

A Study on the Optimization Path of Artificial Intelligence Governance in the Public Policy Perspective

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ABSTRACT

The development and application of artificial intelligence (“AI”) has not only brought fundamental changes in the economic, social and political fields, but also provided technological support for the reconstruction of public policies. The pace of development of artificial intelligence is bound to rise to a whole new level with the corresponding introduction of strategic planning for artificial intelligence in China in recent years. However, with the development of AI technology, many social challenges and potential risks are arising from it. Consequently, the measures to handle those risks and challenges need to be focused on, hence the importance of implementing the optimal path of AI application in the public policy perspective. We aim to explore the multiple governance subjects and governance mechanisms of population intelligence, and break the long-standing concerns about AI. We hope to be able to help the optimization of the development of AI and its use for the government activities. This paper attempts to analyze the logic of AI development in the public policy perspective as well as the risk and challenges of it, and discusses the plausible paths in optimizing the use of AI in governance matters in the future.

Keywords: Public Policy, Artificial Intelligence, Governance, Optimized path.

1. INTRODUCTION

Artificial intelligence as the core technology of the fourth technological revolution is widely cited in various fields, and its application in economic, social, industrial, and knowledge applications brings massive changes. The noteworthy point of this era of artificial intelligence is "it's not only a technological revolution, but also a revolution in decision-making and governance, which is opening up a new unexplored social interaction which may eventually cause several social changes, especially in the field of public governance [1]. Artificial intelligence had huge impacts on traditional production methods, it's innovatively changing the conventional ways of production while also

providing technological support for the development of the society. Most countries use AI technology to improve the internal management process of the government. AI technology help to simplify the inconvenient processes, reduce the burden of manual tasks, and improve the quality of government decision-making. Artificial intelligence will change the way government delivers public services to some extent, including processes, interactions with citizens, decision-making, and public policy design and evaluation [2].

Artificial intelligence technology is now integrated into the society and has been bringing it a lot of convenience. Most AI-based machines used in the public sectors perform intelligent identification, identity verification, service recommendation,

intelligent customer service and information processing to optimize the ways and means of intelligent governance [3]. However, scientific progress and economic development have not allowed mankind to completely ignore the risk and uncertainty of technology, which is causing social concerns. Artificial intelligence in the public safety management, the protection of personal privacy, the ethical issues from the abuse and misuse of smart technology, and the accuracy of algorithmic decision-making are all the major issues that the government, industry and academic will focus on in the current and future years.

This dissertation study is structured in [3] parts, the first part is mainly to discuss the current development of artificial intelligence and the concept of artificial intelligence. The main purpose is to give in-depth understanding of AI technology. The second part is to explore the possible risks of the use of AI in the government matters, and the accuracy of public decision making in the process of intelligent governance by AI technology. The third part is to explore the ways of using intelligent governance under the perspective of public policy optimally, and the in-depth discussion of public policy topics related to AI governance.

2. RESEARCH BACKGROUND

2.1 Artificial Intelligence

The key to the in-depth discussion of AI governance is how to understand and define the AI. Clear understanding of the AI and the risks it bring is an important foundation for AI Governance. The concept of artificial intelligence was first introduced to mankind after the Dartmouth Conference in 1956, and since then the development of artificial intelligence has developed in three main directions. The first one is the connectionism that mimics the brain's cortical neural networks and the connection between neural networks and learning processes; the second one is behaviorism that mimics individual and group control behavior functions and perception-action type systems; the third is symbolism that simulates the logical structure of the brain to process various information and knowledge [4]. And in recent years, under the influence of algorithms, big data and other factors, the development of artificial intelligence has led to the third wave of development. In the 2006, Google used deep learning methods to improve the efficiency of image and voice recognition, and in the driverless, "intelligent +", the industry has shown a strong role in helping the development;

and in the 2016, AlphaGo defeated the world Go champion. Since then, artificial intelligence has become the continuous attention of the society [5]. Artificial intelligence is generally defined as implementing a machine to learn—based on algorithms—to collect, process and adapt data from the real world [6]. The application can be combined with different disciplines to form different research areas, which is also the basic essence of AI. For example, the combination of artificial intelligence algorithms and image recognition has enabled a computerized vision, which works for image recognition to simulate the human senses and thinking ability. Artificial intelligence algorithms are combined with speech recognition to achieve natural language processing; artificial intelligence algorithms are combined with biometric features for biometric recognition to achieve gait, iris, face, multimodal recognition, etc., while its extension is the combination of artificial intelligence with big data, and cloud computing research.[7]

