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Artificial Intelligence in Digital Government Governance: Innovation, Risks, and Policy Responses

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Abstract. With the breakthrough development of artificial intelligence technology, the application of large models in government governance has shown a profound impact. This paper systematically explores the multi-dimensional application scenarios of large artificial intelligence models in constructing China's digital and intelligent government and the resulting governance transformation. The study finds that through application scenarios such as automated government affairs processing, intelligent public services, urban risk prediction, and policy simulation evaluation, large models have significantly improved the administrative efficiency and decision-making of the government and promoted the transformation of the governance model towards a data-driven flat structure. However, risks such as algorithmic discrimination, privacy leakage, administrative ethics violations, and technological dependence have emerged during the technology application process. This paper argues that the deep integration of large artificial intelligence models and government governance needs to strike a balance between technological innovation and institutional regulation. By establishing an adaptive governance framework, we can not only give full play to the advantages of technological empowerment but also avoid potential risks and ultimately achieve the modern upgrade of the national governance system and governance capabilities.

Keywords: Artificial Intelligence; Government Governance; Digital and Intelligent Government.

1. Introduction

With the rapid development of artificial intelligence technology, large models have demonstrated outstanding capabilities in information processing and autonomous learning, bringing new opportunities and challenges to government governance. Entering 2025, large artificial intelligence models, with their excellent information processing capabilities and strong autonomous learning characteristics, have been widely infiltrated into all fields of the social economy. Against this background, the field of government governance is also actively embracing this emerging technology of large artificial intelligence models. Some functional departments of the central and local governments in China have actively accessed large models such as DeepSeek, attempting to leverage their advantages to achieve a leap in governance efficiency and thus promote building a digital and intelligent government. Digital government is a form of management where modern computers, network communication technologies, 5G, big data, artificial intelligence, and the Internet of Things are utilized. It aims to promote the digitalization and networking of government affairs such as daily office work, information collection and release, and public management through these digital technologies. The goal is to reshape government management through data-driven methods and achieve a modern governance model based on data-driven decision-making, services, and innovation. The construction of digital government is not only in response to the technological revolution and industrial transformation requirements, but also an important measure to promote the modernization of the national governance system and governance capabilities.

However, simultaneously, a series of challenges have emerged, such as the complexity of the technology itself, potential data security risks, possible algorithmic biases, and how to integrate with existing administrative processes. An in-depth analysis of the application status and challenges of large artificial intelligence models in government governance can not only provide a theoretical basis for the government to use this technology scientifically and reasonably and help it avoid potential risks, but also promote the innovation of the government governance model and enhance the government's governance capabilities in the digital era. It is of great practical significance for

accelerating the construction of a digital and intelligent government and improving the modernization level of the national governance system and governance capabilities.

This paper aims to comprehensively analyze artificial intelligence's current application status, opportunities, and potential risks in government governance, explore effective risk prevention strategies, and provide a theoretical basis and practical guidance for promoting its safe and reliable application.

2. The prevailing state of the digital government

Countries and regions have developed differentiated approaches to artificial intelligence governance concepts, frameworks, and practices based on their institutional backgrounds and development needs. Corresponding research has also been conducted, including in-depth explorations of specific practical scenarios.

2.1 EU: A centralized governance approach centered on ethics and law

The EU focuses on establishing a comprehensive set of ethical principles and legal frameworks in its governance of artificial intelligence, emphasizing the protection of citizens' fundamental rights and the adherence to the moral bottom line of technological development. Its landmark policy document, the "Artificial Intelligence Act", clearly defines the standards and boundaries for artificial intelligence, laying a rigid legal framework for technological applications in the public domain. Moreover, most European countries have also formulated national-level artificial intelligence strategies.

The EU adopts a centralized model in terms of governance structure, setting ethical and legal boundaries for applying artificial intelligence in government governance through strict legislation and regulation. It particularly emphasizes technology's transparency and explainability. From the perspective of governance methods, the EU's policy measures are primarily based on soft tools, such as publicity and guidance, and incentive "reward" measures. In contrast, applying mandatory "regulatory" tools is relatively limited.

Current research analyzing the governance guidelines and strategic documents of the European Union indicates that although the EU has achieved remarkable results in the construction of legal frameworks and ethical norms, the government is more often positioned as a regulator or facilitator in governance. There is still a lack of sufficient investment and attention in leveraging artificial intelligence to optimize public services and enhance service efficiency.

2.2 The United States: A decentralized governance approach based on market and collaboration

The governance of artificial intelligence in the United States places greater emphasis on protecting citizens' rights and ensuring fair market competition. It stresses enhancing the safety of artificial intelligence through market mechanisms and technological means. Its governance structure adopts a decentralized model, relying on industry self-regulation and multi-party collaborative governance to achieve its goals. The governance methods are highly flexible. Policy documents such as the "National Artificial Intelligence Initiative Act" provide fundamental legal support for applying artificial intelligence in government governance, and clearly define the direction for integrating technological development and public governance.

