Algorithmic Bias in Artificial Intelligence Systems and its Legal Dimensions

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Abstract: Artificial intelligence algorithms form the foundation of modern intelligent systems, enabling machines to learn, infer, and make decisions independently. These algorithms have achieved significant progress due to the abundance of data and increased computational power, enabling them to solve many complex problems. Despite these benefits, such systems face ethical and legal challenges related to algorithmic bias and its impact on marginalized groups. This necessitates strict legislative interventions.

For these reasons and others, this research focuses on the legal and ethical challenges associated with algorithmic bias in artificial intelligence systems. This issue is one of the most prominent challenges facing these modern systems. It adopts an integrated scientific approach that combines both descriptive and analytical methods. It can also be said research adopted a mixed methodology that combines the quantitative approach by examining previous statistics from reliable sources and the qualitative approach based on analyzing information and correlating results. The research examines the development of artificial intelligence and the effects of algorithmic bias on marginalized groups, such as women and minorities.

The research clarifies the nature and causes of algorithmic bias. It highlights the danger of algorithmic bias to individuals and societies. It also sheds light on the legislative challenges related to algorithmic bias. Additionally, the research reviews global legislations that attempt to address this challenge and examines some Arab legislation, particularly Omani legislation.

The research reached several key findings, including the identification of algorithmic bias. This bias refers to unfair discrimination in intelligent system decisions based on factors such as gender, race, or religion. Algorithmic bias can reinforce patterns of racial discrimination due to distorted data or flawed algorithm design.

European law requires platforms to assess the risks associated with algorithms, including bias. They are also required to submit annual reports to an independent oversight system. As for Arab legislation, the UAE has established a charter for the development and use of artificial intelligence, focusing on algorithmic bias. Meanwhile, Oman explicitly criminalizes all forms of racial discrimination.

The research recommends increasing academic research on the legal frameworks to address the challenges of artificial intelligence and justice. It calls on research centers and decision-makers to create a unified Arab law that addresses algorithmic bias. It also encourages updating current laws to keep pace with technological advancements. Additionally, it urges the Omani legislator to introduce specific laws or clear legislative provisions regarding algorithmic bias.

Keywords: Algorithmic Discrimination, Algorithmic Bias, Artificial Intelligence, Legal Legislations, Legal Frameworks.

INTRODUCTION

Artificial intelligence (AIA) forms the foundation of modern intelligent systems, enabling machines to learn, infer, and make decisions independently. This has revolutionized various fields, such as natural language processing, computer vision, robotics, and recommendation systems. This progress is due to the abundance of data and increased computational power. These algorithms have the ability to process and analyze large datasets, uncover hidden patterns, and extract valuable insights from the data. This enables the algorithms to solve many complex problems and discover hidden patterns within the data. Understanding the concepts and basic types of artificial intelligence algorithms is crucial for comprehending the complexities of AI and its wide applications.

However, with this progress, many ethical and legal challenges arise, especially concerning algorithmic bias. Algorithmic bias raises deep concerns about the injustice that some groups may face due to bias or favoritism. This includes negative impacts on women and religious and social minorities, necessitating strict legislative interventions to address these challenges.

Moreover, the field of AI continues to evolve rapidly, with ongoing research and advancements in algorithmic techniques. Practitioners, researchers, and policymakers must stay updated on the latest developments in algorithms. They also need to understand the strengths and limitations of different approaches (Huda, 2023).

Therefore, legal and technical frameworks need to intervene to ensure that artificial intelligence aligns with the ethical values of society. This helps mitigate the negative effects of bias and enhances the tremendous benefits that these intelligent systems can offer.

The research attempts to add to previous studies by focusing on the legal nature of algorithmic bias and its legal implications. It also sheds light on Arab legislation related to criminalizing algorithmic bias, and specifically addresses Omani legislation related to criminalizing all forms of discrimination, including

algorithmic bias, and attempts to propose specific legislative texts that enrich this contemporary field.

RESEARCH PROBLEM:

With the increasing reliance on artificial intelligence algorithms in modern intelligent systems, significant legal and ethical challenges arise. One of the most prominent of these challenges is algorithmic bias, which can lead to injustice for marginalized groups, including women and religious and social minorities.

