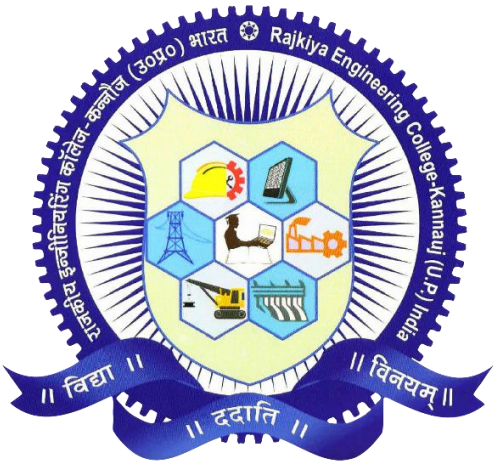
A Project Report On

IOT Technology

Bachelor of Technology

Electronics Engineering



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Abstract

The main objective of this project is to develop a home automation system using ESP8266 Wi-Fi Module remotely controlled by any Android OS smart phone.

As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system. Presently, conventional wall switches located in different parts of house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. Remote controlled home automation system provides a most modern solution with smart phones.

In order to achieve this, a Wi-fi module is interfaced at receiver end while on the transmitter end, a GUI application on the cell phone send ON/OFF command to the receiver where loads are connected. The loads are operated using relays.

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Introduction

Nowadays, we have remote controls for our television sets and other electronic systems, which have made our lives really easy. Have you ever wondered about home automation which would give the facility of controlling tube lights, fans and other electrical appliances at home using a remote control? Off-course, Yes! But, are the available options cost-effective? If the answer is No, we have found a solution to it. We have come up with a new system called Arduino based home automation using Bluetooth. This system is super-cost effective and can give the user, the ability to control any electronic device without even spending for a remote control. This project helps the user to control all the electronic devices using his/her smartphone. Time is a very valuable thing. Everybody wants to save time as much as they can. New technologies are being introduced to save our time. To save people's time we are introducing Home Automation system using Bluetooth. With the help of this system you can control your home appliances from your mobile phone. You can turn on/off your home appliances within the range of Bluetooth.

Project Aim

The aim of the project is to design and construct a home automation system that will remotely switch on or off any household appliances connected to it, using a microcontroller unit.

Project Objective

The objective of this project is to implement a low cost, reliable and scalable home automation system that can be used to remotely switch on or off any household appliance, using microcontroller to achieve hardware simplicity.

Project scope and limitation

This project work is complete on its own in remotely and automatically switching on or off of an electrical appliance not limited to household appliances and can send a feedback message indicating the new present state of the appliance.

Hardware Requirement

The list of components mentioned here are specifically for controlling 4 different loads.

- Node MCU (ESP-12E Module)
- 5 V Relay X 4
- 9 V Power supply
- Bulb Holder
- Led Bulb
- Smartphone or Tablet
- 5 V DC Power supply
- Micro USB cable

