Automatic Lighting System using Pic Microcontroller

Ramkumar. K[1], Ranjitha. R[2], Swathi. P[3], Dr. Anand. C[4], Vasuki. N[5]

[1, 2, 3] Student, Department of Computer Science and Engineering, K.S.R. College of Engineering, Tamilnadu, India. Email: ramkumarblue1998@gmail.com, ranjitharavi729@gmail.com, swathiparthiban089@gmail.com

[4]Associate Professor, Department of Computer Science and Engineering, K.S.R. College of Engineering, Tiruchengode 637215, Tamilnadu, India. Email:canand02@gmail.com

[5]Assistant Professor, Department of Computer Science and Engineering, Institute of Road and Transport Technology, Erode 638316, Tamilnadu, India. Email: adithyavasuki@gmail.com

Abstract - Directly, one of the overwhelming issues that of we tumble is that administration wastage. In our homes, schools, universities and enterprises, we see that fans and lights are consistently kept ON at some future time if nothing in the feast or angle or entry. To avoid one a status we have planned this complimentary "Homeroom Automation". In our complimentary, along by all of machines concern (for example fans and lights) we have incorporated "Participation Monitoring" and "Message Transmission". Current age homerooms are prepared by the entire of electronic gadgets that have additionally abetting programming to recover and advance educating techniques. Be that as it may, it is normally observed that good class augur is stewed on seizure participation, or the class submit face interference guerdon to withdraw sections of understudies and unsettling influences, for example, the manual away from groupie and light. Thusly, to recover these issues the two feet on the ground program is made in this theory freebee that will have no worldly mediation from instructors, understudies or floor participation. Consequently, the position will rush the smooth night and day of the remarkable classes at our association and diminish foretell misfortune. Consequently, in rapidly the fundamental want of our free ride is to spare power, time and keep up in working of study hall framework easily.

Keywords - Automation, Robotization, Load Control, Automatic Attendance, Message Transmission

I. INTRODUCTION

As of late the vivacity emergency has ended up one issue which the entirety world must trust. Home force implementation makes up the biggest piece of vitality utilization on the planet. Specifically, the force implementation 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 fairly, 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 charges of light control in a home, classrooms, workplaces and commercial ventures is fundamental keeping in mind the end goal to spare vitality [1]. Now days keen 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 implementation of minimal effort advances for dependable applications with the assistance of recently advanced calculation makes the mechanization procedure to achieve the buyers at less expensive and solid expense. Later in our task the unique mark acknowledgment framework is utilized to take the participation, power administration and remote message transmission. The classroom squad shows the situation of classroom also the uncountable are controlled a well-known that they ought not be repaid on in a free classroom. With upheaval of alteration, technology apparatus is becoming simpler and easier for us. Self-acting is 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, robotic is the control beyond mechanization. Although mechanization has provided human operators mutually machinery to set up them with the hearty requirements of function, automation greatly decreases the man power sensory and lunatic the requirements as well. Self-operating plays an increasingly pertinent role in the presence economy and in daily experience. Automatic systems are considering preferred during manual system. Through this enterprise we have initiated to exhibit automatic control of a room as a product of which electricity is decreased to sprinkling extent.

II. REQUIREMENT OF AUTOMATION

Already, we observed towards the upcoming when we stated about automation/robotization, which could do anything on pretention of the controller, yet today it has transformed into a real.

Automation can replace great amount of human working power, in addition people are more motivated to mistakes and in serious conditions the likelihood of blunder increments though, automation can work with persistence, flexibility[3].Some of the important reasons are discussed below

a) Carrying functions that are past human abilities of size, weight, speed, continuance, & so forth and with exceptionally immaterial blunder.
b) Supplanting people in undertakings done in risky situations (i.e. fire, space, volcanoes, nuclear offices, submerged, and so forth)
c) Replacing human administrators in undertakings that include hard physical or dull work.
d) Economic growth. Robotization may improve in economy of activities, society or a vast part of humankind. For illustration, when an endeavor that has placed assets into robotization, development recoups its venture, or when a state or country extends its salary because of computerization like China, Japan or Germany in the twentieth Century. This project is focused on implementation of hardware control system for various electrical and electronics devices.

III. PROBLEM STATEMENT

Robotics involves mainly controlling and Software technology to minimize the necessity for individual ability in the generation of products and administrations. Robotization significantly reduces the necessity for human real and mental prerequisites also. Mechanization assumes an unavoidably suited part in the survival economy and in by the day practice.

