Design of Perceptual Stereoscopic Network System for Intelligent Lighting and Smart City Architecture

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Abstract: Using big data means to solve various problems in social life is a common practice in the Internet age. Smart cities are a hot area nowadays, and the power system in smart cities is an important link. How to establish an intelligent lighting system based on stereo perception is an important issue for saving energy and protecting nature and realizing the harmonious development between man and nature. In this paper, the IntelliSense lighting system is divided into three parts: the sensing layer, the data layer and the application layer, and then the corresponding hardware and software systems are designed. The intelligent lighting system of smart city has been designed and applied from the perspectives of convenience, energy saving and convenient upgrading. It has realized the purpose of saving energy and protecting nature. The design and implementation of this system has certain guiding significance for building a harmonious smart city.

1. Introduction

The combination of artificial intelligence developed by big data, Internet of Things and cloud computing is amazing in all walks of life. The most popular combination in urban construction is the construction and planning of smart cities. People are looking forward to using advanced technology to improve the operation and management of the city and to realize the intelligent and modernization of urban governance. Half of the smart city projects that have been launched and under construction in the world are in China. The study of smart city construction has practical reference value for us. In the construction of human cities, it is essential to design the lighting system. In smart cities, we use advanced automation technology to configure corresponding intelligent lighting systems to contribute to the construction of smart cities and energy conservation in China. In the design and use of intelligent lighting systems, it is both a technical issue and a theoretical issue. We define the intelligent lighting system in the city in a perceptible form with a human-centered mindset. By discovering the problems in the intelligent lighting system of smart cities, we have constructed a perceptible three-dimensional network system through the combination of hardware and software, which has certain significance for solving the application of intelligent lighting systems in smart cities.

2. Intelligent system awareness

In the construction of smart cities, the mainstream urban planning framework mainly divides the city's smart network into three layers, from the bottom layer to the outer layer: the perception layer, the data layer and the application layer. The perception layer is an application of advanced tools on the hardware and software and on both levels to collect information from the city. The data layer is a system architecture that utilizes the data obtained by the sensing layer, and involves the sharing of data and the analysis of data in the process of utilization. The structural design of the application layer is mainly based on the mainstream fields in current urban life. The perception layer is more focused on the construction of infrastructure, the data layer focuses on the management of the city, and the application layer is biased towards the existing needs of the service. The structural change at this level is the largest.

