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The origin and development of the smart city

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Abstract: With the development of information technology, under the blessing of cloud computing, big data and 3 s (GIS, GPS, RS) technology, city has entered a stage of wisdom development through the construction and development of informatization, digitization and artificial intelligence period, wisdom city has become an important task and development goal of the current global urban construction. The key to the collaborative development of intelligent cities' hardware and software is the innovative development of intelligent technology, the creation of intelligent economy and the construction of intelligent environment.

Cities are exposing more and more problems during the development, and the future cities will bear the burden of people, resource, environment and society. In order to solve the problem of human survival optimization such as self-regulation and sustainable development, and aim to meet the goal of coexistence between human beings and environment, wisdom city's construction is the irreversible historical trend of current global city developing, the later development trend of city must be the sustainable development road which centered on big data and cloud computing.

The human beings has experienced the design for survival in fear in genetic era, the design for survival adaption in the period of KaoMoXue (Chinese famous literature"KaoGongJi" and the famous philosopher Mo Zi), the design for survival optimization in the period of Bauhaus and Ulm, and its now in the design for survival of leisure in the holographic era, "the huge changes it brings is the survival way which never experienced in the past - the integration of digital live, virtualization, complicated survival, and the integration of survival" 1 social circumstances;basing on the development of new generation of communication technologies such as the "IoT", 3S (Geography information systems, Global positioning systems, Remote sensing) and location-based services data, system design and construction of smart city has been mature, developed countries have collaboratively promoted the overall city planning and design, operation, technology integration and living way, striding forward to wisdom.

The origin of the smart city

The source of intelligent city is divided into three stages: urban informatization stage, digital urban

stage and intelligent city stage. The signature events of each stages are as follows:

The informational city period

In February 1992, President George h. w. bush introduced the concept of "information superhighway" in his state of the union address, intended to build the National Information Infrastructure (NII); the Clinton administration of the United States proposed the "information highway program" in 1993, and finally fully implemented in 1994; the European Community decided to build the information superhighway in 1994; Japan also announced measures in 1994 to promote the development of the information superhighway; in 1995, China joined this competition and carried out the informationized “eight gold” project, and the construction target is jinqiao project, jinka project, jinguan project, etc, the core is the construction of communication network and promote the development of high-speed information network, which marks the preliminary exploration of informationization of China and the beginning of the construction of the information-based city. The information expressway has promoted the construction of the informationized city, which is based on the construction of informationized city and linked with a agglomeration of informationized city, and those links formed a global network of information highways. The information highway and informationized city construction its connected have laid the foundation for the development of digital cities.

The digital city period

In January 1998, American vice President al gore proposed the concept of "digital earth", which based on the "information superhighway" development and solve many aspects of problem, such as natural and social activities through the digital way. American MIT professor Negroponte illustrates the fresh impetus to the world from digital technology in "digital subsistence" , based on this, the construction of digital city is growing. In the same year, China's leaders pointed out that the technology development which mainly symbolized in information technology is rapidly changed, the emerging knowledge economy heralded a new and dramatic change in human economic and social life.This is our country's new understanding of the "digital earth" and the implementation of the concept of "digital earth" in digital cities’ construction.

The intelligent city period

Based on the constant development of urban informationization and digitization, the council of foreign relations was held in New York in November 2008, and the International Business Machines Corporation (IBM) proposed the concept of "intelligent earth”, which inset and install sensors to various kinds of objects, and is widely connection, forming the so-called "IoT", realizing the integration of human society and physical system, bringing the city into the wisdom times of "coexistence" and "leisure life". In 2010, the international business machines corporation formally proposed a blueprint of "smart cities". Wisdom city using big data emerging methods of communication like the “IoT”, mobile Internet, cloud computing and so on to operate data integration of the whole city, and sensing and analyzing, make intelligent response and countermeasure to provide more high quality of human's life.

In November 2016, the information resource management BBS in China held a seminar around our countries’ new wisdom city construction and big data resource management in Beijing, and released the "2016-2017 China's new wisdom city construction and development of the

comprehensive evaluation index system of influence", marks the advance of wisdom city construction in our country.

The development of smart city

Different institutions and scholars define smart cities according to different perspectives, this content reflects the same connotation, "full use of technology methods like information and communication technology, taking the development, utilization and integration of city resource as the core, making education, health, environmental protection, security, transportation, and utilities more intelligent, and providing timely, efficient, interactive information service for the residents, enterprises and society"[2.]

