Discrimination Associated with Artificial Intelligence Technologies

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Abstract

As is known, there has been a significant increase in the use of AI technologies in various fields related to the work of both public and private sectors. Despite its importance in economic, health, security, and educational fields, the use of AI technologies has led to several ethical and legal risks. For example, there are risks of bias or discrimination when building AI systems, challenges related to privacy and data protection, including issues that arise from errors in health protocol procedures and their impact on patient health. This paper aims to highlight a number of practical applications of bias or discrimination associated with the use of AI technologies, concluding with the importance of having clear ethical governance to address the emerging risks of using AI applications.

Keywords: Discrimination – Artificial Intelligence.

Non-discrimination is a fundamental human right, recognized by religions and modern international conventions, following a long struggle throughout human history, and this struggle continues to this day. Therefore, it is essential to protect this right against the risks that may arise from the use of Artificial Intelligence technologies (AI), or "AI-Related Discrimination." However, current laws and regulations combating discrimination have not succeeded in preventing or reducing instances of AI-Related Discrimination. Consequently, there is a need to investigate the necessity of adopting new interpretative approaches or new legal tools to prevent the risks of AI-Related Discrimination. This is a broad topic, both from a judicial perspective and from the scientific and theoretical sectors it addresses, which this paper will attempt to clarify. It is noteworthy that the European Union's AI Act is considered one of the most comprehensive legal systems concerning non-discrimination. Moreover, the EU has made numerous legal efforts prior to the AI Act to combat this discrimination, such as the Data Protection Act. These efforts may provide new tools against AI-Related Discrimination, especially concerning the private sector.

The Nature of AI and Its Associated Discrimination

2.1 Definition of AI

The term Artificial Intelligence (AI) began to emerge in 1955, introduced by John McCarthy during a workshop at Dartmouth College, which brought together researchers interested in artificial neural networks. Although this workshop did not lead to new innovations, it gathered the founders of AI science and contributed to laying the foundation for future AI research.

AI has multiple definitions and no single comprehensive definition has been established. However, for the purpose of this paper, we

present the concept or definition of AI according to the EU AI Act, which defines AI in Article 3 as: "A rapidly evolving set of technologies that can contribute to several broad areas to achieve economic and social benefits across a wide range of industries and social activities, improving prediction, processes, resource allocation, and personalizing digital activities available to individuals and institutions."

AI-based systems can be purely software-based, operating in the virtual world (such as voice assistants, image analysis programs, search engines, and speech and face recognition systems) or embedded in hardware (such as advanced robots, autonomous vehicles, drones, or Internet applications).

On October 20, 2020, the European Parliament approved three directives that clarify the EU's view on regulating various AI-affected issues, promoting innovation, ethical standards, and trust in this technology. These directives are:

1. Intellectual property rights for the development of AI technologies (supporting an effective system to ensure and protect European patent standards).
2. A civil liability system for AI-related issues (proposing a regulatory framework to ensure strict liability for operators of "high-risk" AI systems in the event of damage).
3. Some ethical aspects of using AI software, robots, and related technologies (having a main guideline for human and central control).

Despite these encouraging signs and commendable intentions, legislative attempts remain modest. Many European thinkers, especially legal experts, see them as insufficient given the risks of AI technologies to human freedom and state security, believing that the EU's regulatory and legal agenda is still in its early stages.

2.2 AI-Related Discrimination

While AI technologies provide social and economic benefits to society and various industries, they can also pose unknown risks or severe consequences. One of these emerging risks is AI-Related Discrimination. Despite the seemingly neutral, rational, and unbiased nature of AI and many AI-based decision-making programs, there are inherent risks of violating fundamental rights, including the right to non-discrimination. These risks arise from human design of AI systems; it is unrealistic to believe that AI systems operate independently without human programming. Therefore, the term "AI-Related Discrimination" cannot be separated from human industry.

The nature of AI systems and the fields in which they are used require the application of differentiation techniques such as classification and clustering. Given that these systems are often "black boxes," the decision-making procedures or technical steps taken by AI programs relying on these differentiation techniques are usually opaque. It is difficult to determine whether these decisions are based on discriminatory reasons under the guise of differentiation techniques. If the discriminatory characteristic of AI decision-making cannot be proven, the legal tools and mechanisms to protect the right to non-discrimination cannot be activated. Understanding the reasons behind AI-Related Discrimination involves identifying the discriminatory feature and technical steps used by AI programs, which are crucial to identifying:

1. Problems arising from AI program actions in issuing decisions, such as spam detection, fraud, creditworthiness assessment, or selecting the best job candidate. These are creative (technical) tasks for data engineers and employers. Using AI programs to issue subjective decisions in such areas can cause harmful and discriminatory effects against certain groups.
2. Training data may lead to discrimination in AI decision-making because the training data shapes the model, which then produces specific outcomes. The dataset may be biased due to flawed data collection, leading to incorrect results based on preconceived biased decisions. If training data is biased for these reasons, the resulting data will also be biased,

and non-discriminatory decisions cannot be expected from programs fed with biased training data.