This bias requires strict legislative interventions to ensure the fair and responsible use of these technologies. Additionally, the continuous progress in the field of artificial intelligence necessitates keeping up with updates and understanding the strengths and limitations of algorithms. This ensures alignment with the ethical and legal values of society.

Main Research Questions:

- What is algorithmic bias, and what are its causes?
- What are the key ethical challenges associated with the use of artificial intelligence algorithms?
- How does algorithmic bias affect marginalized groups and minorities?
- What legislative actions are necessary to address bias in artificial intelligence algorithms?
- What legal frameworks are required to ensure the responsible and fair use of intelligent algorithms?
- What are the key legal challenges associated with the use of artificial intelligence algorithms?
- What are the prominent global and local legislations that have attempted to address algorithmic bias, and what methods have they employed to do so?

Research Objectives:

- Clarify the nature of algorithmic bias, its main types, and causes.
- Highlight the dangers of algorithmic bias to individuals and societies.
- Shed light on the key legislative challenges related to algorithmic bias.
- Review prominent global legislations that have attempted to address this challenge.
- Examine some Arab legislations and laws, particularly Omani legislation.

Research Importance:

The importance of this research lies in its attempt to address the legal and ethical challenges associated with algorithmic bias in artificial intelligence systems. It also highlights the impact of such bias on marginalized groups in society. The research also highlights the need to develop legislations that ensure the responsible and fair use of these technologies. It also stresses the importance of aligning them with society's ethical values. This contributes to reducing the injustice caused by biased and unequal algorithmic diversity, leading to a more just and equitable society.

RESEARCH METHODOLOGY

The research adopts an integrated scientific approach that combines descriptive and analytical methods. It describes and defines the issue and presents various opinions on it. The research also utilizes the historical method to narrate legislation related to personal data protection. It also occasionally employs a comparative method in presenting legal opinions. Finally, it analyzes the data and opinions to reach the conclusions.

RESEARCH PLAN:

Chapter One: The Nature of Algorithmic Bias, Its Types, and Causes

Section One: The Nature of Algorithmic Bias

Section Two: Types of Algorithmic Bias

Section Three: Causes of Algorithmic Bias

Chapter Two: Legal Dimensions of Algorithmic Bias and the Legislations and Laws Addressing It

Section One: Legal Dimensions of Algorithmic Bias

Section Two: Legislations and Laws Addressing the Issue of Algorithmic Bias

CHAPTER ONE: THE NATURE OF ALGORITHMIC BIAS, ITS TYPES, AND CAUSES

Section One: The Nature of Algorithmic Bias

Algorithms are defined as a set of instructions designed to solve a problem or perform a specific task (Dictionary of Data and Artificial Intelligence, 2022, p. 40). They are originally attributed to the mathematician Muhammad ibn Musa al-Khwarizmi. Algorithms are the foundation of artificial intelligence and one of its most important components (Abdullah & Ahmed, 2009, p. 98; Badr, p. 6).

Algorithmic bias is defined as a deviation in the results of machine learning algorithms that occurs due to biased assumptions during the algorithm development process. It may reflect societal racism and bias against a specific group or result from bias in the training data fed into the artificial intelligence system (How to Overcome Artificial Intelligence Bias, 2022).

AIA differs from traditional algorithms in that it represents the new generation of deep networks. These are a special type of machine learning that mimics the human brain’s approach to computation, learning, and prediction through neural networks. From an engineering perspective, it takes the form of matrices of densely interconnected neural cells linked by a vast number of synapse-like connections. Deep learning adjusts and refines these connections to improve performance, subsequently training them to make decisions based on what is known as “training data” (Zerilli et al., 2019).

Thus, the algorithm can be considered as an encrypted file resulting from the transformation of input data into output through the analysis of training data. It is important to note that artificial intelligence algorithms are responsible for discovering correlations within this data using their neural network, similar to human perception.

Based on the above, algorithmic bias can be defined as unfair discrimination or preference that emerges in the decisions made by computational algorithms or intelligent systems. This bias results in the

differentiation between individuals based on specific factors such as gender, race, religion, social origin, or any other traits (Shahriar et al., 2019).

