Android app based Home Automation using IoT

Dr. V. Jamuna[1], Ms.J.Anslin[2], Ms. C.Swathi[3], Ms. R. Sharmila[4] , Mr. J. Dhivahar[5]

[1]*Head of the Department, Department of Electronics and Instrumentation Engineering, Jerusalem College of Engineering*

[2]*Assistant Professor,Department of Electronics and Instrumentation Engineering, Jerusalem College of Engineering*

[3, 4, 5] *Student, Department of Electronics and Instrumentation Engineering, Jerusalem College of Engineering*

Abstract -In the contemporary world, the obligation of digital communication between the home appliances exhibit an ease to human life. Nowadays home automation industry is growing widely; this is often powered by the necessity to supply systems which enables support for aged and physically challenged people. Smart home or home automation are often proved because the residential extension of building automation. In this paper the easy governing and monitoring of all the appliances is effectuate by consolidating the system using a NodeMCU . The idea of smart home automation initiates the control of various home appliances and security. The inclusiveness of Internet of Things (IoT) manages the sensor outputs and congregates the information which is mandatory for automation. The gathered datum from the different sensors like flame,gasand humidity sensors are used to reinforce home security. Furthermore, the implementation of android system intensifies interoperability and long range communication. This paper focuses on flexible, cost friendly wireless Home Automation system which is supported by an Android App. The App would be taking commands from user so on regulate different home appliances which may be connected through the medium IoT.

***Key Words*:**NodeMCU, Android system, IoT(Internet of Things), Sensors,Android Application.

1. INTRODUCTION

As the mobile devices are continuously increasing in its popularity, also for its better functionality the demandfor advanced and responsive mobile applications are increasing day by day in people's routine. Web services utilization is an eminent open source and also practical way for providing remote service access in the applications to make them communicate with the devices. Busy and most engaged families, also individuals with physical limitations are the people that who represent an engaging market place for home automation including networking. Nowadays because of the advancing technologies, Home Automation System has become very useful for aged and physically challenged people. The people with hearing issues cannot hear the doorbell; people with Alzheimer illness can forget the gas open in the stove. To overcome these struggles, smart home technology has been developed and helped them to get over their life difficulties. It is very useful to the user for controlling and handling of all the appliances that are connected to the centralized system, connected through a Wi-Fi Network. In this system home appliances are often monitored and controlled, and therefore the user can interact with the system through a user friendly interface. The home appliances like fans, lights, switches are remotely controlled through a main control board. Internet of Things(IoT) is a concept where each device is assigned to an Internet Protocol (IP) address and through that IP address anyone can make the devices identifiable on internet. Automated homes can provide assistance, comfort, and safer surroundings, as well as a securing and empowering environment around disabled people. The users can manipulate appliances anytime, anywhere,

letting the Home become more and more advanced, luxurious and intelligent.

2.METHODOLOGY

This model aids in monitoring and controlling the home appliances using Android App. The inclusion of android application provides the user with instantaneous data.