3. AI USE IN GOVERNMENT: IMPLICATIONS FOR PUBLIC GOVERNANCE

3.1 Technology Risks in Artificial Intelligence Applications

3.1.1 Data Risks

The nature of artificial intelligence is an algorithm based on collecting, processing and adapting data from the real world, and if the particular data used in the training and learning stage is wrong, the final result of the algorithm training will also be biased. The resulting large amount of data as the foundation of artificial intelligence bears the technical risks of AI in practical applications to some extent. The data risks are mainly found in the following areas: First, the training process of the algorithm is added from the malicious samples, which destroy the integrity and reliability of the data, resulting in the compromised trained algorithm model; second, the internal data leakage of the algorithm model is caused by the reverse attack; third, the model stealing attack can reverse the data reduction of the algorithm model, in addition to the security risk of open source learning frameworks, which leads to the leakage of artificial intelligence data to generate data anomalies [8].

3.1.2. Algorithmic Risk

Artificial intelligence is mainly based on algorithms, and algorithm risk is also a major dilemma for the development of artificial intelligence. Algorithmic risks are reflected in the following aspects: First, errors may occur in the process of algorithm design or implementation, making the results failed to match the expectations. Second, the algorithm itself may hide bias or discrimination towards a certain condition, resulting in unfairness in the algorithm model in charge for political decision making; third, the risk of the impenetrable algorithm black box occurring in practice can cause the difficulties of monitoring and review for the AI Program.

3.2 Possible Social Risks in Artificial Intelligence Applications

3.2.1 Ethical Risk

The birth of artificial intelligence is to imitate human behavior, emotions, and way of thinking, which allows intelligent robots to have the ability to learn on their own and simulate human intelligence and behavior to a certain extent. Artificial intelligence robots is expected to be able to go perform better without "spirituality" replacing humans to complete certain tasks. It is because of this special nature of artificial intelligence that the original ethical and moral codes about the relationship between human beings and society are challenged. The discussion on the ethical risks of AI is focused on the following aspects: One is the discussion on the ethical issues of human-robot relationship, whether artificial intelligence robots can have autonomy for that or not. The rapid development of artificial intelligence technology has given ordinary robots the ability to sense and think, and the emergence of these intelligent robots has challenged the issue of human rights to some extent. The human-robot conflict is a current issue that needs to be addressed. The second is the discussion on the accountability of artificial intelligence, who should be held accountable if an intelligent robot has an accident? The German scholar Hans founded the ethics of accountability through a comprehensive and systematic ethical attribution of the purpose, manner and consequences of the actions of the perpetrators [9]. After the emergence of artificial intelligence, the existing disciplinary attributes of accountability principles cannot properly define the ambiguity of

artificial intelligence technology. When a person is injured or killed by a malfunctioning intelligent robot, who will be held accountable for it between the manufacturer, the user, or the robot itself. In recent years, accidents caused by artificial intelligence has been occurring from Google, Tesla and other companies. These occurrences are spiking the discourse for the accountability of artificial intelligence. The difference between intelligent driving and traditional driving is that there is no subjective error on the part of the driver, or objective facts such as fatigue when it caused injury or property damage; The core of artificial intelligence technology is the algorithm, while algorithm is mastered by the developer and the designer of artificial intelligence technology itself. The moral value and behavior preference of the designer might be reflected in the algorithm to some extent, this make the designer become an important factor, this fact should be taken into account in placing accountability in accidents caused by artificial intelligence. Third, the risk of imbalance in social and moral values. The moral values in the society are beneficial in maintain social justice, while the emergence of artificial intelligence may possess a few shortcomings such as algorithmic bias and certain unfairness. On the one hand, if the designer or developer of the algorithm shows any kind of bias or certain discrimination, this value might be emulated by the AI through machine learning or another ways, which consequently might resulting an algorithmic discrimination; on the other hand, even if the developer does not have any bias or discrimination, but if there are tendencies of bias and discrimination in the data, an AI might also emulate certain bias or discrimination from learning the data. For example in 2016, Microsoft released their latest version of AI bot called Tay, which had the ability to chat with Internet users while also learning from their responses, and from that learning mechanism the bot started to become biased, and eventually performed discriminations and hateful speeches within four hours after being online. Microsoft finally had to take it offline to do some adjustment in it [10].