This Project can be proposal by using PLC anyhow the block related to PLC is higher cost. Alternative problem is that, we can manage PLC only if the human who is handling, must be PLC poetry. So, to sidestep this; we are applying Classroom Automation using microcontroller.

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. Inappropriately, this does not reach in our country. During class hours, time is usually misused in multiple ways such as manually keeping record student's attendance one after another. Other distractions besides occur throughout class time such as temperature and light deviation. These problems cause angular students to wander around the class solving for the right switch and adjusting it to equilibrate the environment back to useful conditions. This causes conflicts for both teachers and other students, accordingly, to spread out these irritations a smart classroom system is created that allows the classroom to originate more efficient, and cancel any human assistance.

IV. PROPOSED SYSTEM

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

A. Light Dependent Resistor

A Light Dependent Resistor (LDR) or a photo resistor is a tool whose resistivity is an element of the amount electromagnetic radiation. Therefore, they are light delicate tools. They are likewise called as photo conductors, photo conductive cells or just photocells. They are contained of semiconductor materials having high resistance.

LDRs or Light Dependent Resistors are helpful particularly in light/dim sensor circuits. Usually the resistance of a LDR is high, once in a while as high as 1000000 ohms, however when they are lit up with light resistance drops significantly. By the side of the argument when the light level is low the resistance of the LDR is high. This keeps recent from running to the base of the transistors. So, the LED does not light. In any case, when light vivacities onto the LDR its resistance falls and current streams into the improper of the primary transistor and after that the second transistor. The LED sparkles. The preset resistor can be turned up or down to rise or diminishing resistance; along these lines it can make the circuit appealing much delicate. The figure 2 determines the working hardware of LDR.

B. Lm35 (Temperature Sensor)

The LM35 is an IC senses the temperature where the output voltage is always proportional to the temperature input in °C. The circuit of the LM35 sensor that is used to identify the temperature is impenetrable. While temperature can be dignified using a thermistor, an LM35 is used as an alternative because of its capability to measure temperature with a more degree of accuracy.
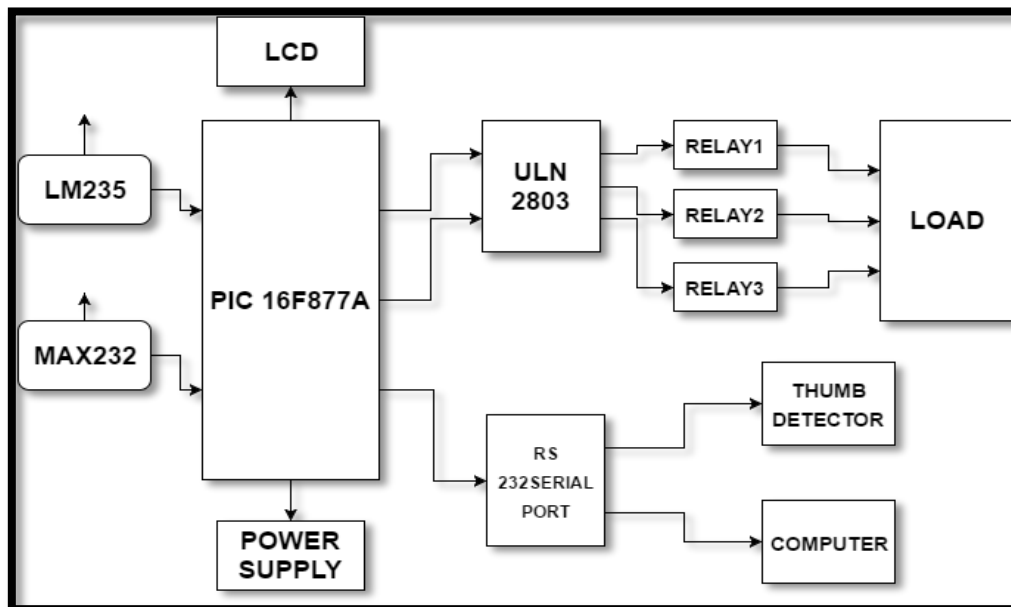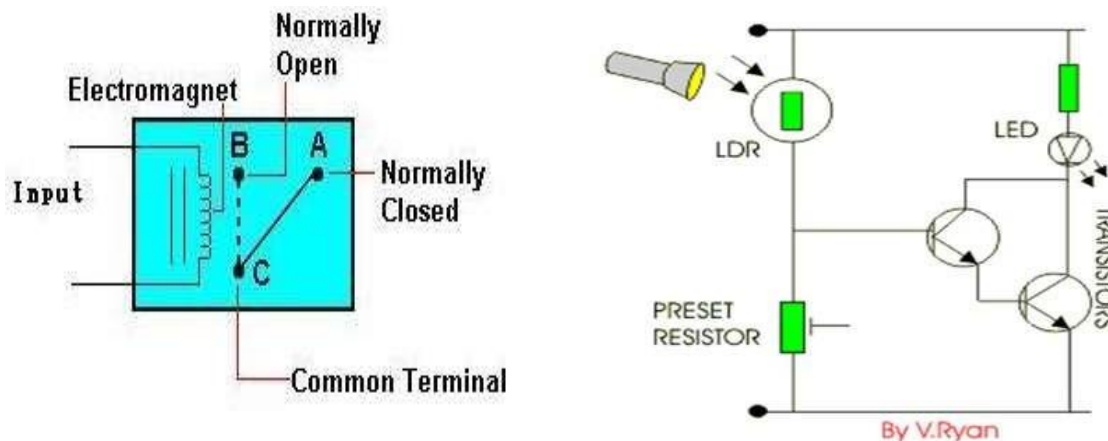
Fig. 1 Proposed System Block Diagram

