IoT Based Complete Home Automation with Voice and Multiple Features

Prof. M. W. Khanooni[1], Kapil Shendre[2], Kritika Ninawe[3], Nitiksha Amnerkar[4], Lakshita Nawlakhe[5], Mrunali Dodewar[6]

[1]*Prof. M. W. Khanooni, Department of Electronics & Telecommunication Engineering, S. B. Jain Institute of technology, Management & Research, Nagpur, India*

[2]*Kapil Shendre, Department of Electronics & Telecommunication Engineering, S. B. Jain Institute of technology, Management & Research, Nagpur, India*

[3]*Kritika Ninawe, Department of Electronics & Telecommunication Engineering, S. B. Jain Institute of technology, Management & Research, Nagpur, India*

[4]*Nitiksha Amnerkar, Department of Electronics & Telecommunication Engineering, S. B. Jain Institute of technology, Management & Research, Nagpur, India*

[5]*Lakshita Nawlakhe, Department of Electronics & Telecommunication Engineering, S. B. Jain Institute of technology, Management & Research, Nagpur, India*

[6]*Mrunali Dodewar, Department of Electronics & Telecommunication Engineering, S. B. Jain Institute of technology, Management & Research, Nagpur, India*

---***---

Abstract - Internet of Things (IoT) is an important concept in today's world when we think about automation and smart home. It is related to the automation by computing things where all things and physical devices can be connected so that we can make those device intelligent, programmable which can interact with humans. IoT is a cloud computing network it can provide ability to user of accessing physical things or control devices from any distance irrespective of time and location through wireless network, the smart home automation is one of the example of IoT technology. This study indicates that the use of IoT on smart home automation was fully embraced in 21st century by ensuring that home appliances and device can commanded through Android Application or Voice Recognition and at a convenient, safe and comfortable mode via wireless network (Wi-Fi). This type of design using IoT not only control the devices but store the sensor data to the cloud and act according to it, this cloud is used to send the sensor data through Wi-Fi module and then decision tree is implemented which decide the output of the electronic devices.

*Key Words***:** Internet of things (IoT), Home Automation, Voice Recognition, Mobile Application, Wi-Fi, Time & Scheduling

1. INTRODUCTION

Internet of Things (IoT) is related to the automation through computer devices and digital devices, it is a computational concept that describes the idea of combining physical devices of everyday use with the internet to enable the communication between things and people and enables the new form of communication. IoT is an extensive network of linking "objects", that in relation to things-things, people-people and people-things. IoT can be innovative concept for smart home system, this system is develop to allow comfort, security, intelligence and quality of life improvement it pays a significant role in smart home.

Smart Home Automation system based on Wi-Fi through Mobile Application and Voice Recognition allows you access to control and monitor home appliances in your home irrespective of time and location and also includes the feature of timing and scheduling which can be also useful in various occasions. IoT helps in not only collection of data from sensors and different devices but also process them as required. The cloud is used to send data from sensors via the Wi-Fi module and then implement the algorithm depending upon that output can be obtained. For the control devices using Android Application the Blynk concept is used, it is also used for timing and scheduling features and for Voice Recognition the IFTTT concept is used between IoT and Google Assistance.

2. LITERATURE REVIEW

As the technology is rapidly advanced over a past few years, during this intelligence in home automation and cloud computing is trending. Most of the home automation are controlled by Android Application and Voice Recognition techniques.

1. Md. Wasif Islam develops a voice-controlled home automation system that controlling all electronic devices of an apartment to be controlled by speech commands, provides fire and movement suspicious detection and also helps the owner personally. It also provides security using an automatic door controlled with fingerprint sensor.

2. Mandula Provided a system that used to control the sensors data, like light, gas, motion, temperature and actuates a process depending on requirement, such as turning on the lights when it getting dark. In addition, use Gmail to store data in a timely manner.

3. Singh design a system that can perform different functions to be performed at home. This allows accessibility via internet from any position in the world. The project used to minimize the usage of energy and reduce human efforts. The smart home system incorporates different aspects of technologies such as wireless networking, communication via cloud. The data stored onto the cloud then analyzed. The user can access multiple home devices over the internet as per their convenience.

4. Sharma Smart home automation system has been designed to communicate with mobile android system. Mobile and system communicate with each other by Wi-Fi. We can use mobile application and communicate with proposed system

from any compatible equipment. The commands to switch ON/OFF electrical peripherals such as air conditioners, fans, lights and etc. Timer setting at home to send quickly and easily from the mobile by comfortable and simple Graphic User Interface application, which can be used by any normal user. The home automation system responds to users' commands by taking actions per commands and gives the result.