Algorithmic biases are systematic, recurring errors in artificial intelligence systems. They lead to unfair discrimination or favoritism in AI decisions toward specific groups or individuals (Al-Jbour, n.d).

In this context, a new term has emerged: "Algorithmic Justice," which is defined as the fair and equitable use of algorithms (Sharif, 2024, p. 839).

Section two: types of algorithmic bias

Some researchers have divided algorithmic bias into three types:

1. Interaction Bias: This occurs when a specific group of people interact with an application, influencing its results over time.

2. Latent Bias: An example of this is that the Arabic content on the internet accounts for only 2% compared to the English content, which reaches approximately 55%. Logically, AI-based translation results would be more accurate and better in English.

3. Selection Bias: This arises from the type of data chosen by the programmer to train the artificial intelligence. For example, if a programmer trains an application to distinguish gender (male or female) based on personal images from Twitter profiles, the dataset could introduce bias. Since the United States has the most Twitter users, this imbalance may skew the algorithms (Mustafa, 2020).

Some researchers have divided it into seven types, some of which overlap with the three types mentioned earlier:

1. Sampling Bias (Selection Bias): This occurs when the data does not represent the actual reality, such as face recognition systems trained on images with limited diversity.

2. Exclusion Bias: This results from the removal of important data points during data processing, leading to incomplete information.

3. Measurement Bias: This arises from issues with the accuracy of the data and how it is measured, such as using artificial images to assess a work environment.

4. Recall Bias: This occurs due to inconsistent labeling of similar types of data, which reduces the accuracy of classification.

5. Observer Bias (Confirmation Bias): This is the effect of seeing what the observer expects or wants in the data, leading to biased results.

6. Racial Bias: This occurs when the data is skewed in favor of a particular population group, such as the inaccuracy of facial recognition for certain races.

7. Association Bias: This occurs when the data reinforces existing cultural biases, such as associating certain jobs with a specific gender (Hassan & Aflah, 2023, p. 445).

Section three: causes of algorithmic bias

First: Biased Data: Tristan Green, an American AI expert, states, "Machines by nature do not have bias, and AI does not want something to be right or wrong for reasons that cannot be explained by logic. Unfortunately, there is

human bias in machine learning due to the creation of data algorithms, and so far, no one has attempted to solve this massive issue (Mohamed, 2018).

The author Noble argues that digital racism results from the racism of programmers who reflect their thoughts and opinions in their designs. This means that the suggestions of these engines are merely a human representation of the developers' biases and their ignorance of the negative social consequences of their technologies (Noor & Hafsa, 2018).

An example of biased data in practice is when a Black researcher discovered it by chance while testing a facial recognition program. It did not recognize her face but could identify white individuals. She then tried using a white mask and was immediately recognized (Sikina, 2023).

There has also been bias found in the workplace due to previously used hiring criteria that reflected certain biases. Over time, algorithms learn this bias and replicate it in the process of selecting job applicants' profiles (Al-Zahra, 2023, p. 22).

Second: Defective Algorithms: An example of this in the workplace is when programmers design algorithms with biased hiring criteria. For instance, they may assume that women are unsuitable for factory work or that white individuals are more deserving of managerial positions (Al-Zahra, 2023, p. 23).

Therefore, one of the sources of bias in these systems is the algorithms themselves, as defective algorithms can amplify biases through feedback loops. An example of this is a word embedding algorithm that associates European names with positive qualities while associating African American names with negative ones (Pierream, et al. (n. d), p. 166).

Third: Generalizations: This occurs when AI systems are programmed with a certain idea and generalized. For example, assuming people with beards are extremists or individuals with dark skin are dangerous can lead to false alarms against innocent people (Taha, 2020).

Bias can also occur when results cannot be generalized broadly. While bias is often thought of as arising from preferences or exceptions in training data. It can also be introduced through how the data is obtained, how the algorithms are designed, and how the terminology of artificial intelligence is interpreted (Siwicki, 2021).

Fourth: Sample size: Other technical factors enhance algorithmic bias, such as disparities in sample size. Since machine learning algorithms are essentially statistical tools, they struggle with handling discrepancies in sample sizes. The algorithm may also face difficulties in capturing certain cultural effects when the population is divided into multiple segments (RAND Corporation, 2017).