Fig. 2 Working of LDR

It is a low self-heating device and does not beat 0.1 C temperature rise or fall when working. The operating temperature of the LM35 ranges from -55°C to 150°C. One article of the LM35 that must be well-known is that its output voltage fluctuations by 10mV with every ^{0}C rise and fall. Its scale influence is given as 0.01V per ^{0}C. For example, if the high temperature of the surrounding atmosphere was 23 C, the output voltage is probable to be 23mV, but due to this deviation from the LM35 the voltage perceived could be wherever from 13mV to 33mV. Hence the variation of the output voltage must be distinguished when the system is being set up. The figure 3 presented below is the LM35 used in the project. Pin 1 is the VCC i.e. stream voltage which is 5V. Pin 2 is theProduction Voltage anywhere the Voltage would be 6V, and Pin 3 is ground pin for theLM35.
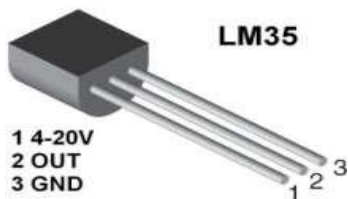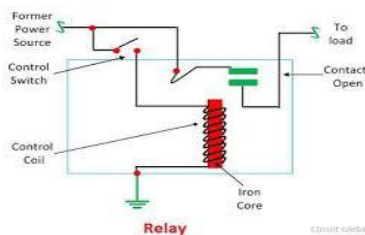

Fig. 3 LM 35 Pin Details   Fig. 4 Working of Relay

a. Relay

Functioning of relay as performed in figure 4, when the power is delivered to relay, the current begin touching through the control coil consequently electromagnetic initiates investing. Hear focuses A, B, C are utilized as controlling points. Next to the point when power source is given because of electromagnetic power, B and C are related consequently shuts the associates carrying about a short circuit for supply to the capacity. At present if relay was deenergized because of closed interactions, then the movement of contact would be converse and make a circuit open. By the side of the opinion when supply is made off, point A and C are linked. The force is basically given by gravity and mechanism.
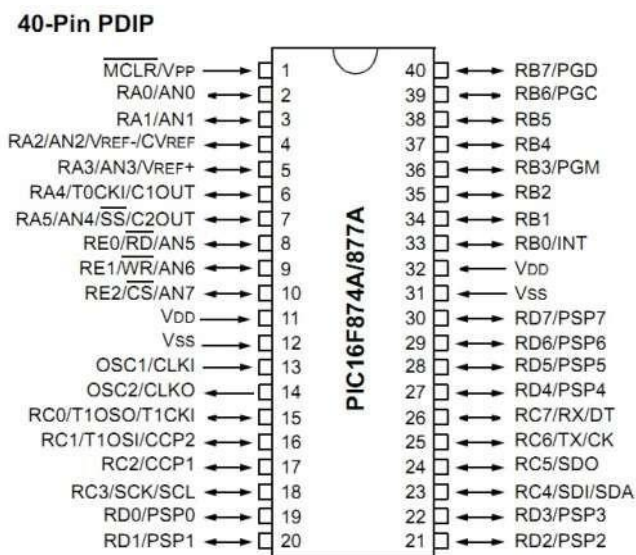
b. Pic Microcontroller

