

IOT BASED HOME AUTOMATION WITH MONITORING SYSTEM

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Abstract - This paper proposes an efficient implementation for IoT (Internet of Things) used for monitoring and controlling the house appliances via Google Assistant, Android application etc. Home automation system uses the portable devices as a computer/mobile. They will communicate with home automation network through an online gateway, by means of low power communication protocols like Bluetooth, Wi-Fi etc. This project aims at controlling home appliances via Smartphone using Wi-Fi/internet as communication protocol and nodeMCU as controlling system.

Key Words: IoT, Google Assistant, Wi-Fi, nodeMCU etc.

1.INTRODUCTION (Size 11, Times New roman)

A home automation system is simply a system that allows some users to have access to some electrical devices like lightning devices temperature & Humidity monitoring, LPG gas leakage or smoke alert through notification etc and this access is monitored through a basic application connected to the main system through a wireless protocol or MQTT (MQ Telemetry Transport) protocol, there are number of open source IoT platforms like Blynk, Adafruit I/O, Ubidots, Thing Speak etc. through these IoT servers we can simply made a Home Automation & Monitoring System.

In this paper we will create the main system which is an electronic circuit board based on a NodeMCU dev board or (Wemos D1 mini Board) which already has a wifi feature in it and this board will be surrounded by some electronic components like Relays and Sensors, about the sensors we will use the MQ-2 Gas sensor for Smoke & LPG Gas leakage detection, and a DHT11 sensor for monitoring temperature & humidity.

About the actuators, we will control some 220V AC bulbs or 12V DC Lights and a 220V AC Fan or 12V DC fan and all these Loads will be controlled through Blynk IoT Platform which has an android app called Blynk that we have to install from the play store. So in this application we inserted some gauges to read the analog values from the sensors and placed some buttons to control outputs.



Figure 1: IoT based Home Automation & monitoring

2. METHODOLOGY

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The Blynk app transmits signals simply by turning ON/OFF buttons in App via internet, the Wi-Fi receiver module receive these signals. Depending on the received character NodeMCU takes various actions to turn ON and OFF (HIGH/LOW) the GPIO pins of the NodeMCU and then from that signal the Relay Driver circuit turn the appliances (Lights, Fan, TV etc) ON/OFF. similarly by pressing manual push buttons also controls the appliances Through NodeMCU and relays, at that time it also gives a feedback status of load switch in the App by simply toggling the button in App. And in the same way the sensors sends the temperature & humidity data and Gas leakage in Air data to the microcontroller unit and then via internet those sensor data values are displayed in the Blynk android App.

For controlling the Loads through Google assistant we are using a service called IFTTT

(If This Then That). IFTTT allows us to make some Applets, by adding simple single phrase commands in Google assistant and after receiving that voice command then making a web request via WebHooks service though which the ON/OFF (1 or 0 , HIGH or LOW) signal is send to the Blynk IoT server to activate the GPIO (General Purpose Input/output) pins of the microcontroller unit (NodeMCU) via internet to control the appliances through the Relay driver circuit.

3. MODELING AND ANALYSIS

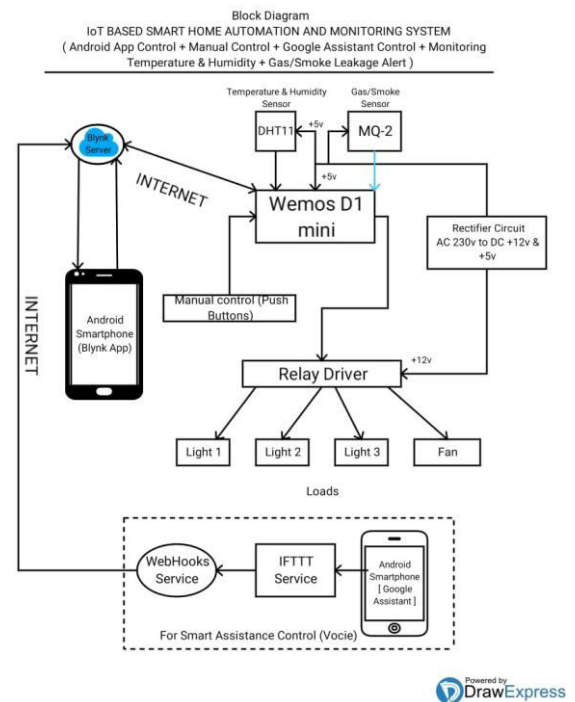


Figure1: Block Diagram.

4. RESULTS AND DISCUSSION

Blynk was designed for the web of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things. There are three major components within the platform:

Blynk App - allows to you create interfaces for projects using various widgets.

Blynk Server - chargeable for all the communications between the smartphone and hardware. you'll be able to use our Blynk Cloud or run your private

Blynk server locally. It's open-source, could easily handle thousands of devices and may even be launched on a Raspberry Pi or NodeMCU.

Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outgoing commands.

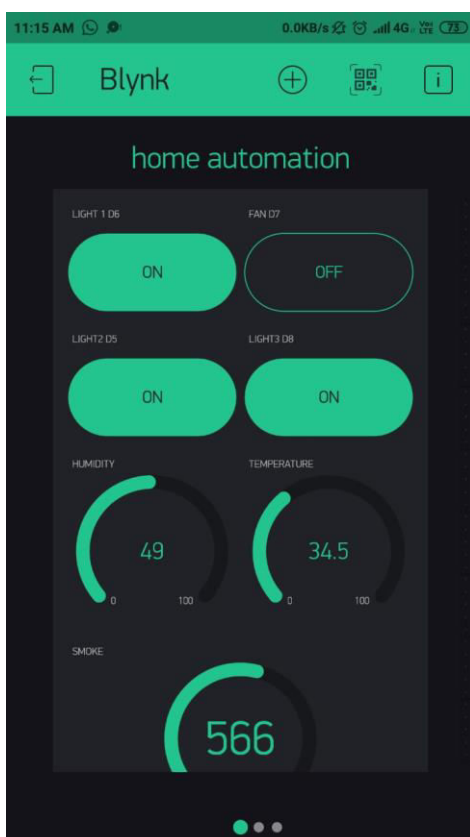


Figure 2.1 : Home Automation Using Blynk App

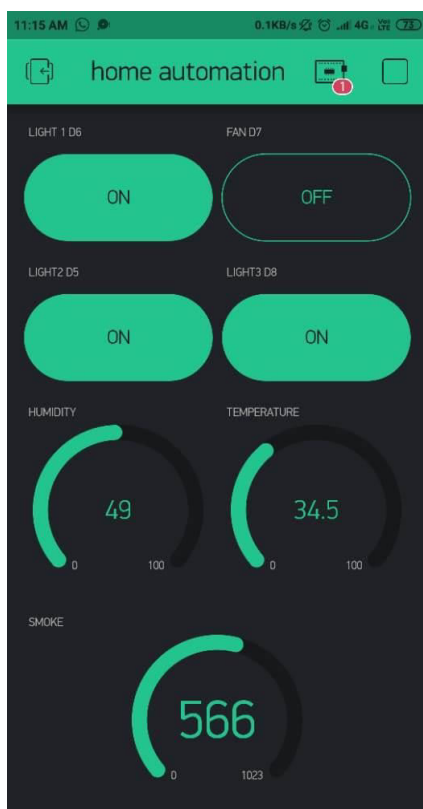


Figure 2.2 : Home Automation Using Blynk App

Each time you press a Button within the Blynk app, the signal travels to space, where it finds your hardware. It works the identical within the opposite way and everything happens in a very blink of a watch.

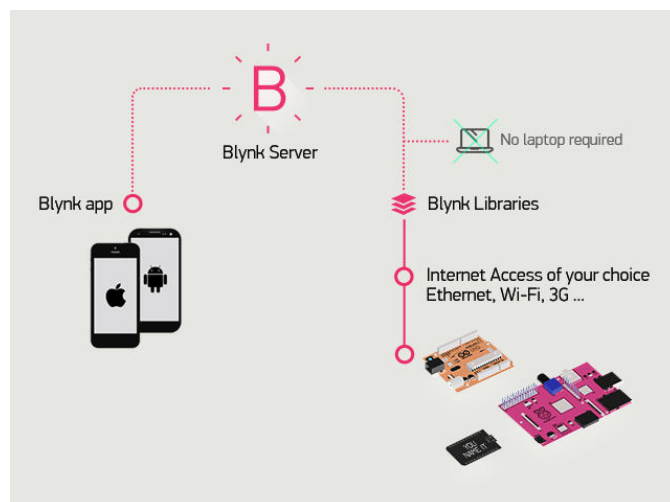


Figure 2.3 Blynk App

Hardware.

An Arduino, Raspberry Pi, NodeMCU or a similar development kit.

Blynk works over the Internet. This means that the hardware you choose should be able to connect to the internet. Some of the boards, like Arduino Uno will need an Ethernet or Wi-Fi Shield to communicate, others are already Internet-enabled: like the ESP8266, Raspberry Pi with WiFi dongle, Particle Photon or SparkFun Blynk Board. But even if you don't have a shield, you can connect it over USB to your laptop or desktop (it's a bit more complicated for newbies, but we got you covered). What's cool, is that the list of hardware that works with Blynk is huge and will keep on growing.

A Smartphone.

The Blynk App is a well designed interface builder. It works on both iOS and Android.

3. CONCLUSIONS

This paper has been experimentally proven to work successfully. We can control the parameters of the AC components using the Blynk app. Experimental work has been carried out carefully. The result shows a solution for remote turn on/off control over appliances and higher flexibility is indeed achieved using IoT.

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