



Research Article

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Home Automation & Its Detection for Performing and Operation for Reducing Power

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Abstract: With increasing in demand of electronics resources and using scaling technology associated with artificial intelligence the number of devices increases with increasing in traffic. These devices consumes power in many times the devices are in active and ON state even though the devices are not needful. In some case like Industries where several number of devices are in ON state for long time even after the industrial task is completed which consume lot of power. An alternate solution is some devices can be made into OFF state and some into ON state so that the Industries can perform the task. The devices as connected as Batch and cluster form which alternative moves into ON and OFF state at a particular state some devices move into OFF and Some devices move into ON depending upon the trial and error designed in the algorithm which reduces the power.

Keywords: Power, Scaling, Active, Consume, micro controller, Cluster, Task, Automation.

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INTRODUCTION

Artificial intelligence with the combination of embedded system makes quick automation approach where n number of devices can be controlled under one roof which simplified the complex problems into easy mode approach and makes the human life better with interaction of hardware components. More Technology with sensors, actuators, semiconductor devices, integrated circuits will make low power for Artificial intelligence approach which will integrate more number of devices in a available memory. Industry 4.0 will still makes the Artificial intelligence more and more wide parameters and decided can be integrated by using data science where n number of inputs can be applied to the automation system.

In [1] proposed a method by using Google assistant, web based assistant and cloud where a devices are connected and devices can be operated by Controllers and IFTTT tools. All the devices has to be uploaded to the cloud for the solicited operations. This method reduces the human interaction and it has energy monitoring system but the heat concept is not focused. In [2] proposed homely automation and security system using zeus actuators and sensors which can operated based on the actions of specified parameters this method discuss about homely devices and security some requirements like Heat, distance and mode of action as alternative approach is not focused. In [3] proposed a method based on the location and action parameters and allows the voice commands for controlling of devices. [4] presented system with

actuators, interconnected sensors for controlling n number of devices through q Toggle works with flexibility of level of power with program interface through different schemes. [5] presents light controlling application built on the top. Matching sensors are implemented and actuators behavior of the node is also consider hence noise is added into the system [6] explains the home automation with sensors which defined location position and parameters undertaking with ambient light, temperature and pressure. Voice identification is also built in the system. [7] Google assistant based commands for controlling all simple devices were developed using microcontrollers but power consumption is high and devices depends on the operation of relays. [8] presented google assistant for domestic household automation based on the smart light controlled eight devices can be connected [9] IoT based homely control of devices with routers and WI-Fi module to control devices and power management is also included. [10] number of switches and ddevices is operated with IFTTT voice command and controller is utilized for transmission of data power management is not implemented [11] explained low cost home automation by blue tooth and controller embedded and PCB model is designed for home automation but power management and hear concept has not included [12] proposed a technique for smart home automation using mobile devices and cloud computing routers are also taken for creating application interfacing with different devices.

EXISTING METHOD

- **Bluetooth Based Home Automation System using Cell Phones:** In Bluetooth based home automation system the home appliances are connected to the Arduino BT board at input output ports using relay. The program of Arduino BT board is based on high level interactive C language of microcontrollers; the connection is made via Bluetooth. The password protection is provided so only authorized user is allowed to access the appliances. The Bluetooth connection is established between Arduino BT board and phone for wireless communication. In this system the python script is used and it can install on any of the Symbian OS environment, it is portable. One circuit is designed and implemented for receiving the feedback from the phone, which indicate the status of the device.
- **Zigbee Based Home Automation System using Cell Phones:** To monitor and control the home appliances the system is designed and implemented using Zigbee. The device performance is record and store by network coordinators. For this the Wi-Fi network is used, which uses the four switch port standard wireless ADSL modern router. The network SSID and security W1-Fi parameter are preconfigured. The message for security purpose first process by the virtual home algorithm and when it is declared safe it is re-encrypted and forward to the real network device of the home. Over Zigbee network, Zigbee controller sent messages to the end. The safety and security of all messages that are received by the virtual home algorithm. To reduce the expense of the system and the intrusiveness of respective installation of the system Zigbee communication is helpful.
- **Home Automation using RF module:** The important goal of Home Automation System is to build a home automation system using a RF controlled remote. Now technology is accelerating so homes are also getting smarter. Modern homes are deliberately relocating from current I switches to centralized control system, containing RF controlled switches. Today traditional wall switches situated in various parts of the home makes it laborious for the end user to go near them to control and operate. Even further it turns into more problematic for the old persons or physically handicapped people to do so. Home Automation using remote implements an easier solution with RF technology. In order to accomplish this, a RF remote is combined to the microcontroller on transmitter side that sends ON/OFF signals to the receiver where devices are connected. By operating the stated remote switch on the transmitter, the loads can be turned ON/OFF globally using wireless technology.
- **Home Automation using Android ADK:** The devices of home are associate to the ADK and the Connection is established between the Android device and ADK. The devices of house are link to the input/output ports of the board (EMBEDDED SYSTEM) and their current situation will have

