Power Saving System Based on Identity Cards

M. Ashok Varma[1], Y. Bala Gangadhar Reddy[2]

[1]PG Scholar, Dept of ECE(ES), Priyadarshini Institute of Technology, Tirupati, AP, India, Email: varmasabarimala@gmail.com.
[2]Assistant Professor, Dept of ECE, Priyadarshini Institute of Technology, Tirupati, AP, India, Email: v.bgangadhar@gmail.com.

Abstract: Introduces the common existed problem that lights work in classroom with nobody, analyzes several traditional solutions and their deficiencies, then puts forward the energy-saving system for classroom based on campus card. The project is based on the Campus Card System, which is mature and has been widely used, in combination with Ethernet, RF wireless communications technology, as well as the development of PC software for database management and other operations, to achieve a complete classroom energy saving system. System controls the master classroom power on and off by detecting the presence of the card, and effectively solve this problem. This system is characterized by simple-use and low-cost renovation.

Keywords: LCD Display, Microcontroller ARM-7, RFID Reader, Voice IC.

I. INTRODUCTION

Most schools, especiall1y colleges, there is a ubiquitous phenomenon that the room is brightly lit during the day although the daylight is good, meanwhile there is another similar situation that people leave classroom with the lights still on. These lamps lit uselessly until the duty to turn off when the building should be closed according to the school regulations, which consequently leads to a great waste of energy. Classroom lighting controlling is never a new topic, there are many similar researches at home and in abroad. According to the information from the current perspective, there is still not a perfect solution. This "Lit waste" problem solving, daytime lighting problem solving, is relatively simple, the current domestic and international research bottleneck is how to detect accurately whether there is someone in the classroom with the lowest cost. The 1st literature designs a light control system, which is mainly detects by the intensity of the outdoor light, without the consideration of the human indoor. The 2nd literature introduces the system which is judges whether there are students or teachers in the room by the difference of numbers of people go inside and outside the classroom, to control the switch on or off. The 3rd and 4th conferences mention the combination of pyro electric sensor and light sensor and division areas of the classroom, which increases the system cost and the difficulty of the placement of the electrical wires.

Scheme in 5th literature uses the data collected through the cameras to analyze. Whether there is anyone working, but its shortcomings are the adjustability of the brightness and accuracy of the distinction. The 6th, 7th, 8th and 9th conferences divide the light area in classroom, so that every lamp can be controlled independently, but causing the complex control and inconvenient operation. According to

the situation the conferences represented, the "daytime light" issue has many simple and effective solutions, but there have remained two problem, one is that how to detect whether there are someone in the classroom, another is the human-position preparing detection. In these retrieval of literatures, human detection methods mainly include image processing method, a pyroelectric detection method. Image processing method includes dynamic and static methods. Human body recognition algorithm is complex and low accuracy, and has the bad adaptability of defects on the intensity detection, inaccurate detection and complex implementation scheme; because pyroelectric detection method can only detect the movement of the human body, when the teachers and students in the classroom still read a book or learning, which cannot be correctly detected, and its detection range is limited. A large classroom should be arranged more than a dozen or even dozens of sensors to cover, which causes high cost, complex wire placement, low detection accuracy and other issues.

Integrated data consulted, the current classroom lighting control system has the problems including complicate switching operation between automatic control and the manual control, and to some extent, the plan itself cannot solve the problem of "lighting waste" well. With the development of Internet technology, all variety of campus basically are equipped with campus card system; the campus card system is greatly convenient for teachers and students, the school staff work on their study and life management. Based on this platform, it can be easily extended for other functions, such as security, monitoring, energy saving etc. This essay combines with campus card system and network technology, and applies in classroom lighting control to design an intelligent classroom energy-saving system. Classroom lighting control power supply is controlled by

whether there is a card or not, and realizes the function that when there are people as well as the card in the rooms, the light will be on, on the contrary, the light will be off. Through this kind of means, the present "lighting waste" problem can be effectively solved. In addition, it can reduce energy waste, improve all the electricity saving awareness, reduce the energy consumption of the school.

