

AUTOMATED POWER CONTROL AND SAVING WITH SMART ATTENDANCE SYSTEM USING IOT

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Abstract: Optimum energy management in smart spaces needs efficient and effective energy-conscious context sensing and technologies that identify and assess power consumption. We suggest an efficient and reliable power management framework with automatic participation in this process. The key goal is to control the fan and lights automatically in any room containing number of people. The next target is automatic attendance. ID cards with barcode information are appropriate for their identification, show their real-time data, uses additional fine system to be late. This work focuses on ensuring that this available to all with information security and authority protection.

Key words: Arduino Uno, Wi-Fi module, RFID module, Relay, PIR sensor.

I. INTRODUCTION:

There are three main objectives of the unified power management with attendance program. The first is to automatically take the attendance via RFID label and the second is the power management program. This system will automatically be attended by students using their ID card and will report the time. Students ID contain barcode data and the attendance can be recorded more efficiently by a RFID reader to a computer. If the participant arrives late, the date of arrival and the fine sum will be provided by the management. It will then be sent to the administration by notifying the parents respectively. Saving energy has become a must in our daily lives. Several conventional energy saving strategies, such as the use of electrical devices that use very less resources or disrupt the entire power supply for a certain area for a scheduled time, they are not effective so consumers can feel a great deal of pain, and the expense of using a high-power electrical device can also rise. Reducing corporate

energy consumption by improving leadership and environmentally friendly. Through advances in technology, a smart and effective approach is used to save electricity bill. Quite inexpensive and compact approaches are without any complex control device to calculate our surroundings. This energy-saving approach together with a barcode attendance system helps to control the electricity use by students and the management. A power-saving device utilizing sensor technology is not as effective as it induces fluctuations of false identity of humans even with minor disruptions. This optimized automatic power management device can be used in schools and colleges to reduce enormous power usage, rendering it practical for use with minimal investment.

II. SYSTEM MODEL:

The existing system senses the occupants using a motion sensor where it normally fluctuates even for minor interference. In this situation, a process requires monitoring and processing the office database (DB) power consumption information for a given duration of use. The existing system includes of different attendance and energy management program. The method has some drawbacks as it will not be robust, it requires costs are high and it renders tracking difficult. In the existing system the attendance of the students in colleges and in many educational institutes followed the data sheet method.

III. LITERATURE SURVEY:

In designing and implementing office standby—power management system by physical and virtual control through user interface normal pattern analysis in energy internet stuff. The drawback is that it's a rather complicated model, it doesn't have attendance program in it and it's expensive. In the intelligent classroom management system, complicated control with a cloud server is needed.

In each IOT-based smart energy management system, the complex monitoring system operates with sensors and is high cost, not effective and reliable.

IV. PROPOSED SYSTEM:

In proposed system, first PIR sensor senses the people entering the room and it automatically switch on the fan. Here the RFID reader count is set to zero. Using RFID tag, the person enters the room is detected by swiping his RFID tag and it upload the data in the IOT server as ‘PRESENT’ then the fans and lights switches on automatically if person enters the room. Similarly, on entering the room the count value go on increasing as if the people swipe their cards within the time which we provided in the code then in IOT server data will be uploaded of the particular person. The persons who will swipe their cards within the time their time of arrival and status of their presence will be uploaded in the IOT server. And the people who come late to the class they can swipe their card in the system when it is restarted after some delay by using a switch. If the person leaves the room the PIR sensor sense the person and switch off the fan and light after some delay time automatically. When the person enters the room then it takes attendance automatically by using the ID card containing bar code data. The bar code contains real time data which gives the information about the arrival time of the person.

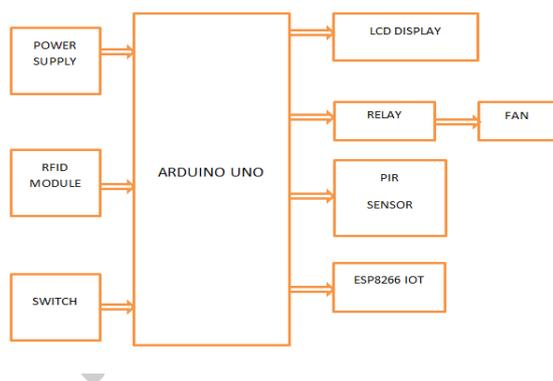


Fig: Block diagram of automatic power control & saving with attendance system

Power supply unit:

The power supply is mandatory to run the electronic component. We get 230V A.C from the supply, for the working of all electronic

components we need a D.C supply. So we have to convert 230V A.C into D.C supply.