Software Requirement

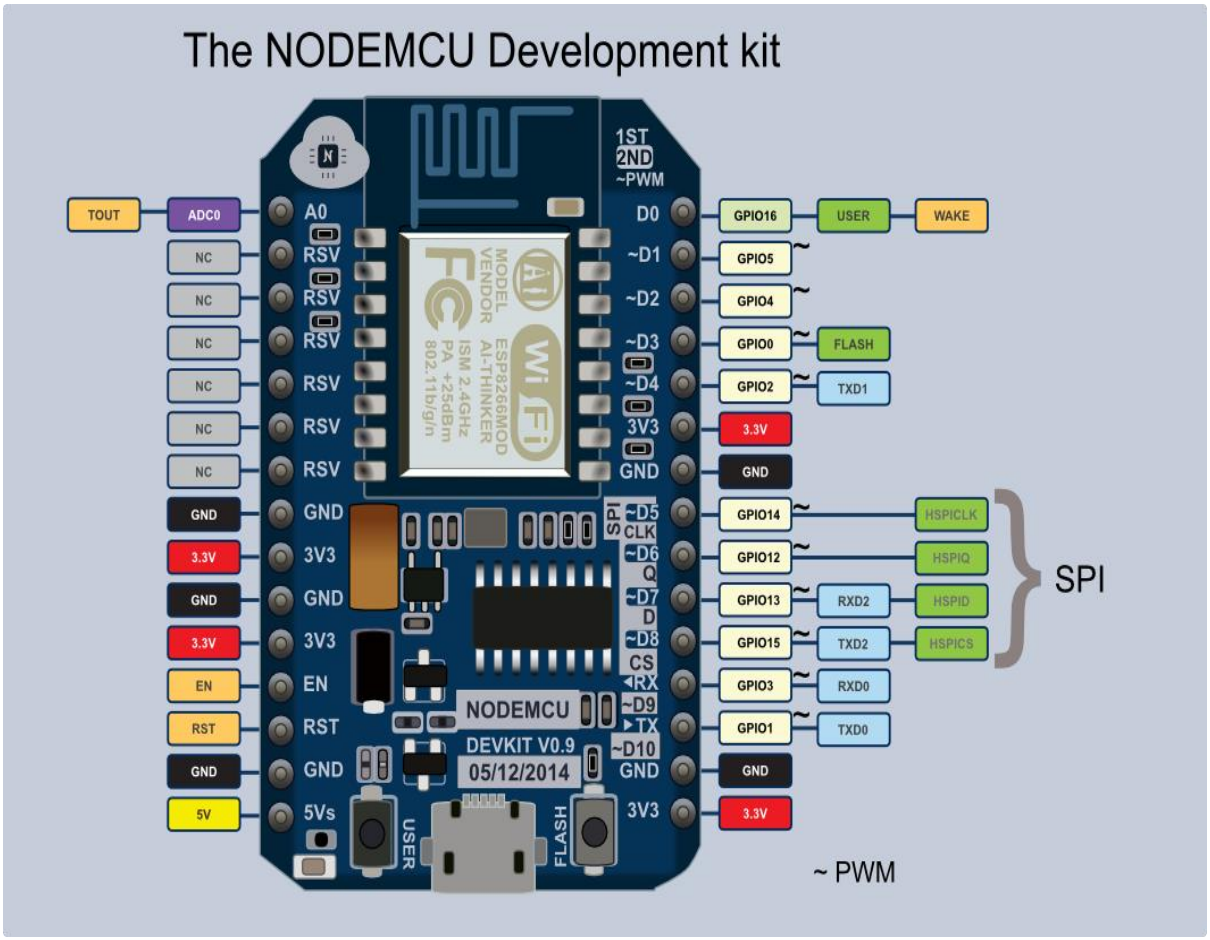
- Arduino IDE 2.0.3
- BLYNK Mobile App

Description of Hardware Required

Node MCU

Node MCU combines “node” and “MCU” (micro-controller unit). It is a low-cost open source IOT platform. It initially included firmware which runs on the ESP8266 Wi-Fi system, and hardware which was based on the ESP-12E module. The firmware uses the ‘Lua’ scripting language. The Node MCU development board can be easily programmed with Arduino IDE.

