

# Research on Smart City Construction of Hangzhou Based on Big Data

Jingwen Xu

Zhijiang College of Zhejiang University of Technology, Zhejiang 312000, China.

---

**Abstract:** Hangzhou has deeply cultivated the first-mover advantage of the Internet and become a typical example of the construction of a new national smart city. On June 28, 2020, Hangzhou Municipal Party Committee made the Decision on Strengthening and Optimizing the Urban Brain to Build an "Important Window" for the Construction of a New Smart City in China, which took the urban brain construction as the main starting point for digital empowered urban governance and comprehensively promoted the modernization level of urban governance. On March 1, 2021, the Hangzhou Municipal Brain Enabling Urban Governance Promotion Regulations will also be formally implemented, which is China's first local legislation on digital intelligence governance. The introduction of the Regulations provides a solid legal escort for the future digital reform in Hangzhou.

**Keywords:** Big Data; Smart City Construction; Hangzhou

---

## 1. Smart city definition and big data concept

Smart city refers to the use of artificial intelligence technology to form a data-driven urban decision-making mechanism. According to real-time data and various types of information, public resources of the city can be allocated and regulated, and finally automatic intelligence can be realized to achieve the optimization of urban operation efficiency. There are two key factors in the construction of smart city: first, the new generation of information technology represented by the Internet of Things, cloud computing and mobile Internet, namely the technical factors at the level of technological innovation; The second is the open city innovation ecology which gradually breeds in the knowledge society environment, namely the social and economic factors of the social innovation level<sup>[1]</sup>.

Big data refers to the data set that cannot be captured, managed and processed by hardware and software within an affordable time. New processing modes are needed to make the data set become a massive and diversified information asset with stronger decision-making power, insight and process optimization. Big data with large capacity and a lot of types, access speed, high application value as the main characteristics, first used in the IT industry, is currently in rapid development for a huge number, source dispersion, format a variety of data acquisition, storage, and correlation analysis, discover new knowledge and create new value, promote new ability of a new generation of information technology and services business.

## 2. Present situation and achievements of construction

2016 "urban brain" was born in Hangzhou, under the impetus of the "three integration", from the local exploration of traffic rule, to the important across of fully cure the city, then to the deepening application in the prevention and control of COVID - 19, city brain has played a very important role, make the wisdom of Hangzhou city realized leap-forward development, promote the modernization of Hangzhou governance process. During his visit to Zhejiang, General Secretary Xi Jinping fully affirmed Hangzhou's urban brain, requiring Hangzhou to continue to explore and innovate, further tap its development potential, speed up the construction of a smart city, make the city smarter and more intelligent, and create more generalizable experience for the whole country<sup>[2]</sup>.

At present, Hangzhou has formed a multi-node regional layout with Yuhang, Binjiang and West Lake as the core, including Xiaoshan, Qiantang New Area, Tonglu and other districts, each with its own characteristics. A platform system has been formed, with the National Independent Innovation Demonstration Zone as the main driving force, the Science and Technology Innovation Corridor in the west and the Intelligent Manufacturing Corridor in the east as the two wings, and the featured towns and the mass innovation space as the support. With Alibaba, Hikvision and H3C as the leading companies, listed companies and unicorn companies as the backbone, and "mass entrepreneurship and innovation" as the support, Wild goose shaped enterprise group has been formed.

According to "2019 Urban Digital Development Index Report", Hangzhou's total index ranks first in China; In the Comprehensive Evaluation Report of Digital Economy Development in Zhejiang Province 2019, Hangzhou continues to top the list with 141.9 points. There are six districts, counties (cities) in the province with more than 100 points in the first echelon. Binjiang District, Yuhang District, Xihu District, Xiacheng District, and Jianggan District of Hangzhou are in the top five. In the Report on Digital Governance of Chinese Cities (2020) released by relevant national institutions in August 2020, Hangzhou ranked first in the level of digital governance of cities in China, becoming the first city in digital governance <sup>[3]</sup>.

