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Exploring the Ethics of Decision- Making of Artificial Intelligence Systems

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ABSTRACT: Decision-making using artificial intelligence (AI) aims to reduce human error and bias in the clinical decision process. The advanced pattern-finding capabilities of AI and machine learning serve as both promise and pitfall, as pattern recognition can unintentionally cause algorithms to incorporate human biases, such as racial, gender, or socioeconomic biases. Considering the health care applications of these tools, ensuring they are safe to deploy is critical. This requires a clear oversight structure from development to deployment. The roadmap identifies the questions for research that need to be prioritized in order to inform and improve the standards, regulations and systems of oversight of ADA-based technologies. Without this, the report's authors conclude the recent proliferation of various codes and principles for the ethical use of ADA-based technologies will have limited effect. While artificial intelligence (AI) technology can enhance social wellbeing and progress, it also generates ethical decision-making dilemmas such as algorithmic discrimination, data bias, and unclear accountability. In this study, we identify the ethical risk factors of AI decision making from the perspective of qualitative research, construct a risk-factor model of AI decision making ethical risks using rooting theory, and explore the mechanisms of interaction between risks through system dynamics, based on which risk management strategies are proposed.

KEYWORDS: Artificial intelligence (AI), machine learning, ethical decision-making, risk management strategies, ADA-based technologies, ethical risk.

I. INTRODUCTION

The ethical risks of AI decision making comprise ethical and moral issues related to human beings and society that arise from errors caused by data or algorithms, and the negative effects of these risks must be addressed in the development of artificial intelligence. Some examples of AI decision making ethical risks include the choice between the lives of pedestrians and drivers in the event of danger, infringement of the privacy rights of people involved in "human flesh searching" based on big data technology, and incorrect decisions made by "intelligent courts" that lack human feelings. AI often struggles to cope with complex decision-making scenarios because tacit knowledge such as customs, emotions, and beliefs is difficult to fully digitize and structure. At the same time, the question of whether future intelligent decision making in the era of strong AI will surpass or even replace human choices is the "moral dilemma" of ethical risk. A European Pathway to Excellence and Trust, stating that the development of AI should be human-centered, sustainable, and under ethical control, respecting the fundamental rights of people and avoiding the problem of risks associated with AI decisions. The legal world is undergoing a profound metamorphosis, with artificial intelligence (AI) emerging as a pivotal force in shaping the landscape of decision-making. From streamlining legal research to enabling predictive analytics, AI has brought unprecedented efficiency and effectiveness to the forefront. However, this wave of technological innovation also beckons us to grapple with complex ethical considerations. It is expected that the proposed system would benefit medical physicians to diagnose heart sound signals and checking the up-normality. Also, the system would offer a promising opportunity to develop an operational screening and testing device for heart disease diagnosis. The performance, classification accuracy and effectiveness of the proposed NN-based decision support system have been examined. In this exploration of the ethical implications of AI in legal decision-making, we embark on a voyage through the dimensions of bias, transparency, accountability, human-AI collaboration, and the evolving regulatory frameworks. In the European Commission also a proposal for an Artificial Intelligence Act, which proposes to address the risks of AI, develop a unified and trusted EU AI market, and protect the fundamental rights of EU citizens.

II. LITERATURE REVIEW

Rowena Rodrigues (2020) This study focusses on legal and human rights issues of artificial intelligence (AI) being discussed and debated, how they are being addressed, gaps and challenges, and affected human rights principles. Such

issues include: algorithmic transparency, cybersecurity vulnerabilities, unfairness, bias and discrimination, lack of contestability, legal personhood issues, intellectual property issues, adverse effects on workers, privacy and data protection issues, liability for damage and lack of accountability. While recognising the good work carried out in the AI law space, and acknowledging this area needs constant evaluation and agility in approach.

Tyler L. Jaynes (2019) The concept of artificial intelligence is not new nor is the notion that it should be granted legal protections given its influence on human activity. Where there are several decades' worth of writing on the concept of the legal status of computational artificial artifacts in the USA and elsewhere, it is surprising that law makers internationally have come to a standstill to protect our silicon brainchildren. With this assumption, an analysis of rights will be made with respect to the needs of a non-biological intelligence possessing legal and civic duties akin to those possessed by humanity today. In this essay, it will be assumed that future artificial entities, such as Sophia the Robot, will be granted citizenship on an international scale.