Circuit Diagram

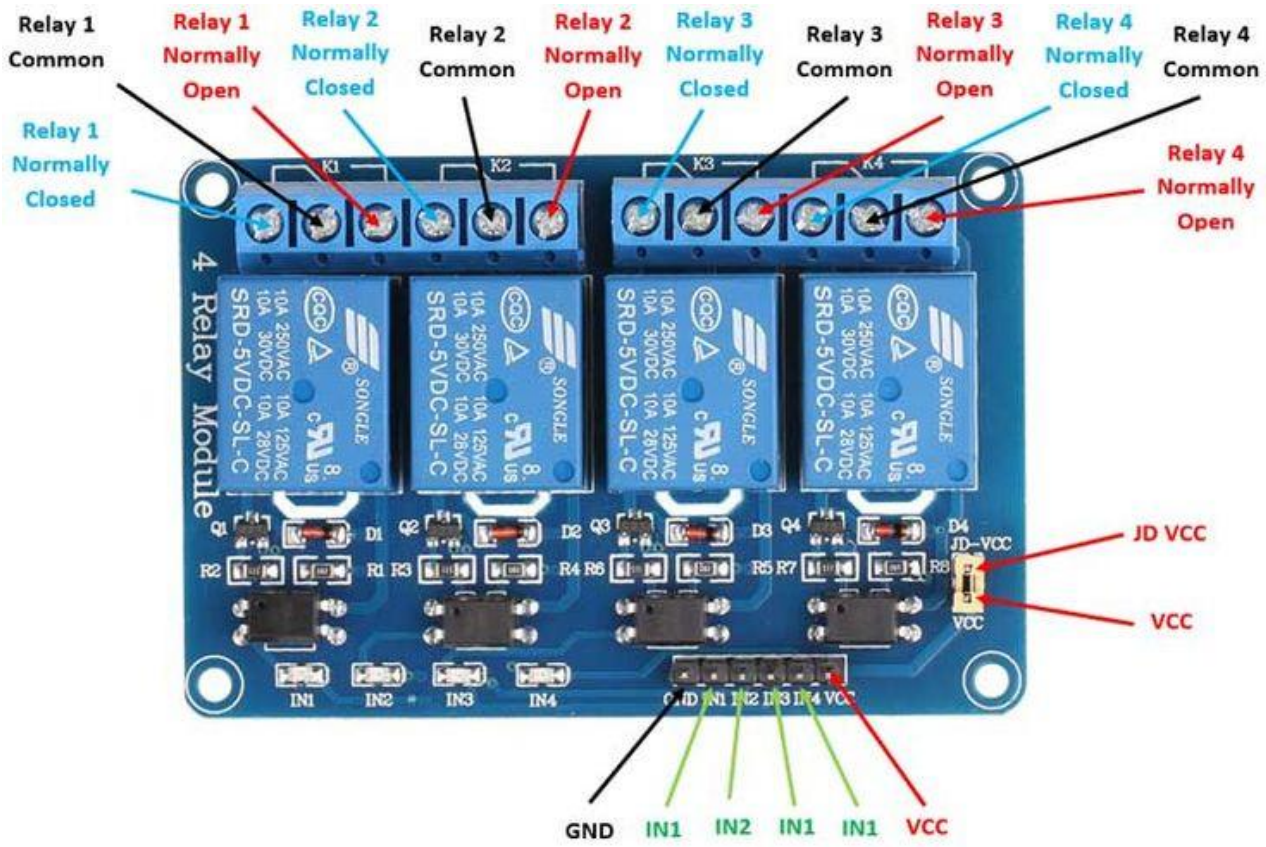


Relay

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations.

Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal.

