From the Perspective of Gender Theory, this Paper Discusses the Causes and Governance Measures of Algorithmic Gender Discrimination

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Abstract. With the advent of the digital age, algorithms have profoundly affected and changed the real social life. However, while various algorithms bring great convenience to people's lives, the problem of algorithmic gender discrimination in some fields has gradually emerged. Algorithmic gender discrimination is hidden in social life and has special harmfulness. It will not only solidify social gender discrimination, but also expand social gender discrimination by technical means. Its governance has become an unavoidable dominant issue in the digital era. From the perspective of gender theory, this paper discusses the causes of gender discrimination in algorithm, and puts forward measures on how to construct the algorithm ecology of gender equality.

Keywords: algorithmic discrimination · gender discrimination · gender · gender equality

1 Introduction

With the advent of the digital age, Internet technologies such as big data, cloud computing, and artificial intelligence have profoundly affected and changed real social life. As the technical basis of the algorithm continues to develop mature, deep into people's daily lives. Algorithms are increasingly used in the fields of production, life, business operation and public decision-making to achieve specific goals, bringing great convenience to people's lives. However, while various algorithms bring convenience to people, the problem of algorithmic gender discrimination in some fields is gradually exposed. For example, in 2018, relevant personnel found that the automatic recruitment system developed by Amazon had the problem of gender discrimination: when the system screened the resumes of job seekers, it would increase the priority of male candidates and reduce the priority of female candidates, thus improving the ranking of male candidates. The emergence of this algorithmic discrimination phenomenon makes people begin to think: as a technology and a mathematical rational application, algorithm should be a neutral, objective, fair and just task executor. Why does gender discrimination occur? How to govern this phenomenon?

R. B. B. M. Hussain et al. (Eds.): ICHSSR 2023, ASSEHR 765, pp. 652–657, 2023.
https://doi.org/10.2991/978-2-38476-092-3_79

2 The Characteristics of Algorithmic Gender Discrimination

2.1 High Concealment

The phenomenon of gender discrimination is often highly concealed. On the one hand, the algorithm is a computer execution program with strong technicality, and the interpretation of non-professionals often has technical barriers and interpretation difficulties. And most of the algorithms involve commercial secrets. In order to keep secret, enterprises often use various technical means to encrypt the algorithms, making the algorithms more difficult to interpret. On the other hand, algorithmic gender discrimination formally conceals the results, so that most people cannot know the process and mechanism of its occurrence, and can only passively accept the results with differential influence and even discriminatory intention made by the algorithm. Under the high degree of concealment, the occurrence of algorithmic gender discrimination is difficult to be detected.

2.2 Special Harmfulness

In some areas that do not involve social factors, algorithmic gender discrimination does not bring harm. However, when algorithms are applied to situations that are concerned about personal interests such as crime assessment and credit loans, algorithmic gender discrimination will bring special harm. Since the algorithm is operated on a large scale, the gender discrimination of the algorithm often affects not only the interests of individuals, but also the interests of groups with similar situations. Moreover, due to the execution of the algorithm, gender discrimination will be enhanced in the subsequent algorithm execution, forming a chain effect, solidifying or amplifying gender discrimination, so that gender discrimination will persist in the algorithm. In other words, the existence of gender discrimination in the algorithm will not only code the past gender discrimination, but also create its own reality, forming a' discriminatory feedback loop of self-realization.

3 The Cause of Algorithmic Gender Discrimination from the Perspective of Gender Theory

The algorithm is a strategy to solve the problem artificially, so it is difficult to write the absolute equal social data and the absolute equal rules into the program. In other words, the algorithm will inevitably be affected by gender, lose the objective and neutral position, treat the data subject differently based on gender in the calculation, and assume the function of unjust executor. Based on gender theory, we divide the causes of algorithmic discrimination into three types: input discrimination, design discrimination and learning discrimination.

3.1 Input Discrimination: Replication of Gender Discrimination in Society

The algorithm is a process of inputting the collected data, processing the data, and revealing the problem characteristics or results through the output results. In other words,

the input data is the cornerstone of the algorithm. The algorithm without input data cannot be executed and is meaningless. Therefore, the objective fairness of the input data has a great influence on the algorithm. However, it is difficult to avoid the collected data copying the phenomenon of gender discrimination in real society.

The data extracted from the real society must have the inherent traces of discrimination in the real society. When the data of implicit social gender discrimination is input into the database, it will pollute the database and lead to the emergence of algorithmic gender discrimination. In the computer field, there is such a view: GIGO, which means that the input of garbage data will lead to the output of garbage data. Put this view in the context of algorithmic gender discrimination, that is, copying the input data of gender discrimination in real society will also lead to algorithm output gender discrimination.

3.2 Design Discrimination: Gender Discrimination from Algorithm Controllers

As a technical means, the essence of algorithm is to reflect the will of its controller. In other words, the algorithm will be affected by its controller. As Morgan (2018) points out, although algorithms have many different cultural connotations, they ultimately remain closely linked to the people, institutions, and power relations that define and use them. Due to the dominance of value standpoint and interest dominant logic, algorithm controllers intentionally or unintentionally design gender discrimination into algorithms, resulting in the occurrence of gender discrimination in algorithms.

