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THE IMPACT OF AI-BASED DECISION-MAKING SYSTEMS ON JUSTICE AND EQUALITY

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ABSTRACT

The rapid proliferation of artificial intelligence (AI)-based decision-making systems in society generates a profound transformation that deeply affects fundamental human rights concepts such as justice and equality. This article provides a comprehensive examination of the development and technical foundations of AI-based systems, as well as their impacts on justice and equality. The increasing role of AI in decision-making processes presents both opportunities and risks, with issues such as bias, discrimination, and lack of transparency posing significant challenges to the preservation of justice and equality.

The article analyzes the application of AI-based systems across various sectors, including judiciary, public policy, healthcare, and employment, focusing on the ethical dimensions, their relationship with human rights, and the legal responsibilities they entail. Additionally, it offers policy recommendations and regulatory requirements for the fair use of AI, evaluates the long-term effects of these technologies, and explores future development perspectives.

In conclusion, the development and implementation of AI-based decision-making systems in accordance with the principles of justice and equality require careful oversight and an ethical framework. The successful use of these technologies to maximize societal benefits while protecting human rights is achievable through a continuous process of monitoring and evaluation.

Keywords: Artificial Intelligence, Decision-Making Systems, Human Rights, Ethics, International Law.

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1. Introduction

Artificial Intelligence (AI) is a technology that began to evolve in the mid-20th century, but it has rapidly matured in recent decades. This progression has been accelerated by technological innovations such as machine learning, deep learning, and big data (Russell & Norvig, 2016). Initially used in simple automation and data processing tasks, AI has now transformed into systems capable of managing complex decision-making processes, making predictions, and performing analyses at levels comparable to human intelligence (Selim, Skender & Ali, 2022). AI-based systems are widely used in various fields, including finance, healthcare, law, education, and transportation, fundamentally altering decision-making processes in these areas (Goodfellow, Bengio, & Courville, 2016).

This development has been supported by technological innovations and increased data collection and analysis capacities. The proliferation of the Internet and technologies like the Internet of Things (IoT) have made it possible to collect and process vast datasets (Skender, Ali & Selim, 20219). These datasets have enabled AI systems to make more accurate and precise predictions, thereby enhancing the effectiveness of these systems in decision-making processes (Nuredin, A. 2023).

The Increasing Role of AI in Decision-Making Processes

Traditional decision-making processes typically relied on human intelligence and experience. However, with the development of AI-based systems, these processes are becoming increasingly automated. AI, with its ability to rapidly analyze large datasets, identify complex patterns, and predict future events, is assisting or even entirely taking over human decision-making processes (Binns, 2018).

For instance, in the financial sector, AI is effectively used in risk analysis and investment decisions. In the healthcare sector, AI's contributions to disease diagnosis and treatment planning are growing. In the legal field, AI systems are employed to predict potential judicial outcomes, conduct legislative analysis, and provide recommendations to judges (Russell & Norvig, 2016).

The role of AI in decision-making is significant not only in terms of speed and efficiency but also in its potential to eliminate bias and prejudice. However, the extent to which AI systems make decisions aligned with human values and fundamental concepts such as justice and equality remains a topic of ongoing debate (Floridi, 2019).

Redefining Justice and Equality in the Digital Age

The increasing role of AI in decision-making processes necessitates a reconsideration of concepts such as justice and equality. While traditional notions of justice have centered around the human factor, the integration of AI could lead to fundamental changes in this understanding. Although AI is perceived as impartial, these systems are programmed by humans and rely on datasets collected from human communities, which can result in the emergence of biases and injustices within these systems (O'Neil, 2016).

The evolution of justice and equality concepts in the digital age is directly related to how AI systems are designed and implemented. The impact of AI on decision-making processes has the potential to create a fair and equal world not just for a specific group or society but for all humanity. However, realizing this potential depends on the proper guidance of AI within ethical and legal frameworks (Binns, 2018).

2. The Technical Foundations of AI-Based Decision-Making Systems Algorithms and Machine Learning Techniques

The foundation of AI-based decision-making systems lies in algorithms and machine learning (ML) techniques. Algorithms are step-by-step procedures used to solve specific tasks or problems and serve as the logical rules guiding AI's decision-making processes. Machine learning, on the other hand, is a technique that enables these algorithms to learn from data and improve their performance over time (Russell & Norvig, 2016).

