COST EFFECTIVE ENERGY SAVING SYSTEM USING RFID

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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.

Key words: ZIGBEE, ETHERNET, SENSORS.

I. INTRODUCTION

Most schools, especiall1y colleges, there isa ubiquitous phenomenon that the room isbrightly lit during the day although the daylightis good, meanwhile there is another similarsituation that people leave classroom with thelights still on. These lamps lit uselessly until theduty to turn off when the building should beclosed according to the school regulations,which consequently leads to a great waste ofenergy.Classroom lighting controlling is never anew topic, there are many similar researches athome and in abroad. According to theinformation from the current perspective, there isstill not a perfect solution. This "Lit waste"problem solving, daytime lighting problemsolving, is relatively simple, the currentdomestic and international research bottleneck ishow to detect accurately whether there issomeone in the classroom with the lowest cost.
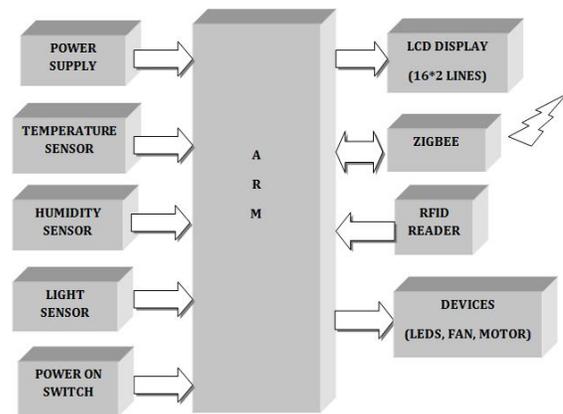
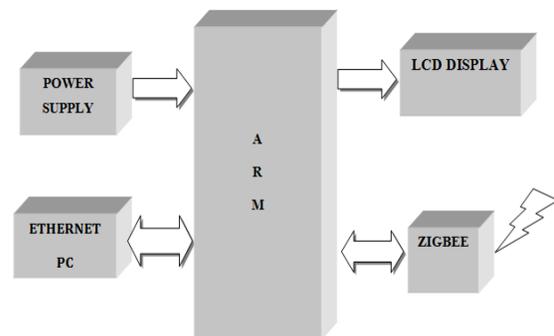## II. HARDWARE SYSTEM

Fig 1: Control Section

Fig 2: Server Section

III.   METHODOLOGY

Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer(CISC) designs.

Liquid-crystal display (**LCD**) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

Temperature sensor:

A thermistor is a type of resistor whose resistance is dependent on temperature. Thermistors are widely used as inrush current limiter, temperature sensors (NTC type typically), self-resetting over current protectors, and self-regulating heating elements. The TMP103 is a digital output temperature sensor in a four-ball wafer chip-scale package (WCSP). The TMP103 is capable of reading temperatures to a resolution of $1°C$.

Fig 3: Temperature sensor

Humidity sensor:

Humidity sensor is a device that measures the relative humidity of in a given area. A humidity sensor can be used in both indoors and outdoors. Humidity sensors are available in both analog and digital forms. An analog humidity sensor gauges the humidity of the air relatively using a capacitor-based system. The sensor is made out of a film usually made of either glass or ceramics. The insulator material which absorbs the water is made out of a polymer which takes in and releases water based on the relative humidity of the given area. This changes the level of charge in the capacitor of the on board electrical circuit. A digital humidity sensor works via two micro sensors that are calibrated to the relative humidity of the given area. These are then converted into the digital format via an analog to digital conversion process which is done by a chip located in the same circuit. A machine made electrode based system made out of polymer is what makes up the capacitance for the sensor. This protects the sensor from user front panel (interface).

Fig 4: Humidity sensor

LDR:

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically. The animation opposite shows that when the torch is turned on, the resistance of the LDR falls, allowing

current to pass through it. This is an example of a light sensor circuit: When the light level is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Consequently the LED does not light. However, when light shines onto the LDR its resistance falls and current flows into the base of the first transistor and then the second transistor. The LED lights on. The preset resistor can be turned up or down to increase or decrease resistance, in this way it can make the circuit more or less sensitive.

Fig 5: LDR

ZIGBEE:

Zigbee modules feature a UART interface, which allows any microcontroller or microprocessor to immediately use the services of the Zigbee protocol. All a Zigbee hardware designer has to do in this caseis ensure that the host's serial port logic levels are compatible with the XBee's 2.8- to 3.4-V logic levels. The logic level conversion can be performed using either a standard RS-232 IC or logic level translators such as the 74LVTH125 when the host is directly connected to the XBee UART. The X- Bee RF Modules interface to a host device through a logic-level asynchronous Serial port. Through its serial port, the module can communicate with any logic and voltage Compatible UART; or through a level translator to any serial device.

