Trends in Social Sciences and Humanities Research
ISSN: 2959-9938
DOI: https://doi.org/10.61784/tsshr3136

EXPLORATION OF THE OPTIMIZATION PATH OF ALGORITHMIC DECISION-MAKING FROM THE PERSPECTIVE OF PUBLIC SERVICE EQUALIZATION: BASED ON THE SURVEY EXPERIENCE OF THE TOURISM BOOM IN NORTHEAST CHINA DURING THE SPRING FESTIVAL

Yue Kong*, Jing Wang, Xiao Li
Department of Administrative Management, School of Economics and Management, Dalian Minzu University, Dalian , 116000, China.
Corresponding Author: Yue Kong, Email: 2401534148@qq.com

Abstract: Currently, the reform of the digital administration is imminent. Although traditional decision-making regulation policies can solve most social public problems, it is difficult to achieve the unity of timeliness and accuracy. Algorithmic decision-making is a process of analyzing, processing, and predicting data through computer algorithms to assist humans in making decisions. The rational use of algorithms can improve decision-making efficiency, reduce labor costs, and lower the risk of misjudgment. This paper conducts a multi-dimensional analysis of the internal logical relationship between public service equalization and algorithmic decision-making, continuously adjusts and optimizes the algorithm model, and explores algorithm applications and solutions that are beneficial to the development of public undertakings, thereby optimizing resource allocation. By applying algorithmic decision-making to public service fields such as intelligent transportation systems, medical resource allocation, educational resource optimization, public safety monitoring, social welfare policy formulation, and disaster emergency response, the quality of public services can be improved, the sustainable development of various social fields can be promoted, and the continuous improvement of the lives of the broad masses of the people can be achieved.
Keywords: Public service; Algorithmic decision-making; Optimization path; Resource allocation

1 INTRODUCTION

The report of the 20th National Congress administrations: "Improve the basic public service system, raise the level of public services, enhance their balance and accessibility, and make solid progress in promoting common prosperity." Public service equalization is an important manifestation of the core socialist values and is of great significance for promoting social fairness, enhancing people's well-being, and achieving common prosperity. During the Spring Festival in 2024, the tourism heat in Northeast China remained high. As of February 17th, the hotel bookings in Harbin on the Qunar platform during the Spring Festival increased by three times year-on-year, and the lingering popularity of "Erbin" drove the hotel bookings in Changchun, Jilin Province, Shenyang, Liaoning Province, and other places to increase by more than four times [1]. Moreover, events such as the ticket refund of the Ice and Snow World, the extortion of the chartered car of Fu Yuanhui, and the cancellation of the "Dragon and Phoenix Flying Together" performance in Laobeishi during the Spring Festival travel period also prove the importance of rationally using algorithmic decision-making to prevent public relations crises. Algorithmic decision-making can effectively improve service efficiency and decision-making accuracy in the process of promoting public service equalization, and plays a crucial role in building a harmonious society, promoting economic development, and safeguarding people's rights and interests.

2 PUBLIC SERVICE EQUALISATION AND ALGORITHMIC DECISION MAKING: THEORETICAL CONNOTATION AND RATIONALE CONNECTION

The pursuit of public service equalisation and the implementation of algorithmic decision-making both aim to better meet public demand and improve the quality and efficiency of public services. The impact of public service equalisation on algorithmic decision-making is comprehensive and far-reaching, and its logical relationship is shown in Figure 1. public service equalisation makes algorithmic decision-making more ethically just and humane. Algorithmic procedures for decision-making using big data also provide accuracy and objectivity guarantees for public services.