A clan of microcontrollers also retains central interface controllers entirely called as PIC which is a Microchip tools. PIC 16F877A microcontrollers have attractive characteristics or features and they are realistic for an wide variety of uses. PIC microcontrollers are RISC processors and work Harvard architecture. It is a current technology and left the requirement to rush the processor. The Harvard architecture makes deployment of distinct coding and software machineries. PIC 16F877A come from under the group of CMOS 8-bit Flash controllers. Apart from the flash platform memory it also comprises of EEPROM.

c. PIN Configuration of PIC16F877A

As presented in the figure 5, PIC 16F877A is a 40-pin controller. There are pins corresponding to five I/O ports, namely, PORT A, PORT B, PORT C, PORT D and PORT

E. Analog inputs to AD converter are AN0 to AN7; and are the different functions of PORT A and PORT E. Two pins are for oscillator connections, namely, OSC1 and OSC2. Source and position ground pins VDD and VSS, correspondingly, are in replica.

Supplementary, functions related with the parallel slave port and serial communications are the alternating functions of PORT C and

40-Pin PDIP

$\overline{MCLR}$/VPP →	1	40	↔ RB7/PGD
RA0/AN0 ↔	2	39	↔ RB6/PGC
RA1/AN1 ↔	3	38	↔ RB5
RA2/AN2/VREF-/CVREF ↔	4	37	↔ RB4
RA3/AN3/VREF+ ↔	5	36	↔ RB3/PGM
RA4/T0CKI/C1OUT ↔	6	35	↔ RB2
RA5/AN4/$\overline{SS}$/C2OUT ↔	7	34	↔ RB1
RE0/$\overline{RD}$/AN5 ↔	8	33	↔ RB0/INT
RE1/$\overline{WR}$/AN6 ↔	9	32	← VDD
RE2/$\overline{CS}$/AN7 ↔	10	31	← Vss
VDD →	11	30	↔ RD7/PSP7
Vss →	12	29	↔ RD6/PSP6
OSC1/CLKI →	13	28	↔ RD5/PSP5
OSC2/CLKO ←	14	27	↔ RD4/PSP4
RC0/T1OSO/T1CKI ↔	15	26	↔ RC7/RX/DT
RC1/T1OSI/CCP2 ↔	16	25	↔ RC6/TX/CK
RC2/CCP1 ↔	17	24	↔ RC5/SDO
RC3/SCK/SCL ↔	18	23	↔ RC4/SDI/SDA
RD0/PSP0 ↔	19	22	↔ RD3/PSP3
RD1/PSP1 ↔	20	21	↔ RD2/PSP2

PIC16F874A/877A

PORT D. RB0/INT is the peripheral interrupt pin.

Fig. 5 Pin Details of PIC 16F877A

d. Programming in PIC16F877A

The software design has been done by using hi-tech C compiler. The program code is prepared in C and protected in a (.C) file. The header file (pic1687x.h) and library file (p16f87.lib) and linker file (16F87.lkr) are involved. The source file is a (.C) file and the workplace is stowed as a (.hex) file. The source code is constructed using pic-kit and the source code is encumbered in the PIC for creating signals to the relays.

e. Power Supply Circuit for PIC16F877A

As shown in figure 6, LM7805 is a sequence regulator. C2, C4 are bypass capacitors C1, C3 are decoupling capacitors. During the lack of DC supply C1 charges and balance the input voltage required for series regulator. The +5V controlled DC power supply is derived from a regulator IC 7805 whose input voltage is free DC supply of around 12V DC applied to the input pin of the regulator IC after purifying AC component through capacitors. The regulator IC keeps the line and load regulation within 1% of through voltage and once again the capacitors are used to reduce the ac mechanisms on voltage. Capacitors C2 andC4 are used for high regularity noise rejection. Capacitor C3 improves the weight regulation.
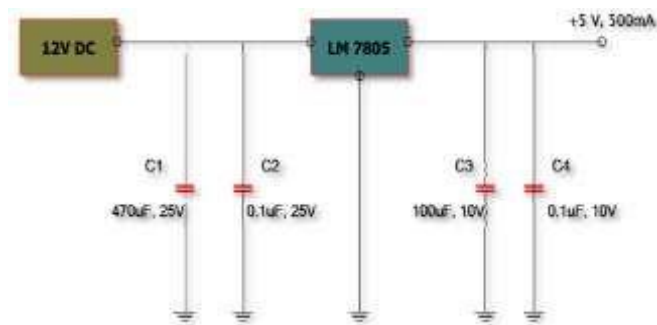
Fig. 6 Power Supply Circuit for PIC16F877A

