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CLASSROOM AUTOMATION

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Abstract- *Presently, one of the dominating problems that we stumble across is service wastage. In our schools and colleges, we see that fans and lights are regularly kept ON unnecessarily. To overcome this power wastage we have designed this complimentary "Classroom Automation". In addition to all this concern of appliances (i.e. fans and lights) we have integrated "Attendance Monitoring" and "Message Transmission". In this proposed system the classroom is equipped with automatic attendance system based on modern technology that ensures the smooth working of the classroom. The complementary LCD display helps the outsider to know about the class and lectures that are going on inside the classroom. The automatic board swiping mechanism will assist the professor and reduce the human efforts. Hence, the system will ensure the smooth working of the classes at our organization and lessen presage loss. Thus in nutshell, the main desire of our project is to save electricity, time and maintain the functioning of classroom system smoothly.*

Keywords*: Automation, Attendance Monitoring, Message Transmission, Software, Load Control*

I. INTRODUCTION

As of late, the vitality emergency has ended up one issue which the entirety world must trust. Home force utilization makes up the biggest piece of vitality utilization on the planet. Specifically, the force utilization of lights in a run of the mill home is an element which can't be disregarded. The ordinary client needs distinctive light intensities in better places. At times the light force from outside is adequate, furthermore, in this manner, we don't have to turn ON any light. Be that as it may, here and there the client leaves and neglects to turn off the light. These elements cause vitality waste. In this way, a few power administration of light control in homes, classrooms, workplaces and commercial ventures are fundamental keeping in mind the end goal to spare vitality. Nowadays savvy robotization has ventured its nearness in each field all over the world. Our task is a stage towards participation and force administration of the classrooms in the schools or establishments. The utilization of minimal effort advances for exceedingly dependable applications with the assistance of recently advanced calculation makes the mechanization procedure to achieve the buyers at less expensive and solid expense. Subsequently, in our task, the unique mark acknowledgment framework is utilized to take the participation, power administration, and remote message transmission. With the upheaval of alteration, technology apparatus are becoming simpler and easier for us. Automation is the reach of control systems and information technologies to lessen the desire for human work in the production of goods and services. In the term of industrialization, automation is the control beyond mechanization. Whereas mechanization has provided human operators mutually machinery to set up them with the hearty requirements of function, automation greatly decreases the human efforts.

II. EXISTING SYSTEM AND ITS DISADVANTAGES

An ideal classroom is an environment in which teachers are able to focus solely on their lectures and the students are able to home in on the information they are being given. Unfortunately, this does not reach in our country. During class hours, time is usually wasted in multiple ways such as manually keeping record student's attendance one after another. Other disruptions besides occur throughout class time such as temperature and light variation. These problems cause hooked students to wander around the class guessing for the right switch and adjusting it to equilibrate the environment back to useful conditions. This causes disturbances for both teachers and other students, accordingly to wipe out these irritations the classroom automation system is created that allows the classroom to commence more efficient, and rescind any human assistance.

III. PROPOSED SYSTEM

A. HARDWARE

Figure 1 describes the block diagram of proposed system. It mainly includes Microcontroller, Relays, DC Motors and Sensors.

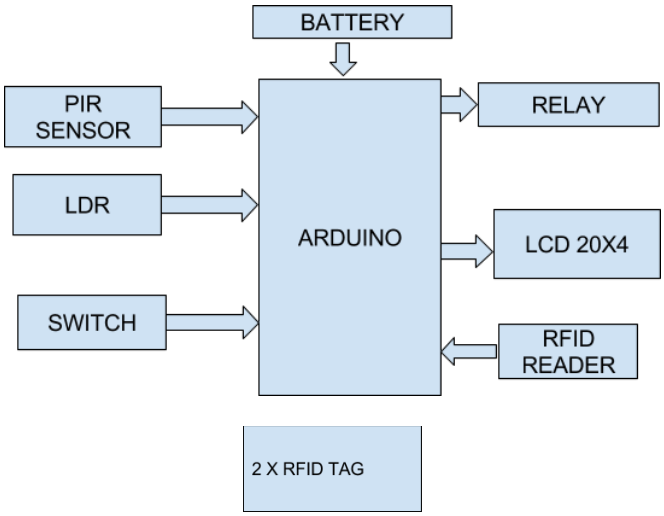

Figure 1: Block Diagram Of The Hardware

LM35 temperature sensor: The LM35 is an IC that senses the temperature. The operating temperature of the LM35 ranges from -55°C to 150°C.

