

Problems and Countermeasures of Artificial Intelligence's Application in China's Financial Market

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Abstract. Nowadays, the application of artificial intelligence (AI) technology in the financial field is gradually increasing, which has significantly improved the efficiency and innovation ability of financial services. However, the application of AI has also increasingly exposed many problems. This paper will analyze the issues from five aspects: information, algorithms, regulation, ethics and laws, and market stability, and summarize the corresponding solutions: the governance of disinformation requires the cooperation of the government, financial institutions, and investors; financial institutions should strengthen data governance to address algorithm deficiencies; regulators should improve the regulatory mechanism and make reasonable use of regulatory technology (RegTech) to improve the efficiency; formulating and improving AI ethics guidelines, and completing responsibility attribution mechanisms will help in the field of ethics and laws; strengthening systemic risk management can also enhance the market stability. This study aims to promote the deep integration of artificial intelligence with China's financial market and promote high-quality economic development.

Keywords: Artificial intelligence, financial market, data governance, RegTech.

1. Introduction

In the modern market economy, the market system is jointly constructed by the financial market, the commodity market, the labor market, and the technology market. Among them, the financial market is at the core and plays an indispensable role in the healthy development of the economy. As an important pillar of the national economy, China's financial market plays an irreplaceable role in aspects of resource allocation, risk management, serving the real economy, etc.

In recent years, artificial intelligence has shown an explosive development in China. Its application has penetrated into many fields such as medical care, education, and art, significantly changing the way of social production and life. In the financial sector, AI technology has been applied to robo-advisor, risk prediction, high-frequency trading and other fields, greatly improving the convenience and accuracy of financial services [1-3]. It turns out that AI has proven beneficial in the financial sector by enhancing process automation, improving risk management, and developing customer service. It personalizes customer experiences with advanced analytics and natural language processing, automates repetitive tasks, and assesses and mitigates risk by analyzing large data sets. In addition, AI has facilitated product personalization, strengthened fraud protection measures, and democratized access to banking services. In the investment and insurance sector, AI enables automated risk management, customized investment plans, and market forecasting. The use of AI to build predictive models for the financial market is a promising area of research, and multiple machine learning models have been deployed in academia [4].

However, this technology penetration has also raised many problems. Moreover, the rapid development of AI technology has difficulties to run-in with the traditional nature of AI regulatory framework, resulting in struggling to make progress in supervision. This study focuses on the application of AI in China's financial market, paying more attention to the analysis of AI in terms of disinformation, algorithm defects, regulatory lag, ethical and legal disputes, and market stability risks. It aims to systematically reveal the potential risks caused by the application of AI technology to the financial market, promotes the establishment and improvement of the financial regulatory system that

adapts to the digital economy era, help the steady development of China's financial market, and contributes China's wisdom to global financial governance at the same time.

2. Problem

2.1. Disinformation

The first thing to consider is the problem caused by the false information generated by AIGC (AI-Generated Content, which refers to the use of artificial intelligence technology to automatically generate text, images, audio, video, etc.), or deepfake. In the financial market, the definition and connotation of AIGC disinformation is multi-dimensional, covering false or misleading financial information created by AI technology [5]. The main purpose of this false information is to manipulate the market, mislead investors in decision-making, or undermine the fairness and transparency of financial markets. For example, in order to enhance their own market competitiveness, some companies may publish false information to damage the image and reputation of competitors, and then affect the stock price. In the context of the rapid development of artificial intelligence, disinformation spreads on social media six times faster than real information, and it is more emotionally inflammatory [6]. In the financial sector, the impact of AIGC disinformation is often more serious than in other fields, because in this field, disseminated faster information is, more attention investors pay, and more accurate information requirements are. Moreover, the application of social robots has also brought more problems to the filtering and screening of financial market information.

2.2. Algorithmic Flaws

AI model bias refers to the systematic errors made by AI systems in the decision-making or prediction process, resulting in results that deviate from true or fair expectations. The bias can come from data, algorithms, or use cases. The core of AI technology lies in data, and the training and optimization of its models rely on large-scale datasets. The performance of models is highly relied on the quality and quantity of data, but financial data is often incomplete, inaccurate, or biased, which may lead to model decision-making errors, causing users to suffer economic losses or unfair treatment. In addition, owing to the defect that AI technology itself cannot verify and screen data, the final training results may turn out to be a algorithmic discrimination (referring to the bias of the trained AI model with discrimination and preference tendencies in terms of nationality, region, race, etc.) [7]. This "unconscious" algorithmic discrimination makes the algorithm itself have social preferences and value tendencies, so that it is unable to deal with the user's problems neutrally, and then makes mistakes.

