Research on Empowering Urban Social Governance with Artificial Intelligence
- Taking the Construction of Smart Cities in China as an Example

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Abstract. Since the concept of 'smart cities' was proposed in 2008, the construction of smart cities has become an important strategic choice to promote urbanization, enhance urban governance, solve the problems of large cities, improve the quality of public services, and develop the digital economy. 2023 is the first year of large-scale artificial intelligence models, and it is also a turning point year for smart cities (urban governance) to enter a new historical period. Cities provide deeper and richer landing scenarios for artificial intelligence.Urban social governance is an important part of national governance.Smart cities apply emerging digital technologies such as big data, cloud computing, Internet of Things, blockchain, and artificial intelligence to various scenarios related to urban governance involving social, economic, and environmental aspects, making cities smarter. With 'Internet Plus government services' as the starting point, by transforming the government's role and optimizing service methods, the level of urban social governance is improved to promote healthy and sustainable urban development. Currently, there are more than 1,000 smart cities globally that have been initiated or are under construction. In terms of the number of cities under construction, China leads with 900 pilot cities, and has formed several large smart city clusters.[1]The most representative ones are Beijing and Shanghai, which can provide global experiences in urban social governance empowered by artificial intelligence.

Keywords: artificial intelligencei, urban social governancei, smart city

1 Introduction

This paper firstly describes the basic concepts of urban social governance and smart city. Due to the development of economy and society, urban social governance faces many challenges, and it is necessary to use artificial intelligence technology to help cities become smart cities. The paper selects Beijing and Shanghai, the most representative of China's smart cities, as case studies, summarizes how the two cities use artificial intelligence to enable urban social governance in the process of building smart cities, and analyzes the impact of artificial intelligence on the governance mode, governance system, governance mechanism and governance mode of urban social governance. Finally, further suggestions are given for the risks and dilemmas faced by artificial intelligence enabling municipal social governance.

2 Basic concepts

2.1 Urban social governance

Urban social governance refers to the activities of government and related institutions in managing, coordinating, and serving urban public affairs within the city. The purpose of urban governance is to improve the efficiency of handling urban public affairs and promote the sustainable development of cities. Urban social governance faces many difficulties such as large scale and concentrated risks, and it is necessary to strengthen the capacity building of urban social governance in multiple dimensions, using technology to promote the modernization and intelligence of social governance.

The main contents of urban social governance include urban planning and construction management, environmental protection and ecological construction, public utilities management, safety management and emergency response, and community governance and services. Good urban social governance should include the institutionalization and standardization of the governance system, as well as the scientific, humanistic, and modernization of governance methods and approaches.[2] With the rapid development of technology, the acceleration of urbanization, and people's pursuit of better quality of life, the challenges faced by cities are complex. Social governance is shifting from institutional construction to technological application, giving rise to the construction of 'smart cities'.

The construction of smart cities can improve the efficiency of handling urban public affairs, beautify the urban environment, enhance the level of urban public services, maintain urban safety, guarantee the quality of life of residents, achieve sustainable urban development, and promote the modernization of the social governance system and governance capacity.

2.2 Smart cities

Smart cities consist of physical facilities, digital space, and social human ecological components, using communication connections, data, intelligence, and other technological means to achieve real-time perception, analysis, and coordination of urban dynamics, and to make intelligent responses to urban governance and public services, ensuring the healthy operation and sustainable development of cities.

Building smart cities is an objective requirement to transform the way cities develop and enhance the quality of urban development. By building smart cities, the information of public service resources such as water, electricity, oil, gas, transportation, etc. in the city is organically connected through the Internet, timely transmitting, integrating, exchanging, and utilizing various information such as the city's economy, culture, public resources, management services, citizen's life, ecological environment, etc., enhancing the ability of people-to-people, thing-to-thing, and thing-to-people interconnection, comprehensive perception, and utilization of information, thereby improving the government's management and service capabilities, and raising the material and cultural living standards of the people. Building smart cities can make urban development more comprehensive, coordinated, and sustainable, making urban life healthier, harmonious, and better.