Passive Infrared Sensor (PIR): PIR is basically made of a pyroelectric material which can detect levels of infrared radiation. The sensor in a motion detector is actually split in two halves. The two halves are wired up so that they cancel each other out. If one half sees more or less IR radiation than the other, the output will swing high or low. It has three pins GND, VCC, and OUT. The GND pin connects to the GND pin on controller. The VCC pin can connect to the 5V pin, the 3.3V pin or a digital output pin set to HIGH. The OUT pin connects to an input pin on the microcontroller.

Light Dependent Resistor (LDR): LDRs or Light Dependent Resistors are extremely helpful particularly in light/dim sensor circuits. Ordinarily the resistance of a LDR is high, once in a while as high as 1000000 ohms, yet when they are lit up with light resistance drops drastically. At the point when the light level is low the resistance of the LDR is high. This keeps current from streaming to the base of the transistors. Thus the LED does not light. In any case, when light sparkles onto the LDR its resistance falls and current streams into the base of the primary transistor and after that the second transistor. The LED shines.

RFID Reader Module: The RFID reader module is a reader, transmitter or receiver that can read or write the RFID tags. It is also called as the RFID Interrogator. An Arduino board controls the RFID reader. For acquiring the data from RFID tags, the Reader is mounted to an antenna. The antenna acquires this data and sends it to the personal computer.

Arduino UNO Microcontroller: The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

Arduino UNO Pin Configuration: As shown in figure 2, Each of the 14 digital pins on the Arduino Uno can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 5 volts. Pin 0 (RX) and pin 1 (TX) are used to receive (RX) and transmit (TX) TTL serial data. Pin 2 and 3 are the pins that can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. Pin 3, 5, 6, 9, 10, and 11 provide 8-bit PWM output with the analogWrite() function. Pin 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK) supports SPI communication using the SPI library. The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

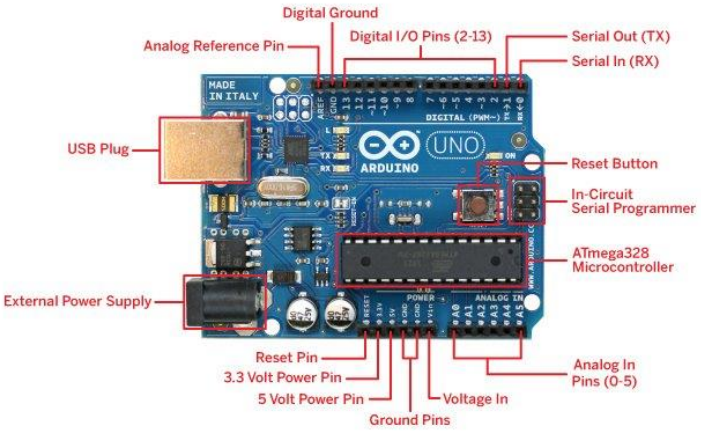

Figure 2: Arduino UNO Hardware

Power supply Circuit: As shown in figure 7, LM7805 is a series regulator. During the absence of DC supply C6 charges and balance the input voltage needed for series regulator. The bridge rectifier circuit converts the input AC voltage into unregulated DC voltage. The +5V regulated DC power supply is derived from a regulator IC 7805 whose input voltage is unregulated DC supply of around 12V DC applied to the input pin of the regulator IC after filtering AC component through capacitors. The regulator IC keeps the line and load regulation within 1% of throughout voltage and once again the capacitors are used to reduce the ac components on voltage. Capacitors C7 and C8 are used for high frequency noise rejection. Capacitor C8 also improves the load regulation.

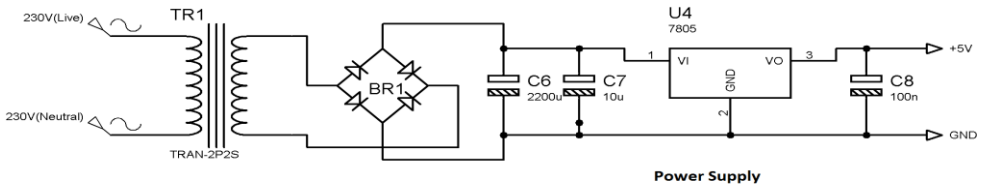

Figure 3: Power Supply Circuit

Circuit Diagram And Working

Figure.4 describes the circuit connection of whole model of classroom automation system with three applications i.e. i) automatic attendance, ii) load control, iii) Message transmission, iv) Board swiping

Automatic Attendance control: The first part of this project is to automatically control the attendance of students entering the class. Each student holds their unique RFID cards (tags). When they flash their cards on the RFID reader module their attendance is automatically updated in the system. Hence it saves the study time which is wasted in managing the attendance.