C. CIRCUIT DIAGRAM AND WORKING

Figure.7 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.
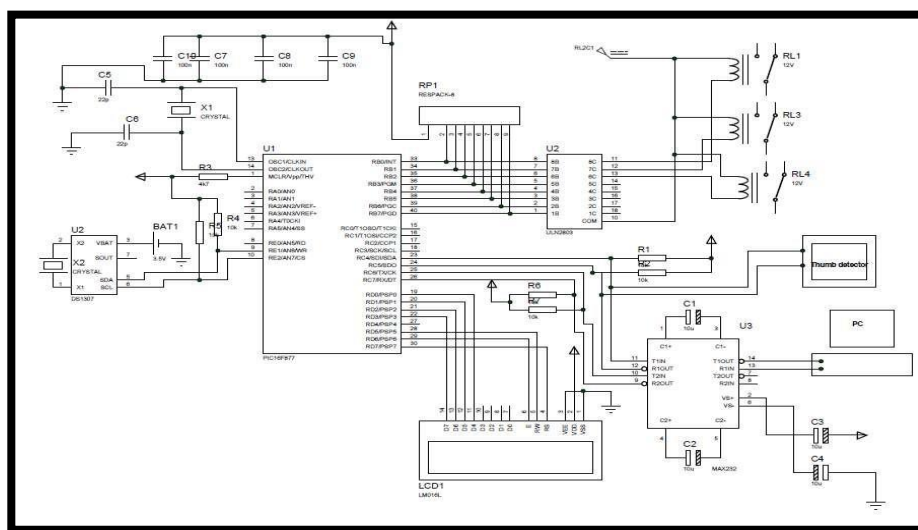

Fig. 7 Circuit Diagram of Proposed System

Automatic attendance system: The first part of the system is to repeatedly take attendance from thumb prints by thumb sensor. Here in this project we have introduced to programme a classroom attendance procedure by using a fingerprint gratitude module. Fingerprint recognition- system can be utilized for both check and ID. In validation, the framework verifies a given finger dip to the "already provided" unique finger impression of a particular user to appear in the event that they are from the same finger (1:1 match). In identifiable proof, the framework compares an information of individual finger mark with the prints of all registered clients in the database to display if the individual is previous known under a copy or false behaviour (1:N match).

Load control: The second unbiased is to automatically switch the fan and lights. The subject is to make several sensors complete the classroom and give a scheduled feedback to the reply these sensors receive. An example would be having heat sensors during the class room that would observe the temperature and carry out to any change by modifying 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.

Message Transmission: The third main part is to deliver the message on the LCD screen/Display situated in the classrooms. Any urgent messages related to students or staff will be displayed immediately. The notification has been transmitted through monitor of Head of the branch or authority.

Experimental Setup: The hardware plan of whole project with previously mentioned three submissions is shown in the figure.8 which contains control unit, supply unit, pc interface for message communication. Red and Green LEDs are used to show the attendance entry and similar of fingerprint. If the fingerprint of student is matched, LED lights to Green which indicates the occurrence of student and data will be stored consequently in the computer connected to the microcontroller with serial bus. Fan and Bulb relate to heat sensors controlled by microcontroller. The comprehensive working of the setup has been described already in the preceding section.

D. RESULTS

The results are differentiated in three main applications as shown in figure.9a, figure 9b and figure 9c respectively.

Automatic Attendance: When the fingerprint of the student is matched LCD Displays the entry and finger id will bestrode.

Load Control: If the intensity of the light is below set point then the bulb glows and if the room temperature is above 300C then fan starts running.

