Smart grid oriented Internet of Things technology and application analysis

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Abstract: In the development of modern society, the Internet itself with the characteristics of diversification and virtualization, has played a good application value. The Internet of Things can realize the interaction and construction of related network resources through the effective integration of physical and virtual bodies. It makes the overall information network communication and power industry structure to achieve the corresponding transformation and industrial upgrading, and ultimately promotes the transformation of social production structure. This provides good convenience for people and promotes the development of the whole society.

1. Introduction
The Internet of Things technology has been well applied in many fields. This modern technology is used in smart grid power generation, transmission and distribution, electricity consumption and other links. The Internet of Things technology enables the corresponding integration of various resources in the power grid, which is directly related to People's Daily life. The power grid industry will have higher requirements on the stability and security of the network. The application of Internet of Things technology can effectively guarantee the smooth completion of relevant functions and realize the application value of modern smart grid.

2. Scientific understanding of smart grids and the Internet of Things
First of all, smart grid is a kind of staggered management internetworking based on physical grid, using more advanced information communication and analysis, decision making, energy configuration, automatic control and other functions. It makes use of terminal sensors and power grid companies to form corresponding internetworking with customers. At the same time, it is necessary to analyze the high consumption of electricity generated due to uneven energy supply in the process of power resource transportation, as well as the high cost of power grid construction and long-distance transmission. Compared with the traditional high-voltage power transmission and transformation mode, smart power grid is characterized by observability, compatibility, real-time analysis, decision making and controllability. It can further optimize the modern power grid structure, power grid control and resource allocation, improve the overall service quality of the power grid, and finally realize the reasonable allocation of resources, so that different parts of assets can be optimized and used accordingly, and bring more stable power resources to users.

Secondly, the application of Internet of Things technology is generated with modern mobile communication technology and computer protection technology. Internet of Things is a network system connected with things. This technology itself is a technology that extracts and identifies information in time through sensors, GPS and other technical means, and carries out information...
transmission. In the application process of Internet of Things technology, it is necessary to collect sound, light, heat, chemistry and location information, and connect the information of articles to the network system according to specific protocols to complete the information exchange function, so that wireless and wired networks can fully integrate to transfer relevant information. Through cloud computing technology and related pattern recognition technology embodies the intelligent recognition and management of many aspects of the function.

3. Terminal acquisition layer

The most critical technology in the application of the Internet of Things itself is wireless sensor network technology, which can produce an overall effect on the development of the Internet of Things, but also enable the integration of other technologies. On the whole, the iot itself for smart grid reflects three levels of content (Figure 1).

![Architecture of Internet of Things](image)

Figure 1. Iot for smart grid reflects three levels of content.

3.1 Perception layer

In this link, mainly through a variety of RFID technology and sensors and TWO-DIMENSIONAL code technology to collect relevant information content. After collecting information data at the perception layer, automatic identification technology is used to automatically identify the information, and effective transmission of data information content is carried out based on wired and wireless communication network to ensure that data information can be transmitted more safely and reliably, reflecting good transmission effect.

3.2 Network layer

The main task of the network layer is to transmit information, collect information, identify information and control information, so it is also called the information transmission layer. In the process of information transmission, it is necessary to make the coverage of various transmitted information more comprehensive and extensive. At the same time, the network layer itself needs to be based on the power fiber network to cooperate with the communication network, wireless network and broadband network, so as to realize the corresponding connection between the Internet of Things and the communication network dedicated to the smart grid. According to the specific situation to flexibly adopt communication methods, the corresponding data transmission. On this basis, the network layer formed by the specific data and information access network system and the core network system can realize high-speed transmission of the Internet of Things itself and the communication network dedicated to the power grid, so that data and information can be expanded [1].

3.3 Application layer

The existence of this level is mainly to comprehensively store, sort out and standardize the obtained
information data content, so that the final data information can be presented on the correct basis. Through the effective application of data information, intelligent result analysis can also be carried out, and provide good basic decision for the relevant operators. In the service process of application layer, basic facilities can provide basic services and information processing for smart grid. Internet of things technology for smart grid itself can include smart grid power generation and transmission and the various links such as electricity, in order to realize the intelligent power grid control decision-making and service functions, the use of some modern intelligent computing technology and modern identification technology, the comprehensiveness of the content of different data in smart grid, arrangement and analysis [2].