3.2.2 Employment Risk

Advances in artificial intelligence have given huge impact on the conventional production methods, driving industrial restructuration on social and economic aspects and creating whole new groups of employment. Intelligent robots are becoming more and more competitive in industrial

fields and other aspects of life, as more and more jobs are being replaced by intelligent robots. A study by Oxford University researchers Calverley et al. in September 2013 found that about 47% of high-risk jobs in the United States might be replaced by computers [11]. The widespread application of artificial intelligence will inevitably cause structural unemployment in a short period of time. From historical perspective, each technological revolution will trigger industrial changes, the first industrial revolution on trains caused unemployment in a large number of carriage driver, but at the same time create a large number of new industrial jobs. The conventional job upgrading is improving the qualities of manual labor, while artificial intelligence brings a direct transition from manual to automated production which potentially replace manual labor.

3.2.3 Privacy Risk

Artificial intelligence is the carrier of data and algorithms, which include large data of personal information, and processing artificial intelligent might be improperly operated so that private and personal information might potentially be exposed. The rapid development of artificial intelligence technology has enabled direct monitoring on users' personal privacy. With image recognition technology, cameras all over the world can accurately identify faces, target surveillance targets, as well as predicting and judging their patterns of behavior. In cyberspace, AI technology can directly monitor and analyze users' chat history, search history, video viewing history, and other information, and use their algorithms to suggest contents according to the preference of that particular user, and filter the unrelated content for the users. This ability might put the users in homogeneity information, which possibly triggers biases and one sided point of views among users. Users eventually might not be used to accepting different kind of views or opinions [12] Artificial intelligence brings convenience to the people, but it also exposes their personal privacy to the risk of misuses such as theft or personal information leakage.

3.3 Decision Risk in Artificial Intelligence

3.3.1 Risk of erosion of decision-making autonomy

Artificial intelligence provides massive data for public-sector decision making as well as

providing technical support. Decision makers rely on algorithms, models and machine learning with the intention of building a more objective decision making system, which might leaving the subjective initiative of people being ignored. Artificial intelligence as an auxiliary tool should be reasonably and equally applied in every aspects including the public sector decision-making.

3.3.2. Risk of defining accountability of the decision maker

To a certain extent, artificial intelligence technology has improved the efficiency of public sector decision-making, but it has also ignored the failure of the decision maker in the decision-making process, and the conventional way in determining intents and accountability is by identifying the root of the failure. With the widespread use of big data technology, the chance of decision maker to shift the blame to the AI algorithm behind a particular decision to avoid getting accountability is higher. The algorithm should only be aids for the process of decision making, and not to be held to any kind of accountability.

4. ARTIFICIAL INTELLIGENCE GOVERNANCE OPTIMIZATION UNDER PUBLIC POLICY

There are indeed many technical risks in the development of artificial intelligence technology as well as the social risks in the application process, but we need to be able to handle the existing updates of artificial intelligence technology through a correct policies and regulations on the use and restrictions of artificial intelligence to avoid the risks that may be brought by artificial intelligence.

4.1. Building a systematic AI risk management system

4.1.1. Improve Laws And Regulations For The Development Of Artificial Intelligence

The emergence of artificial intelligence technology has brought great benefits to our lives, but at the same time it can cause great disruption to society as we know it. If we want to grasp the convenience of these technologies and avoid the risks it brings to society, we should establish a set of standards and policies to guide the development of AI technologies from the legal and regulatory levels. At present, the development of artificial intelligence is apparent in every countries around

the world, and many countries have moved from the stage of technical encouragement to institutional regulation of AI development. For example, Germany, France, the UK, Canada and China have enacted personal information and data protection laws to regulate the excessive collection of personal data and the infringement of personal privacy by AI technologies.

4.1.2 Establishing Industry Regulations

Artificial intelligence has become a global pioneer industry, as an emerging technology, there are a variety of application scenarios, namely automated driving, automated decision-making, healthcare help and medicine prescription, and other sub-sectors, and different industries will encounter different opportunities and challenges in its development. The national laws and regulations is only for the macro-level use of AI. A more specific, detailed, and flexible rules is still needed in the development of AI in specific industries.

4.2 Establish and improve an intelligent social risk resistance mechanism

4.2.1 Employment Security Improvement and Trainings for Unemployment

We will make greater efforts to improve the social security system and reduce the risk of unemployment caused by the automated production of artificial intelligence. Every progress of the industrial revolution might lead to the division of interests and social stratification which always needs to be handled effectively in time. Therefore, the government should also put their focus on making laws and regulations to regulate AI risks, as well as social policies to resolve possible unemployment risks. The government should establish a good employment protection mechanism for workers. The government should not only encourage the continuous innovation and development of technology but should also protect the rights of the employees, and provide a balance between fairness and efficiency, stability and flexibility the industry. On the existing minimum living security system, it is recommended for the government to demand the companies to improve the coverage of unemployment insurance. Secondly, in order to cope with the negative effects of artificial intelligence such as technological unemployment of some people, the government needs to do a provide suitable trainings for the unemployed and

improve the existing re-employment system. Establish a sound employment forecasting and early warning mechanism for potential unemployment, as well as timely warnings for structural unemployment caused by the use of artificial intelligence in the industry. Finally, in response to the changes in the quality of employees demanded as the result of the development of artificial intelligence, the methods and curriculum of education at all levels should be adjusted accordingly.