II. EXISTING SYSTEM

In Existing system human detection methods mainly include image processing method, a pyroelectric detection method. Image processing method includes dynamic and static methods. Human body recognition algorithm is complex and low accuracy, and has the bad adaptability of defects on the intensity detection, inaccurate detection and complex implementation scheme; because pyroelectric detection method can only detect the movement of the human body, when the teachers and students in the classroom still read a book or learning, which cannot be correctly detected, and its detection range is limited. A large classroom should be arranged more than a dozen or even dozens of sensors to cover, which causes high cost, complex wire placement, low detection accuracy and other issues.

Draw backs:
1. High cost
2. Complex wire placement
3. Low detection accuracy

III. PROPOSED SYSTEM
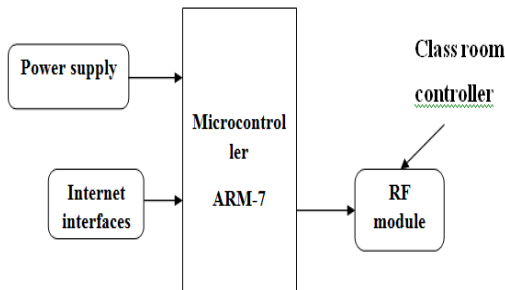**A. Transmission Section**

Fig 1. Block diagram.

Structure of base station as shown in figure 1, is mainly composed of a power supply module, a micro controller, wireless module. The selected micro controller with network module, can realize the information transmission between Ethernet communication and Information Center. And the wireless module is used for interacting data and controlling nodes.Because the data communication between information center and each base stations is small, and belongs to the campus network, the communication is stable and reliable, so the use of UDP network communication protocol is relatively simple to realize, has high efficiency on communication, and meets the demand of the system. The wireless module is implemented by CC1101[4], which incorporates a programmable software modem, supporting 2-FSK, GFSK and MSK modulation format, the data transmission rate of it up to 500Kbps. At the same time, it

has a power output of high performance, its energy is concentrated and its signal transmission is far. It enhances the performance of adjacent channel power (ACP), improves the phenomenon of close signal blocking. This system, which works on 433MHz, with strong penetrability and far communication distance and so on, can be competent for the communication requirements between base stations and each segmented control point within the teaching building.
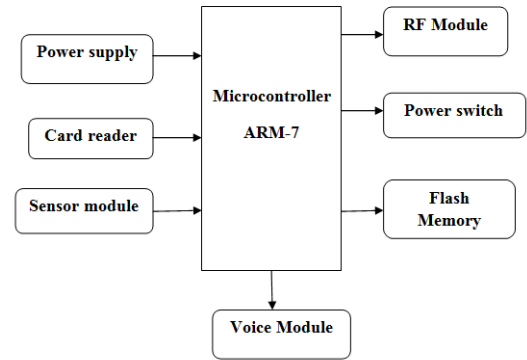
B. Receiving Section:

Fig 2. Block diagram.

Structure of control nodes are shown in figure 2. It mainly consists of the card reading module, power supply module, microcontroller, voice module, a power switch, a wireless module, sensor modules etc. The card reading module can read the information from the card on its top; the sensor module can detect the brightness of the environment. It combined with the clock module can solve the "daytime lighting" problem; The voice module is used when the card is removed, and there will be a voice reminding others of the next card operation. The switch of lighting power is responsible for the opening and closing of the lights in whole classroom. Storage module is used to store card information, and ensure when the communication is abnormally, the microcontroller can still control the lamp. The wireless module is used and to achieve the data interaction with the base stations. Micro controller of nodes applies STC12C5A series microcontroller, it is the enhancement mode, which

IV. SYSTEM MODULES
A. Microcontroller LPC2148

The conventional 8 and 16bit Microcontrollers has its deficiencies when compared with 2bit microcontroller. This proposed system design uses the ARM processor. ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, and the instruction set and related decode mechanism are much simpler than those of micro programmed Complex Instruction Set Computers. This simplicity results in a high instruction throughput and impressive real-time interrupt response from a small and cost-effective processor core. The Philips LPC2148 which is based on 32 bitARM7 TDMI core supporting real time simulation. When ARM processor combined with RTOS with timing constraint can be realized for the data acquisition and transmission of data with high precision.

