Wireless Autonomous Room Controller

Pranjali V Deshmukh, Shubhdeep Singh, Komal Raut, Atul Lakhawade, Virendra Jadhav

*Abstract***:** *When it comes to our home with the use of Internet Of Things (IoT) we can remotely monitor and connect the objects that are present in the real world by use of internet. As with the help of IoT we can can also control, manage and monitor the appliances present in our home so that we can control them remotely. This paper focuses on building a Wireless Autonomous Room Controller so that we can control the devices from anywhere ,also if we are not present in the same network we can still control and manage the devices with the use of internet. By using artificial intelligence we can also automate the whole system based on the conditions and logic that we have set for our system. The whole system is connected to the wifi, The micro controller here is arduino which is a launchpad board that comes with embedded micro-controller and a wifi shield with use of which all the appliances in the home can be controlled and managed.*

Keywords : Automation, Artificial Intelligence, Cloud, IoT..

I. INTRODUCTION

Room Controller is taking Control of home, housework or household activity. In other words it uses IT/Computer to control home appliances .It integrates electronic home devices in a home to integrate with each other. Eg. we can have centralized control of lighting, appliances, security lock of gates and doors to improve convenience, comfort, energy ,efficiency and safety. In today's IT world automation is being popular due to easiness, flexible means of viewing ,monitoring or controlling the appliances and various other things according to users comfort and needs. The popularity of automation has been increasing greatly due to considerable affordability and simplicity through various devices like smart phone and tablet connectivity with the system .A home automation system integrates electrical devices of the house with each other .The techniques employed in home automation include those in business automation as well as the control of domestic activities such as lighting control system, and the use of other electronic appliances. Devices may be connected through a home network to allow control to a personal computer, and may allow remote access from the internet. Due

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to the advancement of wireless technology, several different connections are introduced such as GSM , WiFi and Bluetooth .Each of the connection has its own specifications and applications. WiFi is being chosen with it suitable and scalable capability. The capabilities of WiFi are very vast to be implemented in the design. Also most of the current Laptop/Desktop/Tablet come with buildin WiFi adapter. It will indirectly reduce the cost of the system.

II. LITERATURE REVIEW

In paper entitled " IOT Based Home Automation Using Arduino " it specifies Remote Control Over switches using PAN network. In this system the whole system works with the total dependency on bluetooth means we can control the electrical devices present in our home using bluetooth. Here the range of controlling of very less and this type of system will work efficiently on the smaller scale only. In paper "IOT Based Smart Security and Smart Home Automation" the main focus is to provide security to the house holds or offices it specifies usage of security system like camera and door locks to be monitored remotely so the security of the households is easy to manage and monitor. But we cannot control all the appliances in this system the focus is on security only. In paper "A Node MCU Based Home Automation System" here it uses a Wi-Fi based home automation system Without use of a dedicated microcontroller this system can be implemented on a small scale only as there is no microcontroller so it is totally dependent on Node MCU. In paper entitled "IoT Based Home Automation using Node MCU" here dynamic switch modules are present so that we can controll the switches dynamically. Here we can only take control manually the system cannot works on its own.

III. PROPOSED SYSTEM FEATURES

The system that we are proposing , here we can take control of the various appliances present in the system manually as well as we can make the system to work on its own based on the preconditions that we have set before, We can use a android mobile application to control our device huge buildings in which there are various appliances we can easily monitor as well as manage all of it by a single device here in our system we are not using lan we are connecting the system to the cloud so we can control the system remotely from any corner of the world. Here range is not an issue our system is easily scalable and can be controlled remotely , here dependency is very less and if we have put the system to automatic mode the various calculations that we will need for the system to work in automatic mode will be calculated on the cloud. The system is easily scalable also every module that is present can be controlled uniquely. For example : In a huge building we can control each and every room differently.
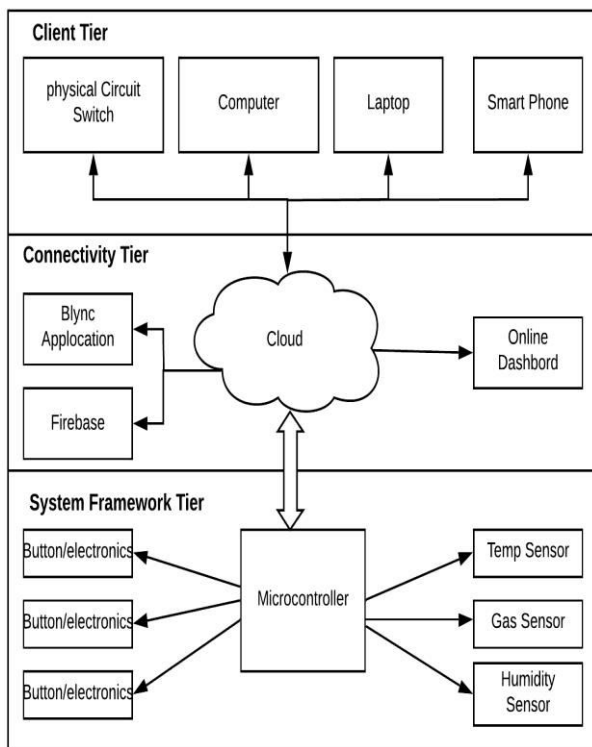
IV. SYSTEM DESIGN AND IMPLEMENTATION

Figure.1: Architecture of system

In figure.1 it represents the three tier architecture of the system.