Another step in AI decision-making that can lead to discrimination is setting conditions. The weighting conditions must be sufficiently detailed to identify necessary distinctions in decision-making. Insufficiently detailed conditions may exclude certain individuals. For example, AI systems might place greater value on graduation from prestigious colleges rather than experience in employment decisions, systematically excluding certain groups and disproportionately discriminating against graduates from less prestigious colleges, resulting in invalid outcomes.

Membership criteria in forums or clubs pose another issue for AI, as the decision criteria for approving membership, set by AI systems, may be based on discriminatory factors favoring certain groups over others, such as nationality, social class, gender, or skin color. This represents indirect discrimination against some groups despite the intent for equality among service beneficiaries. Therefore, the criteria or standards fed into AI programs must be legally and regulatively stipulated to ensure AI decisions are based on legal and legitimate grounds.

Regardless of the aforementioned issues, proving AI program errors and mitigating them is not easy. It requires deep expertise and faces technical and legal challenges, such as the lack of access to program data and codes. For instance, an AI system trained on loan data might consider people from certain neighborhoods more likely to default, using postal codes as negative predictors. If these neighborhoods are racially tied, this results in discrimination against protected groups. AI decision-making systems might also intentionally obscure data to reach discriminatory decisions against specific groups.

Proving AI-Related Discrimination requires examining the core AI programs (algorithms) and how data is processed. This involves two main problems: private institutions tend to withhold their AI systems and data due to intellectual property laws, trade secrets, or company regulations, making examination difficult without mandatory regulations or laws. Secondly, examining AI systems in dedicated laboratories does not provide sufficient results for these complex systems; they must be tested during actual use by real users.

Bias or discrimination resulting from automation or AI programs, and the technical and legal difficulty in proving such discrimination, poses a significant obstacle for the judiciary. These decisions are computationally prepared and easily accessible for individuals and institutions to make appropriate and quick decisions. Additionally, people tend to trust computer-generated outcomes, believing them to be neutral and unbiased, which is an overestimated belief in automation and AI programs. Human intervention is necessary to correct potential defects in AI or automated decisions.

Bias or discrimination in intelligent systems can be defined as digital discrimination leading to social inequality through intelligent systems, impacting employment opportunities or resulting in unfair decisions based on demographic considerations or personal characteristics, negatively affecting individual rights. The solution lies in developing legal rules and policies to eliminate biases or unfair discrimination in AI system design. This way, AI systems can be designed to avoid these flaws. Although avoiding all forms of bias in AI systems is challenging, if not impossible, due to inevitable human interventions in building these systems, minimizing them can be the goal for companies working in this field.

Key Areas Prone to AI-Related Discrimination in the Private Sector

Despite the numerous and varied applications of artificial intelligence (AI) being used successfully in industry and medicine, and offering many benefits including facilitation and flexibility, there are uses of AI applications in

areas considered highly risky due to their direct impact on people's lives and rights. Upon closer examination of the AI regulation draft in EU countries, we find that it classifies some AI uses as high-risk. Specifically, independent AI systems are classified as high-risk if, in light of their intended purpose, they pose significant or high risks such as harm to health, safety, or fundamental rights of individuals, considering the severity and likelihood of potential harm. This section will review several uses of AI applications the potential biases they may invoke.

3.1 Employment

Employers aim to hire the best candidates for their job vacancies and, after selection and appointment, to continuously evaluate them. They try to match candidates' qualifications with job requirements, and post-hiring, they must make decisions about promotions or terminations. Traditionally, these processes have been handled by humans. However, the integration of AI systems in these processes has increased significantly because AI systems can perform these tasks faster and more efficiently than humans. Consequently, these processes have transformed notably with the integration of AI systems, which can conduct testing, selection, and hiring processes.

Despite the advantages of using AI systems in recruitment, these systems can cause discrimination due to the fundamental systematic reasons previously outlined. For instance, Amazon's AI system used for screening job applications was found to discriminate against women. The discrimination stemmed from the system's self-learning from biased historical data, essentially reinforcing previous patterns of discrimination.