Renjie Wang (2019) Artificial intelligence (AI) has experienced rapid growth over the past few years, moving from the experimental to the implementation phase in various fields, including medicine. Machine learning (ML), a subset of AI, allows computers to detect patterns from large complex datasets automatically and uses these patterns to make predictions. AI is proving to be increasingly applicable to healthcare, and multiple machine learning techniques have been used to improve the performance of assisted reproductive technology (ART). In this review, we discuss the basic aspects of AI and machine learning, and we address the applications, potential limitations and challenges of AI.

Nan Liu (2018) Emergency medicine has witnessed increasing interest in the use of artificial intelligence (AI) and machine learning algorithms for numerous applications. This paper provides an updated summary of recent development in AI in emergency medicine. Though this categorization is not meant to be exhaustive, it captures most of the AI applications in emergency medicine. Many AI methods such as classification and clustering algorithms, natural language processing, and text mining have been well investigated, but image understanding, computer vision, and robotics are yet to be explored. This leaves enough space for future endeavors in emergency medicine on applying AI and machine learning techniques to solve clinical problems.

Jonathon Stewart (2018) Interest in artificial intelligence (AI) research has grown rapidly over the past few years, in part thanks to the numerous successes of modern machine learning techniques such as deep learning, the availability of large datasets and improvements in computing power. Despite the successes there remain significant concerns and challenges surrounding algorithm opacity, trust and patient data security. Notwithstanding these challenges, AI technologies will likely become increasingly integrated into emergency medicine in the coming years. AI is proving to be increasingly applicable to healthcare and there is a growing list of tasks where algorithms have matched or surpassed physician performance.

Benefits of AI in Legal Decision-Making

In the ever-evolving realm of law, time is often a scarce resource, and the advent of AI has presented a transformative solution. Capable of processing vast volumes of legal data at breathtaking speeds, AI has become a catalyst for change. Tasks that once devoured countless hours can now be accomplished in a fraction of the time, enabling legal professionals to dedicate their energy to profound analysis and critical thinking. This newfound efficiency not only elevates the quality of legal services but also extends the reach of justice to a wider spectrum of clients.

The Role of Ethical Considerations

As AI takes center stage in legal decision-making, the ethical terrain becomes increasingly intricate to navigate. At its core, the ethical framework of transparency, fairness, and accountability serves as the guiding light to ensure that AI-infused decisions align with the exacting ethical standards expected within the legal domain. Of particular significance is the shadow of biases latent outcome of AI algorithms that necessitates vigilant oversight to safeguard the sanctity of justice.

Bias and Fairness Issues

The promise of AI is intimately entwined with the data it consumes, giving rise to a pertinent ethical concern: bias. When AI algorithms are trained on biased datasets, they risk perpetuating and amplifying societal prejudices, leading to decisions riddled with discrimination. Imagine an AI model designed to forecast recidivism rates, shaped by historical data tainted by racial biases. Inevitably, this AI might unwittingly perpetuate these biases in future decisions,

inadvertently perpetuating injustices. Addressing bias mandates an unwavering commitment to continual scrutiny, rigorous data curation, and the deployment of sophisticated bias-detection mechanisms embedded within AI algorithms.

The Human-AI Collaboration

The symphonic interplay of human wisdom and AI acumen comes to life in the concept of "centaur" lawyering. The computational prowess of AI harmonizes with human judgment, emotional intelligence, and contextual understanding to forge an orchestral collaboration. While AI adeptly navigates vast datasets, human legal experts bring a nuanced comprehension and ethical discernment necessary for complex decision-making. This dance of human-AI partnership ensures that AI amplifies human capacities, emerging as an instrument to augment rather than replace human judgment.

Ethical Principles in AI

Artificial Intelligence (AI) has become an integral part of decision-making processes across industries, raising ethical considerations that demand careful attention. In this review of ethical implications, we delve into key principles that form the foundation for responsible AI deployment. Transparency in AI involves making the decision-making process understandable and accessible to those affected by its outcomes. It is crucial for individuals to comprehend how AI algorithms arrive at specific decisions. Transparency fosters trust and facilitates a more informed dialogue between developers, users, and impacted parties. Trust is paramount in the acceptance of AI-driven decisions. Transparent AI systems help users and stakeholders understand the rationale behind outcomes, reducing uncertainty and skepticism. Transparent algorithms contribute to building trust by allowing scrutiny and providing explanations for decisions, which is especially vital in critical domains like healthcare, finance, and criminal justice. Bias in AI algorithms can perpetuate or exacerbate existing inequalities. Whether through biased training data or inherent algorithmic biases, the consequences can be severe, leading to unfair treatment or discrimination. Recognizing and addressing bias is essential for building fair AI systems.