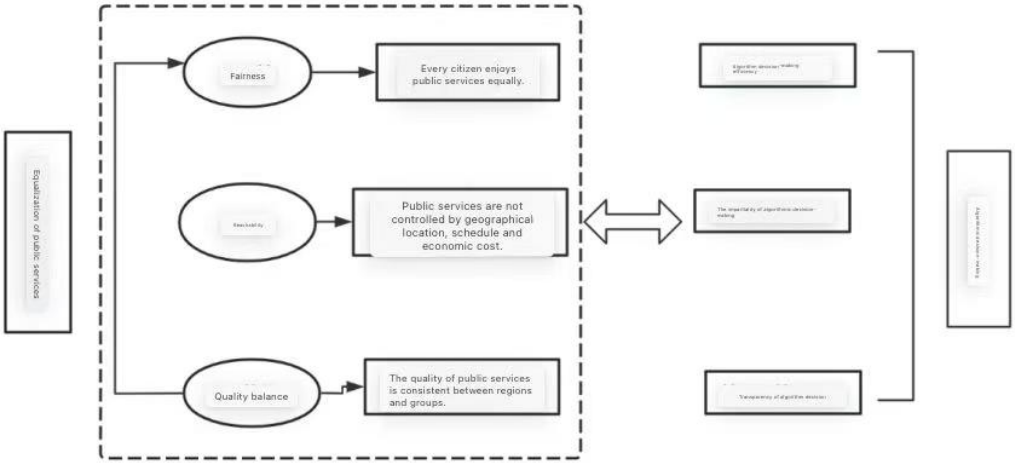

Figure 1 The Logical Connection Between Equalization of Public Services and Algorithmic Decision-Making

2.1 Public service equalisation and the internal characteristics of algorithmic decision-making

Equalisation of public services refers to the right to ensure that all citizens have equal access to basic public services in the area of public services, regardless of any non-economic factors such as gender, race, religious beliefs, etc. Equalisation of public services has the principle of universality: it requires that the scope of public services be broad, ensuring that all citizens have access to the necessary public services, including but not limited to education, health care, social security, etc.; equalisation of public services has the principle of fairness: it emphasises that the prerequisites of public services are equality and fairness, and that it avoids any form of prejudice and discrimination, ensuring that every citizen has access under equal conditions to Public services; Equalisation of public services has the principle of accessibility: it is required that the geographical location, time schedule and economic cost of providing public services should be convenient for the public to access, and there should be no insurmountable barriers. Equalisation of public services has the principle of balanced quality: the quality of public services should be balanced and consistent regardless of geographic location or among groups, and there should be no major differences; equalisation of public services has the principle of sustainability: the provision of public services is a long-term planning and arrangement of China's public utilities, and should ensure the continuity and stability of the services, taking into account the unity of economic and social benefits. These principles together constitute the theoretical basis for the equalisation of public services, which is of great significance for administration decision-making and the formulation of other public policies.

Algorithmic decision-making is a decision-support tool based on data and advanced computing technology, and is a technical means of automatically executing decisions through data collection, collation, and analysis. Algorithmic decision-making is data-driven: algorithmic decision-making relies on massive data resources, and provides scientific decision-making through in-depth excavation and analysis of the correlation and regularity between data; algorithmic decision-making has automated execution capability: people set up the parameters and decision-making model before decision-making, and algorithmic decision-making can quickly respond to the data received and automatically execute the decision-making task; algorithmic decision-making has adaptive and learning capabilities: it can constantly iterate, self-optimize, and automatically execute decision-making tasks; algorithmic decision-making is adaptive and learning capable. Algorithmic decision-making has adaptability and learning ability: it is able to continuously iterate and optimise itself, and update a large amount of database information in a timely manner to improve decision-making accuracy; algorithmic decision-making has objectivity and consistency: it avoids human subjective factors from influencing the decision-making, and reduces the interference of human factors, so as to ensure fairness and impartiality. Decision-making results can, to a certain extent, maintain social justice.

The equalisation of public services makes the public get a sense of belonging, greatly improves the public's sense of ownership, makes them better participate in social life, and provides a data source for algorithmic decision-making. On the other hand, algorithmic decision-making, with its unique advantages, makes it a powerful tool to improve the efficiency and quality of public services, and shows great potential for application in the field of public services.

(ii) Analysis of the rationale for the impact of public service equalisation on algorithmic decision-making

In today's society, public service equalisation has become an important indicator of social justice and progress in a country or region.With the rapid development of science and technology, algorithmic decision-making has gradually become a powerful tool in the field of public services.

