Typical Applications of IoT Cloud Technology in the HVAC Industry

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Abstract: (Objective) Use the Internet of Things and cloud data technology to build intelligent HVAC environment, form the whole ecosystem with cloud technology as the core, running through designers, builders and managers. The application of virtualization based on cloud technology can integrate environmental resources, provide virtual resources such as intelligent management and control and intelligent construction, and provide an intelligent cloud platform for the whole HVAC environment. With the help of big data technology, we can effectively integrate the information of various building structures to reduce the duplication of labor in the design, construction and use process. In this way, we can create an intelligent HVAC environment, and can carry out interactive construction in the new interactive mode, but also can build a cloud platform of HVAC resource sharing, as well as a centralized control of intelligent management center, to achieve multi-dimensional construction and intelligent management. (Conclusion) The intelligent HVAC environment integrated with the Internet of Things cloud technology can realize the effective sharing of resources through the integration of various material resources, thus greatly improving the efficiency of subsequent maintenance.
***Keywords*:** internet of things, cloud technology, practical value

1. Introduction

The combination of Internet of Things (IoT) cloud technology in the field of HVAC is conducive to the enrichment of the HVAC usage environment, saving subsequent costs and improving efficiency, connecting with the traditional Internet in a completely new way, which will make use of advanced intelligent sensing, computing and identification technologies to realize remote control and automated operations, thus improving the efficiency and security of the network, and many projects also realize intelligent identification, tracking, location monitoring and management functions. Cloud technology integrates hardware, network, software and other resources into a wide area network or a local area network to realize the computation, processing, storage, sharing and hosting of data. In cloud storage, individuals are not dependent on a specific terminal server or personal computer. They can store their data in data centers that provide cloud services and can download and upload their information and data anytime, anywhere. At the same time, cloud computing technology can also provide computing processing and data services to provide users with available, on-demand, and easy to carry out web access[1]. With the help of cloud technology, users can access a configurable pool of shared computing resources such as networks, storage, servers, applications, services and other shared resources without the need for administrative work or interaction with service providers.

2. Introduction to the use of Internet of Things (IoT) cloud technology in the field of HVAC

IoT is a kind of equipment and technology using advanced information sensors, radio frequency identification technology, global positioning system, infrared sensors, laser scanners and other equipment and technology to realize real-time monitoring, connection and interaction of the construction process, as well as the universal connection between the operating system and the user, so as to realize the intelligent regulation, identification and unified distribution of the construction process.IoT is a kind of information based on the Internet and traditional telecommunication network transmission technology, which connects all physical entities that can be independently addressed to form a complete network, making the physical world more convenient and efficient By combining a variety of information sensing technologies with the Internet, and according to the standardized protocols, it can realize the intelligent connection between people, machines, and things no matter when and where, greatly promoting the intelligent development of related fields, effectively distributing and utilizing limited resources, greatly enhancing the operational efficiency and economic benefits of the entire industry[2].

Cloud technology is a general term for the application of network information and integrated management application technology in the application of business models based on cloud computing. Resource pools can be formed, which can be used flexibly and conveniently as needed. With the rapid development of technology, future goods can be accurately identi-

fied and will be transmitted to the back-end system for better processing. This data will be processed separately according to different levels and the access to this information must be done by powerful cloud computing technologies. Various prevalent cloud computing technologies are very common in web services such as search engines, sending emails, and so on. The operator can get a large amount of information by simply typing on the operating engine[3].

3. Problems of using IoT cloud technology techniques in the field of HVAC

3.1 Technical issues

From the point of view of the work in the design preparation stage, as a designer, we should carefully study the relevant design requirements, and be able to fully grasp the specific needs of the user for the design, as an excellent designer, we should be committed to in-depth study and improve the original information and drawings of the construction project, in order to better meet the actual needs of the user. He/she is able to define comprehensively the relevant contents of the construction project, including the geographic location of the construction project, the dominant wind direction in winter, the outdoor temperature, the outdoor relative humidity, and the atmospheric pressure. On this basis, he/she should choose air-conditioning methods scientifically and rationally, paying close attention to some key issues Therefore, the designer must carefully study and comply with the relevant air-conditioning design standards and heating and ventilation techniques[4]. In order to ensure the quality of the design, all the guidelines must be strictly adhered to.