Some researchers have argued that the root of algorithmic bias lies in humans, stating: "When we talk about artificial intelligence, we are talking about people." Humans design artificial intelligence algorithms, and humans remain the primary beneficiaries of all AI applications we use daily. This explains why we must start viewing algorithmic bias not just as a technical issue but as a human one. Thus, we need to adopt a new perspective. When it

comes to algorithmic bias, two main issues must be addressed: the input data and the definition of success.

The key question now is: Are the available data complete? Do they represent all people? If not, the predictions made by the algorithm will inevitably be biased. However, the real issue is that we, as humans responsible for designing AI systems, are naturally and subconsciously biased. Human bias is exponentially more complex than AI system bias (Seneor, Abby, & Mezzanotte, 2022).

CHAPTER TWO: THE LEGAL DIMENSIONS OF ALGORITHMIC BIAS AND THE LEGISLATIONS ADDRESSING IT

Section One: The Legal Dimensions Of Algorithmic Bias:

With the widespread use of artificial intelligence systems based on flawed algorithms that were later found to be biased toward a particular race, religion, or gender, significant concerns have arisen. One of the most notable examples is biased criminal inference systems, through which predictive policing assesses the risk level of suspects. This has, in some cases, led to unjust arrests or wrongful accusations based on personal characteristics.

One of the most well-known systems is the COMPAS system. This system employed biased algorithms against African Americans by assigning them a higher risk score for criminal behavior compared to white Americans. This bias resulted in prolonged pretrial detention or harsher criminal sentences based on the algorithm's biased evaluations (Criminal Law, 2017).

Multiple studies in the United States have shown the presence of algorithmic bias against Black individuals in the healthcare sector, leading to the denial or reduction of healthcare services for them (Ziad, 2019).

In the workplace, some company algorithms have tended to reject applicants over forty and those with disabilities (Sharif, 2024, p. 840).

Algorithmic bias has also impacted individuals' credit status, as algorithms have tended to discriminate in loan approval based on race, gender, or address (Elegido, 2015).

Social media platforms provide a fertile environment for the growth of racist and hateful speech despite numerous attempts to adjust their algorithms (Taha, 2020). It has become clear that biased algorithms control what is published or blocked. Not based on clear criteria but rather with discrimination based on race, country, religion, or politics. Human rights apply equally to all people, and standards should be uniform and applicable to everyone.

Artificial intelligence relies on specific algorithms based on defined databases, which may include intentional or unintentional bias. This can lead to discrimination against certain groups or communities. For example, if a model is trained on data containing historical bias, this could result in discriminatory outcomes in areas such as employment, lending, and more. This contradicts the principle of the right to equality and non-discrimination (Murtada et al., 2024).

The way algorithms operate may restrict access to certain information while directing individuals to view specific content based on algorithmic preferences. This can influence a person's decision or choice while blocking

other information that may be equally important. This contradicts the principle of the right to access information (Murtada et al., 2024).

Regarding addressing the issue of algorithmic bias, the RAND Corporation has confirmed that these algorithms have become a reality that cannot be ignored. Other options are available to deal with the current data flood, especially in crime prediction and investigation. This requires transparency in these algorithms to foster greater awareness among users who can understand AI technologies and their capabilities and comprehend the results they produce (Murtada, et al., 2025).

The question here is: what is the legal nature of algorithmic bias?

As shown above, algorithmic bias is a form of racial discrimination. Contrary to the belief that AI systems are inherently neutral, their biased algorithms prevent such neutrality. These algorithms are based on data analysis and the extraction of links and relationships that may be distorted by the discrimination they are trained on. Additionally, the algorithms themselves may have flawed or biased designs, leading to the reproduction and even reinforcement of biased trends (Zaghloul, 2023, p. 211).

Therefore, algorithmic bias is a form of racial discrimination, and as such, it falls under legal provisions that criminalize all forms of racial discrimination, including the U.S. federal criminal code in Section 245 (U.S. Code § 245, Federally Protected Activities).