3 Empowering chinese smart city construction with artificial int elligence

According to the Ministry of Science and Technology, the Ministry of Industry and Information Technology, the National Administration of Surveying and the National Development and Reform Commission, the number of smart city pilot projects in China has reached a cumulative total of 900. From the perspective of regional layout, pilot cities have covered all provinces, municipalities, and autonomous regions, forming four major smart city clusters around the Bohai Sea, the Yangtze River Delta, the Guangdong-Hong Kong-Macao Greater Bay Area, and the central and western regions. Chinese smart cities integrate various technologies such as data, algorithms, and models to achieve real-time prediction, discovery, and disposal of urban operation management, making cities more intelligent. The main features of these cities include data-driven, information sharing, intelligent applications, and cross-department collaboration. This article takes Beijing and Shanghai as examples to analyze how artificial intelligence empowers the construction of smart cities.

3.1 Beijing's 'Smart Beijing' program

Beijing's smart city development has gone through the stages of 'Digital Beijing' and 'Smart Beijing', and is moving towards a new type of 'Smart Beijing'. The Beijing municipal government has overall planning, guiding multiple parties to participate in construction, promoting the 'big outsourcing' mechanism, and accelerating informatization development through models such as Build-Transferband Build-Operate-Transfer. 2023, Beijing's smart city construction will enter the 2.0 stage of full-domain application scenario openness and large-scale construction, plans to be a benchmark city for global new smart cities by 2025.

Based on the functional positioning of the capital city, Beijing's smart city construction fully utilizes artificial intelligence technology with integrated data as the core, uses open and collaborative application scenarios as traction, and drives government reform and technological innovation through smart city construction. Building urban intelligent computing clusters, promoting the integrated development of data, computing power, algorithms, and development platforms, constructing common basic platforms such as general algorithms, underlying technologies, open source software and hardware, etc., solidifying the digital foundation including city codes, spatial maps, basic tool libraries, computing facilities, perception systems, communication networks, government clouds, and big data platforms, comprehensively achieving digital development.[3]By combining the three front-end application entrances of JingTong , JingZhi, and JingBan , the 'Three Controls' are implemented to ensure the smooth access of application entrances, integrated data, and integrated underlying platforms, and to coordinate the integrated development of 'people, enterprises, and government' in the city，for an example see **Figure 1. [1]** .
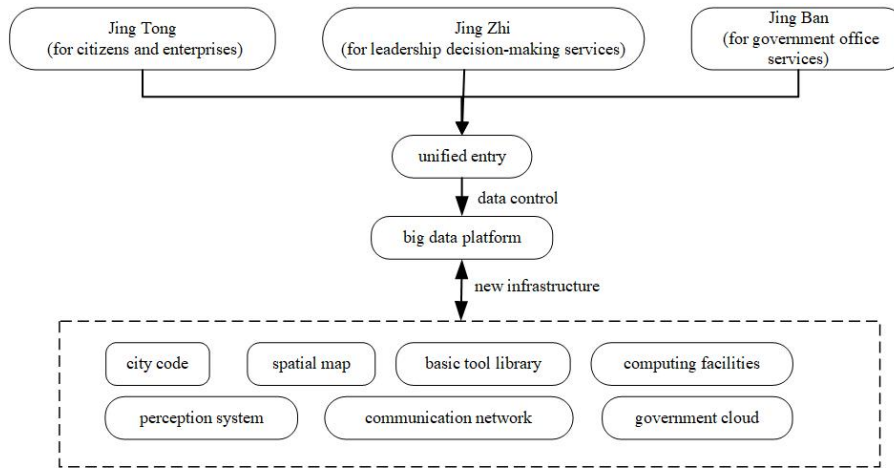
Fig. 1. Beijing smart city construction diagram.

For example, Beijing has established a comprehensive monitoring and early warning system for urban natural disasters by using artificial intelligence technology. Through five business applications, including comprehensive management, prediction and analysis, risk assessment, consultation and judgment, and early warning release, the monitoring and early warning data of all levels and regions are gathered and integrated, and the whole process of early warning, prediction, assessment, auxiliary analysis and early warning information release is realized. A multi-level natural disaster monitoring and early warning system covering major risks and hidden dangers is built, providing strong support for timely and effective prevention.

3.2 Shanghai's 'One Network, One Office' model

In 2018, Shanghai began promoting the reform of 'One Network, One Office' for the public and 'One Network, One Management' for the government, taking intelligence as a breakthrough to promote innovation in urban governance models, reshaping governance methods, and restructuring governance systems. In 2010, Shanghai officially proposed the strategy of 'creating a future-oriented smart city',guided by government planning, with enterprises as the main body, strengthening the focus of the city's relevant special funds on smart city construction projects, while attracting and gathering private capital, foreign capital, and other social capital to participate in smart city construction, aiming to become a global leader in smart cities.