Regulatory Frameworks and Standards

Artificial Intelligence (AI) has witnessed rapid advancements, prompting a growing need for robust regulatory frameworks and ethical standards to govern its deployment in decision-making processes. This review delves into the current state of AI regulations, highlighting existing frameworks and challenges. Additionally, it discusses the imperative for ethical AI standards, examining proposals and global efforts to shape guidelines. The current landscape of AI regulations is characterized by a patchwork of laws and guidelines globally. Some countries have established specific AI-related regulations, while others rely on broader data protection laws. Notable examples include the General Data Protection Regulation (GDPR) in the European Union and the California Consumer Privacy Act (CCPA) in the United States. However, these regulations primarily address data protection rather than the ethical aspects of AI decision-making. Existing regulations face challenges in keeping pace with the rapid evolution of AI technologies. Gaps in addressing ethical concerns, bias mitigation, and transparency issues pose significant challenges.

Ethics of artificial intelligence

The ethics of artificial intelligence is the branch of the ethics of technology specific to artificial intelligence (AI) systems. The ethics of artificial intelligence covers a broad range of topics within the field that are considered to have particular ethical stakes. This includes algorithmic biases, fairness, automated decision-making, accountability, privacy, and regulation. It also covers various emerging or potential future challenges such as machine ethics (how to make machines that behave ethically), lethal autonomous weapon systems, arms race dynamics, AI safety and alignment, technological unemployment, AI-enabled misinformation, how to treat certain AI systems if they have a moral status (AI welfare and rights), artificial superintelligence and existential risks. Some application areas may also have particularly important ethical implications, like healthcare, education, or the military.

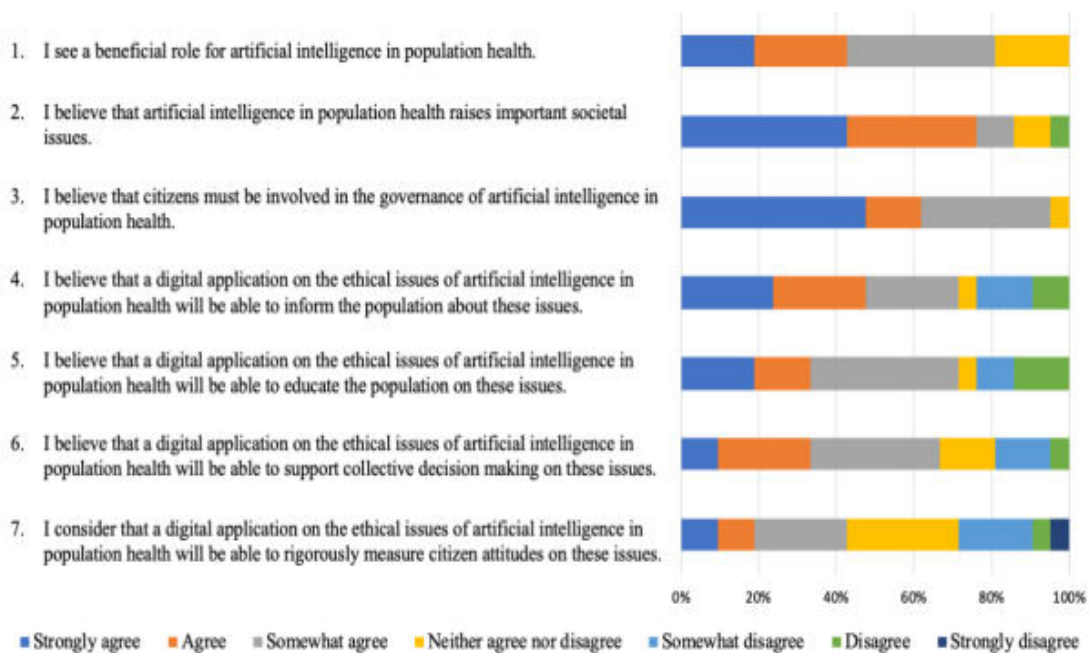
III. RESEARCH METHODOLOGY

Firstly, we conducted a multivocal literature review to survey existing literature, following the guidelines provided. In the second step, we carried out a questionnaire survey study aimed at validating the findings of the multivocal literature review with industry practitioners. Lastly, we utilized the fuzzy AHP approach to rank the identified challenges based on their significance for adopting ethics in software process improvement initiatives. The search query was designed to capture articles related to ethical considerations of artificial intelligence. The query included relevant keywords and phrases such as "ethical considerations", "artificial intelligence", "AI ethics", "technology ethics", and "social values" with the help of Publish or Perish. To comprehensively analyze the scholarly landscape on ethical considerations in the era of artificial intelligence, we used a bibliometric approach coupled with VOS viewer software to uncover key trends,

prominent authors, influential journals, important concepts, and the evolution of research themes in this domain. Before beginning the review process, a thorough MLR protocol was created following the MLR recommendations. All study team members completed the MLR phases. This combination of methods has been used in various software engineering research studies.