2.3. Regulatory Issues

The regulation of Chinese artificial intelligence has fallen into a lag dilemma, and the rapid development of AI technology has far exceeded the speed of regulation [8]. Whether cross-border or cross-domain AI applications, it is very difficult to regulate. The cross-border flow of financial data involves privacy protection and data sovereignty issues, which brings regulatory complexity. Data protection laws and regulatory requirements are inconsistent in different countries and regions, increasing the compliance costs for financial institutions. At the same time, cross-domain supervision not only has a high technical threshold, but also requires multi-departmental coordination. However, due to the imperfect regulatory framework, there are problems such as unclear responsibilities and poor coordination. Moreover, the development and application of RegTech (advocating the integration of law and technology to jointly improve the regulatory capacity of the government) in China is still in its infancy, and falls far short of the standards required for good governance. Due to the lack of regulatory competition, "short-termism" restricting innovation, and rule-obsession, the practice of RegTech often leads to failure [9].

2.4. Ethical and Legal Issues

On the one hand, there are many hidden dangers in the collection, storage, and use of data in the process of AI training. Based on China's current legal system and the technical principles of large models, there is a risk of infringement of training data [10]. For example, the GPT-4 algorithm model is still an "algorithmic black box", and with the networking of its training database, the risk of illegal access to training data increases significantly. Moreover, in the process of algorithm training, users' data is very vulnerable to illegal leakage and abuse, which will in turn damage the interests of individuals, society and even the whole country.

On the other hand, with the wide application of artificial intelligence technology in various fields, the problem of delineating the responsibility for AI decision-making errors has become increasingly prominent. Due to the complexity and autonomy of AI systems, how to define liability becomes a complex legal and ethical issue when AI decisions result in loss or harm. When an AI system makes an incorrect decision, there is still no clear legal basis for how to define the responsibility.

2.5. Market Stability Risk

First of all, AI technology may bring about a monopoly at the technical level and affect the fairness of the market. The release of GPT-4 has caused a sensation in many fields. In order to continue the "snowball effect" and further consolidate its leading position, OpenAI has been continuously upgrading its algorithms and optimizing performance to achieve a monopoly at the technical level, which will undoubtedly cause a bad competition in the market. Second, AI technology can quickly analyze and disseminate information, but it can also lead to information asymmetry. For example, some institutions may use AI technology to obtain and exploit non-public information, which can lead to market failures. Moreover, the widespread application of AI technology may change the operating mechanism of financial markets and increase systemic risk. If multiple financial institutions choose to use similar AI models, a failure in the model can trigger a ripple effect, leading to a market crash. Last but not the least, in high-frequency trading markets, AI can operate at millisecond speeds and generate huge trading volumes, which also provide the possibility of market manipulation [3, 7].

3. Countermeasures

3.1. Disinformation Governance

At present, the legal supervision of false information in various countries is still under exploration. Although the legislative system is gradually improving, such as Provisions on the Administration of Deep Synthesis of Internet-based Information Services and Interim Measures for the Administration of Generative Artificial Intelligence Services published by Chinese government, the feasibility of existing policies has yet to be proven in practice. According to the previous investigations, the governance of disinformation can start from the following three aspects: first of all, in order to regulate the development and use of AIGC, the government should play a leading role in encouraging financial regulators to actively research and formulate relevant regulations; Secondly, financial institutions should actively cooperate to establish a line of defense for compliance and strengthen their independent innovation, R&D and governance capabilities within the scope permitted by law. Finally, every investor should consciously abide by the law, improve their personal quality, enhance their ability to identify false information, and actively clarify false information.

3.2. Improve Technical Capabilities

It is necessary not only to strengthen data governance, but also to enhance the diversity of technologies, and continuously optimizing the existing algorithm structure is essential either. Firstly, financial institutions should establish a sound data management system to ensure the accuracy, integrity, and security of AI training data. For example, improve data quality through data cleansing, deduplication, and standardization or secure data with data encryption and access control. Secondly,

financial institutions should avoid over-reliance on a single AI technology and adopt diversified technical solutions to reduce the risk of single point of failure of technology. One example is to make corresponding plans for a variety of different complex environments, and apply the most suitable AI technology for each different situation. Another one is to strengthen algorithm testing and monitoring, and make emergency plans [11]. Finally, financial institutions should continue to innovate, strive to optimize existing algorithms, and actively collect users' feedback for targeted improvements. For instance, the introduction of multiple AI technologies complements each other to avoid the risks brought by a single technology, and collecting users' feedback through multiple channels can ensure that feedback is comprehensive and timely.

