SMART CLASSROOM WITH THE HELP OF IoT

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Abstract:

Life became easier with our smart phone and making our life more convenient we are introduced with new research topic named Internet Of Things. With the growth of technology, it is becoming a common practice to contact with your day- to-day interacting device remotely using a movable device like a Smartphone which has internet connectivity as a result billions of devices are currently benefited. In this paper, we implement a system where classroom hold communication is made simple by carrying out automation and security with the help of Internet of Things to create a system which will permit someone to remotely observe and control some areas of a class remotely from anywhere. There are various kinds of ways that you can automate your classrooms such as automatic light, automatic fan, smart projector, smart water purifier and many things. Even a handful of minutes saved every day result in a quick comeback on interest measured in both genuine costs and improved student outcomes. By the goodness of blooming automation production and wireless connectivity all the devices within the classroom can be connected through internet. This improves the support energy skill, indoor safety, cost savings of the classroom. It is possible to notice the existence of human in classroom by using Ultrasonic Sensor head emits a motion and receives the motion return back from the human. The time taken by the emission and reception is helpful for ultrasonic senor to calculate the distance between person.

Keywords: Classroom, Smart Classroom, IOT based classroom, IOT Technology, Automated Classroom, ICT Classroom.

I. INTRODUCTION

The project is determined to create a new classroom automation that is smart classroom using normal web server and Wi-Fi technology. The mechanism can be switched ON/OFF and sensors can be observed using a controller through Wi-Fi technology. We also able to ON or off our projector in the classes. Automation is the most commonly used word in the platform of electronics. The inanition for automation made a path to many revolutions in the existing technologies. Due to its user-friendly nature everyone is fond of this technology than other technologies. Instead of switches in our homes and offices we can use smart switches

which provide facilities and work in basis of our command through voice. Considering the advantages of Wi-Fi technology an advanced automation system was developed to command the appliances in the classroom. Wi-Fi is a wireless technology that uses radio frequency to transfer data through the air. Wi-Fi has initial speeds of 1mbps to 2mbps.Wi-Fi transfer data in the frequency band of 2.4 GHz. It aims the concept of frequency division multiplexing technology. Wi-Fi technology range is 40-300 feet. The controlling Tool for the automation in the project is NodeMCU which is low-cost open source IOT platform. The statement sent from PC over Wi-Fi will be received by Wi-Fi module connected to Node Mcu. Node Mcu reads the statement and choose the action of switching the electrical devices which is connected to it through Relays.

II. LITERATURE SURVEY

If classroom automation come to our thought, most of them may imagine about living in a smart classroom. Examples are one remote for every household devices, cooking the rice automatically, starting AC automatically, heating water in geyser automatically. we can say that classroom automation is equal to smart classroom. They both bring out smart living condition and make our life more convenient, comfortable, compatible and provides security.

In the paper of Soh introduced the progress of an Internet based technique which allow to examine the important process variables from a distributed control system.

This paper designs which entitle the end user to use the process variables on the distributed control system, remotely. Pota mitis, Fakotakis, Georgila, and Kokkinakis, G. (2003) suggested the use of talking to interact remotely with the home appliances to do a specific action on behalf of the user. The reach is to make decision for people with disorder to perform real-life operations at home by directing appliances through speech. Voice separation technique is selected to take appropriate decision by command recognition. In the year 2006, S. M. Anamul Haque, S. M. Kamruzzaman and Md. Ashraful Islam introduced a system entitled "A System for Smart-classroom Control of Appliances found on Time and Speech Interaction" that automates the classroom devices by using the

personal computer. This system is developed by using the as programming language and Microsoft voice engine tools for speech recognition purpose. A device can be either controlled by timer or by voice command. Stanescu Ciubotaru-Petrescu, Cioarga, and Chiciudean shares a design and implementation of SMS involved control for examining the devices.