- Client Tier: In this tier the user interacts with the system this is the visual layer of the system. Here the user interacts with the system with the help of various devices like Computer, Laptop, Switches or Smart phone depending on the availability and convenience of the user, the interfaces which the client use can be used to take control of the system manually also we can make the system to work on its own or we can automate the system so that it can work on its own based on the preconditions that we have set. In this tier the user interacts with the system and make the system to work according to its need and convenience.

- Connectivity tier: This tier consists of various components these are: Blynk Application, Firebase, Online Dashboard.

  Blynk application is used to get the user connected to the system with the help of an android device. This application is freely available on google play store and the user gets connected to the system irrespective of the location.

  Firebase : It is an NO SQL database which helps the user to connect to the system with the help of a personal

computer or laptop depending on the convenience and availability of the user.

Online Dashboard: Here it acts as a virtual dashboard with tells us about the information of the various components and appliances present in the system so that it will be easy to control and manage each and every component..

- System Framework Tier: In this tier the main component is microcontroller here it is connected to the various buttons and sensors which on the basis of input from the sensors make the buttons to work in a particular manner based on the various preconditions that we have set or based on the user's input what the user wants. It is directly connected to the cloud so that it can fetch the information and data needed to work in a particular fashion.

V. ALGORITHM

- Step 1.: Starting the services.
- Step 2.: User will choose between Mode = Auto or Mode = Manual mode.
- Step 3.: Save the mode to cloud.
- Step 4.: Update the mode from cloud
- Step 5.: If Mode = Manual then perform step 6 else go to step number 9
- Step 6.: Check the status of buttons on client's application
- Step 7.: Replicate the status to the actual hardware connected to the micro-controller
- Step 8.: Perform step 4
- Step 9.: Check data from the sensors
- Step 10.: Perform the desired operation based on sensors data
- Step 11.: Update the circuit status to the cloud
- Step 12.: Go To Step 4
- Step 13.: End

VI. BLYNK APPLICATION

In our system we are using Blynk Application that is available on the google playstore we can easily download it

and easily integrate it with our system and after that it will be easy for us to monitor and manage the devices present in our system
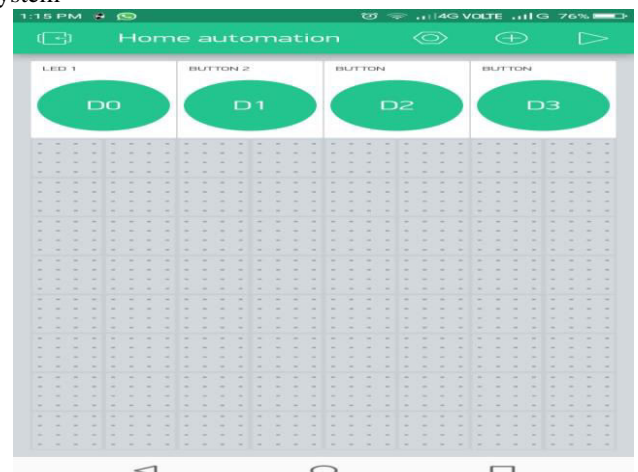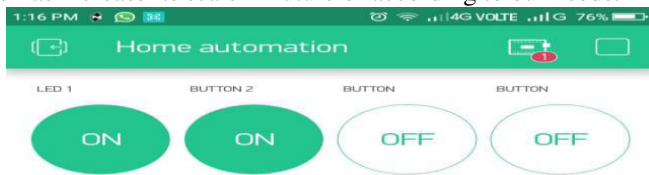
FIGURE.2.1

In figure 2.1 we can add the buttons according to the appliances present in our home we can configure the buttons as well as increase its scale in future or according to our needs.

FIGURE.2.2

In figure 2.2 button 1 represents whether the system is working or not and the rest of the buttons represents the various devices present in our home which we can control by using the app. Here it is not necessary to get connected on the same network as the application is connected to the cloud so we can control it remotely from anywhere.

VII. RESULT AND DISCUSSION

Various states of the system	Explanation
S	It is the start state of the syatem.
I	It is the input command for the system
O1, O2, O3	It represents the operation of fan, bulb, doors respectively
Send()	A function used for sending various commands to the system.
Receive()	A function used for receiving the commands from a device here it is android device

After all the connections properly done and configuring and integrating the application with the appliances we can now control and monitor all the appliances present in our system we can control the on/off of bulbs also we can control the speed of the fan. If we want the system to work autonomously then based on various preconditions that we have set we can make it work in that way also. For example when some one enters the room the motion sensor present on the door detects the motion and then the light gets switched on automatically, also if the temperature of the environment rises above the threshold temperature the fan will turn on automatically. The

system works fine but there is huge dependency on the sensors data and the internet connection. If the sensor will not be able to sense data properly then the efficiency of the system reduces. Also the dependency on the internet is very much if the speed decreases then there will be very huge latency rate in the working of the system. So we should use high quality sensors also we must have very good internet connection so that the system works properly in an efficient manner.

VIII. CONCLUSION

The Wireless Autonomous Room Controller using IOT and artificial intelligence has been successfully implemented and it is very handy and easy to use to integrate and use. The design system not only monitors the data and appliances but can also take decisions intelligently based on the conditions that we have set for the working. This will help the use to analyse , monitor and control various appliances so that the electrical energy also gets used in an efficient manner. .

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