Machine learning techniques include various approaches such as supervised learning, unsupervised learning, and reinforcement learning (Selim, Ali & Ristevski, 2024). Supervised learning involves training a model on pre-labeled data to make predictions on new data. Unsupervised

learning, in contrast, is used to identify hidden patterns or relationships in data without the need for labeled data. Reinforcement learning involves an agent interacting with its environment, learning to achieve the best outcomes through trial and error (Goodfellow, Bengio, & Courville, 2016).

These techniques work on large datasets, identifying patterns, trends, and relationships to build systems capable of making decisions. Particularly, deep learning (DL), with its capacity to create more complex and abstract representations using multi-layered neural networks, allows AI systems to manage more intricate decision-making processes (Selim, Ali, Saracevic & Ristevski, 2024). This enables AI-based systems to be applied in a wide range of areas, from medical diagnostics and financial forecasting to legal analysis and customer behavior prediction (LeCun, Bengio, & Hinton, 2015).

Applications of AI in Data Analysis and Decision-Making Processes

One of the most critical components of AI systems is their ability to process and analyze large datasets. These systems often utilize both structured and unstructured data to derive meaningful insights and predictions. By working on this data, AI identifies patterns, determines correlations, and produces forecasts that can be utilized in decision-making processes (O'Neil, 2016).

AI-based systems typically follow these steps in decision-making processes:

1. Data Collection: Gathering information from broad and diverse data sources.

2. Data Preprocessing: Cleaning, transforming, and preparing raw data for analysis.

3. Feature Selection: Identifying the most important features in the dataset and incorporating them into the modeling process.

4. Modeling: Using machine learning algorithms to model the data and make predictions.

5. Evaluation and Optimization: Assessing the model's accuracy and optimizing its performance.

6. Decision-Making: Making final decisions based on the results produced by the model.

Each of these steps is critical in determining the effectiveness and accuracy of AI-based systems. The data analysis phase, in particular, directly influences the system's decision-making capabilities. For instance, in the healthcare sector, AI can analyze patient data to recommend the most appropriate treatment methods. In finance, it can review market data to offer investment advice. In the legal field, AI can analyze large volumes of legal texts to provide judges with predictions about a particular case (Floridi, 2019).

Transparency and Explainability Issues in AI Systems

The increasing role of AI-based systems in decision-making processes has raised concerns about the transparency and explainability of these systems. AI algorithms often operate using complex mathematical models and deep learning techniques, making it difficult to understand how and why certain decisions are made. This issue is known as the "black box" problem and can undermine the reliability and acceptability of AI systems (Doshi-Velez & Kim, 2017).

Transparency refers to the clarity of how an AI system operates and the data it relies on to make decisions. Explainability, on the other hand, is the ability of an AI system to articulate why a particular decision was made and the reasoning behind it. These concepts are particularly important in fields where AI makes critical decisions, such as healthcare, law, and finance (Lipton, 2018).

The transparency and explainability of AI systems play a crucial role in ensuring justice and equality. For example, if an AI system rejects a loan application, it is essential that the applicant understands the decision and has the ability to challenge it. Similarly, when an AI system is used in a legal case, understanding how the decision was made is necessary to ensure justice is served (O'Neil, 2016).

However, most current AI systems face significant limitations in terms of explainability. Complex AI techniques, such as deep learning models, often struggle to explain their decisions. This issue has led to debates over

whether AI-based systems align with the principles of justice and equality. Addressing the transparency and explainability challenges in AI decision-making processes is among the fundamental issues that must be resolved for broader acceptance of this technology (Binns, 2018).

3. The Threats to Justice and Equality Posed by AI-Based Systems

Potential Biases in AI-Based Decision-Making Systems

Although AI-based decision-making systems are designed to operate objectively and impartially, these systems inherently carry biases because they are developed by humans and trained on data provided by humans. These biases can emerge due to prejudices embedded in the datasets used, choices made during algorithm design, or the conscious or unconscious values introduced by those training the system (O'Neil, 2016).