Scholars' research has found that the core features of the United States' governance practices are industry self-regulation and cross-entity collaboration (such as cooperation among the government, enterprises, and academic institutions). However, similar to the European Union, the United States's governance focus is more concentrated on technical regulations and the maintenance of market order. There is still room for expansion in the practical exploration of artificial intelligence in areas such as optimizing public services.

2.3 China: Government-led strategic-oriented governance approach

The government leads the governance of artificial intelligence in China by formulating systematic policies and plans to guide technological development. The core objective is to serve economic growth and implement national strategies, while promoting artificial intelligence's "reasonable application" and healthy development. Documents such as the "New Generation Artificial Intelligence Development Plan" have clearly defined the key role of the government in technology application and established the practical principle of "pilot first, then regulation" - local governments explore technology implementation scenarios through pilot projects, while large technology companies, relying on their system integration and service expansion capabilities, become the leading providers of artificial intelligence-driven public services.

Chinese scholars have conducted multi-dimensional research on applying artificial intelligence in government governance. For example, based on the "technology - institution - value" analytical framework, they explore the application prospects and potential risks of generative artificial intelligence (such as data security, decision transparency, etc.), and point out that while technology enhances the efficiency of government decision-making and the quality of public services, risks must be guarded against. Currently, China has made significant progress in the development of artificial intelligence technology and data resource integration in practice, but still lags in the construction of risk management systems; at the same time, China actively promotes international cooperation in the field of artificial intelligence, aiming to provide collaborative and mutually beneficial solutions for global governance.

In conclusion, governance practices and research in different countries and regions have all focused on the core proposition of "technology application - institutional norms - value balance", thus forming their unique paths and providing diverse experiences for the global collaborative development of artificial intelligence in government governance.

3. The practical application of AI

With the remarkable advancement of large-scale AI model technology, its practical application in government governance is transitioning from theoretical exploration to actual implementation, demonstrating substantial potential for empowering governance.

3.1 Reengineering of Government Service Processes

Through deep learning and data analysis, AI technology can identify bottleneck areas in government service processes and offer targeted optimization strategies. Specifically, AI algorithms can conduct in-depth data analyses within the approval process, automatically detect and eliminate redundant steps, and optimize the approval sequence, thereby comprehensively reengineering the process. For example, the Guangzhou Government Service and Data Administration Bureau, by applying the DeepSeek - R1 and V3 models, has reduced the average approval time from the original three working days or so to just a few minutes, decreased the rate of manual intervention by 85%, and increased efficiency by over 90%.

However, the empowerment of technology also brings about challenges in terms of skill adaptation. A questionnaire survey among grassroots civil servants in the Pearl River Delta region revealed that 62.4% of the respondents stated they "highly rely on the process prompts and decision suggestions provided by AI systems" in their daily work. Among them, 38.7% admitted that "after long-term reliance, their ability to sort out complex approval logic independently has declined". This reliance may weaken civil servants' basic analytical and risk prediction capabilities, leading to service errors. This phenomenon has raised new requirements for the training system for civil servants: The training needs to achieve a skill transformation from "procedural operational proficiency" to "AI collaborative ability", enabling civil servants to understand the fundamental logical basis of AI algorithms, identify the limitations of AI decisions, and possess the ability to correct AI deviations using human experience. Additionally, a continuous learning mechanism that keeps pace with the iterative

development of AI technology is necessary. For instance, regular AI system update briefings should be held, and cross-departmental "AI + Government Affairs" innovation workshops should be organized to ensure that civil servants always maintain the initiative to master new technologies.

3.2 Decision Optimization

Government decision-making necessitates substantial data support and analysis. AI technology can process and analyze vast amounts of data to provide decision-makers with comprehensive and accurate information, thus laying a solid scientific foundation for government decision-making. The emergence of intelligent governance forms helps to identify the needs of social governance accurately, precisely set the governance agenda, effectively reduce governance costs, and significantly enhance governance capabilities. With the support of AI technology, the government can better use various data resources, acquire more comprehensive, accurate, and timely information, and elevate the informatization level of government governance. For instance, in Shenzhen, optimizing traffic signal settings using intelligent algorithms has reduced traffic congestion time by 20%, significantly enhancing the efficiency of urban traffic operations. This data-driven decision optimization practice improves governance efficiency and offers new perspectives and directions for policy innovation.

3.3 Service Innovation

From the perspective of government-citizen interaction, AI technology can transform the traditional one-way communication between the government and citizens into two-way and multi-directional communication. AI technology can accurately identify public demands through data analysis, facilitating the shift of government services from the traditional "one-size-fits-all " model to a "precision" service model. The Yangtze River Delta region has successfully implemented the "one-network-for-all " service model innovation by applying AI technology. The public can conveniently handle multiple government service matters across regions within the area by leveraging technical means such as data sharing and intelligent algorithms. The public policy interpretation system in the Yangtze River Delta region has increased the accuracy rate of policy delivery to 92.3%. This service innovation practice significantly improves governance efficiency and public satisfaction and promotes regional integration and development.

