OPTICAL FIBER SENSING TECHNOLOGY IN THE IOT

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Abstract:　The growth of the Internet of Things (IOT) industry has become a new mark of the communication domain. As the development of the technology of the IOT and the fiber-optical sensor, the combination of the both is a big question to be discussed, and the fiber-optical IOT also has a good development prospect. This article first introduces IOT's current status, the key technology, the theoretical frame and the applications. Then, it discusses the classification of the optical fiber sensor as well as the development and its application's situation. Lastly, it puts the optical fiber sensing technology into the IOT, and introduces a specific application which is used in the mine safety based on the fiber-optical IOT.

IndexTerms **- IOT, fiber optical.**
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I. INTRODUCTION

Internet of Things (IOT) is an important part of China's strategic emerging industries, it is a new round revolution in information technology after the computer, the Internet and mobile communications, it is driving a new round of information wave on information technology, and it has deeper applications in all walks of life. On the basis of the computer Internet, through radio frequency identification, infrared sensors, global positioning systems, laser scanners and other information sensing device, according to the agreed protocol, anything are connected with the Internet, information exchange and communication are realized to achieve intelligent identify, locate, track, monitor and manage in a network, the Internet is still the core and foundation, but for an extension and expansion of the Internet, it is possible to interconnect with a variety of networks and communicate seamlessly with multi-networks. Optical fiber sensing technology is developed rapidly in recent years, it is new technology, and it has been widely applied in the fields of energy, health care, aerospace, chemicals, environment, etc. Compared to traditional detection technology, optical fiber sensing technology is with remote transmission, multi-parameter, multiplexing capability, ease of networking, real-time online, interference, intrinsic safety, etc., it is facilitated to analyze comprehensively all aspects of the information, it can greatly enhance the existing security monitoring and production automation.

In the development of the Internet of Things (IOT), the fiber-optic communications network is capable of carrying higher bandwidth, and t is suitable for long distance transmission, it is very suitable for expanding IOT applications, it has been applied in network layer of IOT (the Internet of Things).
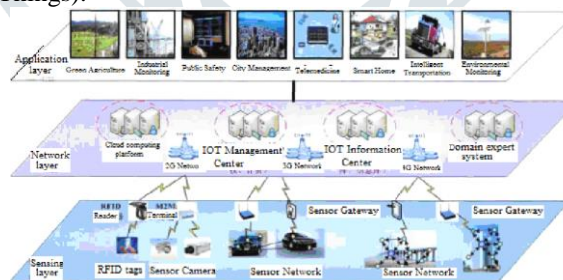

Fig 1: Architecture of things

1.1. **Architecture of Things**

 In the system study, the system architecture is a primary guide specific design, the Sensing layer consists of various types of acquisition and control modules, such as RFID tags and readers, sensor networks, temperature, sound, vibration sensor, two-dimensional bar code, a variety of terminals.

- Sensing layer typically comprises a data acquisition and short-distance transmission, information and data are collected by sensing devices, they are passed to the gateway via bus or short distance wireless transmission technology, the information is submitted to the upper layer.

- Network layer is built on the basis of existing networks, the existing network integration and expansion are made, the functions of data transmission are primarily assumed, and there is the ability to transmit data in the perceived layer with accessibility, high reliability, high security, especially long-distance transmission.

- Perception layer also includes part of the perception of data management and processing techniques.

- Application layer is the driving force and purpose of the development of things. The main function of the application layer is the perception and transmission information to be analyzed and processed, the correct control and decision-making, intelligent management, applications and services are made. This layer solves the problem of information processing and human-machine interface.

1.2. Optical Fiber Sensing Technology Application in Sensing Layer

A wide variety of sensors are used in the Internet of Things, fiber optic sensors are different from the traditional sensors and have a lot of advantages, the application of the Internet of Things will be unparalleled. In the application of Things perception layer, on the one hand, fiber optic sensors can be used to detect a wide variety of environments, they bring things more timely detection information, and they are not impacted by the detect environment. Also, its sense unity characteristics is suitable for a distributed sensing system, the continuous sensing detection and transmission are realized over long distance lines, which is very necessary in IOT network, it is suitable to build network architecture of things.

1.3.   Application Case Study

In the connectivity platform cloud technology research of the mine fiber IOT, we focus on mine safety detection problem, we propose a universal fiber optic sensor IOT interfaces, a fiber-optic sensor IOT is built. System is connected by the user, the Internet, cloud platform, and fiber optic sensors, wherein the optical fiber sensor is a main way to collect information for monitoring mine gas concentration, temperature, level, vibration, humidity, dust concentration, harmful gases, etc. Internet function is to transmit information. Fiber optic ring network transmission of security monitoring system is shown in fig 2.
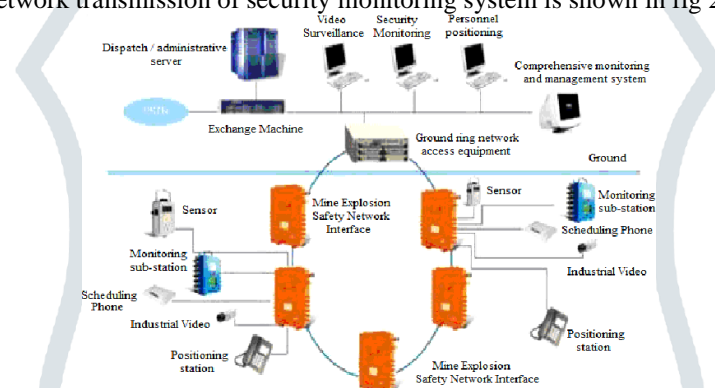

Fig 2:- Fiber optic ring network transmission of security monitors system.

2.   Conclusions and Outlook

IOT framework technology and fiber optic sensing technology has been studied in this paper, the optical fiber sensing technology applications are analyzed in IOT perception layer, and the specific applications of the optical fiber sensing things are studied in mine safety testing, that fiber-optic sensor network is found to provide greater protection for mine safety, based on this, we can predict that the fiber-optic sensing things will have the greater development and application.

3. References

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