UNESCO has stated that another aspect of AI systems is their role in deepening gaps and inequalities. Therefore, it is essential to establish international and national regulatory frameworks to ensure that this technology benefits humanity rather than causing harm.

UNESCO has proposed a comprehensive global regulatory document to establish AI on an ethical foundation that protects and promotes human rights. This would serve as an ethical compass, ensuring the respect of the law in the digital world (UNESCO).

However, there is a real challenge in determining the ethical values that should be taught and then programming them into systems. This requires experts in human values, philosophy, psychology, religion, and other fields (Thaer, 2015).

Although efforts have been made to remove bias from AI systems, this remains difficult. This is partly because they still rely on humans for training by determining the quality of input data. Upon further examination, we see that there are many factors that need to be taken into account.

However, building a culture of reporting, accountability, ethics, and auditing in the field of AI means that there will be future opportunities to identify and stop bias in data, algorithms, or systems (Hassan & Aflah, 2023, p. 448).

It is known that research in the field of artificial intelligence falls under private law. Therefore, it may have ethical considerations that do not necessarily align with societal preferences. This gap can be avoided through

objective discussions that take into account all the perspectives that AI might raise within society (Qaraza, & Qas'a Su'ad, 2022).

Section Two: Legislation and Laws Addressing the Issue of Algorithmic Bias

First: Global Legislation:

In 2019, the U.S. Senate saw the introduction of the Algorithmic Accountability Act by several lawmakers. The bill requires companies to correct faulty algorithms that result in inaccurate, unjust, or discriminatory decisions and to ensure greater transparency, promoting justice and equality in algorithm usage. Algorithms should not be exempt from anti-discrimination laws (Al-Zahra, 2023, p. 29).

It was amended in 2022, with a focus on: Transparency: Requiring companies to disclose details about how their algorithms function. Justice: Preventing algorithms from discriminating against specific groups. Evaluation: Conducting regular assessments to ensure algorithms are free of biases. The amendment also called for imposing penalties on violators.

This bill is expected to contribute to protecting individuals' rights and ensuring the justice of decisions made by automated systems. It may also increase public trust in technology.

However, there are challenges that this bill and others may face, the most important of which are: the precise definition of algorithmic bias. Additionally, a balance must be achieved between the need to regulate algorithms and encouraging innovation in the field of artificial intelligence. Implementing this law could be complex and require substantial resources (Sharif, 2024, p. 859).

In 2021, UNESCO issued a specific recommendation regarding the ethics of artificial intelligence. Paragraphs 13 and 16 emphasize the importance of respecting, protecting, and promoting human dignity and rights in accordance with international law. They also highlight the need to ensure freedom throughout AI systems' entire lifecycle. Technological means should provide new tools for advocating, defending, and exercising human rights and should not lead to violations of these rights (Recommendation on the Ethics of Artificial Intelligence).

AI systems rely on a common set of processes, such as data collection, processing, model building, and pattern recognition. These various components also form the sequential stages in the development of an AI system, known as the "AI lifecycle."

The lifecycle should begin at the conceptualization or problem-definition stage, where the decision is made on whether to develop an AI tool. Tools that do not align with human rights in terms of design should not proceed beyond this stage. Many systems that international human rights organizations call for banning or preventing are present.

The lifecycle of an AI system highlights earlier flaws, such as those occurring during the data collection stages. These flaws can have downstream effects during the model-building and deployment stages. These effects will not be prevented unless interventions that protect rights are implemented at every stage of the lifecycle (Artificial Intelligence & Human Rights, 2024).

In 2022, the European Council reached an agreement on a new law concerning digital services, identified as Regulation 2022/2025, which came into effect on November 16, 2022. The implementation of this law began across the European Union on February 17, 2024 (Stephan, 2024).

The European Digital Services Act (DSA) seeks to regulate the operations of major digital platforms. It specifically targets tech giants with over 45 million active monthly users in the European Union. The law aims to make the Internet a safer and more accountable space. It focuses on regulating the algorithms used by these platforms. It aims to prevent bias and ensure transparency in managing digital content.