passed to the ADK. The microcontroller board (Arduino ADK) is based on the ATmega2560. It has a USB host connection to associate with Android based phones, and that is based on the MAX3421e IC. The two important features of Android Open Accessory Protocol

AOAP) are as follows

It has audio output that is from the Android device to the component and it also support for the component serves as one or more Human Interface Devices (HID) to the Android device. This paper depends upon Android and Arduino platform in which both are FOSS (Free Open Source Software). Including motion sensors for safety systems will detect an unauthorized action and it will automatically notice the user through cell phone or the security system.

Cloud Based Home Automation System

Home automation with cloud based system focuses on home design and implementation Gateway to collect data about data from home appliances and then send to the cloud-based data server on Hadoop Distributed File System, it is processed and used with Map Reduce implement monitoring tasks for remote users. Currently, the home automation system is permanent to develop its resilience by assimilating the current traits that satisfy the insurgency interest of the people. This paper introduces the design and evolution of home automation systems that use cloud computing as a service. The current system consists of three important ones Units: The first part is a cloud server that processes and controls the data and information from clients Users and the status of devices The hardware interface module is the second part that Implement the appropriate connection to the actuators and sensors that give the physical Service. The last part is the home server that builds the hardware device and makes it available to the user Interface. This paper focuses on building web services using the cloud required for security and security Data storage and availability. The current system is cost-effective, reliable and convenient which also provides a secure home automation system for the whole family.

The system consists of different client modules for different platforms.

- **Cloud server** Cloud server is a central server which aims to implement services for the other sub modules. Central server serves as data breathing system and brain it implements three connections to the three sub-modules home system, web configuration tool and mobile. That the server evaluates the data it takes out of the house, sends the current status to the mobile device and vice versa. A database is managed by the server and its status is updated according to the changes done at home.
- **Embedded program** for hardware circuit microcontroller and.

- Internet client for any desktop or mobile phone.

Design a Home Automation System using RF receivers

Home automation is a famous and most used technology in the world. The main goal of this the project consists of developing a home automation system with a four-button key fob RF (Radio Frequency) technology. This four button key fob is also very productive for commercial applications in industrial and medical systems. It is designed to achieve this goal in two parts. Both parts have individual toggle receivers, but they work the same frequency. One of these toggle receivers works individually with some of the household appliances but the other is connected to an Arduino Uno Rev3 microcontroller to convert the signals from n Switch to locking format. We used both

latch and toggle techniques to get the most out of it Result. To achieve this, an integrated development environment software was used Programming target to control the microcontroller, Atmega328 based Arduino Uno. This suggested System will help the elderly and the physically challenged to operate the home appliances only with a small keychain.

Proposed Concepts of home automation with Node MCU

Node MCU

NodeMCU (Node Microcontroller Unit) is a low-cost, open-source IOT platform. It first Included firmware running on Espressif Systems' ESP8266 Wi-Fi SoC and hardware which was based on the ESP-12 module. Support for the ESP32 32-bit MCU was later added.

