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# Improving Computer Lab Management with Sensor Network Technology

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## Abstract:

The present focus on practical teaching and fostering creative thinking within vocational schools has highlighted the limitations of the conventional manual management approach in computer training rooms. These limitations are primarily evident in the prolonged equipment maintenance cycles, which conflict with the immediate needs of teaching. This paper examines a sensor network management model for computer-based training rooms, addressing various aspects such as teaching management, equipment maintenance, environmental management, and safety management.

## Keywords:

Sensor networks; Lab; Computer.

## 1. Introduction

Vocational school computer training computer training room bears the important task of teaching, is assessing the level of computer teaching, students hands-on skills and creative thinking an important place. Therefore, the computer training room construction management of higher vocational schools survival and development of an important bargaining chip.

Since vocational school computer training room bear the heavy task of teaching, with the main body is not fixed, habits are not uniform with the machine, with the machine operation is not standardized. Combined with traditional training room management using manual management mode, making computer failure-prone, difficult to ensure the smooth progress of computer training teaching. The proposed sensor network technology, making the computer training room management problems solved.

## 2. Organization of the Text

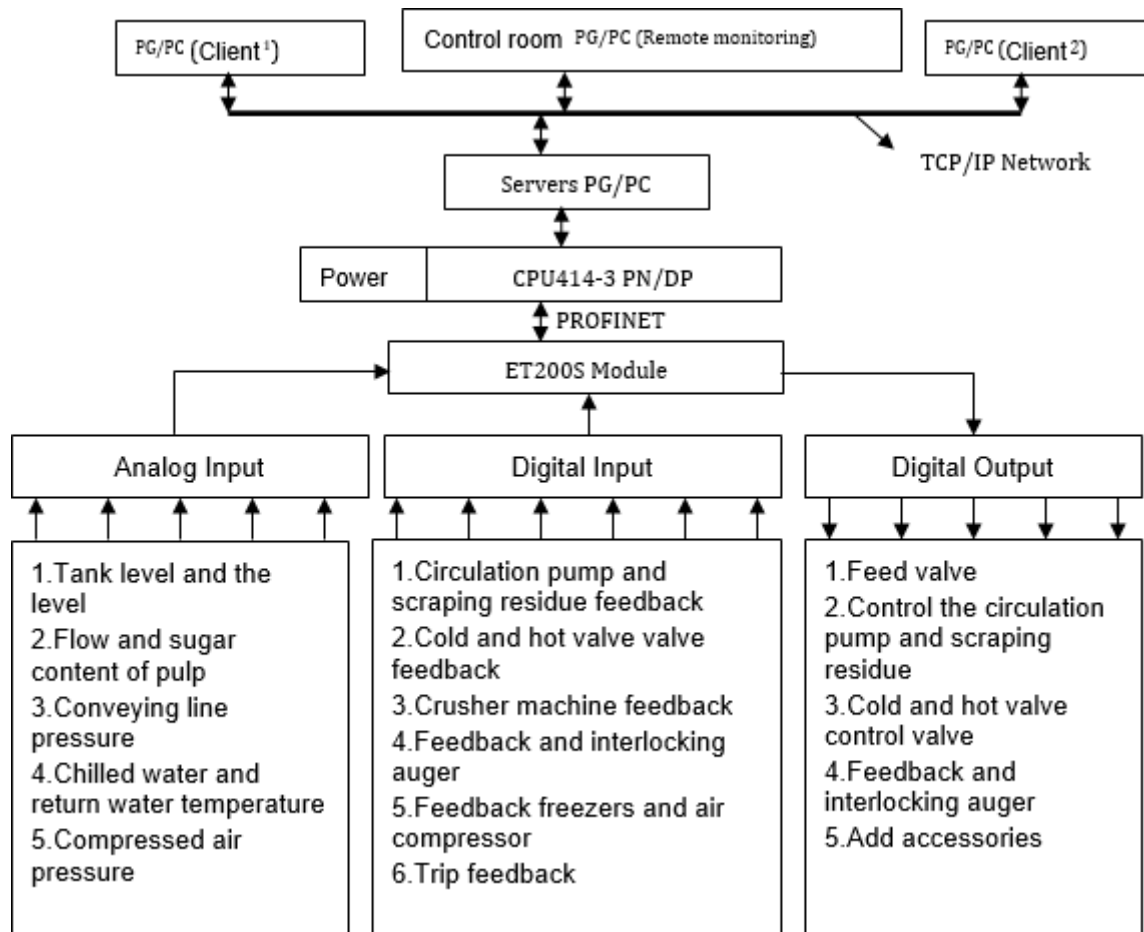
1999 held in the U.S. mobile computing and networking international conference was first proposed sensor network (The Internet of things) and put forward the concept of "sensor network is facing humanity in the next century and a development opportunity."

