large. The task is daunting, but not impossible.[42]

IV. WHEN A SCIENTIST IS LIABLE

Regarding duty of care of a scientist and his scientific consumer product, we can get an indication as to where the courts will decide a scientist's negligence by looking at a few preceding cases. Starting with the landmark English civil case of Donoghue v. Stevenson (1932)[43] (famously called Snail in the Bottle case) the House of Lords ruled that the manufacturer of a ginger beer owed a duty of care to Ms Donoghue because it was reasonably foreseeable that failure to ensure the product's safety would lead to harm to consumers. Prior to Donoghue v. Stevenson, liability for personal injury in tort usually dependent upon showing physical damage inflicted directly (trespass to the person) or indirectly (trespass on the case).[44] More fitting concerning scientists, however, is the case of North Glamorgan NHS Trust v. Walters (2003).[45] This case expanded the English court's parameters of liability and duty of care. In this case the mother of a deceased boy was seeking damages against the North Glamorgan NHS Hospital for the psychological damages incurred in the mishandling and failures leading up to the death of her son. Ward LJ (majority) noted that the mother felt 'that life is empty and meaningless' (words that can be easily used to describe a Believer's parasocial[46] relationship with God). In his ratio Ward LJ extensively referenced Alcock (1991).[47] In the Alcock case ten relatives of the victim's family sued the South Yorkshire police for psychiatric harm and liability of the police for nervous shock suffered as a consequence of the infamous Hillsborough disaster in Liverpool, England – a national tragedy where 96 spectators were killed and 450 injured in a human crush at a football match. The ten relatives were unsuccessful, but many believed this decision was harsh as the courts were trying to avoid a 'floodgate' of similar lawsuits. Keith of Kinkel LJ and the majority judges ruled that seeing replays of incident on TV was not enough to induce psychological harm (a worthy note for Televangelists if this case was still standing). However, the justices instead reversed this and referenced back to the case of McLoughlin v O'Brian (1983).[48] In this case a friend came to the claimant's house to tell her of a serious accident involving her husband and three children, two hours after it had occurred. At the hospital she was told one child was dead and saw her husband and two other children seriously injured. She suffered serious nervous shock and as a result sued the respondent O'Brian who was responsible for the accident. This case was unique at the time because the claimant suffered injuries away from the scene of the accident and hours after the accident occurred. The House of Lords ruled in favour of McLoughlin. The above cases show that English law is continuing to expand the legal parameters of liability, breach and duty of care beyond clinical negligence cases.

V. CAN GOD BE SUED?

In the context of religious violations, it may be worth exploring whether it is possible to sue God. There have been cases where plaintiffs have indeed sought to sue God. The most

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[42] Dunja Mijatović, *Safeguarding Human Rights in the Era of Artificial Intelligence* (July 3, 2018), https://www.coe.int/en/web/commissioner/-/safeguarding-human-rights-in-the-era-of-artificial-intelligence.
[43] Donoghue v. Stevenson, [1932] UKHL 100.
[44] https://en.wikipedia.org/wiki/Donoghue_v_Stevenson (last visited Feb. 25, 2023).
[45] Walters v. North Glamorgan NHS Trust, [2002] EWCA Civ 1792.
[46] Parasocial relationships are one-sided relationships, where one person extends emotional energy, interest and time, and the other party, the persona, is completely unaware of the other's existence.
[47] Alcock v. Chief Constable of South Yorkshire Police, [1991] UKHL 5, [1992] 1 AC 310.
[48] McLoughlin v O'Brian, [1983] 1 AC 410.

famous of which is the case of Betty Penrose. In 1970 Arizonian lawyer Russell T. Tansie filed a lawsuit on behalf of his secretary Penrose against God for his "negligence" in allowing a lightning bolt to strike her house.[49] They were seeking $100,000 in damages for this distress. When God failed to turn up to court Penrose won by default.[50] It was doubtful however whether they actually received the $100,000 in damages.

The most recent case of a civil suit against God was in 2008 when atheist civil rights activist Ernie Chambers filed a lawsuit in Nebraska's Fourth Judicial District Court.[51] The Plaintiff sought 'a permanent injunction ordering the Defendant to cease certain harmful activities and the making of terroristic threats.[52] In response to Chambers' case, two responses were filed. The first was from a Corpus Christi lawyer, Eric Perkins, who wanted to answer the question "what would God say". The source of the second response, claiming to be from God, is unclear as no contact information was given.[53] Chambers then appealed the first decision. But the suit was eventually dismissed because God could not be properly notified and served as he had no known fixed address.[54]

The no doubt humorous reaction these lawsuits receive from observers is indicative of the frivolous nature of even attempting to sue God under tort law. They also show why the court often (sensibly) pursue scientists or organizations behind the scientific invention rather than God himself.

CONCLUSION

This essay set out to answer the question of whether the scientist or the robot will be held liable when a Believer's human rights are violated. The current answer in our judicial system is that it is a shared responsibility; however, this solution was proven to be inadequate, especially in light of potential physical and psychological bodily harm. At present, the European Parliament's proposal of an obligatory insurance scheme seems to be the only feasible idea to help safeguard human rights, but whether it will be sufficient to prevent infringements has yet to be seen. As AI and the 4IR continues their growth and evolution, becoming ever more integrated into our lives, the legal and scientific worlds need to find robust answers to the legal liabilities surrounding AI robots and human rights and God.

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[49] Never Forsaken, https://www.backtothebible.org/post/never-forsaken (last visited Nov. 26, 2022).
[50] *Id.*
[51] https://www.wired.com/images_blogs/threatlevel/files/chambersversusgod.pdf (last visited Nov. 24, 2022).
[52] *Id.* poinr 1.
[53] Lawsuits against God, https://en.wikipedia.org/wiki/Lawsuits_against_God#cite_note-AP15Oct2008-3 (last visited Nov. 24, 2022).
[54] *Id.*

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