The law requires platforms to disclose how their algorithmic systems function. It also mandates assessing societal risks from their services through an independent oversight system. This includes evaluating the risks associated with algorithm design and its impact on fundamental rights, such as freedom of expression and non-discrimination. The law also requires platforms to assess the risks of bias in their algorithms and take preventive measures to minimize them. This includes testing and adjusting the algorithms as needed and reporting any biases discovered.

The law established the position of "Digital Services Coordinator" within each organization to oversee compliance with the law. Fines are imposed for violations, particularly those involving identifying and correcting biases in algorithms. These fines can reach up to 6% of the company's global annual sales.

The European Union also established the "European Center for Algorithmic Transparency" (ECAT) in April 2023 to oversee the accuracy and neutrality of algorithms. Its goal is to provide technical assistance and practical guidance for enforcing the law. One of its key activities includes conducting algorithmic system inspections to support the enforcement of the Digital Services Act. It also conducted technical tests on algorithmic systems to enhance understanding of how they function. It provides advice on the necessary measures to ensure regulatory bodies and researchers have access to data and are involved in scientific research and foresight. This law is considered a radical shift in internet regulation in Europe, aiming to protect users from algorithmic biases and ensure the accountability of digital platforms (ECAT).

The city of Amsterdam has also initiated the creation of a registry for algorithms used in government services. This initiative aims to reduce AI bias and enhance transparency and accountability. The registry documents all stages of algorithm development and encourages public and expert participation in improving them. This initiative also aims to build citizens' trust in AI systems and ensure the provision of fair and equitable services for all. It emphasizes ethical considerations and works to avoid potential biases. Other European cities have followed suit in this initiative (Amsterdam Algorithms, 2024).

Second: Arab Legislation:

Egyptian Legislation:

Egyptian legislation criminalizes discrimination and incitement to hatred, as stated in Article 40 of the 2014 Constitution, amended in 2019. It criminalizes discrimination between individuals on any basis in detail in Article 161 bis, which states: "Anyone who commits an act or refrains from doing an act that results in discrimination between individuals or against a group of people based on gender, origin, language, religion, or belief. This discrimination leads to the violation of the principle of equal opportunity and social justice or disrupts public order. The punishment included imprisonment and a fine of not less than thirty thousand Egyptian pounds and not exceeding fifty thousand pounds, or either of these penalties."

The second paragraph of this article intensifies the penalty if the crime is committed by a public employee, a public servant, or anyone tasked with providing a public service. It states that the penalty shall be imprisonment for a period not less than three months and a fine not less than fifty thousand Egyptian pounds and not exceeding one hundred thousand pounds, or one of these penalties. These penalties happen if a public employee, a public servant, commits the crime referred to in the first paragraph of this article. Or anyone tasked with public service.

Looking at the behavior that constitutes the material element of the crime of discrimination. This includes any action or failure to act that results in discrimination between individuals or against a group of people based on gender, origin, language, religion, or belief. This can lead to violations of the principles of equal opportunities and social justice or disruption of public order. Although the legislator has not explicitly stated that algorithmic bias is one form of discrimination, it undoubtedly falls within the actions that constitute the material element of the crime. This is because such bias can lead to discrimination between individuals based on specific human characteristics. That includes gender, origin, language, religion, and other factors, among others.

Algorithmic bias is, therefore, punishable under Egyptian law as a form of racial discrimination. However, due to the rarity of such cases in Egypt, there have been no judicial applications of this law. This is because Egypt lacks large online platforms, search engines, or tech companies. However, the aforementioned legal provision encompasses this newly emerging form of discrimination (Sharif, 2024, p. 855).

Dr. Mahmoud Salama Al-Sharif proposed an amendment to explicitly criminalize algorithmic bias in a third paragraph of Article 161, with a stricter penalty for this behavior. He argued that the criminal severity of algorithmic bias is more significant than other forms of racial discrimination. This is because of its systematic secrecy in the discrimination between individuals, which contradicts the principles of transparency and algorithmic justice. The difficulty in detecting algorithmic bias is one of its risks, as algorithms are often confidential, with details disclosed only to programmers and experts. Additionally, algorithms are extremely complex, making it challenging to understand how they work and identify potential biases within them. This

emphasizes the need to include an aggravating circumstance in the law. It should explicitly state that the use of biased algorithms is known. Alternatively, the refusal by a company to correct biased algorithms within a specified period should be addressed, especially if they were unaware of the bias initially (Sharif, 2024, p. 855).