Additionally, the distribution of job advertisements by AI systems can lead to discriminatory effects. A research experiment showed that Facebook's job advert distribution could result in illegal outcomes against certain groups, such as disproportionately showing cashier job ads to female users and taxi driver positions to black users. Similarly, another study found that a gender-neutral AI job advertisement system promoted job opportunities in science, technology, engineering, and mathematics (STEM) fields to men more than women.

These distributions can have discriminatory effects, such as exclusion from certain segments of the job market and information for protected classes. Although hiring criteria may seem logical and reasonable at first glance, applying these criteria via AI systems in recruitment processes can result in indirect discrimination due to the designers and users of these programs. Therefore, employers aware of these negative impacts might prefer to remove such criteria from their selection process. For example, the distance between home and workplace is believed to be positively associated with employee engagement and retention. However, some companies do not consider this criterion in AI-based hiring decisions because distance from the workplace and residing in certain neighborhoods may also act as a form of discrimination against individuals from specific classes needing protection against discrimination, particularly in the United States.

3.2 Banking

Banks and credit institutions determine whether they will provide credit services or the amount they will provide to someone by evaluating that person's creditworthiness. Elements such as income, previous loan performance, financial solvency, and property ownership are considered criteria used in assessing creditworthiness. When humans conduct this assessment, it can take a very long time, as was the case until recently. Additionally, humans' limited cognitive ability prevents them from collectively and comprehensively evaluating complex data. In today's credit market, thousands of complex transactions occur every second. Therefore, credit institutions use artificial intelligence systems to assess individuals' creditworthiness quickly enough to keep pace with the market's speed. Thanks to their speed, it is clear that these systems are the

best at evaluating complex data for making credit decisions.

Despite the mentioned advantages of using artificial intelligence systems in credit transactions, the risk of discrimination associated with artificial intelligence still exists. The use of decision-making systems based on artificial intelligence may only shift the location of discrimination from the bank manager's desk to the computer screen of the programmer or to groups training data scientists, as human programmers and data engineers may consciously or unconsciously reflect their biases in operating and results of artificial intelligence systems.

AI-based credit services are more concerned with mortgage transactions for specific groups of people at the expense of other groups. In the United States, although AI system decisions regarding lending may increase the predictive accuracy of decision-making processes, people from certain groups such as Black and Hispanic origin are less likely to benefit disproportionately from these systems' adoption. Similarly, it is claimed that Apple's credit application algorithm discriminates against women. All these examples indicate that the use of AI-based decision-making in the banking sector entails a significant potential for discrimination.

3.3 Advertisement and Pricing

Advertisements are one of the most important methods used in marketing plans, indeed the most important of all. They are a tool for communication with the masses and are paid for by companies or individuals to persuade consumers to take actions aligned with the advertiser's interest. Commercial advertising is an effective means of presenting a product or service to consumers, influencing them, and convincing them to purchase the advertised product.

In the capitalist economic concept, profit maximization is the primary goal of transactions and business, whether civil or commercial. To achieve this goal, goods and services must be presented to target groups through advertising. Additionally, producers must improve the prices of their goods and services, taking into account supply and demand balance in the specific market. By reaching interested customers and determining the optimal price simultaneously, profits increase. Therefore, producers have utilized artificial intelligence to find the best methods in advertising and pricing operations.

The significant increase in recent years in e-commerce contributes to the success of artificial intelligence systems in the fields of advertising and pricing by feeding these systems with massive data to urge individuals to shop and purchase products awaiting in online shopping baskets, their preferred items, feedback, reviews, and even the time they spend on a particular website browsing and examining a certain product. This is achieved through various methods, such as monitoring the duration and quality of pointers on a specific product website and the electronic processing of available massive data by artificial intelligence systems, which can more accurately identify target groups than ever before. For example, pregnant women can be discovered (even before they know they're pregnant!) by reviewing their shopping items and sending them through several surveys or observations, including their interest in baby-related advertisements.

Despite the benign uses, the use of artificial intelligence systems in advertising and pricing may lead to discriminatory results. For example, specialized research revealed that Facebook allows advertisers to exclude certain races from targeted ad groups, such as Asians. Another study uncovered that Google displays better job ads for male users than female users. These examples indicate that AI-based advertising may deprive certain groups of people of specific goods, services, and job opportunities.

Moreover, processing massive data related to customer behaviors provides predictions about customer reactions to price fluctuations. Therefore, artificial intelligence systems used in pricing may classify customers based on their financial ability regarding prices. With this

information, institutions impose different prices for the same product. For example, it was found that a company providing online teaching services offers different prices to customers based on different racial backgrounds. Due to this pricing discrimination, individuals of Asian descent pay more for the same service. Another example of discriminatory pricing associated with artificial intelligence is considering the customer's place of residence in pricing. It was alleged that residents of rural areas receive more money for the same product than those living in big cities by some online stores in the United States. The reason behind this price discrimination is the lack of competition or difficulty in accessing physical stores in rural areas, as rural areas are inhabited by a larger class of the poor. Therefore, this type of pricing discrimination may push the poor to pay more for the same products, enhancing social inequality and discrimination due to the use of artificial intelligence systems.

