

# HOME CONTROL USING NODE MCU

Mr MD Fayeem,  
Mr Vikas Kumar,  
Mr Abhishek Salaria  
DAVIET

## ABSTRACT

The main goal of this project is to create a home automation system utilizing a NodeMcu with Bluetooth that can be managed remotely by any Android OS smart phone. Houses are becoming more technologically advanced as technology advances smarter. Modern homes are increasingly transitioning from traditional switches to centralized control systems with remote-controlled switches. Currently, standard wall switches positioned in various sections of the home make it difficult for the user to go close to them in order to use them. It becomes even more difficult for the elderly or physically disabled folks to do so. With smart phones, a remote controlled home automation system gives the most current solution. To do this, a Bluetooth module is interfaced to the NodeMcu at the receiving end, while a GUI application on the cell phone delivers ON/OFF commands to the receiver where loads are linked at the transmitter end. Through this technique, the loads may be remotely switched ON/OFF by tapping the desired spot on the GUI. The loads are controlled by NodeMcu via opto isolators and thyristors via triacs.

## INTRODUCTION

We now have remote controls for our televisions and other electrical gadgets, which has made our lives a lot easier. Have you ever considered home automation, which would allow you to manage tube lights, fans, and other electrical equipment in your house via a remote control? Yes, of course! Are the available choices, however, cost-effective? If the answer is no, we have a solution for you. We developed a new Bluetooth-enabled home automation system called NodeMcu. This technology is extremely cost efficient and may provide the user with the ability to manage any electrical gadget without the need for a remote control. This project allows the user to operate all of his or her electronic gadgets from his or her smartphone. Time is indeed valuable. Everyone wants to save as much time as possible. New technologies are being developed to help us save time. To save people's time, we're introducing a Bluetooth-enabled home

automation system. You may control your household appliances with this technology from your cell phone. Within Bluetooth's range, you

## BLOCK DIAGRAM

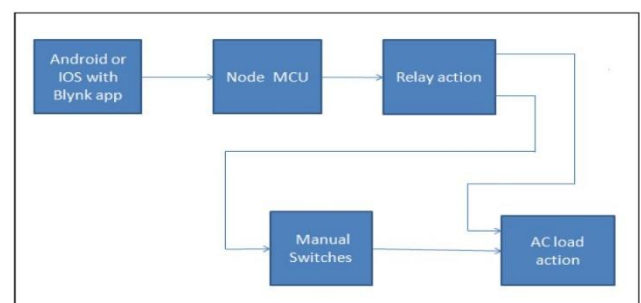


Fig. 1 Block Diagram of Home Control

## PIR SENSOR

A passive infrared sensor is a type of electronic sensor that detects infrared light emitted by objects in its range of vision. They're most commonly seen in PIR-based motion detectors. PIR sensors are widely utilised in security alarms and automated lighting systems.

PIR is technically composed of a pyroelectric sensor capable of detecting various quantities of infrared light. For example, everything emits varying levels of radiation, and the level of radiation increases as the temperature of the object rises.



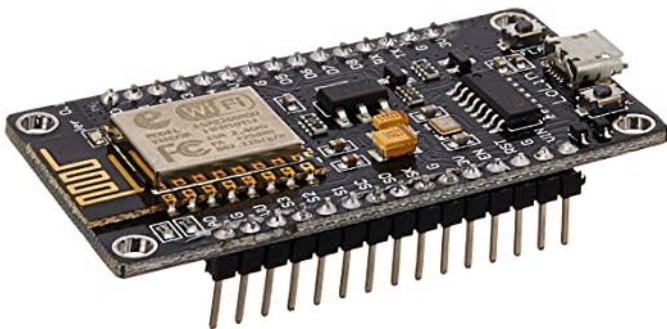
## WHAT DOES A PIR SENSOR DETECT?

PIR sensors are also known as Passive Infrared Detectors (PID). As a result, the PIR sensor can detect infrared light generated by particles.

In general, PIR sensors can detect animal/human movement within a specified range, which is set by the spec of the individual sensor. The detector does not emit energy, but rather passively collects it and detects infrared radiation from the surroundings.

## NODEMCU

NodeMCU is an open-source LUA-based firmware for the ESP8266 wifi chip. By experimenting with the ESP8266 chip, NodeMCU firmware is included with the ESP8266 Development board/kit, i.e. NodeMCU Development Board. Although NodeMCU is an open-source platform, its hardware design is available for editing, modification, and building. The ESP8266 wifi-enabled chip is used in the NodeMCU Dev Kit/board. The Espressif Systems ESP8266 is a low-cost WI-FI chip that supports the TCP/IP protocol. The ESP8266 WiFi Module has further information about the ESP8266. Version2 (V2) of the NodeMCU Dev Kit is available, i.e. NodeMCU Development Board v1.0 (Version2), which often comes in black coloured PCB.



Refer to NodeMCU Development Board for further information about the market's NodeMCU Boards. The NodeMCU Dev Kit's board includes Analog (A0) and Digital (D0-D8) pins similar to those found on Arduino boards. It supports serial communication protocols such as UART, SPI, I2C, and others. We may link it to serial devices such as I2C equipped LCD displays, Magnetometer HMC5883, MPU-6050 Gyro metre + Accelerometer, RTC chips, GPS modules, touchscreen displays, SD cards, and so on using such serial protocols.