For example, an AI system evaluating job applications could be influenced by factors such as gender, race, or ethnicity present in historical data. If there has been discrimination against a particular group in the past, an AI system trained on such biased data could perpetuate the same discrimination. This situation could reinforce existing inequalities, making it more difficult to achieve social justice (Angwin, Larson, Mattu, & Kirchner, 2016).

Bias is not limited to the data sets alone; choices made during algorithm design can also lead to biased AI systems. An algorithm might produce results that are not fair to a particular group or individual. Therefore, preventing biases in AI systems and ensuring these systems make fair decisions is of paramount importance. However, this is technically a complex and challenging task (Binns, 2018).

Discrimination and Bias Risks: Systematic Inequalities

Biases in AI-based systems can lead to widespread discrimination and exacerbate systematic inequalities. This issue can have serious consequences, especially in scenarios where AI systems' decisions affect a broad audience. For instance, if AI is used in the criminal justice system, a system that predicts crime rates or determines sentences could make

biased decisions, leading to significant harm to justice (Angwin et al., 2016).

Discrimination and bias risks may stem from factors overlooked or inadequately considered during the design of AI systems. For example, a healthcare diagnostic system trained primarily on data from white individuals may result in incorrect diagnoses for patients from different ethnic backgrounds. Similarly, credit scoring systems could disadvantage low-income individuals and minorities (Obermeyer et al., 2019).

Systematic inequalities can result in AI-based systems producing outcomes that violate principles of justice and equality. Such systems, even unintentionally, may perpetuate and even intensify existing social inequalities. Therefore, ensuring that AI systems do not discriminate and make fair decisions for all individuals is a critical issue that must be addressed during the development of this technology (Binns, 2018).

Redefining the Concept of Justice with AI

The increasing role of AI-based systems in decision-making processes may necessitate the redefinition of the concept of justice. Traditional understandings of justice are often rooted in human factors and human judgment, but the introduction of AI could lead to fundamental changes in this understanding. The involvement of AI in decision-making processes raises new questions about what justice means, how it can be achieved, and by what standards it should be assessed (Floridi, 2019).

One of the biggest challenges AI poses to the concept of justice is the lack of transparency and accountability in these systems. Decisions made by humans can be explained and debated with accompanying justifications, while decisions made by AI systems often occur in a process described as a "black box." This situation complicates the evaluation of whether AI aligns with the concepts of justice and equality (Doshi-Velez & Kim, 2017).

In redefining justice with AI, the ethical and legal dimensions of this technology must also be considered. Ensuring that AI-based systems align with societal values is not only a technical challenge but also an ethical and social responsibility. For AI to operate fairly, it is essential to uphold fundamental principles such as transparency, accountability, and human

rights in the design and implementation of these systems (Nuredin, A. 2023). S

4. AI and Legal Liability: Ensuring Justice

Legal Liability and Accountability Mechanisms

The assessment of AI-based decision-making systems in terms of legal liability and accountability has become increasingly significant as technology advances. These systems, particularly when used in areas where justice must be upheld (e.g., judiciary, public services, healthcare), can lead to severe consequences if they make incorrect decisions or predictions. Thus, the question of who is liable for damages caused by erroneous decisions made by AI systems is a complex and challenging legal issue (Pagallo, 2013).

Legal liability in AI systems is typically distributed among several parties: system developers, users (e.g., judges, doctors), and other stakeholders involved in the system's design. However, the ability of AI to make independent decisions introduces uncertainties in the chain of responsibility. For example, if an AI system makes a wrong decision, it may be unclear who should be held accountable—the developer, the user, or the AI system itself? (Wachter, Mittelstadt, & Floridi, 2017).

This uncertainty highlights the need for specific legal frameworks to address AI-based systems. Existing legal regulations often fail to fully encompass the complexity and independent decision-making capacity of AI. Therefore, it is essential to clearly define accountability mechanisms and clarify the legal liability areas of AI. This is critical not only for ensuring justice but also for making AI a trustworthy and acceptable technology in society (Gasser & Schmitt, 2019).

Human Oversight in AI-Based Decision-Making Systems

The proliferation of AI-based decision-making systems has underscored the necessity of maintaining human oversight over these systems. Human oversight refers to the process of monitoring, evaluating, and, when necessary, correcting the decisions made by AI. This oversight is crucial

to ensuring that AI adheres to principles of justice and equality and to preventing potential errors (Floridi et al., 2018).

