IoT Based Classroom Automation

Ankita L. Satpute
UG Student
Department of Electronics7 Telecommunication Engineering
MVPS's KBT College of Engineering, Nasik , India

Gauri S. Bhavar
UG Student
Department of Electronics7 Telecommunication Engineering
MVPS's KBT College of Engineering, Nasik , India

Kamini J. Pisolkar
UG Student
Department of Electronics7 Telecommunication Engineering
MVPS's KBT College of Engineering, Nasik , India

Abstract

In the modern world, internet become a daily necessity and the IOT become a center of interest which consists of automation and the analysis. The IOT based automation offers the services with or without direct human interference. This project is used to control lights and fans of classroom based on the presence of human inside the room and the based on temperature of room. This project will also help the teacher present in the classroom to take attendance automatically with the help of fingerprint. sensor. The overall system is design by using Arduino and Nodemcu. By supervising state of sensors which are connected to the Arduino board we can control the various modules.

Keywords: IOT, Automation, Arduino, Nodemcu

I. INTRODUCTION

First objective of the project is to taking attendance automatically from students using their fingerprint ID and record attendance Students fingerprints are recorded and stored in database If the data is utilized and transmitted to the computer then attendance of student is recorded with greater efficiency. The second objective of the project is automatic lights and fan on off control. To achieve this objective several sensors are placed around the classroom. The PIR sensor is used to detect human presence in the classroom. Temperature sensor and LDR is used to monitor the temperature and light illumination in the classroom respectively. The data is received from the PIR sensor and LDR is used to control the lights in the classroom. Status of PIR sensor and temperature sensor is used to control the on-off of fans in the classroom.

II. BLOCK DIAGRAM WITH DESCRIPTION

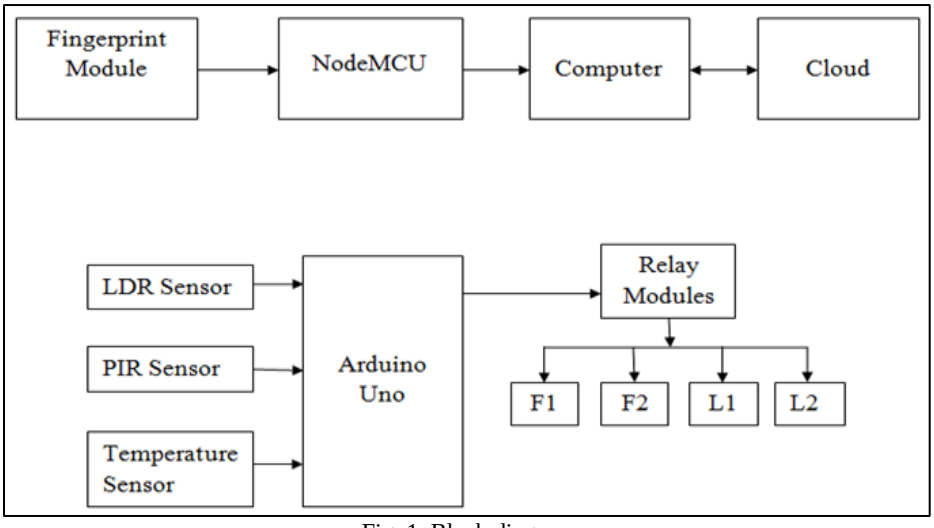

Fig. 1: Block diagram

A. Fingerprint based Biometric Attendance:

This is the first module in our project, which is going to take attendance using students' fingerprint and it will be stored on college ERP directly. In this, we are using R305 fingerprint module and Nodemcu with ESP8266 inbuilt WiFi module. When

student place his/her fingerprint on fingerprint module it will scan and recognize whether this fingerprint is authenticated or not, if it matches with one of the stored fingerprints it will check the id name and according to that attendance will be taken. This attendance will be stored on cloud i.e. college ERP for each respective lecture and for respective staff.

B. Automatic Lights and Fan On-Off Control:

In this we will be using Arduino Uno with various sensors like PIR, LDR, LM35. Firstly, motion will be checked using PIR sensor. If any motion is detected it will then check the light intensity using LDR. If low, it will turn on the lights. Similarly, after detecting the presence of human body, it will check the temperature, if greater than set value, it will turn on the fans. This module will work independently without any app.

III. COMPONENTS

A. Arduino:

Arduino board was designed in the Ivrea Interaction Design Institute in- tended for students without a background in electronics and programming concept. It consists of both a microcontroller and a part of the software or IDE that runs on your PC, used to write & upload computer code to the physical board. The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.

B. NodeMCU:

NodeMCU is an open-source firmware and development kit that helps you to prototype or build IoT products.
MCU stands for Microcontroller Unit. It has inbuilt WiFi ESP8266. It has inbuilt RAM 128Kb and ROM 4Mb.

C. PIR Sensor:

A passive infrared sensor is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications. PIR sensors detect general movement, but do not give information on who or what moved.

D. LDR Sensor:

A Light Dependent Resistor or a photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they are light sensitive devices. They are also called as photo conductors, photo conductive cells or simply photocells. The resistance of a photo resistor de- creases with increasing incident light intensity; in other words, it exhibits photoconductivity.

E. Fingerprint Module:

A fingerprint is an impression left by the friction ridges of a human finger. A fingerprint scanner is a type of technology that identifies and authenticates the fingerprints of an individual in order to grant or deny access to a computer system or a physical facility. These are security systems of bio- metrics. They are used to unlock doors and in other security applications. It captures a digital image of the fingerprint pattern. The captured image is called a live scan. This live scan is digitally processed to create a biometric template (a collection of extracted features) which is stored and used for matching.

ACKNOWLEDGEMENT

We feel immense pleasure in expressing our humble note of gratitude to our project guide MS. S.A.Dhumane, Assistant Professor, Department of Electronics and Telecommunication for her remarkable guidance in doing our project.

IV. CONCLUSION

We have successfully designed, simulated and implemented IoT based classroom automation as per our requirements completely. This system provide reliable response to improve the attendance process. Due to use of various sensors is there, it compares environmental conditions with the programmed values to get reliable and efficient outcome and to save electricity. This is very efficient system for any condition as use of controllers & sensors is made.

REFERENCES

[1] "Automatic switch using PIR sensor", Abhishek N Vaghela, Bhavin D Gajjar, Subhash J Patel in 2017International Journal of Engg. And Research.
[2] "Arduino based led street light auto intensity control system", Shreesh Mishra, Shivakant Gupta, Santosh Singh,Tripuresh Tiwari, Anand Mohan, International Journal ofAdvance Reaseach in Engg.

[3] "Fingerprint Based Attendance System", Karthik Krishnamurthi, S. Irudaya Mary, B.N. Sumalatha, Adler Pereira, International Journal of Advanced Research in Computer and Communication Engg. , Vol.4, issue 3 , March 2015.
[4] Vinay Sagar K N, Kusuma S M, "Home automation using IoT", International Research Journal of Engg. And Technology, Vol. 2, issue 3|June 2015.
[5] Harsh Mehta, Kunal Jadhav, Avinash Mishra, Anushree Deshmukh, "IoT Based Home Automation System using Arduino Board", International Research Journal of Engg. And Technology,Vol.4, issue 1|Jan-2017.