3.4 Insurance

The insurance sector primarily relies on the principle of differentiation between insured individuals exposed to risks and those not exposed to risks, in order to predict risk levels and determine relevant insurance premiums. Therefore, insurance companies have always relied on statistical analysis of data regarding the personal characteristics and habits of the insured individuals, such as smoking, alcohol consumption, age, occupation, and their assets. While this data may be limited and simple in terms of volume and diversity, artificial intelligence systems are provided with it to analyze it accurately and in detail through various technological sources. Data processing provides a greater amount of accurate data about customers, allowing artificial intelligence systems to make predictive risk analysis that insurance companies use to determine their obligations. Additionally, artificial intelligence systems can be used in other stages of the insurance process, such as advertising, continuous communication with customers, claims processing, and fraud detection.

Although artificial intelligence systems may benefit insurance companies in various ways, their use in the insurance sector may pose new problems, including the risks of discrimination associated with artificial intelligence. While discrimination in the insurance sector has been a long-standing issue, AI-based decision-making processes may exacerbate this problem in terms of its scale and speed. Some characteristics and habits may be excluded from insurance coverage, either because the insurance company does not want to insure these individuals or because these individuals cannot afford high premiums. As a result, excessive reliance on AI-based decision-making may lead to the exclusion of individuals from insurance coverage.

In general, direct discrimination in the insurance field can be mitigated by removing certain factors, such as race, gender, or religion, from insurance applicants. However, indirect discrimination poses a serious problem for AI-based decision-making in the insurance sector because excluding some criteria from decision-making does not eliminate the risks of indirect discrimination. For example, it was revealed in an investigative report that "men named Mohammed paid nearly £1,000 more for insurance than those named John." Similarly, it was discovered that the postcode of insurance applicants could significantly affect insurance premium calculations. Therefore, AI-based decision-making systems may impose different premiums based on specific information related to the insurance applicant, such as name and postcode, as this information may be indicative of the applicant's race, gender, or religion, thus exposing individuals from these categories to discrimination associated with these elements.

Apart from discrimination associated with artificial intelligence in the insurance field, AI-based decision-making systems may lead to unfair discrimination between categories if the AI system is fed with data related to previous insurance transactions. For example, insurance

companies used to charge higher insurance premiums to African Americans because calculating premiums based on race was not prohibited until the Civil Rights Act was passed in 1964 in the United States. Therefore, if an AI system uses insurance records from the United States for the past 250 years as its data, the inevitable result is that this AI system will calculate higher insurance premiums for insurance applicants of African American descent, even if the applicant's race is ignored in this process.

Finally, it is worth noting that the consequences of predictions generated by artificial intelligence in the insurance sector, such as medical diagnosis or political circumstances, differ from the consequences in other sectors. Increased predictive accuracy in the insurance sector may lead to increased risks of discrimination arising from extensive use of artificial intelligence. Therefore, there should be a distinction between predictive accuracy and non-discrimination in the insurance sector, and insurance companies should strike a balance between accuracy and non-discrimination by implementing certain techniques that may mitigate the risks of discrimination associated with artificial intelligence in this field.

Conclusion

As stated above, artificial intelligence technologies have the ability to recognize patterns, execute tasks, and make predictions rapidly. However, in most cases, they rely on the accuracy of the data they are fed. Therefore, it becomes crucially important to pay attention to the quality of the data used to feed artificial intelligence applications. Flawed data can lead to incorrect decisions, with potentially huge consequences affecting the course of events and the decisions made by these technologies.

The paper addressed examples of discrimination that may occur when using artificial intelligence technologies. It has become evident through the examples and practical applications mentioned above the possibility of bias in artificial intelligence technologies in areas such as employment, advertising and pricing, insurance, and banking.

In conclusion, addressing these risks cannot be achieved through legal regulation alone. Despite the necessity of legislative intervention, it is not sufficient to provide fundamental solutions. Ethical governance and technological controls to ensure a thorough treatment of these risks is crucial. It is worth mentioning that there are many efforts being made to govern artificial intelligence at the international level. This issue is under discussion in government institutions in the United Kingdom, South Korea, India, Mexico, and the European Union, through various regulatory measures and technical standards regarding the governance of artificial intelligence. Both the public and private sectors are working together to develop regulations and principles governing the use of this technology.

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