Fig: Block diagram power supply unit

230V A.C supply is given basically to a step down transformer.it converts 230V A.C into 12V ac supply. Here the 12v ac is given to bridge rectifier it converts 12v A.C into pulsating D.C the pulsating D.C is converted into pure D.C in the filter section. In the filter section we are using the capacitor, it will remove the ripples. for the constant maintenance of voltage we use 7805 voltage regulator.7805 voltage regulator will produce constant voltage of 5v.if we want 9v dc voltage we can use 7809 instead of 7805 at the end of power supply unit we are using led .we know that the led will operates at 3.3v and we are getting 5v from 7805 voltage regulator, so we are using a resistor in between voltage regulator and led. The resistor is of 1k ohm. The resistor will oppose the flow of current and we will get 3.3V output from resistor and it is given as an input to led. Here we are using led only for the indication of power.

Arduino Uno:

Arduino uno is a microcontroller based on ATmega328, it consists of serial crystal oscillator, voltage regulator, capacitors, etc.....It is having 28 pins.in that 14 digital pins (D0-D13) in that 6 pins will provide PWM output , 6 analog pins(A0-A5) is used to provide analog input in the range of 0-5v, 3 grounds, reset pin is used to reset the controller, ARET, IO references are used for input/ output ,power barrel jack, serial pin is used these draw backs we are using Arduino in our proposed device. The advantages of Arduino are low cost, independent of external programmer, no external power supply need and lots of shields available.

- Arduino board was developed by graduating students in Italy, 2003.
- Arduino user’s 8 bit AVR microcontroller development boards are released.
- It works on 5V.
- Digital pins are used as the input and output pins.
- RX and TX pins are used as transmitting and receiving pins.

- The reset pin is used to reset the Arduino Uno.
- Ground pin is connected to the ground to avoid power fluctuations.

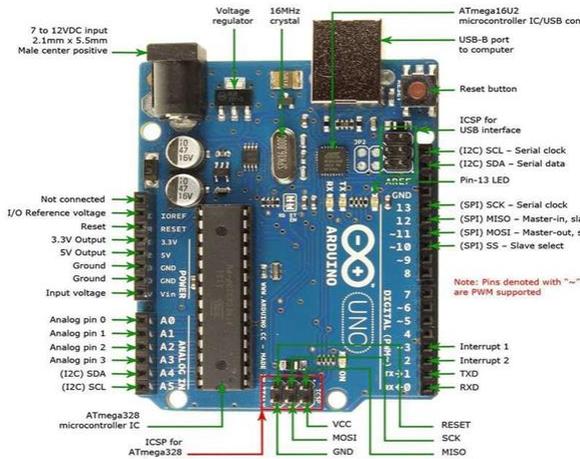


Fig: The arduino Board

- It has 32 Kb of flash memory.
- The size of RAM is to 2 Kb.
- It supports serial communication using RX and TX pins. It is used for interfacing of Wi-Fi, ZIGBEE and any module.
- Arduino is a open source platform (IDE) makes it easy to wright code & download to the board programmer need not worry about the HEX file, Arduino IDE is user friendly.
- It can be run on windows, mac OS and Linux.
- Many boards are available in Arduino boards such as Arduino Uno, Arduino Mega, Arduino Nano etc.,
- The library files are available in Arduino IDE which makes the work of a programmer easy.
- It is compatible with sensors available, such as humidity sensor, temperature sensor, gas sensor etc.,

RFID Module:

The full form of RFID is radio frequency identification. RFID is used to identify a person or a thing wirelessly. This identification is done through radio waves. This is automatic identification technology. RFID can read the data through objects. The objects may be dolls, non-

metals, human beings, cars, clothes and vessels. RFID module contains two parts. They are:

1. RFID Reader
2. RFID tag

The RFID module gives more efficient and reliable work in identifying the data rather than the traditional way of detecting.

1. RFID Reader:

RFID reader is used to read the RFID tags. It will scan the data which is present on RFID tag. The RFID reader working principle is depends on frequency of operation.

