

Home Automation

Sushma
Hanumanthu
Department of
Computer science
Binghamton university_
shanuma1@binghamton.edu

Rajeshwari
Somapur
Department of
Computer science
Binghamton university_
rsomapu1@binghamton.edu

ABSTRACT

Home automation refers to the use of computer and information technology to control home appliances. It is adopted for reasons of ease, security and energy efficiency. As the number of controllable devices in the home rises, interconnection and communication becomes a useful. Our project is implemented in existing home environments, without any changes in the infrastructure as we know Home Automation allows the user to control the home from his or her computer and assign actions that should happen depending on time or other sensor readings such as light, temperature we have performed an installation of the same wherein we control a bulb with an application on the phone. This report contains how to design, implement the home automation system and evaluations are provided.

KEYWORDS

Internet of Things, Home Automation, relay, Wi-Fi module, blynk

1 INTRODUCTION

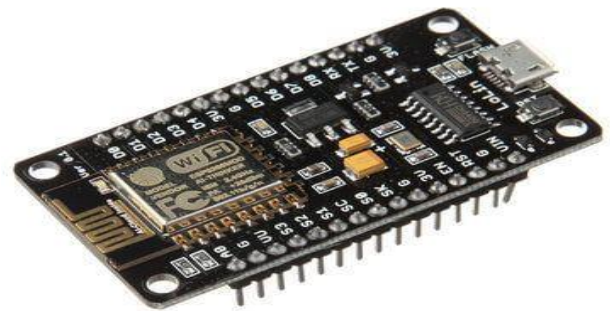
To make life a little easier, increase energy efficiency and enhance home security, we designed the home automation system, which allows the user to control the settings inside the home remotely with a phone app.

2 DESIGN

2.1 Hardware Components

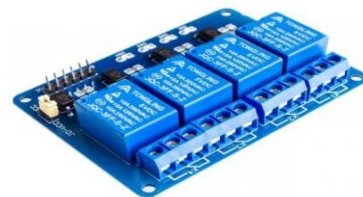
2.1.1 Node MCU

Node MCU is an open-source firmware and development kit that helps you to prototype or build IoT products. Its small and portable therefore easy to use.



2.1.2 A 4 Channel Relay Module

A relay is an electrically operated switch that can be turned on or off. It is operated by an electromagnet.



2.1.3 A 5V Bulb

The bulb is the appliance that we have considered in our project to demonstrate the control by the user through the app remotely.

Software Components

2.1.4 Arduino

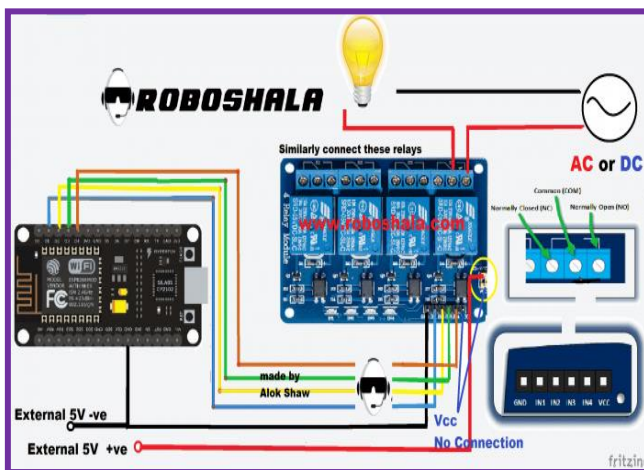
Motion Arduino is an open-source electronics platform based on easy-to-use hardware and software.

2.1.5 Blynk

Blynk is an IoT platform designed to make development and implementation of smart lot device quick and easy. It can be used to read, store, and visualize sensor data and control hardware remotely.

3 IMPLEMENTATION

3.1 Data Flow



3.2 Implementation

The home automation system makes use of the wireless network technology Wi-Fi to automate the working of various devices. We have implemented a bulb to show the working of this project and also used the blynk application. The project requires the user to connect to various devices through Wi-Fi thereby functioning them through wireless means. The Wi-Fi module will receive a signal wirelessly via a cellphone through the app which in turn interprets the signal and sends a signal to the corresponding port accordingly which are initialized as outputs. A relay is used through relay interfacing for those devices which draw a larger current. Once the user gives the signal through the app, the signal is received wirelessly by the WiFi module. It has a code to process the signal received and then accordingly sends the signal to relay. The relay is a switch which is used to turn on or off another circuit, which in our case is a bulb. We have also used an external power source if 5V to power the circuit.

3.2.1 Circuit Connections

The circuit connections are made such that the relay modules' GND is connected to the GND of the node mcu considered. The corresponding Vcc and Vin are also connected to IN1 of relay is connected to the D1 of the node mcu, IN2 to D2, IN3 to D3 and IN4 to D4 respectively. The NO pin of the relay is connected to ne of the terminal of the bulb, Common(C) pin of relay is connected to one terminal of the external switch and lastly another terminal of the switch is connected to the other terminal of the bulb. This makes up a triangular connection facilitating the glowing of the bulb through the connection from relay.

3.2.2 Blynk Application

The project requires the user to connect to various devices through Wi-Fi thereby functioning them through wireless means. The Wi-Fi module will receive a signal wirelessly via a cellphone through the app which in turn interprets the signal and sends a signal to the corresponding port accordingly which are initialized as outputs. Whenever we send a signal through the Blynk App, the Wi-Fi module checks for the character sent and puts appropriate pins high or low according to the code written. These pins control the relay which in turn control the bulb. The bulb will be turned ON or OFF via the app. When the user presses ON button on the app, the relay gets activated and the power for the bulb will pass through the relay contact (Normally Open, NO) and turn on the bulb. Similarly, when the user presses OFF button on the app, the relay gets deactivated and the power for the bulb will be disconnected, and hence the bulb will be turned OFF.

4. EVALUATION

We successfully achieved in implementing a home automation system wherein we considered a bulb as the appliance and we control its functionality using a wireless network through a Blynk application on a cellphone. The user has to press a button on the app which in turn operates the device connected to the circuit.

REFERENCES

- [1] Andreas Kamilaris, Andreas Pitsillides, "Towards Interoperable and Sustainable Smart Homes", *Proceedings Paul Cunningham and Miriam Cunningham (Eds) IIMC International Information Management Corporation*, 2013.
- [2] Byeongkwan Kang, Sunghoi Park, Tacklim Lee, Sehyun Park, "IoT-based Monitoring System using Tri-level Context Making Model for Smart Home Services", *2015 IEEE International Conference on Consumer Electronics (ICCE)*, 2015.
- [3] Mr. Pranay P. Gaikwad, Mrs. Jyotsna P. Gabhane, Mrs. Snehal S. Golait, "A Survey based on Smart Homes System Using Internet-of-Things", *2015 International Conference on Computation of Power Information and Communication*, 2015.
- [4] Kn Vinay Sagar, S M Kusuma, "Home automation using Internet of things", *International research journal of Engineering and Technology (IRJET)*, vol. 02, no. 03, June 2015.
- [5] U.S. Energy Information Administration (September 2012). Annual Energy Review 2011. Available: <http://www.eia.gov/totalenergy/data/annual/pdf/aer.pdf>
- [6] <http://roboindia.com/tutorials/blynk-introduction-nodemcu/>
- [7] <https://dzone.com/articles/home-automation-using-iot>