Human oversight serves two primary purposes: first, to ensure that the decisions made by AI are ethically and legally appropriate; second, to guarantee that AI's decisions align with societal norms and values. For example, an AI system in the healthcare sector may automatically make treatment decisions for a patient. However, if these decisions are not reviewed by a doctor, they could result in unfair or erroneous outcomes (Mittelstadt, Allo, Taddeo, Wachter, & Floridi, 2016).

Human oversight can also address the transparency and explainability issues associated with AI-based systems. The decisions made by an AI system should be understandable, and their reasoning should be explicable. Therefore, human oversight is necessary to comprehend the logic behind AI's decisions and to question them when needed. Including humans in the decision-making process provides the opportunity to detect and correct AI biases and errors, thereby ensuring justice is upheld (Binns, 2018).

Protecting the Right to a Fair Trial and AI Systems

The right to a fair trial is a fundamental legal principle that ensures individuals are subject to an impartial and independent judicial process. The integration of AI-based decision-making systems into judicial processes poses new challenges for the protection of this right. While the use of AI in judicial processes can contribute to faster and more consistent court rulings, it also carries the risk of jeopardizing the right to a fair trial (Završnik, 2019).

The use of AI systems in judicial processes raises several critical issues. First, the impartiality of AI's decisions must be questioned. Since AI systems base their decisions on historical data, any biases present in that data could be reflected in judicial decisions, potentially leading to discrimination and injustice (Angwin, Larson, Mattu, & Kirchner, 2016).

Second, the decisions made by AI systems must be explainable and transparent. The right to a fair trial requires that individuals understand the judicial process and have the opportunity to defend their rights within it. If the decisions of an AI-based system are incomprehensible or

unexplainable, this right may not be fully protected (Doshi-Velez & Kim, 2017).

Finally, the integration of AI systems into judicial processes should not completely eliminate the role of human judges. Human judges possess the ability to make decisions based on ethical, moral, and societal values. Replacing human judges with AI could complicate the delivery of value-based decisions and result in shortcomings in ensuring justice (Calo, 2017).

5. Application Areas: The Impact of AI-Based Decision-Making Systems in Various Sectors

AI Applications in the Judicial System: Potential Risks and Opportunities

The use of AI-based systems in judicial processes has the potential to fundamentally alter the functioning of law and the administration of justice. Implementing AI in the judiciary can contribute to faster and more consistent handling of cases and facilitate more objective decision-making. However, along with these advantages, significant risks also arise.

Opportunities:

- Speed and Efficiency: AI-based systems can quickly analyze large volumes of legal documents and provide decision recommendations based on previous cases. This can accelerate court processes and improve the overall efficiency of the judicial system (Sourdin, 2018).

- Consistency: AI can enhance the consistency of judicial decisions by offering similar recommendations in similar cases, which is particularly advantageous in complex legal systems where consistency is key to ensuring justice.

- Predictability: AI systems can be used to predict possible outcomes for certain cases, helping the involved parties to better understand what to expect throughout the process (Bench-Capon, 2019).

Risks:

• Bias and Discrimination: AI systems can be influenced by the biases present in the datasets they were trained on, potentially leading to discriminatory decisions. For instance, historical discrimination against certain groups may not be recognized by AI, leaving these groups disadvantaged once again (Angwin et al., 2016).

• Lack of Transparency and Explainability: Understanding how and why decisions are made in AI-based judicial systems can be challenging, which may undermine individuals' right to a fair trial and erode trust in the judicial system (Wachter, Mittelstadt, & Floridi, 2017).

• Reduction in Human Judgment: The integration of AI systems into judicial processes could reduce the role of human judges. While human judges can make decisions based on ethical and moral values, AI may overlook these human elements (Calo, 2017).

AI in Public Policy and Social Services

AI is increasingly becoming an important tool in public policy formation and the delivery of social services. AI can enhance the effectiveness of public policies by analyzing large datasets and helping to deliver social services more efficiently and in a targeted manner. However, the use of AI in this field also carries certain risks.

Opportunities:

• Policy Analysis and Development: AI can assist governments and public institutions in making more effective policy decisions by analyzing societal data. For example, the effectiveness of healthcare services in a region can be analyzed using AI, leading to recommendations for addressing shortcomings (Mazzucato & Ryan-Collins, 2019).