The trend of today's global urban development is based on the large data, cloud computing, artificial intelligence, 3 s, “IoT” technology, towards wisdom city development, data computing and technology is the core of the wisdom urban construction and development.Domestic and overseas strove to participate in the construction of the wisdom city life, intelligence traffic and so on various aspects in wisdom urban, and the developed countries like Europe, America, Japan and South Korea are taking the wisdom city construction as the strategic plan of the economic development.The construction of intelligent cities based on holographic time people and all living things aiming at leisure and centuries-old coexistence is being comprehensively developed.

The United States, the concept of "smart cities" pioneered by IBM has aroused the concern of national leadership, eventually rose to national strategy to push country’s development; the European Union focus on the cities’ sustainable development of smart cities’ construction, and upholds environmental protection idea in natural resources and social environment; after experiencing "E-japan", which laying the foundation for information construction, and electronic "u-japan" strategy, Japan launched Japan's wisdom "I - Japan" plan in 2009 to promote the wisdom of government management, health care and talent education; Korea launched U - Chesapeake strategy in 2003, its Ubiquitous Society aimed at shaping the Ubiquitous Society, that is the intelligent society which pursuit information digitalization and seamless connection, providing convenience for the people with high quality and intelligence service, in June 2011, Seoul, south Korea, the “wisdom Seoul 2015” strategy was released, aimed to build an electronic platform that could complete more than 80 municipal services by mobile phone or tablet.

Chinese government attached great importance to the cities’ intelligent construction and promoted it to the strategic plan, in June 2014, the NDRC (national development and reform commission) issued the "Chinese smart grid and wisdom city development research report”, which provided develop direction for China's new urban wisdom and economic development.In 2016, the premier clearly pointed out to "build smart cities and improve living conditions" in the two sessions.During the “13th Five-year Plan” period, the Ministry of Housing and Urban-Rural Development of the People's Republic of China said it would invest more than 500 billion yuan in

the total investment in smart cities.Under the guidance of the policy environment, there will be a breakthrough and remarkable development in the construction of intelligent cities in China.

According to the current development status of the whole world, the development of technologies which based on the "IoT", cloud computing and artificial intelligence must be the trend of the future urban construction. Smart city has broad prospects on the social economic development, the urban intelligent construction and the public's intelligent services , and also has the profound significance to the harmony between human and ecological resources . However, there is still various of difficulties and challenges to realize the harmonious development among people, objects and environment in the smart urban vision in the wisdom urban system construction, this way is still long and with heavy burden, but there are good prospects which requires the leading technical personnel across multidisciplinary fields to cooperate with each other.

In the development of smart cities' construction, hardware and software should coordinate and develop.In addition to the research of hardware condition of core communications technology, software condition of people-oriented also received attention, the hardware condition is the technical basis of the system operation of the intelligent city , and the software condition is the direct condition to improve the public sense of well-being and use felling, both are indispensable and only a perfect combination of those two will work together to facilitate the complete framework of the intelligent urban system.

The collaborative development of hardware and software in smart cities develops from the following aspects:

The innovative development of intellectual technological. Problems of large data, cloud computing, "IoT" in wisdom city construction are the core problems of the forefront information technology, its the endogenetic force to promote the development of intelligent city and its also both opportunities and challenges of the new era subject, needs to pointedly innovate the intelligence technology and overcome difficulties to ensure city operation with low carbon, environmental protection, efficient, improving the management level of the city and servicing the public in multi angle and multi dimensional, providing the public more leisurely and making a harmonious development among people, objects, environment .

Create a smart economy. The wisdom urban development based on the intelligent technology must push economy to the smart economic transformation, upgrade development, relying on the wisdom city's running data, optimizing the economic activity and adjusting economy timely, increasing the economic vitality, at the same time, generating and conceiving more wisdom economic form.

Build a smart environment. Constructing an online awareness and intelligent warning platforms for urban pollution sources, noise, garbage, hazardous gases, air quality, river water level, water logging, etc, all sidedly and intelligently realizing online monitoring of the urban environment, environmental data acquisition and calculation for the scientific and efficient management of urban

environment, constructing a smart environment of low load, low cost, high quality, quick fixes and sustainable development.

Conclusion

In recent years, there have been new breakthroughs in the smart cities' construction, including big data, cloud computing, and 3S. Basing on the development of the informationized city and digital city, relying on the combination of the real world and digital world established by the "IoT", cloud computing and big data, the smart city realized the interconnect ability between people and things, comprehensive perception ability and information integration services. The intelligent city has broad prospects in the city's macro-control, economic transformation and the intelligent service of the people. The comprehensive and in-depth advance of the smart cities still requires the joint efforts of academic, industry in multi-field and interdisciplinary.

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