Shanghai, as the economic center of China, has fully penetrated smart city information applications in areas such as people's livelihood, urban management, and government affairs. Information security technology support and protection mechanisms continue to improve, deeply integrating information technology with industrialization, and promoting industries to accelerate towards high-end development. The Shanghai municipal government relies on the electronic government cloud to strengthen the interconnection of various urban operation systems, forming a collaborative operation system across departments, levels, and regions. for an example see **Figure 2. [2]** Establish high-performance computing facilities and big data processing platforms, build artificial intelligence computing power and algorithm centers, optimize the layout of edge computing nodes, construct edge computing node resource pools,

and achieve coordinated supply of computing power in the cloud, edge, and end. Build a new type of urban IoT network integrating IoT, data communication, and intelligent communication, deploy urban neural nodes and perception platforms, construct the 'urban neural system', and promote the improvement of the urban governance system and governance capabilities.
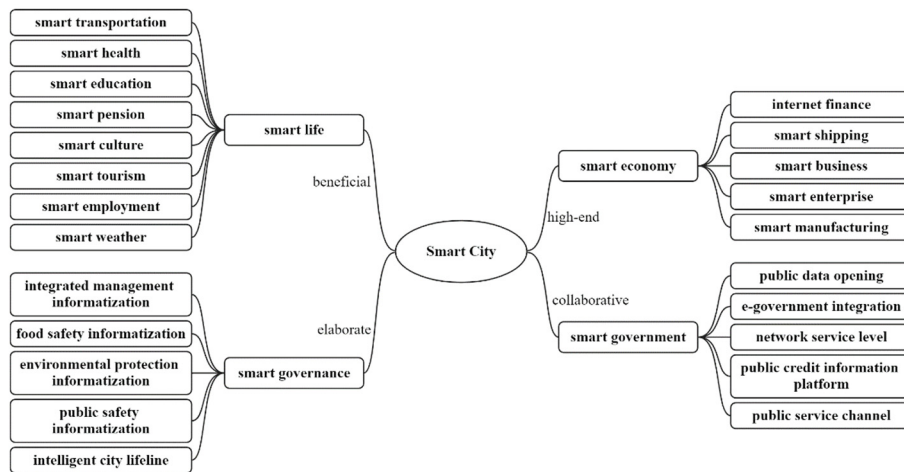

Fig. 2. Shanghai smart city construction diagram.

Such as Shanghai has built a digital platform of fire rescue "one network unified management".It is based on the ability requirements of all kinds of disasters and large emergency needs, focusing on consolidating the three-in-one fire digital base of IoT, IoT and intelligence, gathering all kinds of basic information, video images, IoT perception and other internal and external data resources, accumulating more than 40 internal and external systems and more than 1.11 billion internal and external data, providing multi-dimensional solid underlying support for all kinds of upper-layer application systems and providing auxiliary support for leaders at all levels to command and make decisions.

The premise for each city to build a smart city is to proceed from its own reality, adapt to local conditions, focus on the long-term and overall situation. Both China and foreign countries have achieved rapid development in the construction of smart cities, but there are differences in concept, technology application, policy support, public participation and other aspects, which provide rich inspiration and reference for the international community in the planning and construction of smart cities.Western smart city construction often emphasizes the innovation and application of technology, while China's smart city construction pays more attention to the top-level design and overall planning of the government, emphasizes the combination of technology and urban development goals, and the role of smart city construction in promoting social governance and improving the quality of life of citizens. In terms of technology application and development, China is at the forefront of the world in the application of some smart city technologies, such as artificial intelligence, big data, 5G communication, etc., and the application of these technologies has effectively promoted the intelligent and refined urban management. In addition, in terms of public participation and privacy protection, China is constantly strengthening laws, regulations and technical protection measures.Through in-depth

understanding and analysis of the differences between Chinese and foreign smart city construction, we can better grasp the global trend of AI-enabled smart city development, promote international cooperation and exchanges, and jointly promote the improvement of global governance.