• Targeted Social Assistance: AI can more accurately identify those in need and ensure that social assistance is distributed in a more targeted manner. This allows for more efficient use of public resources and more effective combat against poverty (Eubanks, 2018).

• Data-Driven Decision-Making: AI enables governments and public institutions to make decisions based on large datasets, ensuring that public policies are grounded in scientific evidence (Floridi et al., 2018).

Risks:

- Data Privacy and Security: The use of AI in public policy and social services requires the collection of large amounts of sensitive data. Misuse of this data could result in violations of individuals' privacy rights (Gasser & Schmitt, 2019).

- Bias and Injustice: Biases in the data used to train AI systems can result in public policies that are unjust to certain groups. For example, an AI-based social assistance system could exclude or misclassify certain ethnic or social groups (Obermeyer et al., 2019).

- Accountability Issues: When public policies are determined by AI, it may be unclear who is responsible for these decisions. This can weaken accountability mechanisms (Mittelstadt et al., 2016).

The use of AI in public policy and social services has the potential to provide significant societal benefits, but the ethical, legal, and social implications of this technology must be carefully considered.

AI in Private Sector Decision-Making: Finance, Healthcare, and Employment

AI-based decision-making systems have a significant impact in various sectors within the private sector, including finance, healthcare, and employment. The use of AI in these areas can contribute to more efficient business processes, cost reductions, and better outcomes. However, alongside these benefits, there are also challenges and risks.

Finance:

- Opportunities: AI can be used in finance for risk management, fraud detection, and investment decisions. The combination of big data analytics and AI allows for more personalized and accurate financial services (Baker & Filbeck, 2020).

- Risks: Bias in financial decisions made by AI could lead to discrimination against certain customer groups. Additionally, the lack of transparency in algorithms could undermine investors' and customers' trust in the decision-making process (O'Neil, 2016).

Healthcare:

- Opportunities: AI can revolutionize healthcare by enabling disease diagnosis, treatment planning, and patient monitoring. By analyzing large datasets, AI facilitates early disease detection and the development of personalized treatment methods (Topol, 2019).

- Risks: Bias in AI systems used in healthcare could lead to certain patient groups receiving incorrect diagnoses and treatment. Moreover, the replacement of human doctors with AI as decision-makers could raise ethical concerns and lead to violations of patient rights (Floridi et al., 2018).

Employment:

- Opportunities: AI can improve efficiency in recruitment processes by helping to identify the most suitable candidates. AI-based systems can analyze large datasets and enable unbiased, data-driven hiring decisions (Bessen, 2019).

- Risks: The use of AI in employment processes introduces risks of discrimination and bias. Algorithms may be biased against certain genders, ethnicities, or age groups, leading to the unfair distribution of job opportunities. Additionally, excluding the human factor in workplace decision-making processes could create ethical and social problems (Tene & Polonetsky, 2017).

6. Ethical Considerations: The Intersection of AI and Human Rights

The Ethical Dimensions of AI-Based Decision-Making Systems

The ethical dimensions of AI-based decision-making systems are directly related to the impact of these technologies on human life. The integration of AI into human decision-making processes raises various ethical and human rights issues. The capacity of these systems to make decisions without human intervention necessitates a reevaluation of fundamental ethical principles such as justice, equality, autonomy, and human dignity (Floridi et al., 2018).

The ethical dimensions of AI become particularly evident in fields where these technologies are used in decision-making processes. For instance, the role of AI in the judicial system, healthcare sector, or employment processes is critical not only from a technical accuracy or efficiency

perspective but also in terms of human rights and ethical principles. For AI to be effectively utilized in decision-making processes, these technologies must be ethically acceptable (Binns, 2018).

In this context, considering the ethical dimensions of AI requires the establishment of ethical guidance and oversight mechanisms both during the development of the technology and in its application areas. These mechanisms aim to ensure that AI is used in a manner respectful of human rights and aligned with societal values (Floridi & Cowls, 2019).

Ethical Principles Such as Human Dignity, Autonomy, and Data Privacy

Some of the fundamental principles that must be considered in the ethical evaluation of AI-based decision-making systems include human dignity, autonomy, and data privacy. These principles are essential for the societal acceptance of AI and its fair use.