3.2 Audience issues

In the current situation of the construction industry, projects applying green concepts in construction practice are not considered common, as the public's perception of green concepts is still not deep enough and lacks sufficient understanding of the true meaning of green concepts, so the traditional construction model tends to neglect the effective use of resources, which hinders the pace of green development also pays little attention to environmental protection. Due to the cognitive problems in the construction industry in the past, people's way of thinking is also very different from before. At present, the green concept has just entered China's construction industry, and although most construction companies are trying to promote the green concept, due to the lack of sufficient cognition, they still stick to the traditional building concepts and old-time construction methods, while failing to truly incorporate green ideas into the construction industry. In addition, the management of non-green building design in the construction industry by the relevant departments also needs to be strengthened[5].

3.3 Design problems

In the actual design process of the cooling and heating source program, one common solution is "electric cooling + industrial waste heat", which can improve the efficiency of the server room, but will consume more space. Another solution is to use water source heat pump technology, which can provide a variety of different temperatures and humidity to meet the needs of a variety of application scenarios. Fourthly, the "boiler room + electric cooling" heat and cold source solution is highly flexible and energy efficient, with small size, low noise and high energy efficiency. However, as it is less environmentally friendly, it is recommended to consider carefully when choosing it. By using heat pumps, we can maximize the use of heat stored in summer to provide effective heating in winter. At the same time, we can also cool our homes by judiciously using the energy stored in winter.

4. problem solving in the field of HVAC using IoT cloud technology

4.1 Technological innovation

The use of renewable energy not only helps to conserve land resources, but also meets the requirements of environmental protection. However, the operation of HVAC systems consumes a large amount of electricity, so we must take measures to reduce this consumption to ensure safe and efficient operations. This can add up to some unnecessary expenses and adversely affect the environment. HVAC systems can be energy intensive in operation, so consideration of energy efficiency must be given to minimize losses during operation[6]. Designers need to adequately regulate the HVAC system to reduce energy consumption and minimize the waste of resources by optimizing the way energy is utilized, thus achieving conservation and sustainable development. , implanting green concepts to protect the surrounding environment.

4.2 Equipment production

With the continuous development of urbanization, the speed of infrastructure construction is also accelerating. At the same time, the state's capital investment in large-scale municipal projects has also increased. However, because large space

plant belongs to a relatively large space, the HVAC engineering system is often needed in the actual design process, but due to the influence of the large space building environment itself, the actual construction process has certain specificity, so the corresponding company needs to pay attention to the comparative analysis of the HVAC design of the larger space industrial plant and take reasonable measures to realize the energy-saving design, in order to improve the utilization of space resources. Realize the stable and healthy development of the enterprise[7].

4.3 User expansion

With the progress of Internet of Things technology and artificial intelligence technology, traditional office buildings are gradually developing into intelligent office buildings. However, intelligent office buildings still face the following problems:First, under actual conditions, it is difficult to establish an accurate, easy to grasp clear construction of the building's cooling and heating sources. Secondly, there are many factors involved in office buildings that are not under human control, such as the price of electricity at different times of the day, and the amount of electricity used by residents. Third, traditional building energy management methods often rely on different building environment configurations and are difficult to easily and quickly transfer to other buildings. Fourth, each user in a shared office building tends to have different indoor temperature requirements due to different regional locations, changes in the angle of direct sunlight, and differences in their own temperature preferences. A single system cannot guarantee the thermal comfort needs of the entire user.

5. Conclusion

Through the commissioning and delivery of this project, the IoT cloud technology shows the advantages of timely fault warning, efficient assistance and convenient program upgrades, which greatly improves the efficiency of server room management and reduces the operating costs of enterprises. In addition, parameters such as energy consumption are very intuitive and clear, and data analysis of daily, monthly and annual energy consumption is provided, which exceeds the owner's expectations and provides an important reference for the next energy-saving measures. Through an actual project case, this paper introduces in detail the multilayer architecture of the HVAC IoT cloud platform and its related technologies. From the project application, it can be seen that the IoT cloud technology can realize multi-faceted remote monitoring, data analysis and project management, greatly reducing operation and maintenance costs and providing more convenience for the owner. The development of cloud technology will become an inevitable trend in industrial automation. It is expected that IoT technology integrating big data and artificial intelligence will be more perfectly applied to the industrial industry in the future.

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