Sensor networks, is the second computer, Internet and mobile communications after a new round of revolution in information technology, information industry is commanding heights of future competition and industrial upgrading of the core driving force is to accelerate industrialization, information technology integration of the catalyst. To implement the State Council and the Jiangsu Province on advancing the development of sensor network instructions, accelerate the construction of Suzhou sensor network construction, specially formulated with the planning, implementation period of 2013-2016. Sensor networks globally relevant technical standards, application services and industrial development is still in its infancy, the application mainly in transport and logistics, industrial control, environmental monitoring, smart security and other industries. In China, the country's level of technological development in the field of sensor network industry forefront of the world. The Chinese government attaches great importance to sensor network technology research and development and industrial application work, Premier Wen Jiabao repeatedly focus on domestic sensor network research and development work, and proposed a "perception of Chinese" concept. Sensor network

through radio frequency identification (RFID), infrared sensors, global positioning systems, laser scanners and other information sensing device, according to the agreement agreed to anything connected to the Internet, information exchange and communication, in order to achieve articles intelligent identify, locate, track, monitor and manage a network. "Sensor network is the material objects connected to the Internet." Visible sensor network is based on the extension of the Internet and developed networks, sensor networks are still the core and foundation of the Internet, sensor network will be extended and expanded its client to any goods and goods between the exchange of information and communication.

### 3. Traditional Computer Lab Management System

Teaching management, school teachers need to use educational software for students electronics division, and then need to manually Statistics absent students. During practice teaching when a student with a laboratory sixty training teachers, students who have questions on what they have learned or not the case, you need to guide teachers to students answering, classroom time is limited, can not meet the students need answers.



**Fig 1.** Configuration diagram Communication Engineering Center Laboratory

Fig. 1 shows basic computer information management, the use of paper-based records of each batch of the recording hardware and software purchase time and damage time, repair time for each computer and each computer every lesson with the machine records, as some students do not fill cause incomplete records, laboratory management personnel records can not be the case under investigation with the machine running the computer case to the lab administrator's work has brought great inconvenience.

And paper information easily lost and difficult to keep. As I was shown a new lab, each lab is equipped with computers, Wu can realize network management, teaching will bring great convenience. The wine fermentation control system uses the Siemens S7-414 central processing unit (CPU model CPU414-3 PN/DP) to do the main control unit, ET-200S Series I/O data acquisition and control units throughout the plant, through to a PROFINET field bus Main control unit and the I/O units link together. By 6.53 and PROFINET network configuration king, together with the seamless connection of the control procedures to ensure that the system in the entire wine production process to achieve safety, quality, efficiency, energy saving purposes.

Regular computer detection, laboratory manager need to maintain a large number of computers, however, frequent use of computers, will inevitably lead to different types of faults, such as computer hardware is damaged, the computer does not start properly, computer viruses have been destroyed and so on. Maintenance of computer lab administrators can use the idle time of the laboratory, open every computer to detect, find the cause, repair, maintenance records, etc., not only a waste of time, but also affect teaching.

Laboratory environment management, higher frequency of use as laboratories, laboratory humidity, temperature control and dust removal work is not timely treatment, leading to laboratory hardware glitches, such as power supply, motherboard damage, the host Blue Screen and so on. Can not guarantee the smooth progress of teaching.

