Design and Implementation of Home Automation System using IOT

Harpreet Singh Bedi*, Gautam Yadav, hello Manohar, Gona Bhanu Prakash,

Mallela Hari Haranath Reddy, Saurabh Kumar

SEEE, Lovely Professional University, Punjab, India

ABSTRACT

In this era of an human world with full of technology, we all are seeing the increase of technology and automation and mostly controlled by robots without much work done by humans. In this paper, we would like to introduce a smart home automation using NODE MCU AND RELAY (IOT). Nowadays everyone using internet without any distraction and problems in their day to day life. IOT provides a platforms to control and connect the devices, sensors using internet and they can be accessed remotely.. Our idea is to introduce a smart home automation using iot to help people to control electrical appliances and devices using smart phone with the help of internet and control them anytime using their smart phone and mostly helpful and met the requirements of disabled and elderly in home. The control system with smartphone application implements automation technology to provide access to the smart phone .This is an user friendly, cost efficient and easy to install in places like home, shops or small malls. We used nodemcu, an popular iot device which is used to transform the data and to perform the automation which is default inbuilt with wifi sensor. Solid state Relay to control the load and the switches and blink app in smart phone to control the electrical appliances using internet. So this project tells about the creation of a home automation system prototype with the leading ability to switch ON/OFF the electrical appliances through the blynk app. The system consists of a NODE MCU, SMARTPHONE having proper connectivity.

INTRODUCTION

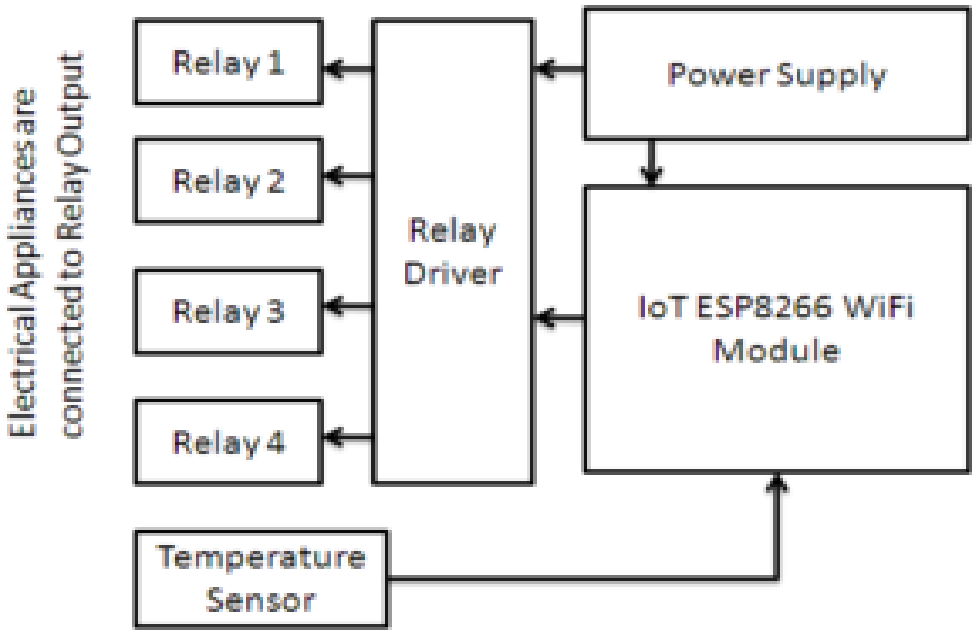
The Internet of Things is a concept where devices provide an IP address and with that IP address the device is identified online. This automotive and digital system has provided unique identifiers and the ability to transfer data without the need for "human to person" or "human to computer". Able to transfer data over network. "Objects" or devices connected to the Internet and the resulting network are called "Internet of Things". This system is powered by the web with embedded systems such as processors, sensors and these are connected via an iot gateway to share data with other sensors or data is sent to the cloud for analysis. The internet of things helps people to work smarter and live smarter and to be able to control their lives and their smart devices go to automated houses.

Internet of Things (IoT) introduces the concept of remotely connecting and monitoring real-world objects (objects) via the Internet. When it comes to our house, this concept can be appropriately applied to be smart, secure and spontaneous. This IoT project focuses on building a home wireless security system that sends alerts to the owner via the Internet in the event of any breakup and raises the alarm voluntarily. Alternatively, the same can be used for home automation using the same set of sensors.