Human Dignity: Human dignity refers to the inherent worth and value of each individual. Designing AI systems in a way that respects human dignity ensures that these technologies are integrated into human life with respect. The use of AI in decision-making processes may lead individuals to feel judged or evaluated by a machine. Therefore, it is important that AI systems are balanced with human intervention to prevent undermining human dignity (Nuredin, A., & Nuredin, M. 2023).

Autonomy: Autonomy is the ability of individuals to make independent decisions about their lives. The use of AI-based systems in decision-making processes could threaten this autonomy (Selimi & Useini, 2019). For instance, an AI system making automatic decisions about individuals' health conditions might overlook whether these decisions align with the individuals' preferences and rights. In such cases, AI must respect and protect individuals' autonomy rights (Mittelstadt et al., 2016).

Data Privacy: AI systems often process large datasets to make decisions. These datasets may contain personal information, making data protection crucial for ensuring privacy (Selim, Ali & Ristevski, 2024). AI systems must respect individuals' privacy rights during the processes of data collection, processing, and storage, avoiding any violations of these rights. Breaches of data privacy can harm individuals' privacy and are ethically unacceptable (Gasser & Schmitt, 2019).

These ethical principles are vital for increasing societal acceptance of AI-based systems and ensuring that these technologies are used in harmony with human rights. Violating these principles not only has negative effects on individuals but can also undermine the social legitimacy of AI.

Ethical Evaluations from the Perspective of Justice and Equality

Justice and equality are fundamental reference points in the ethical evaluation of AI-based decision-making systems. The fair and equitable use of these technologies fosters societal trust and acceptance. However, the violation of these ethical principles in the development and application of AI systems can exacerbate existing social inequalities and hinder the administration of justice.

Justice: The principle of justice requires the protection of individuals' rights and the fair distribution of societal resources. For AI-based systems to make just decisions, they must operate without bias and partiality. However, biases present in the datasets used to train AI can lead these technologies to produce unjust outcomes. Therefore, ethical oversight mechanisms must be developed to ensure the fair operation of AI systems (Završnik, 2019).

Equality: The principle of equality envisions that all individuals have equal rights and that these rights are recognized without discrimination. It is critical that AI-based decision-making systems do not lead to discrimination, especially in areas such as employment, healthcare, and education, where AI's non-discriminatory decisions are essential for ensuring social equality (Selim & Ali, 2022). In this context, AI systems must be designed with an equitable approach and subjected to continuous monitoring and improvement processes to uphold this principle (Binns, 2018).

7. Future Perspectives: The Evolution of AI and Human Rights

The Future Development of AI Technologies and Their Impact on Human Rights

Artificial intelligence (AI) technologies are rapidly evolving and are expected to become even more complex and influential in the future. This evolution will deepen their impact on human rights. The future development of AI will bring both opportunities and threats. In this

process, carefully assessing the positive and negative effects of AI on human rights will be critical to ensuring that these technologies are used in accordance with the principles of justice and equality (Floridi et al., 2018).

Opportunities:

- Advancement of Human Rights: AI has great potential to extend and protect human rights for a broader audience. For example, AI-based systems can detect human rights violations more quickly and facilitate rapid interventions. Additionally, AI can contribute to a more equitable distribution of fundamental rights, such as education, healthcare, and justice (Scherer, 2016).

- Inclusivity and Accessibility: AI can help make services more accessible. For example, AI-supported technologies developed for individuals with disabilities can enhance their participation in society and improve their quality of life (Sharkey, 2018).

Threats:

- Restriction of Privacy and Freedoms: The development of AI can lead to more comprehensive processes of collecting, monitoring, and processing personal data. This could result in serious human rights issues, such as violations of privacy and restrictions on individual freedoms (Zuboff, 2019).

- Deepening of Bias and Discrimination: The data-driven nature of AI could perpetuate and exacerbate existing biases and discrimination. If these systems are not developed according to ethical principles, they could deepen existing social inequalities (Eubanks, 2018).

The future development of AI technologies presents both promising and concerning aspects from a human rights perspective. To ensure that these technologies positively impact human rights, it is important that their development is supported by ethical and legal oversight.