4. Governance Pathways

With the expansion of artificial intelligence's application, large-scale models of government governance, as well as technical, institutional, and ethical risks, have become prominent, and it is necessary to explore governance paths from three perspectives.

4.1 Techonlogy

Data serves as the "fuel" for artificial intelligence; however, the prevalent issue of data silos across government departments significantly hampers the deep integration and application of AI technologies. Establishing a comprehensive cross-departmental data-sharing framework is essential to address this challenge. First, a structured government data classification and management system should be developed. This system must clearly define data sensitivity levels and access permissions, ensuring that data sharing is conducted under conditions of security and control. Simultaneously, standardized data formats and interface protocols should be introduced to eliminate technical barriers between departments, enabling seamless data integration and interoperability.

Blockchain technology presents a promising solution for secure and transparent data sharing. Leveraging blockchain’s encryption capabilities and immutability ensures the safe exchange of government data while supporting traceability and auditability. For instance, the "City Brain" initiative in Jinshan District, Shanghai, successfully integrated data from 23 departments, resulting in a 40% improvement in emergency response efficiency.

Furthermore, enhancing algorithm interpretability is crucial. A formal algorithm filing and explanation mechanism should be established, and a "dual algorithm parallel verification" approach should be implemented. A hybrid verification system combining traditional manual review with algorithmic decision-making should be adopted for critical decision-making processes to ensure accuracy and reliability. Drawing from the European Union’s regulatory framework, periodic algorithm audits should be conducted to strengthen transparency and build public trust in AI-driven governance.

4.2 Institution

At the institutional level, a legal and regulatory framework needs to be established: accelerate the formulation of the "Promotion Law for Artificial Intelligence Applications", establish three fundamental systems, adopt the "domain legislation + special regulations" model, draw on the ethical review system of the German "Algorithm Accountability Law", and formulate differentiated regulatory rules for different fields such as public administration, healthcare, and financial supervision. This can better adapt to the characteristics and needs of other fields. For example, in the healthcare field, it is necessary to focus on the application of artificial intelligence in medical diagnosis, treatment plan recommendations, etc., to ensure its safety and effectiveness; in the financial supervision field, it is necessary to strengthen the supervision of the application of artificial intelligence in risk assessment, transaction monitoring, etc., to prevent financial risks.

Establish a three-level regulatory framework of "central coordination - local pilot - industry self-discipline". The central government is responsible for overall planning and policy formulation to ensure the overall direction and standardization of artificial intelligence applications; local governments can carry out pilot projects based on local conditions, exploring suitable regulatory models and experiences for their regions; industry self-regulatory organizations can play a coordinating and regulating role within the industry, promoting fair competition and healthy development among enterprises. Set up an AI ethics review committee and implement the "regulatory sandbox" system. For example, the AI governance joint meeting mechanism established by the Beijing Government Services Administration has achieved regularized collaborative supervision among 28 bureaus and departments, improving supervision efficiency, public participation, and the transparency and credibility of governance.

4.3 Ethics

The application of artificial intelligence must comply with social values and ethical requirements. First, it is necessary to establish norms and technical guarantees: formulate ethical guidelines, establish three core principles of fairness, explainability, and controllability, and implement "algorithm impact statements", requiring technology suppliers to provide social fairness assessment reports to ensure that the application of artificial intelligence does not exacerbate social inequality. For example, the intelligent customer service monitoring service in Hangzhou monitors differences in services, dynamically monitoring the differences in service access among different groups. This approach enhances the fairness of public services and increases public acceptance of the application of artificial intelligence.

Improve the digital inclusion system, develop multimodal human-computer interaction systems, and configure aging-friendly equipment such as voice interaction and gesture recognition in government service halls. At the same time, a "digital vulnerable group service window" should be established, retaining no less than 30% of traditional service channels to ensure that different groups can enjoy convenient government services. Shanghai's "Silver Age Classroom" trained over 100,000 elderly people, improving their digital literacy and adaptability to the application of artificial intelligence.

Apply privacy computing technology, deploy federated learning systems in government cloud platforms to achieve "data availability but invisibility," use homomorphic encryption technology to process sensitive personal information, and establish a "minimum necessary" authorization

mechanism for data access. For example, Zhuhai's "Smart Government Affairs" shared data from 12 departments, reducing the risk of information leakage by 92%, ensuring data security and promoting the rational utilization of data.

5. Conclusions

This research has revealed that while artificial intelligence technology has significantly enhanced the efficiency and accuracy of government governance, it has also introduced certain potential risks. To address these challenges, a collaborative governance framework integrating "technology-institution-ethics" must be established to promote the in-depth integration of technology and governance. Future research should further deepen cross-regional comparative analysis and long-term tracking studies, aiming to provide more comprehensive theoretical support and policy recommendations for transforming government governance in the era of artificial intelligence.

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