- Low frequency: the range of frequency is 125 kHz to 134 kHz. It transmits the signal in short range that is 10cm.
- High frequency: the range is 13.56mhz.its range up to 1meter.
- Low frequency and high frequency RFID tags uses inductive coupling (near field coupling).
- Ultra high frequency: its range is up to 860-960mhz.the range is in between the 10 to 15 m.
- Ultra high frequency RFID tags uses electromagnetic coupling (far field coupling).



Fig: The RFID Reader

RFID read particular frequency, first It induce the power into tag next it synchronizes clock to tag and acts as a carrier for return data from tag.

2. RFID Tags:

RFID is an IC chip.it has unique electronic code. The code is varied from each person .it is also

called RFID key. There are three types of RFID tags. They are

1. Active Tags
2. Passive Tags
3. Semi Passive Tags



Fig: The RFID Tags

These tags are in size of keychain or label. Here in this system we are using passive tags as the identity cards of the person.

Liquid crystal display unit (LCD):

LCD the name itself indicates that it is used to display the different strings. LCD is having two modes. They are

1. Command mode and
2. String mode.

In this system we are using LM016L LCD



Fig: Pin description of LM016L LCD

In this we are using LCD of 16*2 which means it has 16 columns and 2 rows. The maximum display of characters in the LCD is 16. The power supply is given at VSS pin and grounding the VDD, VEE is used change contrast of the display. RS is data select line. rw pin is used to read or write the data operation. Enable pin will make LCD to working

condition. We are using only 4 bits, so we have interface MSB data pins to Arduino Uno.

Relays Module:

Relay is nothing but a mechanical switch. It is electromechanically or electronically operated to control the electronic circuits. Relay is a switch that opens or closes the circuit in electromechanical circuits and it can be constructed with electrical, mechanical and magnetic components.



Fig: Relay Module

There are so many types of relays such as induction type relay, solid state relay, hybrid relay, thermal relay, reed relay etc., Relays are used in computer circuits to perform arithmetic and logic operations, automatic stabilizers. In this system we are managing the power for that the bulb and the fan is used so in order to control those two these relays are used.

PIR Sensor:

The module consists of a pyro electric sensor which generates energy when exposed to heat when human being or animal body will get in the range of sensor .It will detect movement because the body will radiate heat. The meaning of PIR sensor is passive infra-red.



Fig: PIR Sensor

The sensor not using any energy for the detection it will take the energy from the other object. The

module contains special cover called Fresnel lens which focus IR signal on pyro electronic sensor. When the person enters the room it senses the person and automatically switch on the bulb and fan which are interfaced with relay. The PIR sensor covers the area up to 180 degrees of the front side, when person is detected within that range it will activate.

ESP8266 Wi-Fi module:

ESP8266 is among the most integrated Wi-Fi chips in the industry. Measuring just 5mm x 5mm, ESP8266 requires minimal external circuitry and integrates a 32-bit Tensilica microcontroller, standard digital peripheral interfaces, antenna switches, power amplifier, low noise receive amplifier, filters and power management modules - all in one small package, which makes it perfect for IOT use-case design and development. In many cases, even the production IOT landscape is using ESP8266 due to its capabilities and powerful features. On top of that, it is low cost and available readily. The ESP8266 Wi-Fi module is a complete Wi-Fi network where we can easily connect as a serving Wi-Fi adapter, wireless internet access interface to any microcontroller based design on its simple connectivity through Serial Communication or UART interface. Here the Wi-Fi module which works on the users network will upload the data in the IOT server.

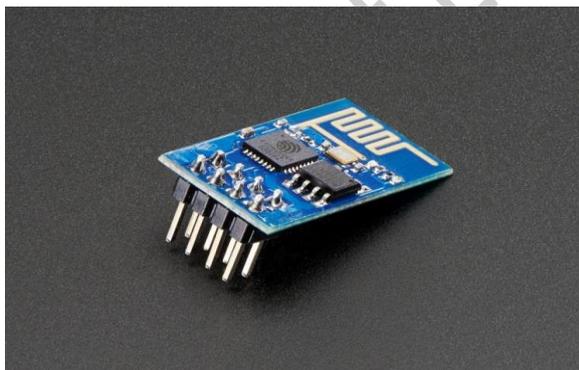


Fig: ESP8266 Wi-Fi module

Arduino and Raspberry Pi do not have built-in support for wireless networks. Developers will have to add a WIFI or cellular module to the board and write code to access the wireless module.