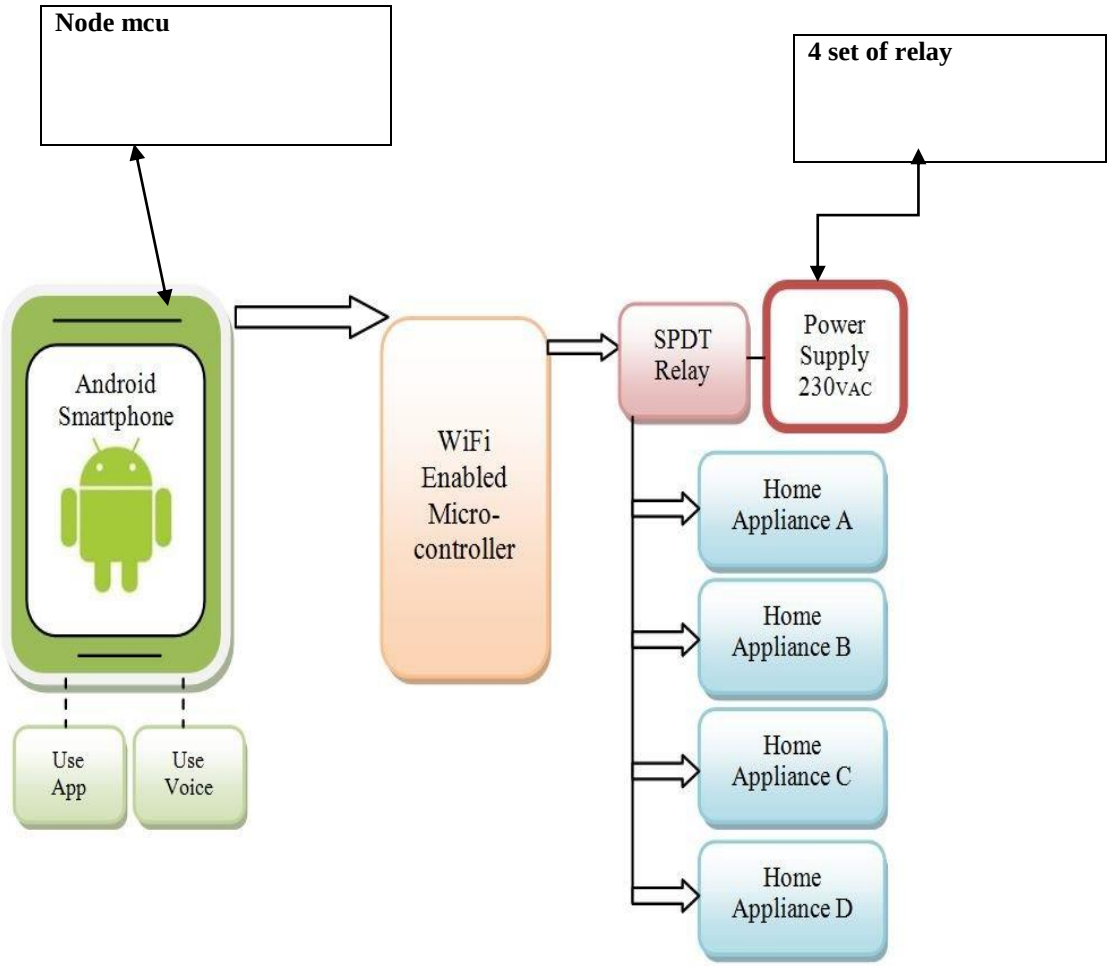
The recent technologies which use the wireless network communications like Bluetooth, wifi that enabled different devices to connect with each other through the help of internet or connecting with the wifi router or wireless hotspot. Using wifi which acts as an gateway through Arduino to different devices and to receive or transfer data and which eliminates the need for wired devices and reduces complexity to design, reduces the cost and the power consumption and work as a standalone device. So, with this technology we designed home automation system which is based on internet by remote control and controlled anytime using our smart phone by observing the home appliances.