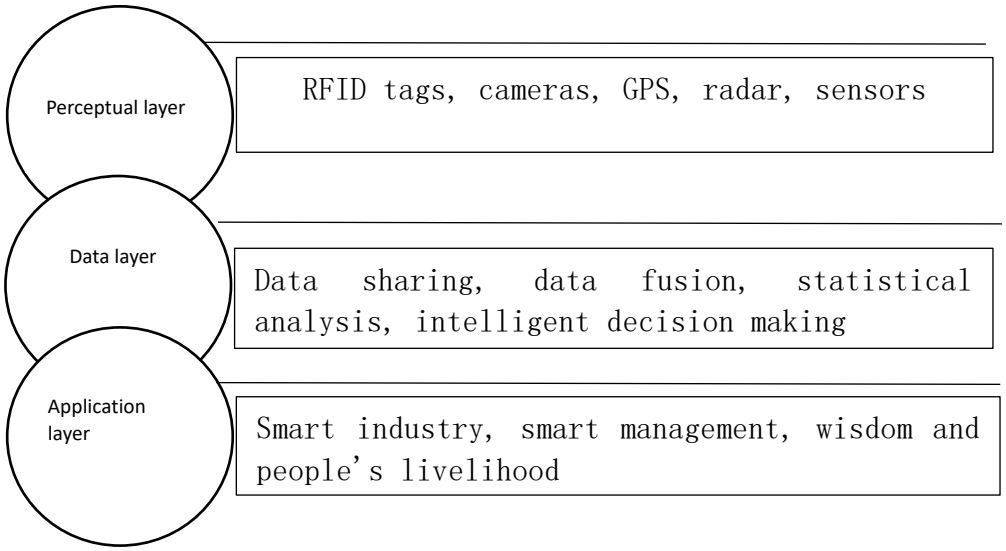

Fig.1 Intelligent system structure

2.1. Energy-saving function of the sensing system

At all framework levels, there is electricity; at the same time, lighting systems are required at all structural levels. Smart products are a familiar type of product for commercial systems. In this big environment, energy conservation and emission reduction have been advocated by the government. In daily life, most of our public spaces and some private spaces are working day and night, and the operation of lighting products consumes natural energy from beginning to end. As a populous country, the lack of energy is a real problem. In the face of China's energy problems, what we can do is not to stop the use of energy, but to save energy and reduce emissions in the process of using energy. And only a complete system can bring intelligent energy-saving effects, each component is linked, and the overall effect is a single sum. The changes brought by intelligent lighting are very large. We install such lights in the space, and the intelligent control lamps are brightly switched. For example, in the service industry, the lights can be appropriately dimmed when there are few people, or it is lit up in a separate area and the energy savings are huge.

2.2 Convenient intelligent lighting system

The intelligent lighting system is closely combined with the actual situation of the current smart city lighting system. With advanced science and technology, combined with humanized design concepts, a sophisticated, complex and huge intelligent application system is constructed. The original intention of designing this system is to provide convenience for the life of a smart city and bring high-efficiency effects to the construction of a smart city. In the traditional lighting system, there are often problems such as incorrect system switching time and unstable voltage during peak power usage. The perceptible intelligent lighting system solves these problems from the underlying logic. By sharing and applying real-time information through cloud computing and Internet of Things technologies, the quality of service of the lighting system can be improved.On the other hand, our intelligent lighting system provides convenience for humans and also causes some troubles for other creatures in nature. The city itself was born through the destruction of nature. The construction of a smart city, we hope to return to the origin of nature as much as possible. Lighting systems are something that is not needed at all in nature, reducing the impact on nature, and is an inevitable requirement for intelligent lighting systems in smart cities. While providing convenience to humans, we must rationally reduce the impact and damage to other organisms based on intelligent systems.

2.3. Meet the conditions for upgrading

Artificial intelligence is a newly developed technology, because in the initial stage, upgrading is very fast. Specific to the field of intelligent lighting systems, the upgrade of hardware materials will

inevitably lead to the upgrade of lighting fixtures. The upgrade of the software framework is also a small revision every quarter, and the speed of the major revision every six months is advancing rapidly. Traditional lighting systems do not have software upgrade issues with the lighting system itself. In the face of the hardware upgrade problem, the traditional system needs to go through the process of user repair, scheduling maintenance personnel and material installation. Each step is very expensive in terms of time and cost. When applying the intelligent system, when dealing with the hardware upgrade problem, it only needs to combine the information workflow of the smart city, from the selection of materials to the installation and replacement of the lamps, all of which are automatically arranged and operated by the urban system, which will replace the complex and time-consuming upgrade system problems. Analysis of the current changing Internet environment, we believe that the upgrade and replacement of the system is a very important issue, not only the perceived stereoscopic intelligent lighting system needs, but also the exploration of the construction of smart cities.