## **2.1 Intelligent transportation**

Hangzhou Smart Transportation has built a number of information systems based on the command center. The function of the comprehensive traffic information command center has been continuously improved, and the linkage function with the command centers of various districts, counties and cities has been added. The three-level emergency command support system has been further improved. The integrated traffic information law enforcement system has realized the coordinated law enforcement and network monitoring system covering the city's waterway, highway and road administration law enforcement categories. Intelligent port and navigation section management system uses a variety of sensing equipment to automatically identify, automatically capture and automatically judge whether the ship is seaworthy, which effectively improves the management efficiency.

On the basis of more than ten years of information construction, Hangzhou traffic has carried out the idea of "data running more, people running less", actively promoted the reform of "running at most once" and actively implemented the "six handling", namely "online handling", "one card handling", "one window handling", "mobile handling", "self-service handling" and "light handling", and developed the self-service machine for traffic matters, which has provided more options and convenience for the masses to handle affairs.

In recent years, mobile payment has developed rapidly and become the main method of payment for Chinese cyber citizens. As the first city in China to realize "code scanning for bus and subway ride", Hangzhou Bus has realized mobile payment covering the whole city, Hangzhou Metro has realized the function of electronic payment directly through the gate, and Hangzhou ETC has made high-speed passage smoother. These have brought convenience, benefits and safety to more citizens and tourists.

In addition, "do not queue, do not lift the bar, do not scan the code", All 69 parking poles in Hangzhou West Lake scenic area are laid off. The "leave before you pay" policy reduces the entrance time from 20 seconds to less than 2 seconds. Hangzhou, the first city in China to remove parking poles, has received 92.5 percent of parking levers <sup>[4]</sup>.

## **2.2 Smart medical care**

In order to solve the problem of the difficulty and annoyance of getting medical treatment under the traditional medical treatment mode, Hangzhou has implemented the smart medical treatment, which is mainly reflected in the aspects of whole process coverage, full self-service, full circulation service and full self-service medical treatment, which has greatly improved the service level at all stages of medical treatment. This also makes Hangzhou the first city in China to realize the whole process of medical treatment with an electronic social security card. At the end of 2018, the first domestic hospital with the "full process face-brushing for medical treatment" was launched in Yuhang District of Hangzhou.

Hangzhou takes the measure of booking registration on the Internet at different times before seeking medical treatment, and sets different registration methods for different groups of people to achieve timely medical treatment. At the same time,

inter-hospital settlement and full self-service are implemented to shorten the traditional process of medical treatment. In addition, the realization of city-wide access to medical records and the delivery service of cloud pharmacy to patients' homes have provided convenience for the people in terms of more services and improving people's livelihood.

For the prevention and control of COVID-19 epidemic, Yuhang District of Hangzhou has created a "1+1+1+N" sophisticated intelligent control model at the grass-roots level. One code, one digital platform, one thing and N emergency plans make epidemic prevention and control more precise, more intelligent and more efficient.

## **2.3 Wisdom government affairs**

According to the Survey and Evaluation Report on Online Government Service Capability of Provincial Governments and Key Cities (" Good or BAD ") (2020) released by the E-Government Research Center of the Party School of the CPC Central Committee (National Academy of Governance), Hangzhou is ranked second in online government service capacity of key cities. In the new journey of building an "important window", Hangzhou is promoting the construction of a digital government in an all-round way, striving to provide zero-distance services and "one-stop service"<sup>[5]</sup>.

For example, in the office hall module of "Hangzhou science and technology brain", you can apply online for work permits for foreigners in China, identification of provincial technology-based small and medium-sized enterprises, and inquire about provincial science and technology awards, key research and development projects, etc. Each business list has a "guide to work", and the work realizes "one-button navigation".

## **2.4 Wisdom green**

In the past, it took two to three hours for Hangzhou Dajiangdong to collect data on the concentration of enterprises' exhaust emissions, and since 2018, environmental protection departments have only needed one minute to get results through the use of new equipment, which has changed the feedback lag in the past and realized the transformation from "civil air defense" to "technical defense", reducing environmental pollution control to the "last kilometer".

On the other hand, several communities in Hangzhou have started to use smart garbage sorting and collection bins. There is no need for special person on duty, no need for special bags -- the system can track the person who put it through weight measurement and ID identification matching, accurate measurement, automatic monitoring and cloud management can be implemented, and environmental awareness can be promoted on the smart screen of the dustbin and the dustbin itself through the media.