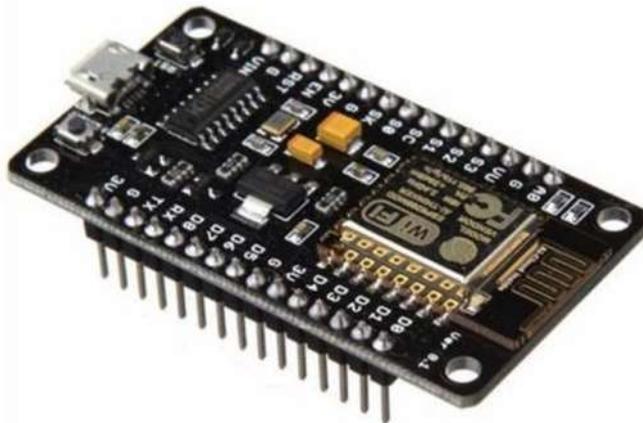


Figure 1: NodeMCU Development Board

NodeMCU is an open source firmware for which open source prototyping board designs are available. The name "NodeMCU" is made up of "node" and "MCU" (microcontroller unit). That the term "NodeMCU" strictly speaking refers to the firmware rather than the associated development kits.

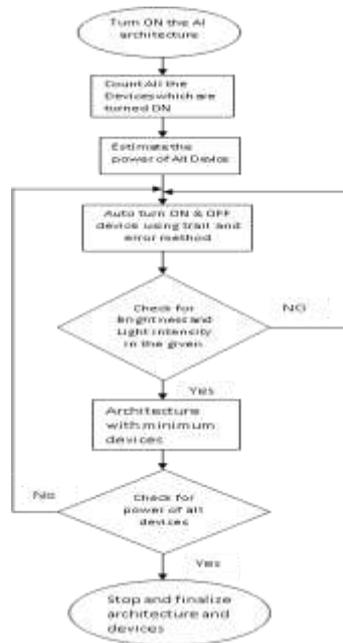
Both the firmware and prototyping board designs are open source.

The firmware uses the Lua scripting language. The firmware is based on the eLua project and based on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as luacjson and SPIFFS. Due to resource limitations, users must select the modules

they are relevant to their project and build a firmware tailored to their needs. Support for the 32-bit ESP32 also has been implemented. The prototyping hardware typically used is a circuit board that acts as a dual in-line package (DIP) that integrates a USB controller with a smaller surface mount board that contains it MCU and antenna. The choice of DIP format allows for easy prototyping on breadboards. The design was originally based on the ESP8266's ESP-12 module, a Wi-Fi SoC integrated into a Tensilica Xtensa LX106 core, widely used in IoT applications.

PROPOSED METHO

Flow chart of proposed method



Below is the process of creating an account in the Blynk application and generating it unique ID for a

specific device. This ID serves as an identifier for the respective device on the Blynk Server.

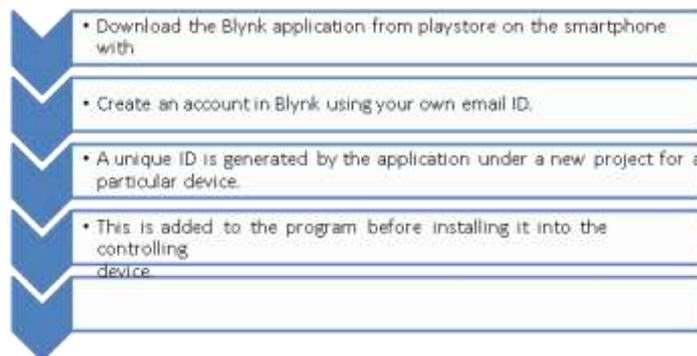


Figure 2: Creating an account and generating unique ID in Blynk Server

Once the unique ID is generated, the next step is to include that key in the written encoding in Embedded C to establish communication between Node

MCU and Blynk Server. This process is described below.

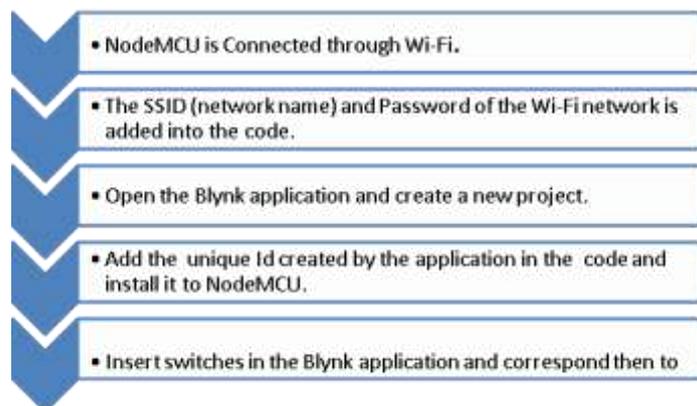


Figure 3: Setup to control NodeMCU from Blynk application

PROJECT LAYOUT

- **Node MCU:** Node MCU is the microcontroller unit

in the prototype. It has a built-in Wi-Fi module (ESP8266), which makes wireless remote

switching of home appliances.