Equalisation of public services requires that the administration should ensure that all citizens enjoy equal rights and services when providing public services. This requirement provides a clear goal and direction for algorithmic decision-making.For example, on the occasion of the Chinese New Year tourism fever in the three northeastern

provinces in early 2024, when many tourists need public services while travelling, the algorithm can analyse the demand data of each tourist and develop a tailor-made solution for them, while ensuring that it is timely and effective.This in turn enables the optimal allocation of public resources and personalised services.
The equalisation of public services requires that the administration should fully consider the differences and characteristics between different regions and groups when providing public services.Algorithmic decision-making can reveal these differences and characteristics by analysing a large amount of data, providing the administration with a scientific basis for decision-making[2]. The equalisation of public services also emphasises the care and protection of vulnerable groups.Algorithmic decision-making can identify and analyse the characteristics and needs of vulnerable groups and provide them with more accurate and effective services.Based on this, algorithmic decision-making can not only coordinate inter-regional development and narrow the gap between cities, but also pay timely attention to the relevant interests and needs of different groups in society.It is conducive to common development and advances the realisation of social equity.

3 REALISTIC CHALLENGES FACING ALGORITHMIC DECISION MAKING IN PRACTICE FROM THE PERSPECTIVE OF PUBLIC SERVICE EQUALISATION

In the pursuit of public service equalisation, algorithmic decision-making, as an emerging tool, has gradually come into the public eye and is widely used in various fields of public services.
However, a series of problems and challenges inevitably exist while algorithmic decision-making is becoming increasingly convenient. In general, algorithmic decision-making faces the challenges of data bias, privacy protection, and morality and ethics in the perspective of public service equalisation.

3.1 Limitations in the Application of Visualisation Techniques in the Algorithmic Decision-Making Process

In the field of algorithmic decision making, the application and development of visualisation techniques are crucial.
The multidimensionality and complexity of data pose great challenges to the development of algorithmic decision-making visualisation [3]. When dealing with large-scale datasets, especially high-dimensional data, it is difficult for traditional visualisation methods to show the full picture of the data to the public. For example, it is difficult to show data in ten-dimensional space in a two-dimensional plane with existing technical means. In addition, the complex logic and iterative processes within algorithms, such as the training and optimisation of neural networks, are difficult to understand for non-specialists.
Although existing technology for visualisation can reveal the behaviour of algorithms and the process of decision making to a certain extent, there are still many advanced algorithms and complex models whose internal mechanisms are difficult to visualise in a way that is understandable to the general public [4].
The public cannot observe the complete data and will be sceptical about algorithmic data decisions.The application of visualisation techniques in algorithmic decision-making is also limited by the cognitive ability and acceptance of users.Public service equalisation covers a wide range of areas, and the public in many remote areas, due to the backwardness of education, will find it more difficult to accept the so-called ‘large amount of objective data’ for decision-making about their own practical interests under the premise of a low degree of visualisation.

3.2 The Public is Algorithmically Biased and More Concerned about Data Privacy

In the wave of digitisation, algorithmic bias stems from bias in datasets, flaws in model design, and improper manipulation in the training process.
It leads to algorithms showing unfair tendency in handling specific tasks. As a result, it is likely to exacerbate social inequality under the social premise of equalisation of public services. Algorithmic bias manifests itself in the form of poor feature selection: when constructing a predictive model, the selection of features that have low correlation with the target variable or are biased may lead to algorithmic decisions that are biased in favour of a specific group of people. The rest of the general public who are not biased will become dissatisfied [5].
Whereas the administration under the public service equalisation perspective has to consider the interests of all the public as much as possible, so the public will develop algorithmic bias. In some specific cases, the algorithm's decision-making results will affect subsequent data collection and processing, creating a feedback loop that further exacerbates the problem of algorithmic decision-making bias.
Meanwhile, data privacy is also a public concern.In the digital information age, the collection and use of personal data has become increasingly generalised, with the attendant risk of privacy leakage and abuse. The public is concerned that unauthorised access to personal data by third parties for commercial marketing, credit scoring, etc. will seriously affect their normal work and life. The equalisation of public services requires the widening of public service areas and the provision of practical guarantees for the public at large, so the issue of data privacy is a great challenge to the development of algorithmic decision-making.

3.3 The Problem of Defining Ethical Responsibility in the Algorithmic Decision-Making Process

In the process of algorithmic decision-making, the problem of defining ethical responsibility is a complex and multidimensional issue, which involves the majority of users and the public [6].