3. METHODOLOGY

The proposed system uses the ESP8266 Wi-Fi module which is connected to the sensors and the electronic devices, it uses the Wi-Fi network to connect it from the cloud. The different sensor data is collected using IoT and depending upon these data different event occurs. The system consist of an Mobile Application which is develop using android platform and it also uses the IFTTT between IoT and Google assistance. Following figure represent the system architecture.
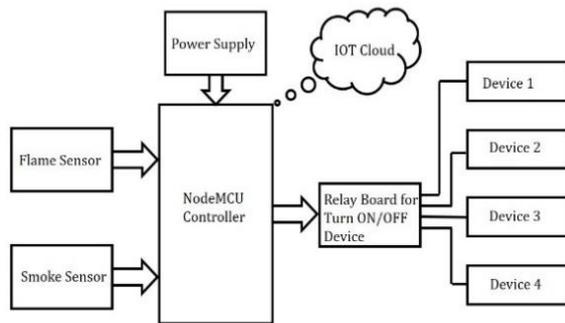
Figure(a): System Architecture of Automation using ESP8266

The core of Home automation system is NodeMCU ESP8266 which is small in size, low cost microcontroller, it can easily interact with outside world and is compatible with C language. In this system architecture all the sensors i.e. Smoke Sensor (MQ2) and Flame Sensor is connected to the NodeMCU ESP8266, these sensors act as an input to ESP8266. The flame sensor detects the fire or other sources of light that are within the wavelength range from 760 nm to 1100 nm. This is a sensing through the infrared signal. When the flame is detected, the unit will turn on the red light. The flame sensor which is connected via ground wire and analog wire is connected to the microcontroller. Gas sensor detects the flammable gases and smoke. The sensor resistance is varied according to the type of gas and sends a voltage value to the microcontroller which is proportional to the concentration of smoke / gas This implies that there are more installation. The gas is reduced as the concentration of the gas decreases and the output voltage decreases. The gas sensor switch is connected via ground wire and analog wire is connected to the microcontroller. If smoke and flame detected to particular sensor it gives an alarm by the buzzer and gives notification to the mobile. On the other hand depending upon instructions provide by the user via mobile application and voice commands relay perform their operation to their particular device. The mobile application used id Blynk for controlling, these application is also used for timing and scheduling features. The timing and scheduling features is used for like setting alarm, turning a particular device for a specific time, as a remainder notification, etc.

Implementation Steps:
**Step 1:** To establish connection between the client and the server, the Wi-Fi option in the Smartphone is enabled.
Step 2: It is connected to the Wi-Fi module of the system.
Step 3: Each electronic/electrical appliance in the system is connected to the digital pins on the Wi-Fi Module.
Step 4: A Relay is used for connecting each device to the Node MCU, which helps in converting high Voltage supply to low voltage.
Step 5: A C-program is loaded on to the microprocessor chip on the Node MCU which specifies what action is to be performed on receiving inputs.
Step 6: A Cloud Interface is developed which enables the end user to monitor and control the appliances from any remote location.
Step 7: Successful controlling and monitoring of appliances.
Step 8: Implementing the Timing and Scheduling features as per requirement.