3.3. Improve the Regulatory Framework

First, establish an adaptive regulatory mechanism. Regulators should strengthen the dynamic monitoring of AI technology and formulate flexible regulatory policies. It can be appropriately adjusted with reference to the corresponding regulatory regimes in Europe and the United States (such as the five basic principles for AI rights proposed by the United States). Second, strengthen cross-border and cross-sector cooperation. On the one hand, regulators should strengthen international cooperation and develop unified data protection standards and regulatory frameworks for cross-border data flows. On the other hand, for the flow of data between different fields, regulators should actively coordinate with professional departments in various fields to promote the prosperity and development of cross-cutting fields. Finally, promote the development of RegTech. The use of AI tools for financial supervision purposes has been increasingly recognized by the European Union [12]. AI technology can be used to improve regulatory efficiency, and realize real-time monitoring and risk warning of the financial market [7]. As a case in point, develop an AI-based market monitoring system to detect abnormal trading behavior in real time, and various new technologies, including Eye DES (a cutting-edge AI-based technology and platform whose functional components provide market intelligence and unbiased detection of market abuse, can be chosen to contribute to the development. Likewise, it will also help to try to establish a two-tier fault-tolerant mechanism for regulatory technology, and adjust it according to the results of practice [13].

3.4. Strengthen Construction of Ethics and Law

On the one hand, AI ethics guidelines should be developed and improved. There has been a precedent for it in the world. In 2019, the European Union issued ETHICS GUIDELINES FOR TRUSTWORTHY AI, hoping to establish "human-centered and trustworthy" AI ethical standards and continuously promote the acceptance and application of AI technology by the public. In order to achieve "trustworthy AI", the document established three basic principles: AI should comply with the law; AI should meet ethical principles; AI should be reliable. They have an important reference value for formulating AI development policies. On the other hand, the responsibility attribution mechanism should be improved and privacy protection should be strengthened. The practicing steps are as follows: clarify the responsibility for erroneous decisions in AI systems through legislation, improve laws and regulations related to privacy protection, and protect the rights and interests of users. These countermeasures which based on the connotation of data privacy protection and the legal attributes of data privacy rights include such as clarifying data ownership, cracking algorithm black boxes, coordinating the application of law, clarifying responsible entities, and providing legal support for the delineation of responsibility and data privacy protection [14-15].

3.5. Enhance Market Stability

First of all, oppose data monopolies resolutely. The following three aspects can be taken into account: constructing a diversified and refined anti-monopoly regulatory strategy; construct a legal system for the supervision of anti-monopoly digital platforms; formulate standards for active review by anti-monopoly law enforcement agencies. Second, improve the risk early warning mechanism. Regulators should strengthen the monitoring of market fluctuations, discover and respond to potential

risks in a timely manner, and strengthen the supervision of the high-frequency trading market to prevent artificial market manipulation. For example, develop an AI-based market risk early warning system to monitor abnormal market fluctuations in real time. Third, diversify the algorithm application. Financial institutions should avoid using highly similar AI algorithms to reduce the possibility of algorithm resonance, encourage to develop diversified trading strategies, and reduce the convergence of market behavior. Finally, strengthen systemic risk management. Financial institutions should strengthen the research and management of systemic risk, avoid over-reliance on AI models, and pay attention to the distinction between high-level and small-scale models when determining systemic risk, which can use EU legislation as a mirror.

4. Conclusion

This paper examines a series of problems exposed by the expanding application of artificial intelligence technology in the financial field, including disinformation, algorithm defects, insufficient supervision, imperfect ethics and laws, and market stability risks. In response to the problem of algorithm deficiencies, financial institutions shall establish and complete a data governance system. For regulatory issues, regulators need to innovate regulatory tools and rationally apply regulatory technology to improve regulatory efficiency. At the same time, it is necessary to accelerate the formulation of AI ethics norms and clarify the criteria for determining responsibility. In addition, it is necessary to improve the early warning mechanism for systemic risks to ensure the stable operation of the financial market. Through the above measures, it is hoped that it can provide some references for the deep integration of artificial intelligence technology and the financial system and the high-quality development of the economy.

However, there are still some shortcomings in this study: first, the research method is qualitative, and there is a lack of quantitative empirical evidence for key issues such as algorithm resonance and market volatility; Second, the international comparative perspective is weak, and the experience of AI supervision in Europe and the United States has not been fully drawn; Third, the feasibility assessment of the technical scheme is insufficient, and the actual application cost of regulatory technology is not considered. In the future, it is expected to strengthen quantitative modeling, international experience integration, and technical and economic research to better promote the standardized development of AI applications.

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