V. EXPERIMENTAL RESULTS:

The purpose of this work is to design a RFID Technology-based attendance system using

arduino, where student or employee attendance is automatically recorded with a card swipe. The project's function is clarified below. The PIR sensor is connected to the A0 pin. DC fan and relay are given to 7th pin. The 12th and 13th are given to reset and enable. TX (transmitter) and RX (receiver) are connected the 2nd and 3rd pins. Switch is connected to 6th pin. RFID module is given to the 1st pin in circuit. The RFID reader can identify the ID card when this circuit is turned ON, transmitting the special 12-digit card number to the microcontroller via serial terminal. And the status of the student is uploaded in the IOT server. This WIFI can either be a WIFI device or network, it must be recorded in the software as the IOT name which is used in the system is "project" and the password is "project8125" then it will connect to the corresponding network. So that the attendance system uses barcodes which records the attendance of each participant and a power saving system utilizing sensor technology which is the most efficient method that can be used in schools and college to eliminate enormous power usage and automatic attendance process. It research introduces the classroom management system's experimental model.

S.No	Student	Status	Entry Time	Date
1	2	LATE	T.09:17:01	2019-12-10 18:13:31
2	3	PRESENT	T.09:02:01	2019-12-10 18:42:28
3	1	PRESENT	T.09:01:26	2019-12-10 18:41:31
4	1	PRESENT	T.09:00:25	2019-12-10 18:07:22
5	1	LATE	T.09:17:14	2019-12-10 18:05:51
6	2	PRESENT	T.09:01:55	2019-12-10 18:03:11
7	3	LATE	T.09:17:03	2019-12-09 21:53:22

Fig: Attendance report

The automatic attendance program achieved its goal and handled the attendance in a manner that was both user-friendly and effective. So we can also create an automatic attendance with all these works published. For each late arrival, the fine number will be applied. And the accountable workers, meanwhile, will take action. The program will promote the smooth running of our university's planned classes so reduce the loss of time. This system is fully automatic and no human interaction is needed except for switching on the system after some delay for the late comer students then also the

system will update their status in the server. Here we use a switch to give some delay and after that it will be in on position to again work and record the attendance. Gives you real-time student attendance records in our new system focused on RFID. It can be used for student enrollment at schools, different educational institutes, as well as university campus. With RFID, we can replace it with an automated attendance system.

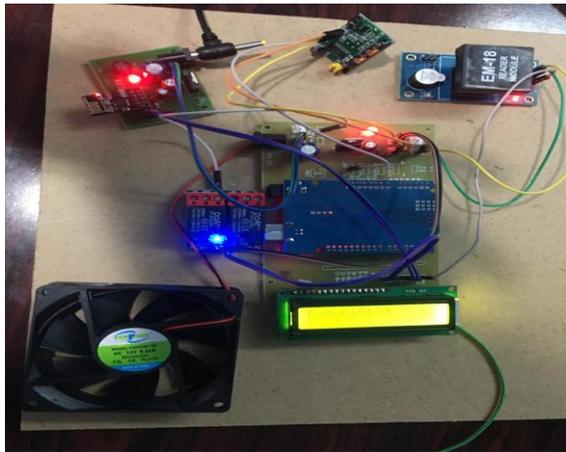


Fig: Hardware set up

VI. FUTURE ENHANCEMENT:

By using the Raspberry-pi, the student information is stored in the Database (DB) and their attendance status and the bill for the late comer people will be reported automatically to the management. In image processing there is high level security by identifying the person entering the room. And also by using different types of sensor we can improve the attendance status of the students as well as the employees in the many offices.

VII. CONCLUSION:

In order to reduce energy consumption in institutions and to help the management as well as the environment in terms of saving electricity bills, an intelligent and effective method for measuring our environment is available with advancement in technology. This power saving method is also part of the system that uses barcodes and reports the attendance of each student and a power saving system using sensor technology, which is the most efficient method that can be used in schools and college to reduce the enormous power consumption and automated attendance system. The automated attendance system was able to achieve its objective and take the attendance in a manner that was both

user-friendly and efficient. So with all these work reported, we can also develop a better IOT system for Energy Management interfaced with Arduino Microcontrollers for controlling the usage of appliance like speed of fan, light intensity rather than just switch on or off.

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