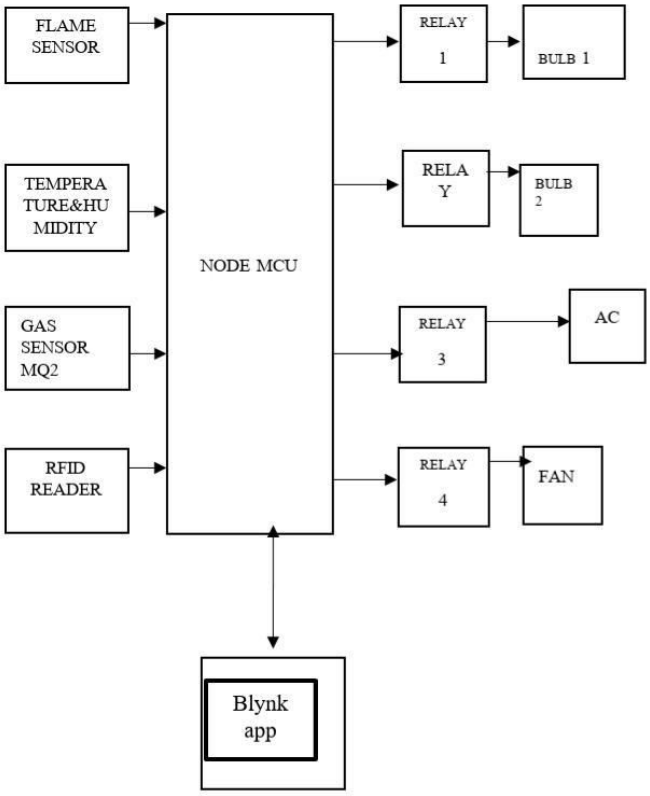

Fig 2.1 Block Diagram

The RFID inclusion brings home security by detecting the entrance of the unauthorizedindividuals. The presence of humidity sensor, temperature sensor, flame sensor and gas sensor helps us to monitor the variables. All the sensors and hardware are connected to the Node MCU to provide fullest control. The Wi-Fi router connected to the Node MCU is supplied with constant power supply to invoke fine operation. The datum from the sensors and the status of the hardware are updated constantly in the android application 'Blynk' through IoT in the cloud for the user convenience. The inhibition of IoT also enables the long range wireless communication in controlling the devices .Also the abnormal variation from various sensors are notified through the android app to the user .The change of status of the hardware appliances is achieved by receiving the command from the user through the android application which enables\disables the power supply to the hardware through node MCU.

3. HARDWARE DESCRIPTION

The implementation of right hardware enables the ability to develop the IoT prototype iteratively and respond to technology pivots with.A protocol selected with the proper testing and careful consideration helps to avoid performance bottlenecks that otherwise would restrict the technology and device integration capabilities with sensors and IoT gateways.

Fig 3.1 Hardware Setup

The various sensors are scaled for compatibility and range of working with the microcontroller for higher efficiency. The process of choosing the hardware also included a detailed study of the components available in the current market to ensure the selection of highest efficient component. The fig 3.1 shows the assembled component setup. The experiment in the hardware is conducted iteratively for effective deployment. The Hardware Testing provided good results in achieving Home Automation with ease.

4. SOFTWARE DESCRIPTION

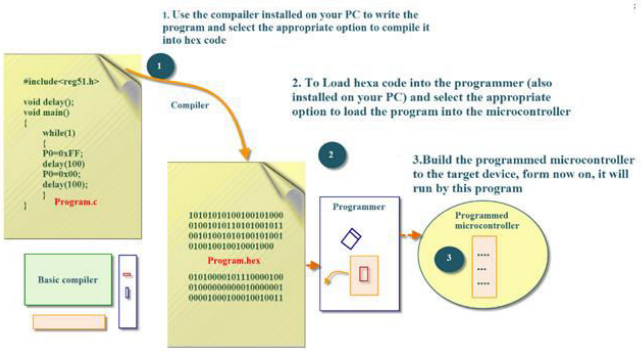

Fig 4.1 Overall Software Flow

Each processor used in Electronic System is associated with embedded software for programming requirements. Embedded C programming plays a key role in performing specific function by the processor to achieve the operations. C provides optimized machine instructions according to the given input, which increases the performance of the embedded system. Most of the high-level languages rely on libraries; hence they result in more memory accumulation which is a major challenge in embedded systems.

5. WORKING

The functioning of this device involves the controlling of various home appliances like lights, bulbs and air-conditioning systems. The application is also intended to extend the monitoring of home average temperature, leakage of gas and security outreach. This is achieved by connecting the hardware appliances and the sensors like temperature, flame, gas and humidity sensor to the Node MCU. The Node MCU is assigned with the concept of IOT to enable a wireless communication which can send and receive the datum. The inhibition of an android application enables the user to receive notifications about the status of various appliances. This is accomplished by the development of the android app 'blynk', where monitor and control of the status of hardware appliance is achieved along with the data from the sensors.

The data from the sensors are updated to the Node MCU connected along with the Wi-Fi router from which the data is uploaded in the cloud through IoT and viewed via the android application 'blynk'. In the case of changing the status of hardware appliances, the user input through the android application is detected and the command is sent through the Node MCU where it cuts off or let's through the supply to the appliances. This android application plays an eminent role is changing the status of hardware appliances, where the appliances can be controlled manually too. In this case the Node MCU is always provided with constant power supply along with a Wi-Firouter to provide continuous data acquirement.

6. CONCLUSION

"Technology converts human lifestyle smarter." Home automation also known as 'Domotics' can quickly bring the future into the homes by incorporating security and control of household gadgets.Recent advancements on the section of home Automation has provided a more complete understanding of the modernized Human life within the prevent of drowning and non-drowning accidents. The prototype developed yielded satisfactory results in all conditions. The measure of accuracy and precision are also high in detecting the reach of peak among the variables through distinguished sensors. The perks of inhibiting an automated space for living helps the user to manage the appliances from one place thereby increasing the insights about home management. The developed prototype can also be involved in any industrial space to manage and control various variables like gas, temperature and flame from a remote region. In case of accidents, it can save human lives due to its long range accessibility.

Future Scope

Home of the future is a line up for the digital technology. Home automation has become possible with the innovations in technology like Iot and AI.Witha single command of verbal instructions multi tasks were carried out in pipeline basis. These technologies can beused to build fully functional Home Automation system and control smart home devices including smart lights, connected thermostats, and appliances.

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