4. FLOW CHART

Following flowchart shows the programmable implementation of the given system
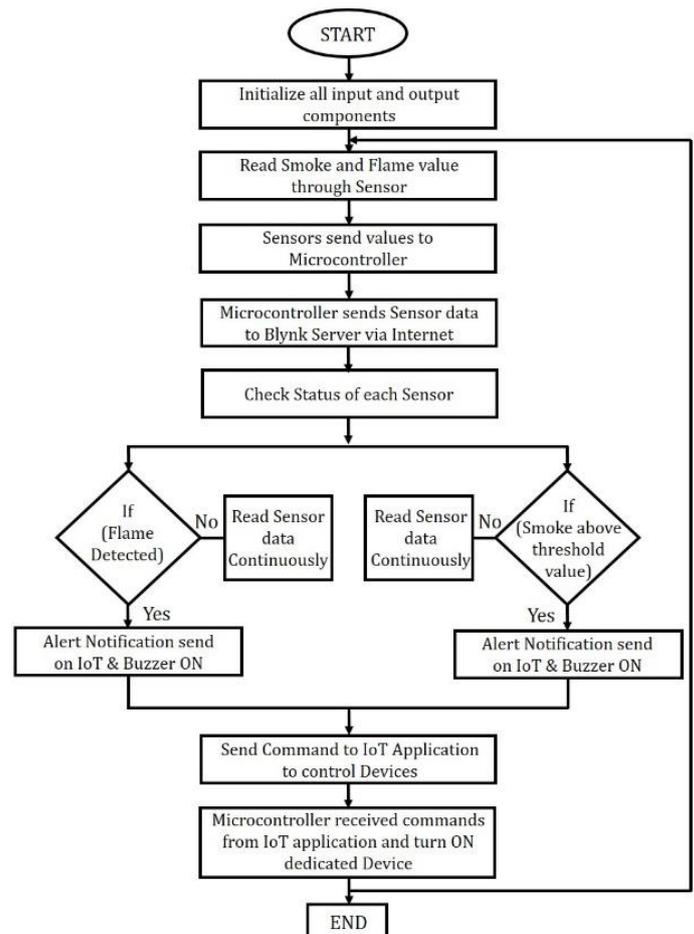
Following are input/output of these Home Automation project consisting mobile application, voice recognition, flame detection, smoke detection.
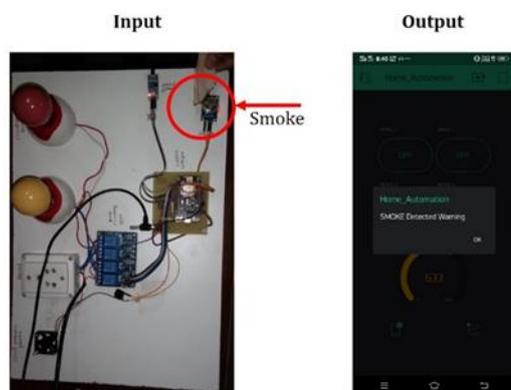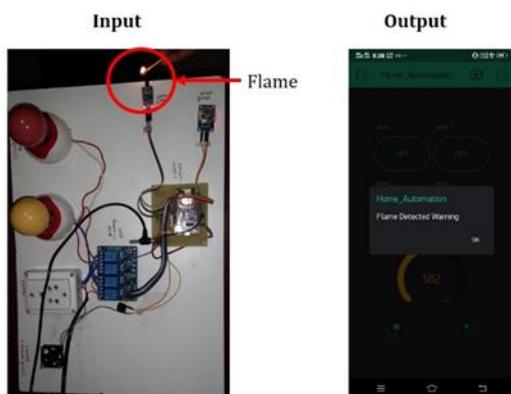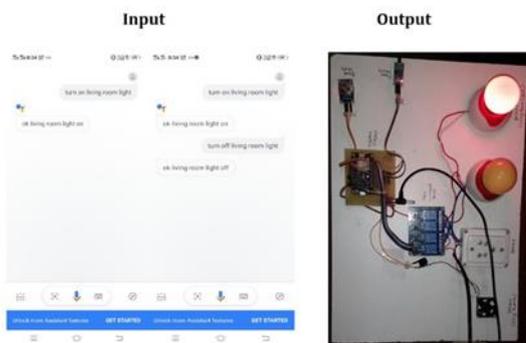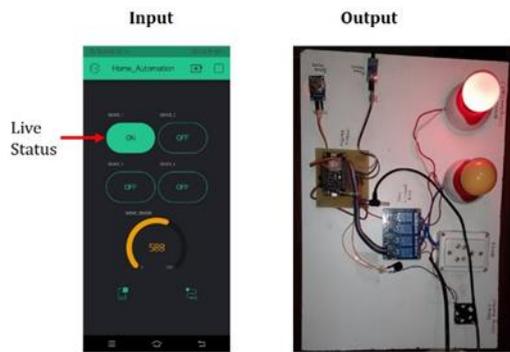
5. RESULT

This proposed system is implemented and tested successfully using Mobile Application and Voice Recognition technique and Timing and Scheduling features are also successfully implemented with proper execution.

6. CONCLUSIONS

The project has been successfully implemented. IoT is an important system connecting people, devices and things. The idea and benefits that are brought by the adoption of IoT are likely to revolutionize how human respond to their environment. Our system introduce the IoT in electrical elements of house by controlling different things as well as adding sensors for the fire detection, these features of home can controlled through the Wi-Fi from anywhere in the world. The microcontroller is connected via Wi-Fi to the broker and is controlled by different media. The technology customize the features, and in case of instruction in one area of the system, the chances of homeowner noticing change are high. Therefore it is high time for a larger population to adopt the brilliant ideas of the Internet of Things.

ACKNOWLEDGEMENT

First and foremost, I would like to take this opportunity to thank our guide prof. M. W. Khanooni for his guidance and advice on this project. At the same time I won't forgot my group participant for sharing some of their information to complete this project successfully. I also want to thank those respected faculty members who contributed to complete this IoT Based Complete Home Automation with Voice and Multiple Features.

REFERENCES

1. Mohammad Asadul Hoque, Chad Davidson. 'Design and Implementation of an IOT-Based Smart Home Security System'. In 'International Journal of Networked and Distributed Computing'. Volume No. 07, Issue No. 03. April 2019.
2. Y. A. Bahshm, A. O. Aldhaibani. 'Designing a Smart Home Automation System Using Internet of Things and Mobile Application'. In 'Journal of Network Communications and Emerging Technologies'. Volume No. 10, Issue No. 03. March 2020.
3. Ahmad Sinali Abdulraheem, Azar Abid Salih, Hilmi Abdullah. 'Home Automation System based on IOT'. In 'Technology Reports of Kansai University'. Volume No. 62, Issue No. 05. June 2020.
4. Prof. Madhu B R, Vaishnavi K R, Dushyanth N Gowda, Tushar Jain. 'IOT Based Home Automation System over Cloud'. In 'International Journal of Trend in Scientific Research and Development'. Volume No. 03, Issue No. 04. June 2019.
5. Tanish Sehgal, Shubham More. 'Home Automation using IOT and Mobile App'. In 'International Research Journal of Engineering and Technology'. Volume No. 04, Issue No. 02. February 2017.