4 Empowering urban social governance with artificial intelligence

Artificial intelligence is reshaping the ways, systems, mechanisms, and models of social governance globally. The integration of smart cities and artificial intelligence will continuously reshape cities, improve government service efficiency, enhance the targeting and effectiveness of public policies, promote citizen participation, and make cities smarter, more convenient, and better.

The construction of smart cities in China not only promotes the development of the digital economy, but also signifies the transformation of urban governance in China from a management-oriented government to a service-oriented government. Artificial intelligence not only changes the way and means of governance, but also has a profound impact on governance systems, governance mechanisms, and governance models.

4.1 Artificial intelligence empowers urban social governance methods

In terms of governance methods, artificial intelligence, based on big data, achieves the scientific and precise social governance, helping urban social governance to achieve high-quality development and high-quality living with high efficiency. Artificial intelligence can model and predict changes in the future economic and social development of cities, enabling governments to allocate social resources effectively, implement precise policies, and effectively address social needs. For example, by analyzing public transportation data, designing and optimizing transportation routes, and solving parking and traffic congestion issues; artificial intelligence can improve the automation level of government public services through machine learning, such as using online business processing platforms to provide convenient and efficient government services to the public; artificial intelligence can also provide personalized services to citizens based on their personal data, such as providing 24-hour health consultations to meet the individualized needs of the public.

4.2 Artificial intelligence empowers urban social governance system

In terms of governance system, artificial intelligence promotes the coordination and planning of economic, social, and urban governance at the city level through data sharing platforms, adhering to the principles of demand orientation, problem orientation, and result orientation. It coordinates and regulates operations at the city level, district level, and grassroots level, and promotes the participation of multiple entities in social governance. Artificial intelligence breaks down information silos, promotes information sharing among government departments, strengthens collaboration among departments, and enhances the comprehensiveness and coordination of government decision-making. For example, strengthening data sharing among urban planning departments, environmental protection departments, and economic development departments to formulate comprehensive policies and promote sustainable urban development. Artificial intelligence provides intelligent platforms and channels for governments,

non-governmental organizations, businesses, and citizens. For example, through online voting systems, it enables diverse social entities to effectively participate in policy-making, enhances the democratization and transparency of social governance, increases the acceptance and satisfaction of policies, and realizes the construction and optimization of a social governance system based on shared governance.

4.3 Artificial intelligence empowers urban social governance mechanisms

In terms of governance mechanisms, artificial intelligence analyzes potential social issues through big data analysis, formulates risk warning and policy evaluation mechanisms, and improves the city's emergency management and governance level. Artificial intelligence can monitor social and economic activities in real time, identify potential risks and issues through data analysis and prediction, establish effective warning mechanisms, such as obtaining potential natural disaster warnings in advance through monitoring of the natural environment, and timely and effectively respond to natural disasters, ensuring public safety and reducing social losses. Artificial intelligence can help the government establish effective governance feedback and evaluation mechanisms, judge the effectiveness of policies by collecting policy implementation data and feedback information, prompt the government to continuously adjust and optimize policies, improve social governance effectiveness, for example, by analyzing garbage classification data, the effectiveness of garbage disposal can be evaluated, achieving fine management and recycling of various types of garbage, promoting urban beauty and sustainable development.

4.4 Artificial intelligence empowers urban social governance models

In terms of governance models, artificial intelligence has constructed a virtual city identical to real-world data, transforming offline governance into an online model, expanding the "new space" of urban governance, and enhancing governance efficiency and effectiveness. By establishing a foundation of urban data, artificial intelligence integrates various aspects of city management, public services, and citizen life, creating a smarter and more sustainable city. For instance, smart agriculture can leverage data analysis to fully utilize local climate and soil conditions, plant appropriate crops out of season, and monitor crop growth in real-time to promptly address potential diseases, thereby improving crop yield and quality.