Nowadays we can see the advancement of different wifi technologies. There are different type of connections like wifi, bt and gsm. For this smart home automation we used wifi because of various uses of wifi and the capabilies to more than enough to implement the design. Also the computers or smart phones which are coming with default wifi adapter and this reduces the cost and complexity of the system.

GENERAL BLOCK DIAGRAM

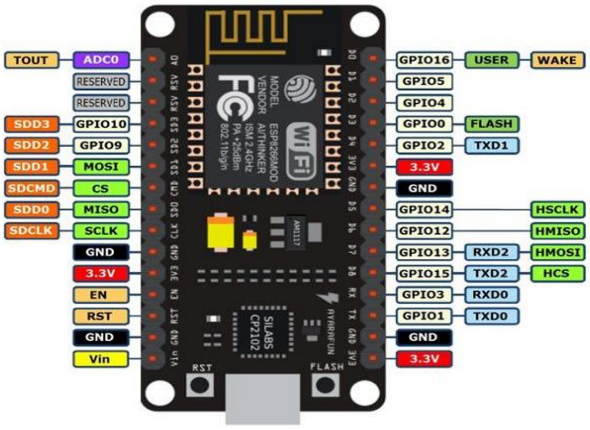


SCHEMATIC REPRESENTATION



This block diagram consists of various components like Node Mcu, relay, power supply and smartphone having proper internet connectivity.

NODE MCU

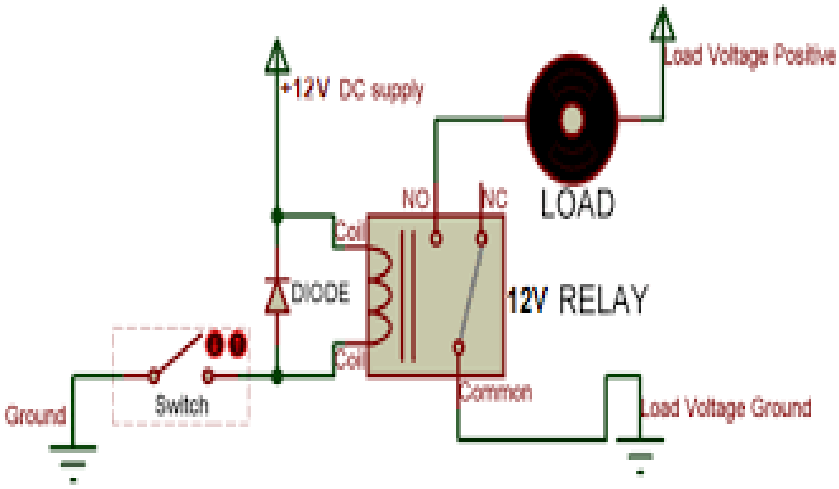


Node mcu has inbuilt wifi which enables to communicate with mobile devices by connecting the node mcu with mobile application. It is low cost wifi inbuilt chip used for multipurpose IOT application.

It is better and cheaper than Arduino.

This is ESP8266 NODE MCU.