3. System design and function implementation

3.1. System architecture design

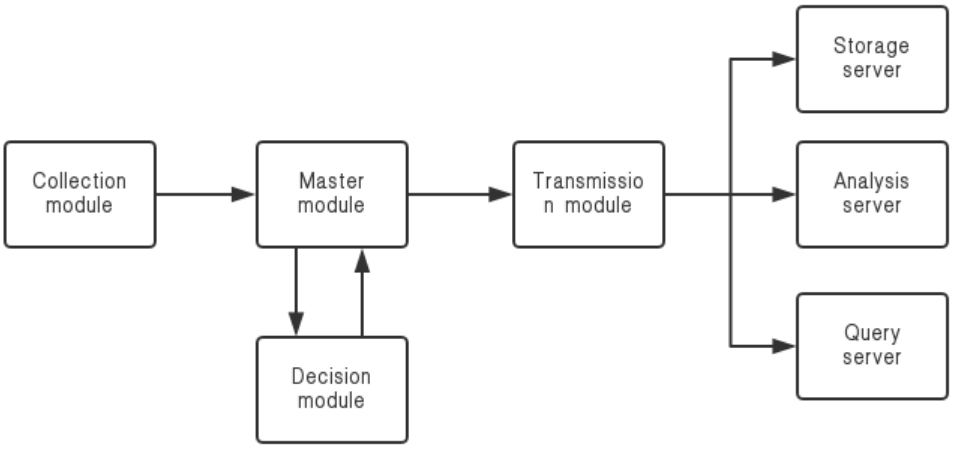

Fig.2 System architecture

In the hardware design, we mainly apply the popular micro-service concept, and combine the intelligent lighting system with the construction of smart city, which is divided into: collection module, main control module, decision module, transmission module and server module. As the smallest unit, the five parts bear all the functions of the intelligent lighting system in the smart city application, and realize the design of the perceived three-dimensional network architecture. In the collection module, we mainly use the sensor component that can perform real-time acquisition function to collect and store data in real time. The main control module plays an irreplaceable role from the beginning to the end. From the time of collecting data, the main control module has the initiative right. In this process, the program of data transmission and storage needs to be planned. The main control module acts as a central hub to conduct the direction of data. The decision module is a more advanced device that controls the main control module. In this part, we usually directly use the MCU or CPU directly, which has higher requirements for computing power. The importance of the first-level transmission module in the micro-system is listed separately as a separate module because the area and complexity of the transmission line is greatly increased throughout the smart city, and any part of the line Breakage or blockage has a fatal effect on the operation of the system. The server module is very costly, but the server industry is fully commercialized. When we make the choice, we can directly apply the servers commonly used in the smart city network.

In addition to hardware design, our systems require powerful software resources for intelligent analysis and integration of data. These software resources will be the core configuration of the

system, and will be configured and configured in each step of the system. Only a hardware system is a system that cannot work, and the combination of software is an essential task. In the choice of software, we tend to choose mainstream applications in the field of big data and cloud computing, such as Hadoop, Spark and so on. In the configuration of the server and the writing of the automation script, we also actively choose the mainstream framework suitable for micro-services, so that in the process of using our system, we can better add and delete the functions of the system.

3.2. System Function Implementation

The entire architecture of the system is mainly around three problems that need to be solved: sensitization, human lights and upgrades. The sensitization adjustment mainly uses the information of the collection module of the system, and determines the illumination intensity of the luminaire by collecting the intensity of the light to judge the surrounding environment. In strong light, the light is weak, and in low light, the light is strong. Through this orderly adjustment, the energy of the lighting system is effectively saved. It is also based on this idea that people go out of the light, but this emphasizes the human-centered approach. The intelligent lighting system we designed is mainly designed and installed based on the needs of human society, but people and nature should live in harmony. When no one needs lighting, we need to have as little impact on nature as possible. The endless illumination is a high degree of destruction to nature. This completely artificial light source never existed in the local environment. In order to avoid the continuous impact on the environment, we turn off the lighting system when no one is present. . This is also an essential requirement of a smart city. As for the upgrade, as mentioned in the previous question section, the upgrade and maintenance of the traditional lighting system is very time-consuming and costly. The intelligent lighting system we configure here can detect the upgrade problem and automatically report the upgrade location and needs.

4. Conclusion

Smart city is an inevitable choice for urban design and planning in the information age. At present, there are many research fields in smart cities. This paper starts from the research of the perceptual three-dimensional network system of intelligent lighting system, analyzes the problems and solutions that may arise in the intelligent system, and designs and explains the optimized products by using scientific methods and techniques. Through research, we can basically grasp the minimum version of intelligent lighting system in a smart city. In the future optimization and iteration, we will finally realize the core construction of intelligent system in smart city. Starting from intelligent lighting is a good means to solve the problem.

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