Message Transmission: The required message to be displayed on LCD display located in classroom will be typed in VB.NET software and processed.
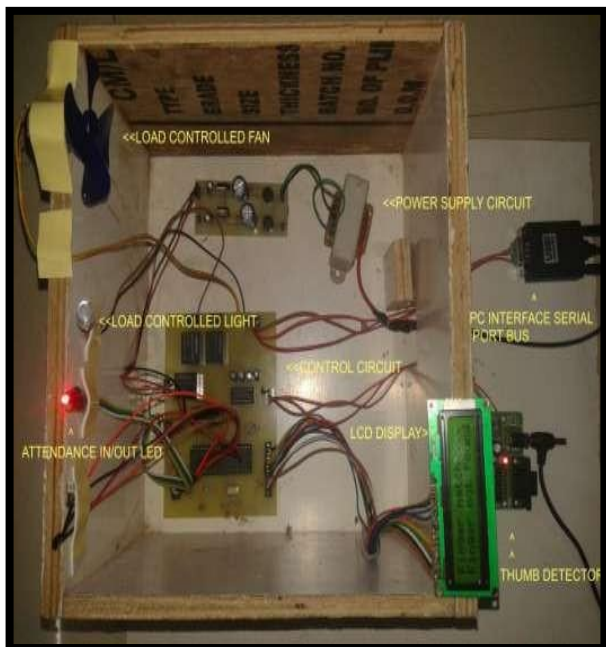

Fig. 8 Hardware setup of Entire Project

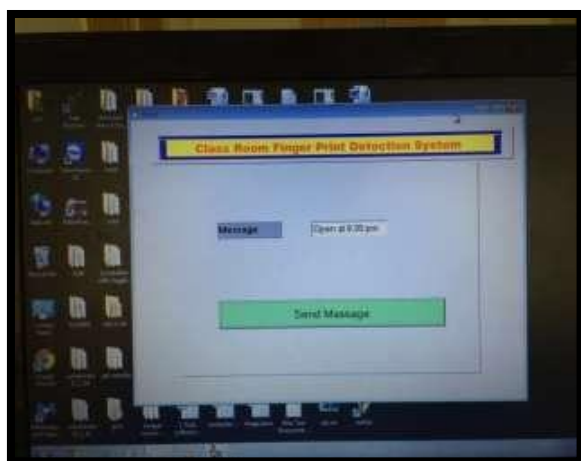Fig. 9 (a) Automatic Attendance using Thumb Detector

Fig. 9 (b) Message Transmission using VB.NET through PC

Fig. 9 (c) Message is displaying at LCD

V. CONCLUSION

The theory and idea of the intellectual classroom robotics model depends on the control framework. In electrical outline, the functions and features of the electrical sections are needed to decide the model requirement. The framework for example, bypassing the chances of misconducts in the attendance entry record, helps to maintain the data of students entry to the addresses very accurately or in a proper manner, the encryption system includes more safety so that there will be no shadowy unique mark which can mess around with the verified information and which can save time in taking attendance and also the message communication which can reduce the disruption of class, hence the system will enable

the smooth running of the programmed classes at our university, and reduce time loss. This project has offered design and development of classroom robotics using microcontroller. We can save the electricity with our planned work, where we have motivated on energy saving with load control in classrooms and time organization with the help of attendance monitoring which is based on fingerprint identification.

REFERENCES

[1] Kyong Nam Ha, Kyong Chang Lee, Suk Lee "Development of PIR sensor based indoor location detection system for smart home", in proceedings of the SICE-ICASE. International Joint Conference, pp.2162 {2167, oct.18-21, 2006.

[2] Devendra Kumar Yadav, Sumit Singh, Prof. Shashank Pujari, Pragyan Mishra UG Student, Dept. of ECE, Sambalpur University Institute of Information Technology, "Fingerprint based Attendance system using microcontroller and labview."

[3] International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (An ISO 3297: 2007 Certified Organization) Vol. 4, Issue 6, June2015.

[4] Inderpreet Kaur, "Microcontroller Based Home Automation System with Security" (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 1, No. 6, December2010.

[5] http://www.pitt.edu/~sorc/robotics/, Lukas Hoffmann, PIC 16F877A Tutorials.

[6] Automatic Room Light Controller with bidirectional visitor counter | VOL-I Issue-4| ISSN: 2395-4841

[7] http://www.ijictrd.net/papers/IJICTRDV1I4005.pdf

[8] www.slideshare.net

[9] https://www.pantechsolutions.net/project

[10] www.ti.com/lit/ds/symlink/lm35