Algorithms are often designed by algorithm controllers to solve a certain problem or a certain type of problem. In the process of designing algorithms, algorithm controllers may unintentionally or intentionally bring their subjective gender discrimination into programming. On the one hand, due to the influence of cultural factors, the algorithm always contains certain value judgments or specific value positions. This phenomenon is due to the different subjective evaluation of controllers in the process of designing related algorithms. The influence of this subjective factor cannot be avoided, even the code or program written according to the best technical practice will fail in some cases. When designing the algorithm, the controller of the algorithm will be dominated by the dominant logic of interests and modify the algorithm to maximize its own interests. In this correction, individual differences may be ignored, and most of the data are homogenized. In this process, it is difficult to avoid gender discrimination in the algorithm.

3.3 Discrimination in Learning: Unconscious Inheritance of Human Gender Discrimination

In the algorithm, the algorithm used in machine learning is a special algorithm. It is the core of artificial intelligence and the fundamental way to make computers intelligent. Compared with the clarity of the output of other algorithms, the machine learning algorithm automatically analyzes the data to obtain the rules, and uses the rules to predict the unknown data, and then outputs the predicted data. At present, our machine learning algorithms are only unconsciously focused on weak artificial intelligence with specific functions, and cannot resist social discrimination. Since it has not yet reached the stage of strong artificial intelligence, machines cannot think like humans. This leads to the

fact that the algorithm does not have the ability to resist when the machine is learning, and will unconsciously and indiscriminately inherit human gender discrimination.

4 The Governance Measures of Algorithmic Gender Discrimination from the Perspective of Gender Theory

At present, different disciplines have different focuses on the governance of algorithmic gender discrimination. In the computer field, the solution to the problem of gender discrimination in algorithms is to find various technical methods to eliminate, reduce or 'minimize' bias in data sets and algorithm decisions. For example, El-Mahdi El-Mhamdi, Rachid Guerraoui and other scholars have solved the problem of correcting group discrimination in the fractional function and minimizing individual errors in the latest research. In the field of law, scholars pay more attention to defining the relationship between algorithm and law, seeking to effectively deal with the value crisis and legal challenges of algorithm, and solving the legal regulation problems of algorithm.

4.1 Legislation of Gender Equality Algorithm

The government should establish and improve laws and regulations on algorithmic gender discrimination, establish an accountability system for algorithmic decision-making, strengthen penalties for violations of algorithmic gender discrimination, and supervise algorithms and algorithm controllers, which are necessary measures to avoid the occurrence of algorithmic gender discrimination. At present, many countries have realized the problem and taken a series of measures, but there is still a large vacancy in the field of algorithm, so the law on algorithm still needs to be improved. Take anti-sex discrimination as the goal of public policy.

4.2 Establish a Correct Gender Awareness

It will be an important measure for the design of control algorithms to establish a correct awareness of gender and consciously assume the obligation to prevent gender discrimination in algorithms. First of all, algorithm controllers should follow the guidance of the correct value system, clarify the gender value orientation of the algorithm, internalize and externalize the professional ethics of gender, and improve the professional quality of the whole industry. Among them, the leading enterprises of the algorithm should bear certain social responsibilities, actively guide the formulation of the algorithm industry convention on gender, play a leading role, and prevent the occurrence of gender discrimination in the field.

4.3 Enhancing Algorithm Transparency

Improving the transparency of the algorithm and making the algorithm known to the public is an effective measure to control the occurrence of gender discrimination in the algorithm. The parties should be united to establish algorithm transparency regulations, which stipulate that algorithm controllers disclose algorithm data sources, processing

methods and mechanisms, so that people can understand the corresponding processing mechanisms. To a certain extent, gender discrimination in the algorithm can no longer occur quietly.

4.4 Intervention of Technical Means

In today's digital survival, we should carefully examine the complex gender relations in society, identify the so-called 'dirty' data from the real society from a rational perspective, and scientifically clean up the data.

5 Conclusion

In the digital age, algorithms penetrate into all aspects of people's lives and become a new social force. However, the existence of gender discrimination in human society extends to the algorithm world, which makes the problem of algorithm gender discrimination appear. Algorithmic gender discrimination is implied in social life and has special harmfulness. It will not only solidify social gender discrimination, but also expand social gender discrimination by technical means, which is not conducive to the benign operation and coordinated development of society. After analyzing the causes of algorithmic discrimination based on gender theory, we find that algorithmic gender discrimination is a copy of gender discrimination in social reality and an artificial design. In this sense, any algorithm is difficult to avoid the occurrence of gender discrimination, and algorithmic gender discrimination is not only difficult to eliminate once it is formed, but also expands the impact of gender discrimination. Fortunately, the algorithm is ultimately controlled by people. We can not only govern from a technical point of view, but also control the occurrence of gender discrimination from multiple practical perspectives such as society and law. In multiple dimensions, it steers algorithms away from the darkest possibilities and toward a world that better reflects our values.

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