B. Power Supply

The info to the circuit is connected from the directed power supply. The a.c. info i.e., 230v from the mains supply is venture around the transformer to 12v and is encouraged to a rectifier. The yield acquired from the rectifier is a throbbing d.c voltage. So as to get an unadulterated DC voltage, the yield voltage from the rectifier is nourished to a channel to evacuate any AC parts present much after correction. Presently, this voltage is given to a voltage controller to get an immaculate steady dc voltage.

C. Voice IC(APR9600):

The APR9600 device offers true single-chip voice recording, non-volatile storage, and playback capability for 40 to 60 seconds .The device supports both random and sequential access of multiple messages. Sample rates are user-selectable, allowing designers to customize their design for unique quality and storage time needs. Integrated output amplifier, microphone amplifier, and AGC circuits greatly simplify system design. the device is ideal for use in portable voice recorders, toys, and many other consumer and industrial applications. APLUS integrated achieves these high levels of storage capability by using its proprietary analog/multilevel storage technology implemented in an advanced Flash non-volatile memory process, where each memory cell can store 256 voltage levels. This technology enables the APR9600 device to reproduce voice signals in their natural form. It eliminates the need for encoding and compression, which often introduce distortion.

D. RFID Reader

Radio Frequency Identification (RFID) is a wireless system that uses radio-frequency electromagnetic fields to transfer information, and information is in the form of identification number. In this simplest sense, it is look like a digital barcode reader as it helps to identify particular products. But in this case "Barcodes" are transponders (tags) which have identification code that is read by RFID readers when tag is in the range of reader. However RFID technology has more advantages over barcodes for example tags have read and also write capabilities and with the ability to store, change and transmit much more data. RFID also is more complex as generally it means that it provides identification using radio frequency so there are hundreds of possible uses. RFID is used for different appliances such as tracking, identifying, sorting, locating, even for paying and toll collection. There are lots of possible appliances. In the future, it is even expected that there will be a system for shopping in supermarkets to attach a tag to every product and after crossing the purchasing zone all products will be counted in system without barcode reading to each product separately.

V. CONCLUSION

The system does not use the scheme mentioned in many references that mainly relieson the human body detection, and the brightness detection, but just regard them as an auxiliary method, solving the inaccurate identification, control the scintillation and other situations. Meanwhile, basing on Ethernet and wireless communication technology, it can to the maximum extent reduce the cost of system installation and maintenance. The system has been in several laboratory trials, its effect is pretty good. It can not only be applied to the variety of schools, but also can be applied to all kinds of enterprises and institutions and the factories. It has a high popularization value in energy conservation and emission reduction.

VI. REFERENCES

[1] Huang jie. Lighting control system of STC12C4052AD single chip design based on [J]. and electronic technology, 2010 (7):37-38.

[2] Qin Haiyi. [J]. automatic control system for classroom lighting electronic technology, 2011,24 (10):22-23.

[3] Chen Jiujiang, Wu Tong, Wang, Sun said. Intelligent control of Journal of natural science of Heilongjiang University,[J]classroom lighting system 2006,23(3):314-316.

[4] Zhou Yao. University classroom lighting energy saving control system design of [D]. master's degree paper of Zhengzhou University, 2010

[5] The Nie Xiong, Huang Binquan, Chen Hua. A classroom energy saving lighting system personnel identification algorithm for [J]. video applications and engineering, 2011,35 (15):15-5.

[6] Feng Lingjie, Liu Yingbo, Jiang Daiping. Sunplus singlechip Multifunctional Classroom Lighting Control System Based on [J]. software design and development, 2009,5 (25):7142-7143.

[7] Chen Jing. Automatic classroom lighting controller MCU study based on [M]. master's degree paper of Fujian Agriculture And Forestry University, 2010

[8] Chen Suisheng, Lu Jiangang, Guo Xiaohua. Technology and application of [J]. design automation, intelligent public indoor lighting system, 2008, 27 (4):118-120.

[9] Zheng Guoheng, Zhou Yao, Zhang Ke. The design of [J]. Lighting Engineering Journal of university classroom lighting energy saving control system, 2010,21 (2):32-37.