The paper has three modules involving sensing unit for examining the applications of a processing unit, that is microcontroller and a communication module that uses modem or phone via serial port RS-232. The Short message service is used for status reporting such as power failure. Ahmed Jawarkar, Ladhake, and Thakare(2008) propose remote checking through smart phone involving the use of speech commands. The spoken commands are established and sent in the form of text short message service to the control system after microcontroller receives the short message.

On the content of short message provide service takes a decision of a particular topic. "Remote Controlled Home Automation Using Android application via Wi-Fi Connectivity" by Prof. Era Johri Dept. Of Information And Technology.

Wi-Fi based home automation system Home automation systems using smartphone, NodeMCU board and Wi-Fi technology are secured and low cost. The Wi-Fi arrangement uses a PC or smart phone as receiver device. It has a high communication rate, great security and low cost, so it can be executed as a real time system. Wi-Fi network has no range limitation for smartphone, then it will be up-to command the home appliances, this is one of the major advantages of Wi-Fi based home automation system.

Voice identification based home automation A voice recognition based home automation system suggested and executed by a researcher. The wireless communication between the smartphone and the NodeMCU is done through Wi-Fi technology. This will be helpful for handicapped and aged people who wants to management appliances by speaking voice bid. The main drawback of this system is that communication between user and voice identification tool depends on signal to noise ratio (Signal to noise ratio), if voice signal is noisy then communication can highly consequence and the system will fail to show accuracy.

III.PROPOSE SYSTEM:

The proposed system is a joining of hardware section like relay modules, voltage supplies NODEMCU and flexible components like mobile applications. Both are equally useful and don't any significance in the system without each other's extent. The system is divided into 2 parts for greater understanding. A -The

electrical equipment's automation. B - Attendance automation part. A] The electrical appliances automation the beginning phase of this will include of a mobile application that takes care of the end user. This system of demand is significant only for the user end. The request will necessary a signup at the beginning which is only for one time. Compulsory fields will be the registered email address of the teacher with the establishment and the identification id (UID or the employee id). These will useful if in case the password or the other fields need to be reset. In the next stage after fortunate registration there will be a login page that will have a username and password as the input fields. If the password is gone and needs to be reset there will be a grassland which will help to reset the password. After a victory login there will be options available to do the several operations i.e. Lights Fans and presence. Lights and fans automation is explained by the detailed architecture of the proposed system. In this module, the user execute operations on light and fan. And these operations like ON or OFF. This task will be executed by NodeMCU kit and user will give his request through android application. The mobile application will have a login page in which the user is expected to enter his aspect. After successful login process user can actually to do the operation on these mechanism by selecting device type means light or fan and select operation type. In case end user selected a device type as FAN and operation type as OFF. When user sends appeal of FANOFF then this request will send using Device URL request to NodeMCU through wireless communication network. There are two types of ways in wireless communication initial way is using router and next is by establishing hotspot. NodeMCU is an open source IoT platform. The NodeMCU firmware is project to the popular NodeMCU devkits. NodeMCU module grants permission to the GPIO (General Purpose Input/Output) subsystem. All approach is based on the I/O guide number on the NodeMCU dev kits, not the inside GPIO pin. For sample the D0 pin on the dev kit is survey to the internal GPIO pin 16 and GPIO (need Input/Output) refers to a set of generic pins of a microcontroller that can be helpful for digital signaling. pins can be   to act as input or output, and worth can be either logically high (1) or low (0). The voltage significance is ideally set to VCC for high and GND for low. But the underneath technology determines the actual acceptable logic levels. This NodeMCU and repeat module is connected to each other. Node MCU and relay are connected through VLC pins and these two devices are also connected. The environment of relay module is always off when request will accepted via NodeMCU that time relay's turn will become opened and device will act according to user's request means light will become O.
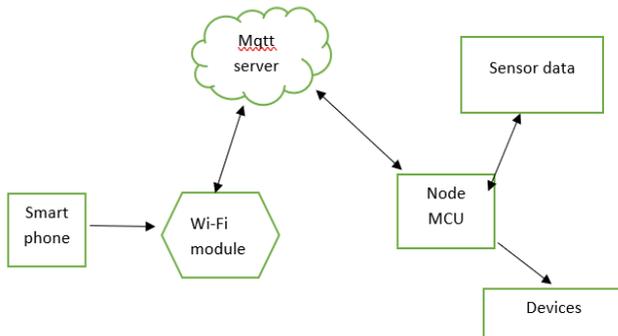
The devices are used to automate the classes through mobile phones or personal computer. Using the internet connectivity these systems in the classes are managed with the help of IOT. Android Apps with user interface manage the devices. The command from android system is send to controller through Wi-Fi device using mqtt server. Mqtt server work on pub/sub technology. The sensor data monitored by controller. Depends on the current status of sensor data next command is initialized for further use. Ultrasonic sensor notices the movement of humans and send data to controller. Relay module is provided to take care of the response from controller. All 230V devices controlled by circuit. Hence automation system is given for classes with internet connectivity and Wi-Fi interface.