4.2.2. Improve the ethical regulations of artificial intelligence

Without ethical regulation, the development of technology can be far more harmful than the convenience it can bring. With the frequent occurrence of incidents that violate social ethics such as gene editing, the development of emerging technologies such as artificial intelligence requires that they must be able to respond to social ethical demands and reflect on their possible social consequences. Regulating the social risks posed by AI requires not only a focus on the legal level of regulation, but also the development of a standard ethical system of science and technology to enable AI to develop within a socially ethical framework. In addition, it is also necessary to embed ethical algorithms as an important part of the overall algorithm system, focusing on requiring the use of subjects in the process of human-computer interaction to carry out the necessary moral construction, from the institutional level to inhibit the infiltration of unjust and unethical factors into the code and algorithms, to resolve the possible social and ethical risks brought about by artificial intelligence.

4.3. Build a multi-body participation in intelligent decision-making mechanism

4.3.1 Clarifying the Roles

The effective development and application of artificial intelligence involves multiple stakeholders, such as algorithm developers, computer experts, government, academic organizations, etc. moreover, artificial intelligence as an emerging technology itself has a large uncertainty and a high degree of professionalism, so it is necessary to implement the role of each stakeholder and establish a governance system that relies the cooperation of experts, enterprises, government, the public and other multiple subjects.

Managing the risks brought about by the development of artificial intelligence is the responsibility of the government, and is a major test of governmental management efficiencies in the new era. The government should be able to identify its responsibilities, build a governance system and mechanism for data sharing and algorithm optimization, as well as improving the government's social governance capacity. The two cores of artificial intelligence are algorithms and data. The core problem of algorithm is the legitimacy of algorithm designs, which involves the questions of who makes the algorithm, for whom is it made, how to make it, and who and how to regulate it after it is made. Data is a key element of artificial intelligence and a fundamental strategic resource of the country, which is related to the protection of the country and its citizen. The government should start establishing a new data and algorithm governance system, and return the ownership, use, control and disposal rights of citizens' personal data to the citizens. The government has a central position in AI risk management because of its unparalleled authority. In the cooperative management of AI risks, the government should be in the core position, and other social forces such as enterprises, academic institutions, associations and developers should be the important subjects to participate in the effort to manage the potential risks of artificial intelligence. Channels for consultation and discussions among these subjects, and should be established effectively. As shown in Figure 1.

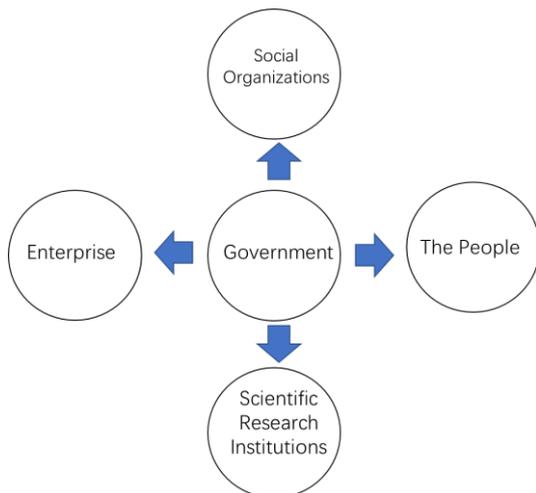


Figure 1 Illustration of the Role of Stakeholders in the AI Risks Management Coordination

4.3.2. Build cooperation platform

As a highly integrated and emerging technology, artificial intelligence requires collaboration and cooperation to promote solutions of common worldwide problems caused in the use of artificial intelligence in various fields. Funding and supports for universities and research institutes to carry out international cooperation and academic exchanges about artificial intelligence shall be improved as well. Encouragement for all stakeholders of the use of artificial intelligence to participate in discussions to set a universal sets of standards and rules for the use of artificial intelligence is a crucial step as well.

5. CONCLUSION

Artificial intelligence possess a certain security risks in practical application, but it is crucial to improve the efficiency of public sector decision-making, enhance the quality of public sector decision-making and promote the accuracy of public services. The research and development of artificial intelligence has become a concern for the society nowadays, and with the wide range of reaction and attitude towards it, it only make sense for the people to continuously explore the depth and width of artificial intelligence governance.

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