## **3. The uncertainty in the construction**

### **3.1 There are uncertainties in the management and control of information security**

Smart city is a complex system composed of multiple subsystems, which are interrelated and interact with each other. Even if the information of each subsystem is secure, it cannot represent the information security of the whole system. In a smart city, the government needs to collect citizens' personal information to provide more accurate services. The major application software also takes information collection as the premise for citizens to enjoy its services, and the scope of information collection is increasingly extensive. If the information security in a smart city is not guaranteed, the life of residents will be affected to varying degrees, and the life safety of residents may be threatened in serious cases. All kinds of information in a smart city are interconnected. Once information security is not properly controlled, a large amount of information and privacy are likely to be leaked, leading to a series of chain reactions. Smart cities are highly dynamic and heterogeneous, and the traditional network security technology is no longer applicable. Users in smart cities are more complex and diverse than those in other systems. Users' uneven information literacy and lack of awareness of network information security will weaken the ability of various technologies to control information security, making it more difficult for users to prevent information security threats.

### **3.2 There are uncertainties for older people living in smart cities**

In smart city, elderly users may find it difficult to recognize and understand some complex or abstract dynamic icons in the interface due to their low level of familiarity with emerging Internet information and their eyesight begins to decline. Therefore, it is slow and difficult for them to obtain information. Because some elderly users are not familiar with the various operations on the mobile phone, they are prone to encounter various operational difficulties when traveling by car or entering and leaving some indoor places, and still cannot complete a series of operations independently when seeking medical treatment or shopping.

### **3.3 There are uncertainties in the long-term development of the smart**

#### **parking industry**

In the next few years, the demand for parking spaces in Hangzhou will continue to rise, and there is a huge space for the development of the smart parking market. The bright development prospect and high profit margin of its smart parking market also make many potential entrants covetously for this "big cake". Moreover, the low threshold of smart parking hardware equipment makes the transformation cost not high, and the market entry threshold is low. Many small enterprises also want to enter the market, resulting in small scattered market participants and scattered market competition pattern, which has a negative impact on the long-term healthy development of smart parking industry.

## **4. Construction suggestions**

### **4.1 Innovate technology and strengthen control**

Continuously innovate the technical means of information security management and control to meet the security needs in encryption, authentication, intrusion monitoring and privacy protection. We will comprehensively implement a system of hierarchical information security protection and risk assessment, strengthen the development of a network security protection system, and conduct regular security inspections of information systems. Establish the preparation and exercise of emergency plans for key information systems, and improve the ability of emergency handling of information security incidents.

### **4.2 Integrate the construction concept of "suitable for aging"**

The complex information of the network interface should be simplified. The interface design should try to avoid too complicated background pattern and pay attention to the integrity of the tone. For abstract or dynamic icons, text and voice explanations should be carried out to help the elderly understand. Enlarge the icons and text spacing appropriately, which helps the elderly to identify and operate the selection. In addition, more courses to teach the elderly how to use smart phones can be carried out in communities to make it more convenient for them to travel, seek medical treatment and go shopping.

### **4.3 We will improve regulations and policies on building smart cities**

"Hangzhou city brain" should start from the whole society, not only through digital reform to build the whole government, but through the data sharing to connect governance subjects across the economic, political, social, cultural and ecological domains. In legislation and policy, more explicit provisions should be made on the property rights of data, the relationship between digital governance and personal privacy, so as to achieve overall intelligent governance.

## References

- [1] Yang Chao. Research on Problems and Countermeasures of Smart City Construction in China [J].
- [2] Zheng Qiwen. Research on the construction of smart city in Zhoushan based on big data [J].
- [3] Yu Jiansheng. Research on the Uncertainty and Countermeasures in the Promotion of Smart City [J].
- [4] Cui Weirong. Research on Information Security and Privacy Protection in Smart City [J].
- [5] Decision of Hangzhou Municipal Committee of the Communist Party of China on Strengthening and Optimizing Urban Brain and Building an "Important Window" for the Construction of a New Smart City in China.