Laboratory safety, laboratory every day there are many students on the machine, inevitably involves laboratory supplies and student materials safety management problems, the main power supply does not regulate the use of prevention of fire hazards resulting loss of phenomena and laboratory items.

## **4. Sensor Network based Computer Lab Management**

Sensor networks can be achieved on the management of the laboratory people, things and objects, and objects communicate with each other, the effective integration of people within the system, and things to achieve information collection and information control. Real time identification, location and tracking system behavior. Use of sensor network technology management computer lab instead of the traditional manual management of computer labs to improve the management of the computer lab automation and intelligence.

### **4.1. Teaching Management**

Ensure the smooth daily teaching laboratory management is a top priority, the use of sensor network technology to manage the laboratory computer lab management more intelligent network.

#### **4.1.1 Student attendance**

Installed in each laboratory door access control (RFID reader), while each student with RFID tags, RFID tags do not students can not enter the lab, the teacher can get through the system each student's attendance and learning content monitoring information.

#### **4.1.2 Teaching Quality Monitoring.**

Use of sensor network technology, through a variety of data collection terminals to obtain data, monitor all school teachers, including teaching content, teaching methods, teaching attitude, teaching status, etc., and according to the data obtained full system analysis and testing, assessment the quality of its teaching and the advantages and disadvantages, in order to improve deficiencies. Effective teaching quality monitoring is an important part of the teaching process is also effective teaching and successful teaching all foundation.

#### **4.1.3 The learning process of tracking**

Students' classroom learning process can be sensor network throughout the record. If a student in the operating process, students master the knowledge points for a bad, or forgotten, the learning process can be recorded once again learning, learning to make up the loopholes, and you can review has been learned, to fill gaps and

lack of investigation purposes. Heavy reinforcement learning difficulties.

## **4.2. Computer Maintenance**

Use of sensor network technology laboratory equipment for computer maintenance computer management approach to achieve leapfrog development.

### **4.2.1 computer's basic information**

Installed on each computer in an RFID tag, record the computer date of purchase, instructions for use, hardware configuration, maintenance records and other basic information. Such replacement of hardware on your computer, change the software, they can read and write through handheld devices will change the information into the computer's RFID tag, while the updated tag information via handheld devices automatically sent to the device management server updates the data permanently stored together. You can also use handheld devices to read and write a variety of laboratory inventory items, to prevent leakage of the investigation, the wrong check, etc., greatly reducing the time for a variety of information statistics.

### **4.2.2 The use of computers process of tracking**

Computer lab bear the heavy task of teaching, the number of multi-day training with machines from different grades and different classes, computer event of a failure, the administrator can not be first time that the cause of the fault and fault maker, the computer can not receive timely maintenance and take effective punitive measures, affecting the smooth progress of teaching. With RFID technology, according to the RF chip in each computer information recorded in real- time monitoring usage of each computer, repair, maintenance, hardware and software changes, etc., so that the computer causes are well documented.

### **4.2.3 Routine Computer testing**

Computer routine testing laboratory management is a top priority, the sensor network environment, embedded sensors on each computer in real time on the computer's operating status monitoring, once the computer key parameters are changed, sensor network reception signals from the sensors will be fed into the equipment running status evaluation system to judge, administrator based on the evaluation results can be quick decisions, determine the device's maintenance program. In addition to using state assessment system for routine monitoring of the computer, the administrator should conduct regular inspection of the computer, each time maintenance, repair and inspection results entry handheld reader, also stored in the device's electronic tag, This not only saves manpower and resources, but also improve the training equipment efficiency.

## **5. Summary and Outlook**

Things technology in university laboratory equipment management application is a long-term significance of the research topic. This article is based sensor network based computer lab management mode, the main analysis of the college laboratory equipment management system applications. But overall the practice of partial theories is not enough. But it expresses the first line of the experimental work as experimenters urgent hope that through such a system will be related laboratory work more scientific and standardized wish. I believe that with the continued construction of university laboratories as well as the development of networking technology, this demand will become more intense, such applications will become increasingly widespread and mature.

## **References**

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