Load Control: The second objective is to automatically control the fan and lights. The subject is to fabricate several sensors overall the classroom and give a planned feedback to the response these sensors receive. An example would be having temperature sensors during the class room that would examine the temperature and carry out to any change by altering the fan speed. For light control, there will be proximity sensors that would detect student's presence and allows the lights to run on if students are nearby. Also the light dependent resistor will detect the intensity of atmospheric light and accordingly illuminates the room lights.

Board swiping: Whenever the professor flashes his RFID tag onto the reader module, the motor driver will trigger the DC motors to clean the blackboard. Also a manual switch is provided to clean the board in between the sessions.

Message Transmission: The third part is to convey the message on the LCD screen/Display located outside the classrooms. It displays the information such as Professor's name, Subject name, Branch and division**.** Whenever the professor flashes his RFID tag onto the reader module, his information will be displayed on the LCD screen.

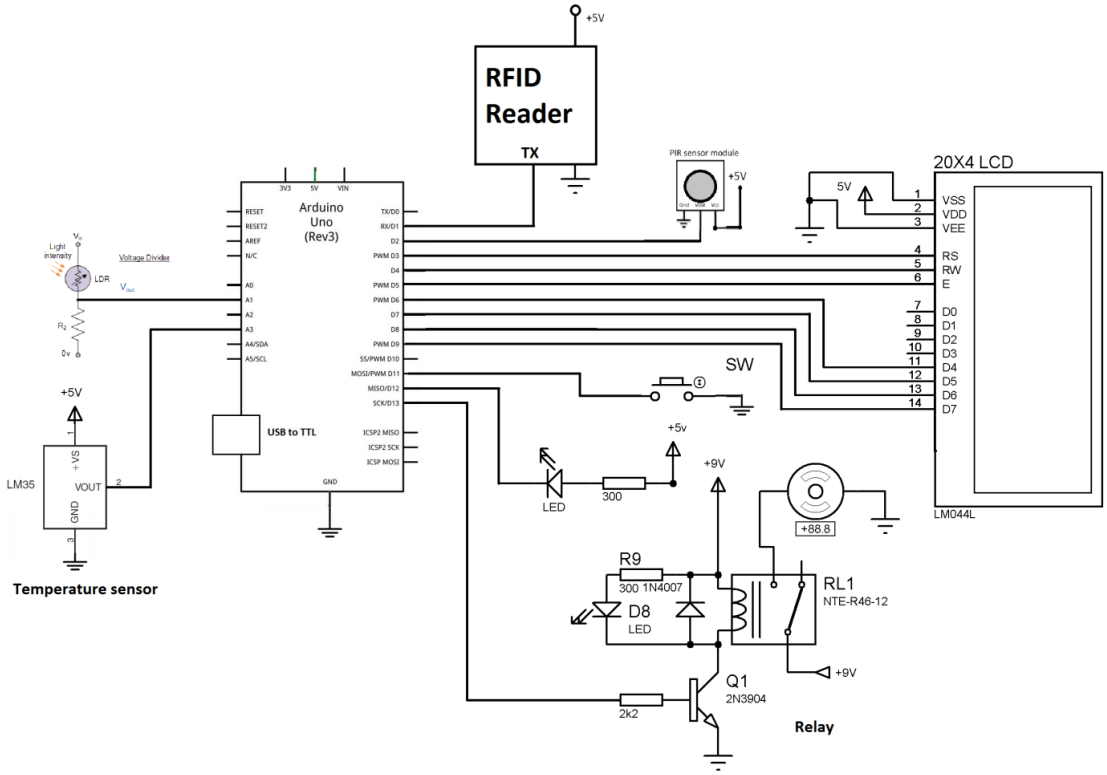

Figure 4: Circuit Diagram of Proposed System

B. SOFTWARE

1. Visual basic 6.0
2. Arduino ide

Visual basic 6.0: The entire database of the proposed system is stored in the personal computer using the software **virtual basics version 6.0.** The communication between the Arduino and Visual Basic is done using ascii over serial/USB. The data sent to the Arduino is formatted in to commands which are enclosed in start and end markers; "<" and ">". The flowchart of the coding section is given in figure 5.