Relay

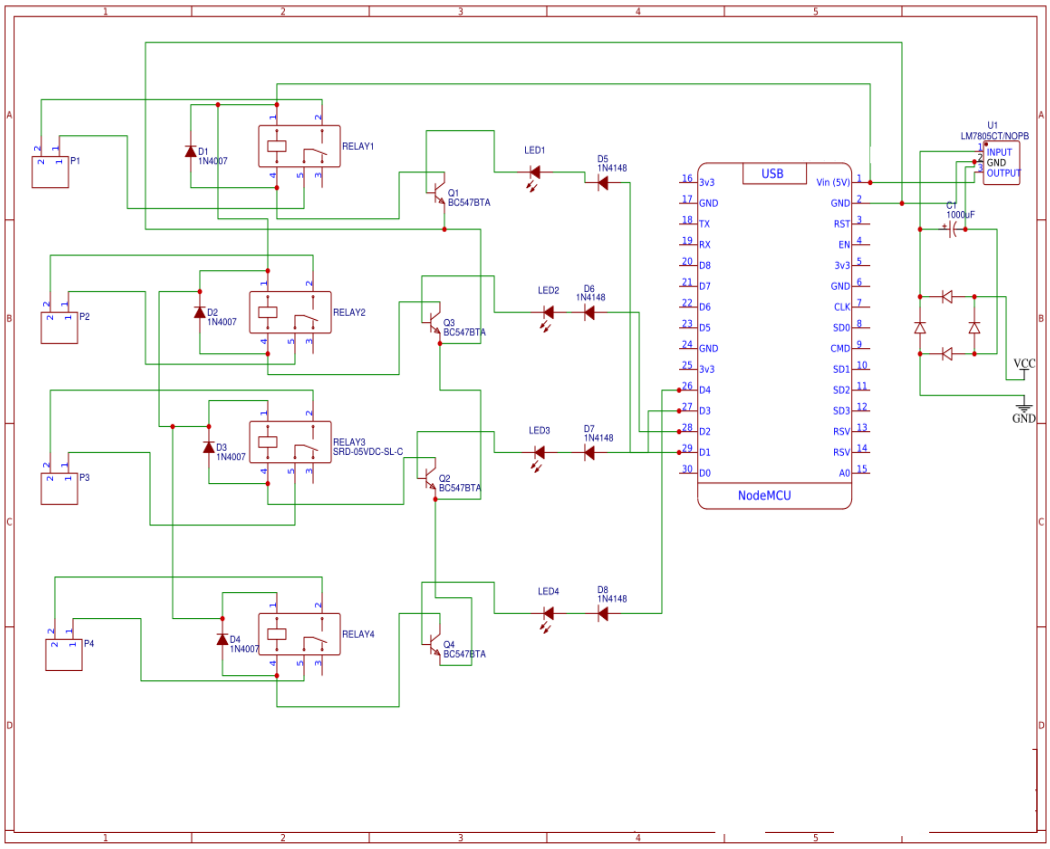


A relay is a device that opens or closes contacts to trigger the operation of another electrical controller.

Whenever we give the command with the help of mobile application, it is received by the node mcu and as per code uploaded in the node mcu it will send signal to relay for switching the load or appliances.

Circuit Diagram

The complete circuit diagram used for this project is mentioned below



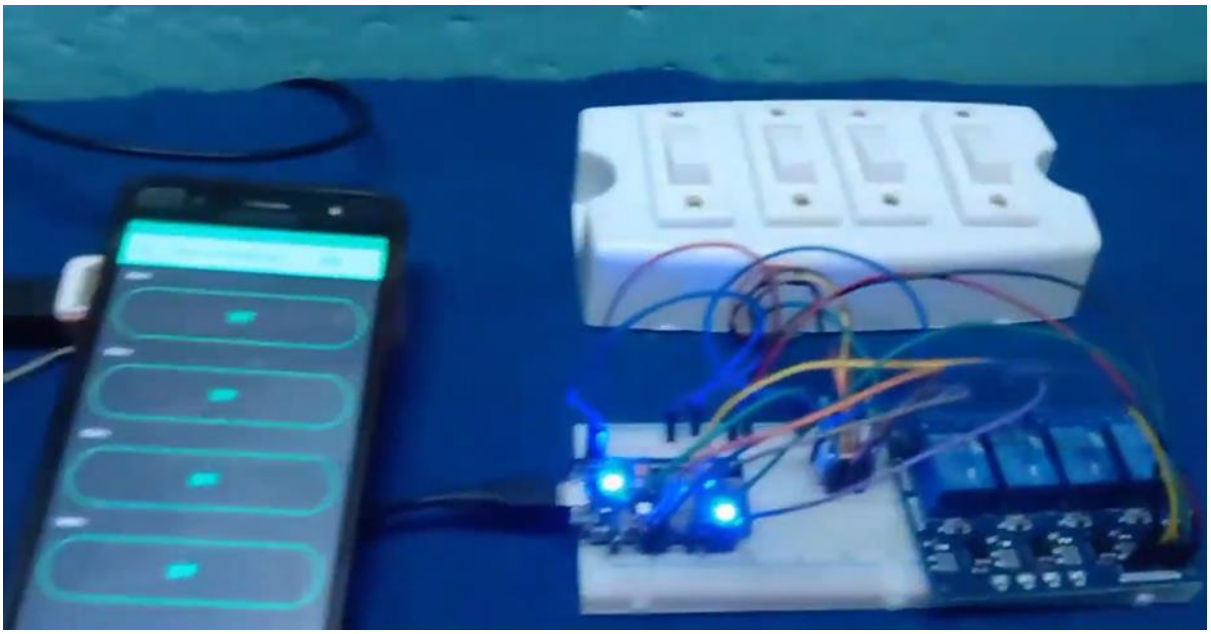
Circuit explanation

The circuit diagram consists of main microcontroller that is Node Mcu, 4 set of relay with four household appliances and proper 220 volts supply for load and 5v supply for node mcu.