IV.IMPLEMENTATION/ METHODOLOGY:

1. Arduino:

The Arduino Uno is board based on the ATmega328 and it is a micrcontroller. It has 6 Analog inputs, 14 digital input and output pins, a 16 MHz crystal oscillator, an ICSP header, a USB, a power jack, and a reset button. It consists of everything that are needed to provide support to the microcontroller. To get started all we have to do is simply connect it to PC or smart phone with a USB cable or power it with an AC-to-DC adapter or battery .

2. Hardware Connection:
   - Connect the Trig pin to digital pin on the Arduino.
   - Connect the Echo pin to digital pin on the Arduino.
   - Connect the Gnd(ground pin to the negative rail on your breadboard.
   - Connect the Vcc pin to the +ve rail on breadboard.

   - Connect the negative rail of the breadboard to the Gnd pin and connect the positive rail of the breadboard to 5V pin on the Arduino.

3. Wires:

Wires are cylindrical, flexible strands of metal. They are usually used to hold loads of telecommunication signals.

4. Breadboard:

It is one of the most fundamental device when constructing electric circuits.

5. Software:

Program the sensor and the Arduino to function in the way to get required results and then assigning values to the outlets of the Arduino and the sensor.

6. Finally assemble the design based on our requirement for functioning.

7. Test and execute.

   ➢ Use IR sensors and Ultrasonic Sensors at IN & OUT for the lab.
   ➢ Consumption of power is reduced which is helpful for future consumption.
   ➢ Arduino will use increment & decrement counterto count number of students.
   ➢ These devices are used to maintain the count of number of students according to that these appliances will grant ON and OFF when class is empty.

NODE MCU:

V.APPLICATION:
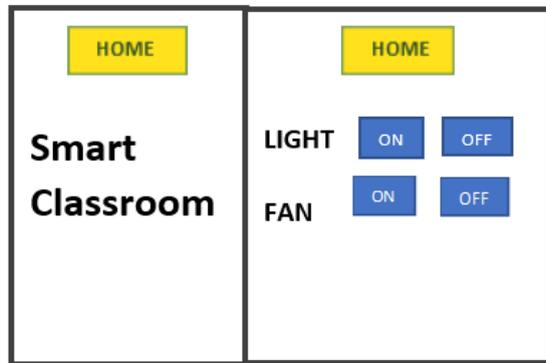
ADVANTAGES:

1) Maximizing Classes security.

2) Control over the functions of classroom using apps.

3) Minimizing electric shocks, fire accidents.

4) Improved appliance functionality.

5) Classroom management insights.

6) Used to reduce electricity consumption.

VI.CONCLUSION:

Hence it is proved from this project work that smart classroom system can be made from very low-cost and using available components can be used to manage the multifarious home appliances includes security lamps, the television, washing machine, air conditioner and even the entire house lighting system. Still, the components required are so less and few devices can even fit in our palm so it can be packed easily and portable. The designed smart classroom was tested and researched a number of times and certified to manage various home appliances and classroom appliances used in the lighting system, air conditioning system, home entertainment system and many more. Hence, this system is scalable and portable.

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