The United Arab Emirates:

The United Arab Emirates launched the Artificial Intelligence Development and Use Charter on June 10, 2024. The issue of algorithmic bias was made one of the primary priorities and focal points of the charter. Regarding algorithmic bias, the charter emphasized the following:

The UAE aims to address the challenges posed by AI algorithms concerning algorithmic bias, significantly contributing to providing a fair and equal environment for every individual in society. This will lead to the responsible development of AI technologies that are inclusive and accessible to all, support diversity, and respect individual differences. This ensures equal technological benefits and improves the quality of life without exclusion or discrimination (Charter for the Development and Use of Artificial Intelligence).

Third: Omani Legislation:

Oman has not issued a specific law to criminalize algorithmic bias, but the Sultanate's existing legislative texts and laws contain provisions rejecting all forms of discrimination and bias.

The Sultanate has enacted laws that criminalize any act of racial discrimination. The Omani Penal Code, issued by Royal Decree No. 7/74, criminalizes any call for racial discrimination, including the promotion of religious or sectarian sentiments. Article 130bis of the Omani Penal Code stipulates that anyone who promotes religious or sectarian strife or incites hatred or animosity among the people will be punished. The punishment includes temporary imprisonment for a period not exceeding ten years.

In the context of equal treatment before the law, Article 17 of the Basic Law of the State states: “All citizens are equal before the law, and they are equal in public rights and duties. There shall be no discrimination between them based on gender, origin, color, language, religion, sect, domicile, or social status.”

In terms of the citizen’s security and protection from harm, Article 18 of the Basic Law of the State states: “Personal freedom is guaranteed according to the law. No person shall be arrested, searched, detained, imprisoned, or restricted in their place of residence. Or have their freedom of residence or movement restricted except in accordance with the provisions of the law.”

In the area of freedom of thought, opinion, and expression, Article 29 of the Basic Law of the State explicitly ensures this by stating: “Freedom of opinion and its expression by speech, writing, and all means of expression is guaranteed within the limits of the law.” Additionally, Article 31 of this law affirms: “Freedom of the press, printing, and publication is guaranteed according to the conditions and regulations defined by the law. Anything that

leads to sedition threatens the security of the state or insults human dignity and rights is prohibited."

In the economic, social, and cultural fields, Articles 11-13 of the Basic Law of the State guarantee citizens' rights in these areas. Article 11, in particular, outlines several economic principles upon which the system of governance in the Sultanate is based. These principles aim to promote justice, equality, freedom, and human dignity, ensuring that individuals can live and experience their humanity. This is achieved by enacting appropriate legislation that guarantees individuals the exercise of their economic freedom and the right to own property, either individually or in partnership with others.

The Omani Labor Law, issued in 2003, includes a set of principles emphasizing the equality of all workers, regardless of their nationality, gender, religion, or any other differences among humans. In its first article, the Omani Labor Law defines a worker as any natural person, whether male or female, who works for a wage of any kind under the administration or supervision of an employer. The definition of a worker, as protected by the law in Oman, is comprehensive and includes all workers without discrimination based on their gender or nationality. Similarly, the definition of an employer is free from any description or qualification that would suggest any form of discrimination or differentiation. The prohibition of discrimination, as outlined in the Labor Law, goes beyond the general and broad definition. It extends to all the consequences arising from the employment contract, including the worker's rights related to wages, annual or sick leave, end-of-service benefits, and other entitlements (Article 9 of the Convention, 2004).

In addition to Oman's accession to the Arab Charter on Human Rights, Royal Decree No. 16/2023 was issued, approving Oman's membership in the Arab Charter on Human Rights (Published in Official Gazette No. (1486)).

Article 3 of the Arab Charter on Human Rights stipulates:

1. Each State party to this Charter undertakes to ensure that every person within its jurisdiction enjoys the rights and freedoms set forth in this Charter. This protection must be provided without discrimination based on race, color, sex, language, religion, opinion, or thought. It also extends to factors such as national or social origin, wealth, birth, or physical or mental disability.