Whenever the signal passes towards the relay module it activated the load and supply the current and load starts working

Hardware and implementation

The complete components and the hardware required for this project is shown below. For programming the node mcu we are using ARDUINO IDE.



RESULT AND DISCUSSION

From this research we are able to find the way to use the appliances of home in an efficient ad smart way. Previously we are using outdated method to switch on/off the devices by mechanical switch which are not automatic but in case of automation we are

using voice command mode using blynk app which are working perfectly. So we can say that it can save our electricity bill and time

CONCLUSION

The aim of this project is to create low cost and easily controllable simple home automation design and further we can conclude that home automation is special type of system which can effortlessly control the major appliances used in our daily life like fan, light ,ac, cooler, TV and many more for switching purpose and through this research paper we have shown how the home automation is made and discussed about its application and methodology.The main novelty present in this project is the reduction in the consumption of electrical energy which ultimately reduces the energy bills and cost as well as saves the time of people by automating the home. It is one of the boons for the mankind. Basically, this projects aims to replace the physical switches to automated switches using Wireless control of home appliances (Mobile app Switch and Voice mode)

Future of the home Automation

The future scope of this work is to use to make our home automation brighter with wireless sensor. It involves various kinds of sensors for switching every useful device when you enter your room like automatic AC switch on with proper regulation of temperature, opening/ closing doors by itself. With advancement in technology safety and security will be major concern, so for safety measures wireless locker with proper alarm and fingerprints mechanism should be used.

Clapping switch for on/off will be used and many more features can be included. It is possible to have a great control features. Home automation is just not limited to only switch on/off the devices by mobile application or any voice mode but with time the scenario is completely changing, wireless network of sensor is combining with home automation to understand human nature of living lifestyle so that Artificial Intelligence can better manage the home. sensor like humidity sensor , temperature sensor, smoke detector , motion sensor are implemented in home automation and sensor data are further analysed to understand the use pattern and in favour of that deep learning is used for the intelligence device of data. The future will be completely boom with advanced sensor and artificial intelligence.

REFERENCES

(1) Ahmed Elshafee, Karim Alaa Hamed, "Design and Implementation of a Wi-Fi based Home Automation System", International Journal of Computer, Electrical Automation, Control and Information EngineeringVol: 6, No: 8, 2012, pp 1074 - 1080.

(2)] D. Greaves, "Control Software for Home Automation, Design Aspects and Position Paper", The AutoHan project at the University of Cambridge Computer Laboratory

(3) A.J. Bernheim Brush, Bongshin Lee, Ratul Mahajan, Sharad Agarwal, Stefan Saroiu, and Colin Dixon, "Home Automation in the Wild: Challenges and Opportunities", CHI 2011, May 7–12, 2011, Vancouver,

(4) Inderpreet Kaur , "Microcontroller Based Home Automation System With Security", (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 1, No. 6, December 2010

(5) Home Automation & Wiring (1 Ed.). New York: McGraw-Hill/TAB Electronics. 1999-03- 31. ISBN 9780070246744.

(6) Djemaa Boucha, Ayoub Amiri, Djillali Chogueur. "Controlling electronic devices remotely by voice and brain waves" , 2017 International Conference on Mathematics and Information Technology (ICMIT), 2017

(7) Bedi, H.S., Goyal, N., Kumar, S. and Gupta, A., 2017. Smart trolley using Smart phone and Arduino. *Journal of Electrical & Electronic Systems*, *6*(2), pp.1-3.

(8) Bedi, H. S., & Arora, K. (2015). Monitoring and Controlling of Industrial Crane using Programmable Logic Controllers. *Indonesian Journal of Electrical Engineering and Informatics (IJEEI)*, *3*(2), 115-118.