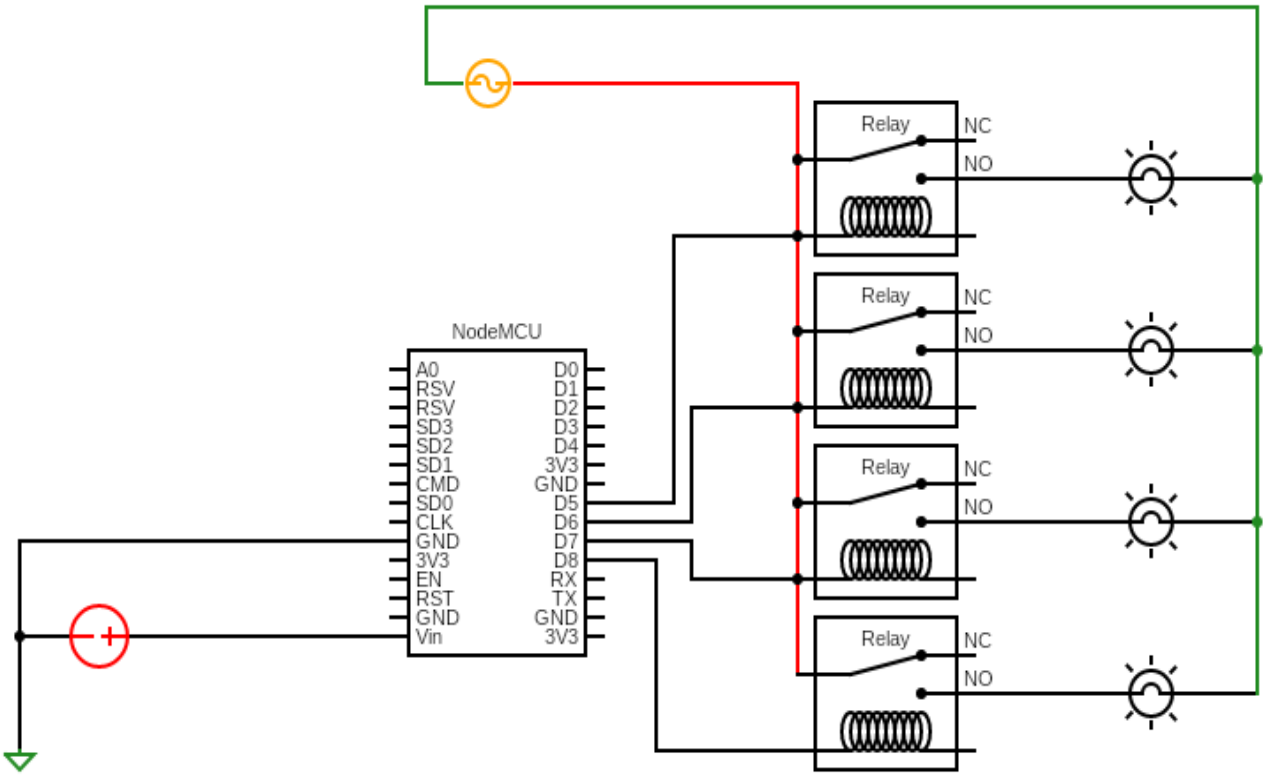
Circuit Diagram



Design And Implementation

A low cost and efficient smart home system is present in our design. This system has two main modules: the hardware interface module and the software communication module. A regulated 5 V DC supply is given to Vin terminal of Node MCU.

Designing the Circuit



Technical Specification for this Project

1. A smartphone or an Android mobile which should have the android app installed in it.

2. Wi-Fi module – Our project will be connected to the smartphone using Wi-Fi technology.

3. Relays to control devices - We have used 4 channel relay module that can operate at max 12 V.

4. Output devices – For the demo purpose, we connected 4 AC bulbs.

Pros of Home Automation

1. **Security**
   Tap your finger to turn on lights when you get home so you worried about what's hiding in the shadows, or in your pathways. Or automate to turn on when you aren't home to look like you are to ward off potential robbers. Door locks are another automated home product that can increase your home security.

2. **Energy Efficiency**
   Increase your home's energy efficiency by remotely powering off systems and appliances when they aren't in use.

3. **Savings**
   Home automation literally pays off. When you are able to use home systems and appliances only when needed, the savings will be apparent in the first utility bill. No more wasting money on lights left on when you aren't home, or spending money on gas to drive home because you forgot to lock the door.

Applications

- Using this project, we can turn on or off appliances remotely i.e. using a phone or tablet.

- The project can be further expanded to a smart home automation system by including some sensors like light sensors, temperature sensors, safety sensors etc. and automatically adjust different parameters like room lightening, air conditioning, door locks etc. and automatically adjust different parameters like room lighting, air conditioning (room temperature), door locks etc. and transmit the information to our phone.

- Additionally, we can connect to internet and control the home from remote location over internet and also monitor the safety.

Conclusion

The home automation system has been experimentally proven to work satisfactory by connecting sample appliances to it and the appliances were successfully from a wireless mobile device.

We learned many skills such as soldering, wiring the circuit and other tools that we use for this project and was able to work together as a team during this project.

The Bluetooth client was successfully tested on a multitude of different mobile phones different manufactures, thus proving its portability and wide compatibility. Thus a low-cost home automation system was successfully designed, implement and tested.