2- The States parties to this Charter shall take the necessary measures to ensure actual equality in the enjoyment of all the rights and freedoms outlined in this Charter. Ensuring protection from all forms of discrimination for any of the reasons mentioned in the previous paragraph.

3- Man and woman are equal in human dignity, rights, and duties in light of the positive discrimination recognized by Islamic law and other divine laws. As well as the legislation and agreements in force for the benefit of women. Accordingly, each State party undertakes to take all necessary measures to ensure equal opportunities and actual equality between women and men in enjoying all the rights contained in this Charter.

Article 11 of it states:

All individuals are equal before the law and have the right to enjoy its protection without discrimination.

CONCLUSION

FIRST: KEY FINDINGS:

1- Algorithmic bias is defined as unfair discrimination or preference that appears in decisions made by computational algorithms or AI systems. That leads to the differentiation of individuals based on certain factors such as gender, race, religion, social origin, or other characteristics.

2- Algorithmic bias is a form of racial discrimination. Contrary to the belief that AI systems are completely neutral, their biased algorithms prevent this neutrality. This is because these algorithms are based on data analysis and the extraction of links or relationships. That may be distorted by the data used to train the algorithms or by flawed designs, which can lead to the production and reinforcement of biased trends.

3- Algorithmic bias is a form of racial discrimination, and as such, it falls under legal provisions that criminalize all forms of racial discrimination. That includes the U.S. Federal Penal Code and the European Union legislation.

4- Research in the field of artificial intelligence is part of private law, and as such, it may have ethical considerations that do not necessarily align with societal preferences. This gap can be addressed through objective discussions that take into account all perspectives that AI may raise in society.

5- In 2021, UNESCO issued a special recommendation on the ethics of artificial intelligence. In paragraphs 13 and 16, the respect for human dignity and rights, as well as their protection and enhancement, is stated. This is in accordance with international law ensures freedoms throughout the lifecycle of AI systems. Technological means should provide new tools to advocate for, defend, and exercise human rights and should not lead to violations of these rights.

6- European law requires platforms to disclose how their algorithmic systems work and to assess the societal risks resulting from the use of their services through an independent regulatory system. This includes evaluating the risks associated with algorithm design and its impact on fundamental rights, such as freedom of expression and non-discrimination. The law also requires platforms to assess the risks of bias in their algorithms and take preventive measures to mitigate these risks.

7- Algorithmic bias is considered punishable under Egyptian legislation as a form of racial discrimination. Even though there have been no judicial applications for this behavior due to its rarity in Egypt. As there are no large-scale platforms, search engines, or huge tech companies operating on the internet there.

8- Among the pioneering projects in the Arab world to combat algorithmic bias is the United Arab Emirates' launch of the Artificial Intelligence

Development and Usage Charter on June 10, 2024. This charter has made addressing algorithmic bias one of its key priorities and main focuses.

9- No specific law has been issued to criminalize algorithmic bias in Oman, but the legislative texts and laws in force in the country are filled with a rejection of all forms of discrimination and bias. The Sultanate has enacted laws that criminalize any act of racial discrimination. For example, as the Omani Penal Code issued by Royal Decree No. 7/74 criminalizes any call for racial discrimination, including the promotion of religious or sectarian discord. Additionally, the Sultanate has joined the Arab Charter on Human Rights, which calls for the rejection of all forms of racial discrimination.

SECOND: RECOMMENDATIONS:

The research recommends the following:

1- Increasing academic research on the legal frameworks imposed by the challenges of artificial intelligence on justice.

2- The research recommends that governments review and update current laws, regulations, and guidelines. To address emerging challenges and regulatory gaps and integrate new algorithmic advancements into governance.

3- The research calls upon research centers and decision-makers to collaborate in establishing a unified Arab law on algorithmic bias. To address the legal issues arising from the rapid development of artificial intelligence systems.

4- It is recommended that the Omani legislator introduce a specific law, as it did with the digital privacy law. Or create legislative provisions that explicitly criminalize algorithmic bias, adopting the laws of the European Union and UNESCO recommendations as references in this regard.

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