5 Pathways for enhancing urban social governance through artificial intelligence

Artificial intelligence, through its application in smart cities, can improve the efficiency and effectiveness of urban social governance, enhance the quality of public services, and promote citizen participation and innovation in social governance. However, with the rapid development of emerging digital technologies such as big data, the Internet of Things, cloud computing, blockchain, and artificial intelligence, social activities are becoming increasingly complex and uncertain. The corresponding artificial intelligence algorithms are becoming more complex, and the foundational data is growing exponentially, leading to issues such as privacy breaches, algorithmic bias, misuse of technology, job displacement, security threats,

ethical dilemmas, and lagging regulations, posing significant challenges to urban social governance. The following measures should be taken to address these challenges:

5.1 Formulate coordinate long-term development plans and cross-sector collaboration mechanisms

The government serves as the leader of the governance system and regulator of governance operations, and it needs to integrate the development needs and goals of the city in order to coordinate the planning and deployment of artificial intelligence development, ensuring that technology and urban development progress in sync. It promotes information sharing among government, businesses, non-governmental organizations, and other sectors, enhancing the availability of data. Effective cross-sector collaboration mechanisms are established to facilitate integrated development of social governance across levels, regions, industries, and domains, achieving resource integration and complementary advantages. Through international exchanges and cooperation, advanced technology, experience, and funding are introduced to comprehensively enhance the level of social governance and fulfill global governance responsibilities.

5.2 Expand channels and feedback mechanisms for diverse participation in social governance

The goal of governance is to maximize public interest, but not all demands align with it. The development of artificial intelligence technology has broadened the scope of public participation in social governance. The government should strengthen coordination and interaction with the public and other stakeholders, encouraging businesses, research institutions, civil organizations, and citizen groups to participate in social governance.[4] It should lower participation barriers, expand channels, create more interactive platforms, and hold public hearings in various forms, allowing diverse stakeholders to participate in policy-making and provide feedback on implementation. This approach seeks consensus and solutions, enhancing governance transparency and public satisfaction.

5.3 Strengthen technological innovation and ethical research in artificial intelligence

Technology is a means to an end, which is improving governance efficiency. Measures such as increasing financial subsidies and tax relief should be taken to encourage the development of new artificial intelligence technologies. Based on the different characteristics of government public affairs and the diverse needs of the public, easy-to-understand and operable artificial intelligence models should be constructed.[5] The tool combination and human-machine coordination should be continuously adjusted based on the practical effectiveness of artificial intelligence. New technologies should be explored to align with social governance and ethical standards, with a focus on both technological innovation and the prevention and control of ethical risks. A dedicated artificial intelligence technology review body should be established to conduct ethical reviews and risk assessments of newly developed technologies, ensuring that they meet ethical standards and the public interes.

5.4 Enhance information security protection and legal safeguards

With the deep integration of artificial intelligence in urban social governance, vast amounts of government data and personal information are collected and analyzed. The government should

strengthen information security infrastructure, accelerate the upgrade of information security technologies, and optimize digital platform systems. Data encryption technologies should be enhanced, and strict data access controls and supervisory mechanisms should be established to ensure data security and the privacy rights of citizens. Adhering to a bottom-line mindset and a cautious principle, comprehensive laws and regulations should be established to clarify the rights of data subjects and the responsibilities of data users throughout the entire process of data collection, storage, processing, and sharing. Legal responsibilities for data breaches should be defined to protect data security and privacy.

6 Comment

In summary, Chinese smart cities, by integrating data, algorithms, models, and other artificial intelligence technologies, have achieved real-time prediction, detection, and management of urban operations, making cities more intelligent. Artificial intelligence has not only changed the methods and means of urban social governance but also optimized the governance system, mechanisms, and models, promoting healthy and sustainable urban development. In the future, the government should continue to actively respond to the opportunities and challenges brought by artificial intelligence to urban social governance, and promote the modernization of urban social governance with the help of artificial intelligence, so as to make the city smarter and the people's life better.

7 Conclusion

This paper deeply discusses how artificial intelligence can improve the level of urban social governance in smart cities. By analyzing two cases in Beijing and Shanghai, it reflects that artificial intelligence plays a key role in improving governance methods, governance systems, governance mechanisms and governance models. In the future, further research can be conducted from the following directions: carry out long-term tracking research to evaluate the application effect and impact of artificial intelligence in urban social governance in smart cities, and provide a basis for future policy formulation and technological development; study how to narrow the digital divide through policies and technological means to ensure the inclusive and social equity of smart city development; study how artificial intelligence can promote the personalization, intelligence and efficiency of public services, including service model innovation and service quality improvement in key areas such as public safety, medical and health care, education, transportation and so on. Through these studies, it is helpful to build a more intelligent, efficient and equitable urban governance system and realize the sustainable development of smart cities.

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