4. Application analysis of Internet of Things technology for smart grid

The application of the Internet of Things is reflected in different links of the power system, especially in different links of power transmission. There are many links related to the Internet of Things, including the automation of power distribution and power acquisition, from the access of the initial power generation link to the subsequent detection and production management and supervision of the substation. Through the Internet of things technology in the smart grid power information content to realize intelligent control, and carries on the further optimization and configuration, can eventually realize tidal power, solar, and biomass power and wind power and other diversified power effect, make it play out in People's Daily life the good result, Ultimately, the overall power planning capability of state Grid will be improved to maximize the effect in the smart grid system in Figure 2 [3].

4.1 Knowledge of transmission line status

The understanding and monitoring of transmission line status is one of the most important application values of Internet of Things technology. Through the monitoring of different nodes in the whole transmission line by Internet of Things technology, various signs existing in the transmission line area, conductor temperature, circuit capacitance, tower tilt, etc., can be timely understood. The actual running state of transmission line is well sensed and analyzed. Smart grid can understand some abnormal operation conditions, self-regulate them, and provide users with the basis for continuous power supply, effectively preventing power outages due to delayed maintenance in the subsequent transmission line operation process, which affects People's Daily life [4].

4.2 Timely detection of equipment status

Through the Internet of things technology itself is equipped with some of the sensor and microelectronics technology, timely monitoring, on the whole line for understanding the operation parameters and running state of equipment, various technical indicators in the process of equipment operation and key parameters are obtained and analysis, and be able to real-time detection of power station and substation equipment data produced solutions, Obtain the specific data test report, the operating condition of the equipment for the corresponding prediction, and the related problems for real-time maintenance. In this case, not only can the actual level and link of each voltage in the traditional electrical equipment be detected correspondingly, but also the corresponding dynamic characteristics of the equipment in each link of wind power generation and solar power generation can
be monitored and controlled at the same time. To be specific, sensors installed on the dam of hydropower station can monitor the actual situation of the dam itself, understand the problems existing in the dam itself, and prevent the dam break risk of the reservoir, making a significant contribution to water conservancy construction [5].

4.3 Management of power production
In practice, the management of electric power production originally reflects certain complexity characteristics, but in the management process of electric power production, full application of Internet of Things technology can reflect good monitoring effects. Some key steps and process and important equipment can through the Internet of things technology to realize the automation of a comprehensive and timely monitoring, and the corresponding coding way, every line taken identity recognition technology to prevent others in the process of electric power production to the operation of the power the entire production process execution error, or have some mistake. In addition, through the establishment of artificial intelligence database system, it is also possible to find some intelligent system operation problems existing in the equipment and timely report them so that the responsible person can understand them and effectively control these problems [6].

4.4 Monitor and troubleshoot power failure in time
In fact, with the increasing scale of modern power system, the role in People's Daily life is more and more obvious, the number of equipment has become more and more abundant, for the state detection of power equipment has generated higher requirements. Based on the climate conditions, in the condition of electric power equipment operate, make full use of the Internet of things technology to dynamically on the specific line, the application of this technology can be in time to face the problem of transformer oil temperature is too high or too negative charge, and start the emergency plan, make timely diagnosis for the fault of the problems associated with and response to, so that they can promote the troubleshooting, Solve the fault problem and provide good stability for the whole power system [7].

4.5 For intelligent power generation
People are increasingly demanding for the stability of the power grid, need attention in the process of the smart grid construction of the practical operation of electric power equipment and power distribution site operation situation, timely detection, to take effective safety protection measures, so that they can make intelligent electric network and realize the two-way interaction between users and data analysis, to achieve the effect of energy conservation and emissions reduction, At the same time, it can also timely collect users' electricity consumption data, realize remote monitoring and economic intelligent power dispatching, and provide stable power resources for schools, hospitals and other places with high electricity consumption [8].

5. Conclusion
To sum up, in the process of the development of modern society in China, the Internet of things technology itself reflects the good value of application of time in the Internet of things technology research is relatively short, compared with advanced countries there are some shortcomings, and technology of Internet of things has been applied directly to the smart grid construction has a great difficulty. This requires professionals in related fields to analyze better Internet of Things technology based on the objective situation of China, and apply it to smart power grid to play a good effect and provide people with more stable power resources.

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