IV. RESULTS AND DISCUSSION

Most participants (18/21, 86%) believed that AI was currently used in population health. Only 14% (3/21) of the participants indicated that they did not know. This last group is, on average, 10 years older than those who answered “yes.”



Graph 1: Participants' answers to Likert scale questions

Participants were also surveyed on their relatives' views on AI in population health. Participants were asked what they thought their relatives' positive and negative opinions were on this topic. This question was intended to encourage respondents to think beyond their own opinions and not to probe the real perceptions of those around them.

Table 1: Importance of citizen perspective in comparison with other stakeholders (N=21)

| Statements | More important, n (%) | Equally important, n (%) | Less important, n (%) |
|--|-----------------------|--------------------------|-----------------------|
| "I consider that the contribution of citizen perspectives in the governance of AI in population health is as important as the contribution of politicians and public decision makers." | 5 (24) | 15 (71) | 1 (5) |
| "I consider that the contribution of citizen perspectives in the governance of AI in population health is as important as the contribution of AI developers." | 5 (24) | 10 (48) | 6 (29) |
| "I consider that the contribution of citizen perspectives in the governance of AI in population health is as important as the contribution of ethicists and jurists." | 1 (5) | 12 (57) | 8 (38) |
| "I consider that the contribution of citizen perspectives in the governance of AI in population health is as important as the contribution of population health specialists." | 0 (0) | 13 (62) | 8 (38) |

Positive correlations were found between the importance of citizen involvement in AI governance and that of other



stakeholders (health AI specialists, AI developers, ethicists, and lawyers). Finally, we noted a correlation between respondents who thought citizen perspectives were paramount and an agreement that societal issues were important.

Table 2: Perspectives on the idea of using a digital app for citizen involvement

| Barriers to the app | Associated key performance indicators |
|--|---|
| Accessibility | <ul style="list-style-type: none"> • Accessibility • Clarity |
| Question of its usefulness | <ul style="list-style-type: none"> • Participation rate |
| Question of interest and participation from the stakeholders | <ul style="list-style-type: none"> • Impact of the tool on decision makers |
| Transparency | <ul style="list-style-type: none"> • Transparency |
| Financing | — ^a |
| Difficulty to generalize | — |

^aNot available.

We surveyed participants on the barriers and key performance indicators (KPIs) of a citizen engagement digital app. By KPIs, we meant components measuring the effectiveness, feasibility, and practicality of such a tool to assess its potential for implementation. The participants identified 6 barriers and 5 KPIs. Barriers and KPIs were addressed by 2 different questions, but the answers echo each other. Of the 6 obstacles, 4 can be associated with the 5 success indicators, which can be presented as responses to the obstacles.

V. CONCLUSION

While we enjoy the convenience brought by AI, we also need to avoid the ethical risks it may generate as far as possible. In this study, we identified and organized the ethical risk factors of AI decision making using a rooted theory approach, and constructed a conceptual model of risk factors. The ethical handling of data, encompassing privacy and informed consent, remains a cornerstone. Respecting individuals' rights over their data and obtaining clear consent are essential prerequisites for ethical AI deployment. Recognizing the potential societal repercussions of AI, particularly in terms of job displacement, underscores the ethical responsibility to consider and mitigate adverse effects. Strategies for retraining, reskilling, and societal support are crucial components of an ethical approach. As we conclude this review, it is imperative to recapitulate the critical ethical considerations that shape the discourse surrounding AI and emphasize the urgency for ongoing dialogue and robust frameworks. The necessity for transparency in AI decision-making processes is paramount. The dynamic nature of AI technology requires a commitment to continuous dialogue. Ethical considerations in AI are not static; they evolve with technological advancements. Therefore, ongoing interdisciplinary discussions involving experts, policymakers, industry leaders, and the public are essential to adapt ethical frameworks to emerging challenges.

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