Algorithmic decision-making process mainly relies on a large amount of information data, in which the definition of the responsible subject is vague. Algorithmic decision-making is sometimes regarded as a 'black box', and it is difficult for outsiders to understand its internal logic and decision-making process, and it is difficult to trace the specific reasons for the decision-making results. During the hot period of travelling in the Northeast, some users reported that they spent different amounts on taxis for the same distance. This is due to the algorithm providing different prices for different users based on their purchase history, search history and other data.

This kind of price discrimination affects the travel satisfaction of many tourists, at this time, whether the algorithm developers and travel platforms should bear the corresponding ethical responsibility. The frequent occurrence of such problems requires algorithm developers to take into account not only efficiency and profit, but also social responsibility and ethics when designing and implementing algorithmic decisions.

4 REALISATION PATH OF OPTIMISING ALGORITHMIC DECISION MAKING UNDER THE PERSPECTIVE OF PUBLIC SERVICE EQUALISATION

4.1 Strengthening Transparent Sharing and Enhancing the Fairness of Decision-Making in Administration Governance Algorithms

Fairness and impartiality is the core of value in the administration governance decision-making system, and fair and impartial decision-making is the common pursuit of citizens and also reflects the credibility of administration governance. The intervention of artificial intelligence algorithms makes decision-making fluctuate, and the fair value of administration governance decision-making is subject to certain impact, bringing administration governance algorithmic decision-making into the dilemma of how to achieve fairness. In the scenario of algorithmic embeddedness the responsible body is vague, the responsible body of traditional algorithmic decision-making is often the public organisation and individual who realises the action, while the algorithmic procedure composed of data is difficult to clarify the specific responsible body.

Take Harbin Ice and Snow World as an example, during the Spring Festival, the number of tourists in Harbin Ice and Snow World surged, and how to reasonably allocate resources to ensure the tourists' travelling experience has become a major challenge for scenic area managers[7]. To this end, the scenic spot introduced an AI-based passenger flow prediction and scheduling system, which analyzes historical and real-time data to predict the flow of visitors in the next few days, so as to rationally arrange various resources, such as ticket windows, tour guides, and catering services. In order to ensure the fairness of the algorithmic decision-making, the system adopts a multivariate data fusion method, which not only takes into account the objective factors such as historical passenger flow, weather, holidays, etc., but also takes into account the subjective factors such as tourists' age, gender, and travelling preferences. In this way, the system can predict passenger flow more accurately and avoid prediction bias caused by a single factor, thus ensuring a fair distribution of resources.

The system also introduces a dynamic adjustment mechanism, i.e., it adjusts resource allocation in real time according to changes in real-time data, which avoids wastage or shortage of resources due to prediction bias, and ensures that every tourist can enjoy a fair tourism experience.

There is objectivity in the setting of the initial procedure, which is integrated with the subjective views and values of the procedure setter, and there are potential uncertainties. This poses a new challenge to the transparency of algorithmic decision-making, and administrations should disclose the decision-making logic and rationale of algorithms so that the public can understand how the algorithms work and how they influence decisions. Algorithmic decision-making is different from e-administration in some aspects. While e-administration assists the administration in decision-making, algorithmic decision-making can meet the requirements of certain important outcomes without human involvement. Therefore, algorithmic decision-making can only be persuasive if the information is transparent, and can help the administration to make decisions, prevent public relations crises and optimise the allocation of resources.

4.2 Overseeing Governance Responsibilities and Promoting the Standardisation of Algorithmic Decision-Making in administration Governance

Strengthen the testing and vetting mechanisms before algorithmic decision-making is applied. Introducing a public process, in which the public does not specifically understand how algorithms are applied to public services before decisions are formally made, the process retains the public's right to know, improves the openness of algorithmic applications, actively listens to public suggestions, and understands the nature of the emergence of differing views, so as to understand the public's needs and to strengthen algorithmic decision-making systems.