- **Four Channel Relay Module:** The four-channel Relay module consists of 4 individual relays that are physically connected between nodes MCU and the home appliances. It takes signals from GPIO pins of the node MCU and accordingly connects or disconnects household appliances from the mains. They act as a switching device.
- **LED and Resistors:** LED and resistors are used in this prototype to replace real devices. They show power turn devices on and off. In real-time operation, they would be replaced by actual ones domestic appliances.
- **Blynk Application:** The Blynk application was built for the Internet of Things. It can remotely control hardware, it can display sensor data, save

data, visualize, etc. The prototype mainly uses Blynk Application to capture commands from user to hardware over wireless network.

- **Google Assistant:** Google Assistant is a system software that is present on the Android phone. It interprets the voice user commands to turn a device on or off.
- **IFTTT:** IFTTT application the voice commands interpreted by the Google Assistant are not understandable therefore, the Blynk application cannot send to the hardware. IFTTT is an intermediate application which interprets commands from the Google Assistant and sends an on and off signal to the Blynk application about Blynk Server.

ARCHITECTURE

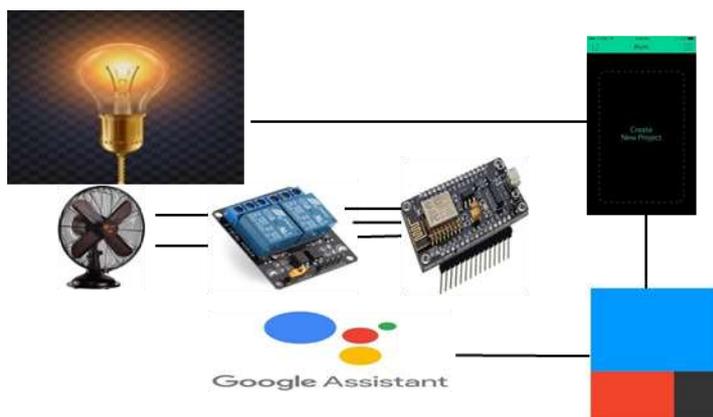


Figure 5: Basic Architecture of Proposed System

BLOCK DIAGRAM

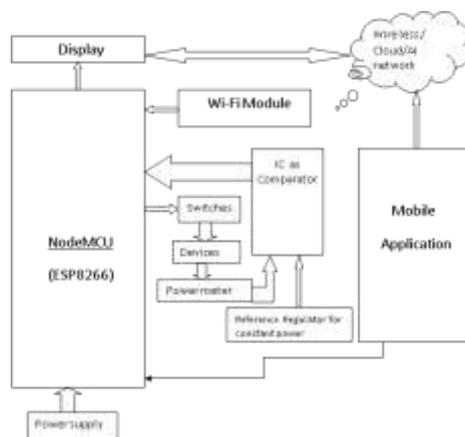


Figure 6: Block Diagram of Proposed System

The proposed system is shown above. The NodeMCU Unit is the microcontroller or the main control unit of the system. It can be operated through mobile that interface with mobile application, wireless and Controller. The system can be operated with mobile. A signal is sent to the controller by using mobile. Controller performs its operation switcher are connected initially the switcher moves into ON state

which enables all devices into on state the power meter measures the power of all the devices present across the architecture and network. Ic is connected to power meter and reference regulator or constant power. Ic compares the signal of power meter and reference regulator if the power meter is high when compare to reference regulator then IC output is enabled send the signal to controller. The controller scans the

brightness across the devices and it will send the signal to switches to perform trail and error operation that will reduce the power. The process is repeated so that power meter and reference regulator both are equal. Hence the WLAN module (actually built into NodeMCU), helps the microcontroller to establish a Wi-Fi communication with a device and accept commands