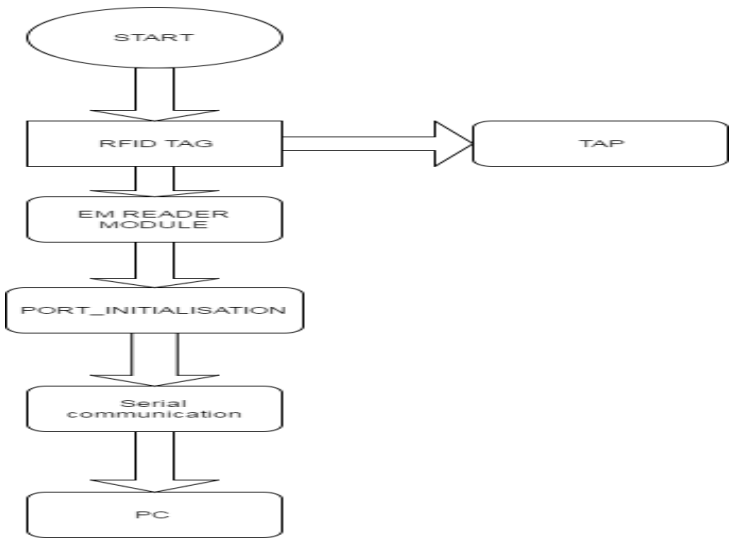

Figure 5: Flow Chart of the Software Coding

IV. RESULT

When the student enters the class he flashes his unique RFID tag onto the reader. His attendance is marked and store in the database which is located in the personal computer. The serial communication is taken place by using virtual basic software. When the student reaches his place the fan and room light will turn ON with the help of sensors. The intensity of room light is controlled by the LDR output.
When the professor flashes his unique RFID tag onto the reader his information such as Name, Subject name and class is displayed on the LCD display as shown in figure 6. Also the board is swept clean automatically. Manual switch is provided to clean the board in between the session. The DC motors mechanism is used in this system to clean the board.

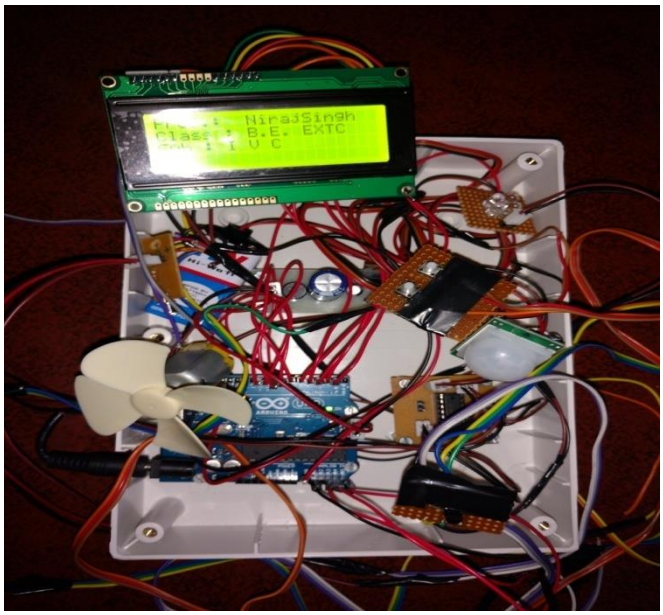

Figure 6: Hardware Setup OF Entire Project

V. CONCLUSION

The hypothesis and idea of the intelligent classroom automation model depends on the control framework. In electrical outline, the functions and characteristics of the electrical segments are needed to decide the model prerequisite. The framework lessened numerous issues, for example, bypassing the chances of malpractices in the attendance entry record, helps to maintain the data of students entry to the lectures very accurately or in a proper manner, the encryption system includes more security so that there will be no mysterious unique mark which can mess around with the recorded information and which can save time in taking attendance and also the message transmission which can reduce the interruption of class, hence the system will facilitate the smooth running of the scheduled classes at our university, and minimize time loss. This project has presented design and development of classroom automation using microcontroller. We can save the electricity with our proposed work, where we have focused on energy saving with load control in classrooms and time management with the help of attendance monitoring which is based on RFID Technology

VI. REFERENCES

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