Taking Changchun Jingyuetan Ski Resort as an example, the number of visitors to the ski resort surged during the Chinese New Year, and in order to reasonably allocate resources and ensure the tourists' travel experience, the ski resort introduced an AI-based passenger flow prediction and scheduling system, which predicts the passenger flow in the coming days by analysing the historical and real-time data, so as to reasonably arrange the various resources, such as the ski equipment rentals, catering services, and ski coaches. The system adopts a standardised data collection and

processing process to ensure the accuracy, completeness and consistency of the data. For example, the passenger flow data collected by the system includes not only historical data, but also real-time data, such as weather, holidays, special events and other influencing factors, to ensure the standardisation of the forecast data; and validated algorithmic models, such as time-series analysis, machine learning, etc., to ensure the accuracy and stability of the forecast. In addition, the system regularly calibrates and optimises the algorithmic models to ensure their adaptability. The standardisation of the decision-making process is essential, including data collection, data processing, model prediction, decision making, and decision execution. For example, after predicting the passenger flow, the system will reasonably arrange resources such as ski equipment rental, catering services, ski instructors, etc. according to the prediction results to ensure that every visitor can enjoy a high-quality tourism experience[6]. Based on this, Changchun Jingyuetan continuously optimised its algorithmic decision-making during the Spring Festival to improve visitors' experience and win a good reputation.

It can be seen that a positive algorithmic impact assessment system can play an important influence in enhancing algorithmic transparency, balancing the public's disadvantaged position in algorithmic decision-making, and effectively optimising the allocation of resources to ensure the efficiency of administration governance algorithmic decision-making efficiency, the scientific content, and the precision of the decision-making method.

4.3 Improve the Legal System to Give Legitimacy to the administration's Governance of Algorithmic Decision-Making

The premise and foundation for the administration to carry out algorithmic decision-making security governance is to have the guidance of sound regulations and policies, the current legal provisions on algorithmic decision-making in China are relatively weak, and the relevant policies are lacking in systematicity, which places higher requirements on the program setter and algorithmic decision selector in terms of ethics. Algorithmic decision-making and other digital technologies empowering the field of basic public governance contribute to the convenience of public governance decision-making, while influencing the supply of basic public services, effectively optimising the allocation of public resources, and realising the equalisation of public services.

In addition, attention should be paid to the regulation of data security to prevent the leakage of relevant information. Formulate reasonable data division requirements, categorise data well, keep important data and core data confidential, and protect the interests of the administration, enterprises and individuals. General data should also be handled carefully, so as to be responsible for the country, enterprises and individuals [8].

4.4 Promote Deep Learning and Develop Innovative Algorithmic Decision-Making for administration Governance

Algorithmic decision-making is a comprehensive consideration of many complex elements to obtain a single objective result, and the result obtained will become an important factor affecting social governance, so it is of concern to the whole society. It is a huge but very important process, and deep learning systems must be strengthened in the face of system inefficiencies and the need for personalised services. Through technological development and advancement, complex data is analysed and reliable and relevant conclusions are drawn, so that resources from various fields can be combined to uncover minute information that has been overlooked and missed, or to eliminate non-essential factors from interfering. Algorithmic systems of deep learning can replicate existing successes while also reducing labour costs and achieving better results than human decision-making.

Innovation is always the development of things can not be separated from the law of development, there is no innovative algorithmic decision-making will always stop in front. Follow up the objective changes in social development, seek innovative paths, collect public opinions and suggestions on algorithmic decision-making through multivariate decision-making, establish feedback and improvement mechanisms and other innovative ways, and continuously optimise and improve algorithmic decision-making in order to achieve a reasonable allocation of social public resources.

5 CONCLUSION AND DISCUSSION

The optimisation of algorithmic decision-making under the perspective of public service equalisation is a complex and long-term process. We will continue to move forward in this great cause, and in the face of the great background of digital information technology, we will also keep abreast of the times, not forgetting the past, absorbing the past and facing the future. Taking the application of algorithmic decision-making in the Spring Festival tourism in the three northeastern provinces as an example, we will incorporate the principle of fairness, pay attention to the regulations of ethics and morality, and ensure the privacy of data, so as to continuously improve the outstanding utility of algorithmic decision-making in practice. In order to achieve the importance of utilising algorithmic decision-making to avoid harm and to continuously regulate and evaluate the effects of algorithmic decision-making, so as to achieve the equalisation of public services, promote social justice, and enhance the well-being of people's livelihoods.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

FUNDING

This research was funded by the Innovation and Entrepreneurship Training Program of Dalian Minzu University (Project No. 202412026001); "Sunbird" Student Research Project Funding Program of Dalian Minzu University; Project No. TYN2024367

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