## How to start with NODE MCU

The NodeMCU Development board has wifi, analogue and digital pins, and integrated monitoring protocols. To get started with NodeMCU for IoT applications, we must first understand how to write/download NodeMCU firmware on NodeMCU Development Boards. And, before that, where will this NodeMCU firmware be obtained in accordance with our specifications. There are online NodeMCU custom builds accessible via which we may quickly obtain our custom NodeMCU firmware. Refer to Getting Started with NodeMCU for further information on how to generate custom NodeMCU firmware online and download it.

## PROGRAMMING EXPLANATION

The complete programme is provided in the Code section below; first, we included all of the essential libraries or header files and declared numerous variables for computations and temporary data storage.

## APPLICATIONS

### HOME IS WHERE THE SMART IS

If you're not the most tech-savvy customer, it's inconceivable that you've missed the multitude of home automation goods covering the shelves and advertisements of every home improvement store. An everyday trip for light bulbs can suddenly have you wondering whether your lamp might send you a message informing you that the light bulb needs to be replaced. In addition, if your light is communicating with you, may your refrigerator and sprinkler system be as well? Yes, according to experts, the possibilities are limitless. Where do you start if that's the case? Smart home software may automate any daily, recurring task. The higher the control and flexibility of these processes, the larger the resident's energy and cost savings, which are elements that anybody who pays utilities wants to manage. The smart home revolution is more likely to be an evolution, with the addition of one or two home systems at a time, progressively automating our houses through smart mobile devices. However, with these efficiency features comes the issue of usability.

Will it offer you joy or frustration? With so many brands and models available in an ever-expanding market, how can you know which one is right for you?

## **LIGHTING CONTROL: LEAVING THE DARK AGES AND STEPPING INTO LIGHT**

Smart lighting lets you manage wall switches, curtains, and lamps, but how user-friendly is a lighting control system? It turns out that it is highly capable; its capabilities are wide. You can schedule when lights should turn on and off, decide which specific rooms should be illuminated at certain times, choose the level of light that should be emitted, and choose how specific lights react through motion sensitivity, as seen with Belkin's WeMo Switch + Motion, which is both affordable and simple to use due to its plug-and-play simplicity.

## **HVAC REGULATION: NO LONGER BURNED BY YOUR HEATING BILL**

As fuel prices increase and indeed the supply and reliability of our resources become more of a worry, efficiently heating and cooling our houses becomes less of a fiscal bonus and more of a need. Smart thermostats and controlled home heating systems have grown more widely available and simple to integrate into any home over the last year.

Heating and cooling our houses spend an average of 50% of our annual energy bills, making regular HVAC regulation more rewarding. The Nest Learning Thermostat, which maintains a significant lead over the almost non-existent competition, learns your heating and cooling preferences over time, removing the need for programming, and is accessible via your smartphone app. With automatic HVAC, you may lower the temperature when a room is empty and raise or lower it at particular times based on your schedule and occupancy.

## **LAWN IRRIGATION SYSTEMS: THE GRASS IS ALWAYS GREENER**

Most homeowners take pleasure in having a lush and healthy grass, but the weather does not always cooperate and offer the necessary components for a flourishing landscape. For decades, we've relied on sprinkler systems to keep our lawns looking their best, but at what cost?

The average American household spends around 30% of their daily water use on lawn and garden upkeep. Almost half of the revenue is squandered owing to inefficiency. If that number is applied to the national average, poor

watering practises lose up to 4.5 billion gallons of water every day. When we consider the monetary implications of this, we find that Americans spend over a thousand dollars per year on water, with a chunk of it being wasted. When you include the rising worry about climate change and the drastic loss in agricultural natural resources, the global implications are much more severe. Sprinkler control systems, such as Skydrop, provide water regulation via real-time connection with local meteorological data.

If a downpour forms and drops two inches of precipitation on your grass, the automatic sprinkler recognises the saturation and turns off the planned watering. In contrast, if the system detects dry conditions, it will provide the essential quantity of nutrients without over-watering.

## **SMART APPLIANCES: WHATS FOR DINNER?**

Will smart kitchen gadgets help you become a better cook? Maybe. Smart refrigerators, such as LG's Smart ThinQ, allow you to scan grocery shop receipts, keep an inventory of your contents, and receive notifications when an item is ready to expire. More impressively, it offers meals based on the contents of your refrigerator and alerts you when goods need to be replaced. Smart ovens connect to your smartphone and automatically warm to the proper temperature depending on a recipe from your recipe library. While these appliance alternatives appear to be mostly for convenience, there is a conservation component as well.

By automating your kitchen appliances and making them available from your smart device, you can cut off power to unused equipment, lowering your energy usage and expenditures. Given the number of appliances owned by the average home, this might save a significant amount of money over time.

## **SECURITY SYSTEMS: KNOCK KNOCK.**

whos there? The Internet of Things . While productivity and sustainability are clearly advantages of Iot, its ability to increase control over home security is a key emphasis. Smart locks, such as Kwikset's Kevo, a Bluetooth enabled electronic deadbolt, and different linked home security systems, such as iSmartAlarm, include door and window sensors, motion detectors, video cameras, and recording

mechanisms. All of which are linked to a mobile device and accessible via the cloud, allowing you to get real-time information on your home's security status.

Naturally, there is some scepticism surrounding the degree of confidence in monitoring your home's security system via a mobile device, but it merits serious consideration when evaluating the possible advantages and peace of mind it affords homeowners.

## CONCLUSIONS

We created a remote control software for the Android operating system. To communicate with the robot, the programme linked to wi-fi. Wireless control is one of the most critical basic demands for all individuals. Wi-Fi modules are used in wireless network operated robotics. The Blynk android application will send commands to the automobile over wi-fi so that it may travel in the desired direction, such as forward, backward, turning left, turning right, or stopping.

## REFERENCES

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