Data is presented to the X-Bee module through its DIN pin, and it must be in the asynchronous serial format, which consists of a start bit, 8 data bits, and a stop bit. Because the input data goes directly into the input of a UART within the X-Bee module, no bit inversions are necessary within the asynchronous serial data stream. All of the required timing and parity checking is automatically taken care of by the X-Bee's UART.
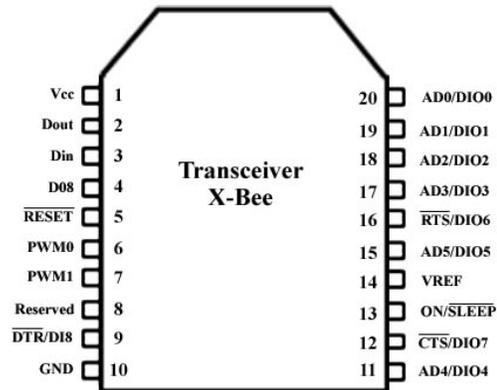
Fig 6: ZIGBEE pin diagram

RFID:

Radio Frequency Identification (RFID) is a silicon chip-based transponder that communicates via radio waves. Radio Frequency Identification is a technology which uses tags as a component in an integrated supply chain solution set that will evolve over the next several years. RFID tags contain a chip which holds an electronic product code (EPC) number that points to additional data detailing the contents of the package. Readers identify the EPC numbers at a distance, without line-of-sight scanning or involving physical contact. Middleware can perform initial filtering on data from the readers. Applications are evolving to comply with shipping products to automatically processing transactions based on RFID technologyRFID Reader Module, are

also called as interrogators. They convert radio waves returned from the RFID tag into a form that can be passed on to Controllers, which can make use of it. RFID tags and readers have to be tuned to the same frequency in order to Communicate. RFID systems use many different frequencies, but the most common and widely used & supported by our Reader is 125 KHz.
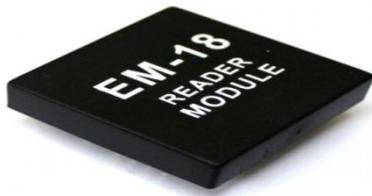

Fig 7: RFID Reader

Tags are classified into two types based on operating power supply fed to it.

1. Active Tags
2. Passive Tags

Active Tags: These tags have integrated batteries for powering the chip. Active Tags are powered by batteries and either have to be recharged, have their batteries replaced or be disposed of when the batteries fail.

Passive Tags: Passive tags are the tags that do not have batteries and have indefinite life expectancies.
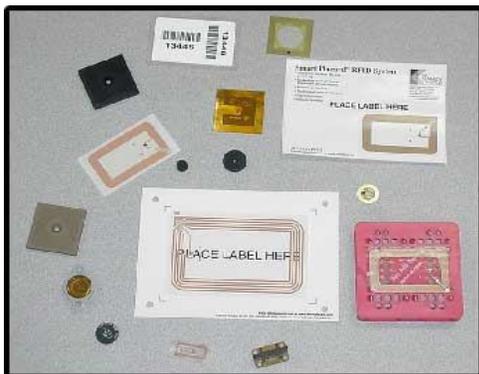

Fig 8: Different types of tags

Ethernet:

Ethernet is a family of computer networking technologies for local area networks (LANs) and metropolitan area networks (MANs). It was commercially introduced in 1980 and first standardized in 1983 as IEEE 802.3, and has since been refined to support higher bit rates and longer link distances. Over time, Ethernet has largely replaced competing wired LAN technologies such as token ring, FDDI, and ARCNET. The primary alternative for contemporary LANs is not a wired standard, but instead a wireless LAN standardized as IEEE 802.11 and also known as Wi-Fi.

The Ethernet standards comprise several wiring and signaling variants of the OSI physical layer in use with Ethernet. The original 10BASE5 Ethernet uses coaxial cable as a shared medium, while the newer Ethernet variants use twisted pair and fiber optic links in conjunction with hubs or switches. Over the course of its history, Ethernet data transfer rates have been increased from the original 2.94 megabits per second (Mbit/s) to the latest 100 gigabits per second (Gbit/s), with 400 Gbit/s. Systems communicating over Ethernet divide a stream of data into shorter pieces called frames. Each frame contains source and destination addresses and error-checking data so that damaged data can be detected and re-transmitted. As per the OSI model, Ethernet provides services up to and including the data link layer.

IV.   CONCLUSION

The system does not use the scheme mentioned in many references that mainly relies on 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.

V.   REFERENCES

(1)   Huang jie. Lighting control system ofSTC12C4052AD single chip design based on [J].and electronic technology, 2010 (7):37-38.

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

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

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

(5) the NieXiong, Huang Binquan, Chen Hua. Aclassroom energy saving lighting systempersonnel identification algorithm for [J]. videoapplications and engineering, 2011,35(15):15-45.

(6)   Feng Lingjie, Liu Yingbo, Jiang Daiping.Sunplussinglechip Multifunctional ClassroomLighting Control System Based on [J]. softwaredesign and development, 2009,5(25):7142-7143.

(7)   Chen Jing. Automatic classroom lightingcontroller MCU study based on [M]. master'sdegree paper of Fujian Agriculture And ForestryUniversity, 2010

(8)   Chen Suisheng, Lu Jiangang, GuoXiaohua.Technology and application of [J]. designautomation, intelligent public indoor lightingsystem, 2008, 27 (4):118-120.

(9) Zheng Guoheng, Zhou Yao, Zhang Ke. Thedesign of [J]. Lighting Engineering Journal ofuniversity classroom lighting energy savingcontrol system, 2010,21 (2):32-37.