

# Application and Research of Using the Virtual Reality Technology to Realize the Remote Control

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**Abstract:** The concept of remote control comes from the inter-operation among the computers; whereas in the field of industrial control, the remote control can function on the workshop directly through the computer, to realize the monitoring over the production environment and the operation on the mechanical equipment. The virtual reality technology can vividly simulate the on-site situation in the digital form, thus brings a truer operating experience for the manager. And the data interchange between the virtual reality and the true site can be well resolved by the sensor.

**Keywords:** Virtual Reality, Internet of Things, Remote Control

## 1 Virtual Reality Technology

The Virtual Reality (Briefly called VR) is the high-tech that appeared during the recent years, it utilizes the computer to simulate a three-dimensional virtual world, provides the user with the visual, acoustic and tactile simulation, makes the user feel in the real world and observe the things within the three-dimensional space timely and without limit<sup>[1]</sup>.

## 2 Wireless Sensor Network

Sensor network technology is one of the most important technology in the internet of things. Wireless sensor network, an important part of the internet of things<sup>[2]</sup>, connects the micro sensors in the monitor area to compose a vaulting network system with the purpose of cooperatively sensing, collecting and processing the information of the sensed object in the area to send them to the observers<sup>[3]</sup>. Wireless sensor network's structure as picture 1.

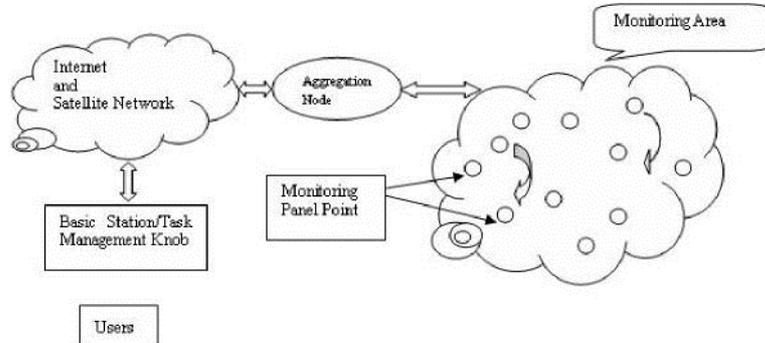


Fig. 1. Wireless sensor network's structure

### 3 Application of the Virtual Reality Technology in the Remote Control Field

#### 3.1 Framework and Structure Drawing in Application

Under the environment of internet of things, the wide application of sensor technology makes it possible to apply the virtual reality technology in the remote control field<sup>[4]</sup>. And the framework and structure in application is as showed in Figure 2.

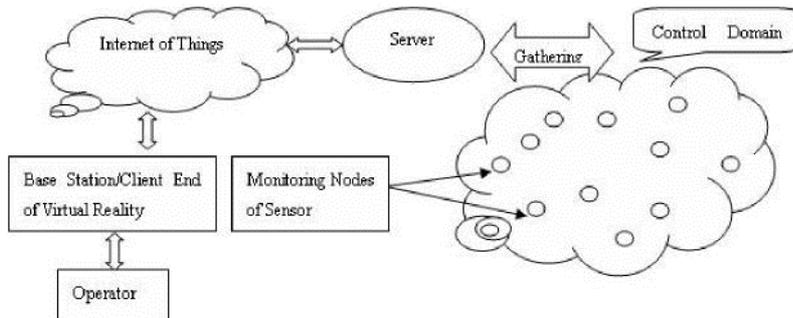


Fig.2. Framework and Structure Drawing in Application

In the drawing above, the signal collection and the command transfer in the remote control domain are realized by the nodes of sensor placed in the key positions within the domain<sup>[5]</sup>. The functions of these nodes are very clear; they can be divided into two categories: one category tests the indexes such as temperature, humidity, air pressure, and the other category is mainly in charge of the transfer of

all control commands. The processing of all data and the realization of virtual reality are mainly accomplished by the remote server set in the control domain, and the site data collected by the sensor and the control commands sent by operator through the client end are perfectly combined with the virtual reality procedure by specially designed interface module<sup>[6]</sup>.

### 3.2 User's Operation Procedure

As the performer of remote control, the user can “truly” observe the actual situations of the controlled domain by virtual reality technology. The change of the controlled domain can be digitally dealt with by the special server after the data collection of sensor and transferred to the far-end client by the internet. At the client end<sup>[7]</sup>, when the operator needs operate on the remote control terminal, the operation can be conducted directly according to the demand under a virtual “reality” environment, and the content of operation can be transferred to the far-end server through the internet in the form of data, then after the compiling of server, the execution of final command will be completed by sensor. After the procedure above is completed<sup>[8]</sup>, the sensor will continue to collect the current data and start repeating the previous procedure<sup>[9]</sup>. The specific operation procedure is as showed in Figure 3.

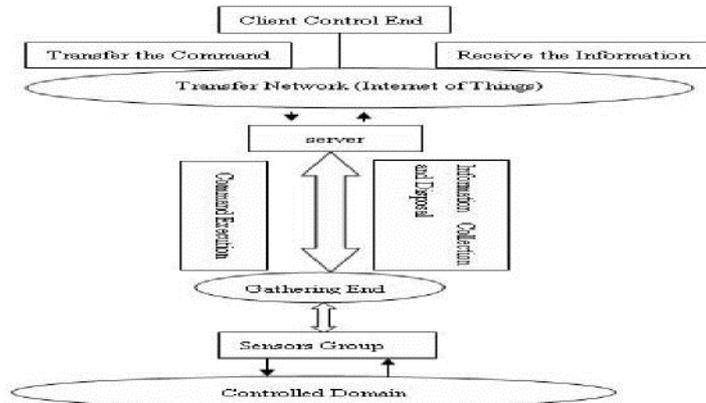


Fig. 3. Flow Chart of the Operation of the System

## 4 Conclusion

Under the environment of internet of things, the wide application of sensor technology enables the virtual reality technology to possess the potential and space for further development in the remote control field. The functions of the sensor can mainly be divided into 2 aspects, one is to transfer the test data of all parts of the remote control domain to the operator instantly, the other is to execute the operator's remote control command within the control domain, meanwhile transfer

the newest data of the site to the operator after the command is executed. The virtual reality technology makes the operator “truly” observe these data and execute the operational command, to realize the remote control over some special domains under the virtual reality environment.

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