Redefining Justice and Equality Norms in the Age of AI

The development of AI technologies will require the redefinition of justice and equality norms. The increasing role of AI in decision-making processes challenges traditional understandings of justice and equality,

necessitating their adaptation to the dynamics of the digital age. This process will present new questions and challenges for both legal scholars and ethicists.

Redefining Justice:

- Transparency and Accountability in Decision-Making Processes: In the age of AI, the concept of justice may be redefined to emphasize the transparency and accountability of decision-making processes. The ability to understand and question the decisions made by AI systems is crucial for ensuring justice. Therefore, the future definition of justice will focus not only on the outcome of a decision but also on how that outcome was reached (Floridi & Cowls, 2019).

- Redistributive Justice: AI technologies may also necessitate the redefinition of justice in terms of the redistribution of resources. AI's ability to distribute economic and social opportunities fairly could enhance the welfare of broad segments of society. In this process, the scope of justice may extend beyond legal decisions to encompass the protection of social and economic rights (Završnik, 2019).

Redefining Equality Norms:

- Equality of Opportunity: In the age of AI, equality must be reevaluated in terms of access to opportunities. AI is expected to provide equal opportunities in areas such as education, healthcare, and the job market. However, this equality must be assessed not only at the starting point but also in terms of outcomes. Even if equal opportunities are provided, how these opportunities are realized will define the scope of equality norms (Binns, 2018).

- Inclusive Technologies: The development of AI requires the creation of inclusive technologies that address the needs of different social groups. This is important to ensure that AI benefits not just a select few but the entire society. Equality norms should encompass this inclusivity and the protection of the rights of diverse groups (Eubanks, 2018).

The redefinition of justice and equality norms will be a fundamental aspect of shaping social order in the age of AI. In this process, the contributions of legal and ethical disciplines will ensure that these norms are developed in alignment with human rights.

The Future of International Law and Regulations Regarding AI

The global proliferation of artificial intelligence technologies is bringing the legal and regulatory frameworks surrounding these technologies into the international arena. The cross-border effects of AI necessitate the development of international legal norms and regulatory mechanisms, in addition to national regulations. In this area, international cooperation and the establishment of standards will be inevitable in the future (Scherer, 2016).

Development of International Law:

- Universal Norms and Standards: The global impact of AI requires that these technologies be developed in compliance with universal legal norms and standards. International law should establish minimum standards for the use of AI, ensuring that these technologies are aligned with human rights. These standards should cover fundamental principles such as data privacy, ethical use, and the prevention of discrimination (Floridi et al., 2018).

- International Cooperation: The development of international law and regulations regarding AI necessitates global cooperation. International organizations, governments, and civil society organizations must work together to ensure that AI is used fairly and respectfully towards human rights. This cooperation should include the creation of mechanisms to ensure the ethical and legal oversight of AI, extending beyond national borders (Gasser & Schmitt, 2019).

The Future of Regulatory Frameworks:

- Harmonized Regulations: Harmonizing AI-related regulations at the international level ensures that practices and standards in different countries do not conflict with one another. This will play an important role in regulating AI's impact on global trade, data flow, and international relations (Wachter, Mittelstadt, & Floridi, 2017).

- Legal Liability Mechanisms: The regulation of AI within the framework of international law must comprehensively address the legal liabilities associated with these technologies. In particular, the compliance of AI decisions with international human rights law should be a cornerstone of future regulatory frameworks (Calo, 2017).

8.Conclusion

Assessing the Long-Term Effects of AI-Based Systems on Justice and Equality

The long-term effects of AI-based decision-making systems on justice and equality are closely linked to how these technologies are developed, implemented, and regulated. As AI becomes increasingly integrated into decision-making processes, it has the potential to transform social structures and legal systems. However, ensuring that this transformation occurs in a fair and equitable manner requires careful evaluation and planning (Floridi & Cowls, 2019).

Effects on Justice:

- Predictability and Consistency: AI-based systems can enhance justice by increasing the predictability and consistency of decisions. However, to ensure these systems operate in line with fundamental principles of justice, they must be transparent and accountable (Binns, 2018).

- Risk of Bias and Discrimination: AI's reliance on datasets for decision-making can perpetuate past biases and deepen discrimination. Therefore, the long-term effects of AI systems must be continuously monitored from a justice perspective, with interventions made when necessary (Angwin et al., 2016).