Circuit Diagram

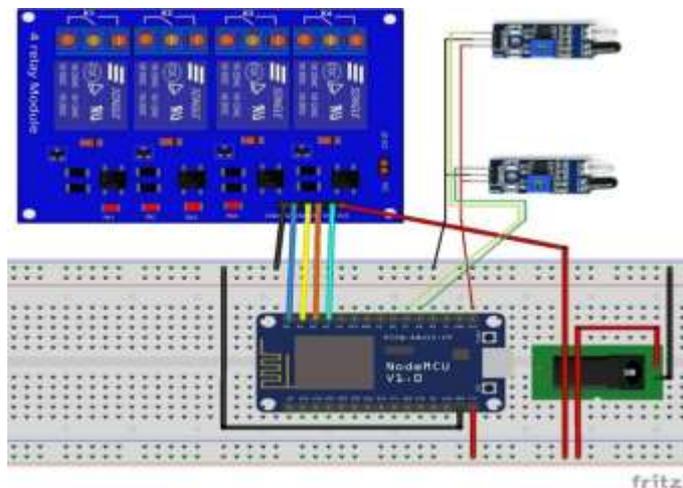


Figure 8: Circuit Diagram of Proposed System

- The proposed system uses relays to connect the electrical devices to NodeMcu.
- The WiFi module in the NodeMcu chipset helps the system connect to the cloud.
- All controls can be done using the Blynk application and Google Assistant. 5v relays are used to control home appliances.
- IR sensors are used to detect vehicle speeds and door lock monitoring.
- The whole system is powered by a 9V power supply

RESULT

Examining different home automation systems shows that there are different types of technologies used to implement this type of system. All proposed systems have been presented and compared in this paper, which shows some advantages and disadvantages of the systems. This review explained various home automation systems e.g. web-based, bluetooth-based, Mobile Based, SMS Based, ZigBee Based, Arduino Microcontroller Based, Android App Based, IOT-based and cloud- based. Home due to its performance, simplicity, low cost and reliability automation system makes its position in the world market, this day is not so far, when every house becomes the smart home.

The Home automation Internet of Things has been using experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet. The designed system not only monitors the sensor data like temperature, gas, light, motion sensor but also

from an application over a wireless network. The node MCU further reception of the signal then switches the device on/off with the help of the relay. The nodeMCU, relay and the end devices are physically connected. There is a power supply for this supplies the microcontroller, the relay and the end devices. There is also a display unit showing the status of the application.

actuates a process according to the requirement. For example, the switch gets dark. It also stores the sensor parameters in the cloud (Gmail) in a timely manner. This will help the user to analyse the condition of various parameters in the home anytime anywhere.

Home automation using the Internet of Things has been experimentally proven works satisfactorily by connecting simple devices to it and the devices have been successful remotely controlled via the Internet. Home automation is undeniably a resource to make a home environment automated. People can control their electrical devices through this home automation devices and setting up control actions via mobile devices. In the future, this product have high marketing potential. In addition, it can be demonstrated from the computer mobile phones to control equipment in large places such as industries, hospitals, Institutions, etc.

Future Scope

There are a variety of improvements that could be made to this system to achieve more accuracy in detecting and recognizing.

- There are many other sensors that can be used to increase security and control of the house-like pressure sensor that can be placed outside the house to detect someone entering the house.
- Changing the way of automatic notifications by using the GSM module to do this system more professional.
- A smart garage that can measure the length of the car and choose which block to put the car in and it navigates the car through the garage to make parking easier homeowner in his garage.

CONCLUSION

The main outline for the project is to be able to communicate with various electrical devices wirelessly within the home. IOT or Internet of Things is an upcoming technology that will allow us to do this controlling hardware devices over the Internet. Here we suggest to use IOT for control household appliances and thus the automation of modern households via the Internet. This system uses two loads to demonstrate as house lighting. Our user-friendly interface allows the user easy control these home appliances over the Internet. For this system we use a NodeMCU. That NodeMCU is connected to a 4-channel relay module to receive user commands over the Internet. Relays are used to switch loads. After receiving user commands over the internet, the microcontroller processes these instructions to operate these loads accordingly. So this system enables efficient home automation over the Internet.

Also in home and building automation systems the use of wireless technologies offers several possibilities benefits that cannot be achieved with a wired network.

- Reduced installation costs.
- Easy to deploy, install and cover.
- System scalability and easy expansion.
- Aesthetic Benefits.
- Integration of mobile devices. For all these reasons, wireless technology is not only an attractive choice in renovation and refurbishment, but also for new installations.

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