Effects on Equality:

- Equal Distribution of Opportunities: The integration of AI into decision-making processes can help distribute opportunities more fairly. For example, access to healthcare or employment opportunities can become more inclusive with the influence of AI. However, to achieve this equality, AI must be developed and implemented impartially (Mittelstadt et al., 2016).

- Addressing Social Injustices: AI has the potential to eliminate social injustices, but realizing this potential requires guiding these systems according to ethical and social responsibilities. Otherwise, AI technologies may further entrench existing inequalities (Eubanks, 2018).

The long-term effects of AI-based systems on justice and equality will be shaped by how these technologies are integrated into society. Therefore,

to develop AI in alignment with the principles of justice and equality, these technologies must be continuously monitored, evaluated, and adapted as necessary (Floridi et al., 2018).

Policy Recommendations and Regulatory Requirements

To ensure that AI-based decision-making systems are used fairly and equitably, specific policy recommendations and regulatory requirements must be implemented. Establishing a comprehensive regulatory framework at both national and international levels is essential to minimize the potential negative side effects of these technologies and maximize societal benefits (Scherer, 2016).

Policy Recommendations:

- Transparency and Accountability: The operations of AI systems, the data they are trained on, and the decisions they make should be transparently explained. This transparency allows users to understand the systems and challenge decisions when necessary (Wachter, Mittelstadt, & Floridi, 2017).

- Ethical Oversight Mechanisms: Independent ethical oversight mechanisms should be established to ensure that AI-based systems operate according to ethical principles. These mechanisms must guarantee that AI systems are free from bias and comply with human rights (Gasser & Schmitt, 2019).

- Data Protection Laws: Protecting individuals' personal data is crucial in the application of AI-based systems. Strong data protection laws should safeguard privacy and ensure that AI's data collection processes adhere to ethical standards (Zuboff, 2019).

Regulatory Requirements:

- International Law and Standards: The global impact of AI necessitates the development of international law and standards in addition to national regulations. These standards should ensure that AI is developed and used in compliance with human rights (Floridi & Cowls, 2019).

- Liability and Accountability Framework: A clear legal liability framework should be established for damages resulting from AI's

decisions. This framework should ensure that both developers and users are held accountable (Calo, 2017).

- Fair and Inclusive Access: To ensure justice in access to AI technologies, equitable approaches should be adopted in their development and implementation. This will maximize the societal benefits of AI technologies and ensure that no one is excluded (Eubanks, 2018).

Implementing the above-mentioned policy and regulatory requirements is essential to ensuring that AI-based systems are used fairly and equitably in society. This is necessary both to maximize the potential benefits of AI and to minimize its possible harms.

Recommendations and Final Thoughts on the Fair Use of AI

To ensure the fair use of AI-based decision-making systems, some fundamental principles and recommendations should be considered. These recommendations aim to establish ethical and legal frameworks that will guide the development, implementation, and monitoring of AI technologies.

Recommendations:

- Education and Awareness: Individuals who develop and use AI technologies should be educated about the ethical dimensions and human rights impacts of these systems. This education should aim to ensure that AI is used fairly and responsibly (Mittelstadt et al., 2016).

- Human Oversight: Human oversight and intervention should be maintained in AI-based decision-making processes. This oversight provides the opportunity to review whether AI's decisions are ethically and legally appropriate (Floridi et al., 2018).

- Ethical Guidelines and Guidance: Ethical guidelines and guidance documents should be developed for the development and implementation of AI technologies. These guides should offer concrete recommendations to developers and users to ensure the fair use of AI (Scherer, 2016).

- Societal Participation: Broad segments of society should be involved in the development and implementation processes of AI. This participation ensures that AI technologies are designed and applied in ways that meet societal needs (Završnik, 2019).

AI-based decision-making systems have significant potential to uphold principles of justice and equality in society. However, to realize this potential, the ethical, legal, and societal dimensions of AI must be carefully addressed. The fair and equitable use of AI technologies will facilitate their societal acceptance and ensure their integration in a manner consistent with human rights. In the future, a continuous process of monitoring, evaluation, and improvement will be necessary to ensure that the opportunities offered by AI are assessed fairly and contribute to societal benefit (Floridi & Cowls, 2019).

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