DESIGN AND IMPLEMENTATION OF A NODEMCU BASED HOME AUTOMATION SYSTEM

J. Ramya, Dept of ECE, Vignan's Nirula Institte of Technology and Science for Women, Guntur, Andhra Pradesh, India

Y. Sravanthi, Dept of ECE, Vignan's Nirula Institte of Technology and Science for Women, Guntur, Andhra Pradesh, India

SK. Gulshan Tarunnum, Dept of ECE, Vignan's Nirula Institte of Technology and Science for Women, Guntur, Andhra Pradesh, India

Dr.G.Sandhya, Department of ECE, Vignan's Nirula Institute of Technology and Science for Women, Guntur, Andhra Pradesh, India

Abstract:
Home automation systems are an extension of present home activities, and thanks to fast computing devices and wireless sensor networks (WSNs), they can easily expand into an IoT-based smart bank for gesture recognition and control. The goal of this work is to use an ESP8266 board to expand a domestic automation device that can be controlled remotely via an Android smartphone. Modern homes are gradually shifting away from traditional switches and toward centralized control systems with far-flung control switches.

Keywords: Home automation, wireless sensor networks, IOT, smart home

1.   INTRODUCTION:

The most important aim of this work is to expand a domestic automation device the uses an Arduino board with Bluetooth that may be remotely managed from an Android smartphone [2]. Modern houses are regularly transferring from conventional switches to centralized manipulate structures which uses far- flung manipulate switches [8]. Have you ever thought about a life where you can use your voice to operate home appliances as needed? The days of having to be a millionaire like Tony Stark to get an automated home with voice control are over [3]. The concept present in [1] describes the use of voice to control electronic devices such as televisions, fans, lighting systems, and the Internet at a fraction of the cost without employing any programming or node MCU background. The home automation with the Node MCU and the Google Assistant is presented in [4].

2.   MATERIALS AND METHODS

This section presents various hardware and software requirements and the procedure of the proposed algorithm. The Circuit diagram of the proposed concept is presented in Figure 1.

Hardware Description:
Node MCU [ESP8266]: The ESP8266 board is a low-cost Wi-Fi module, a stand-alone System on Chip with an integrated TCP/IP protocol stack that may offer access to Wi-Fi networks to microcontrollers [2]. The ESP8266 may run programs or delegate all Wi-Fi network tasks to a separate processor. The ESP01 module from a third-party vendor, Ai Thinker, was used to introduce this chip to Western OEMs in August 2014. This little gadget allows the microcontroller to connect to a Wi-Fi network and establish a rudimentary TCP/IP connection using Hayes commands [3]. The Node MCU is presented in Figure 2.
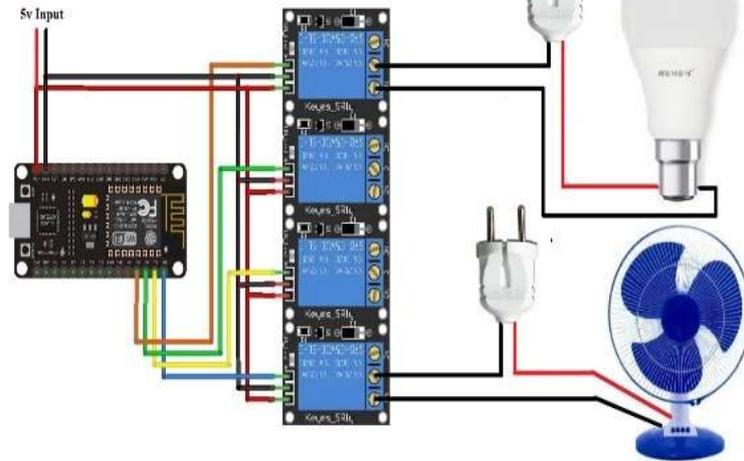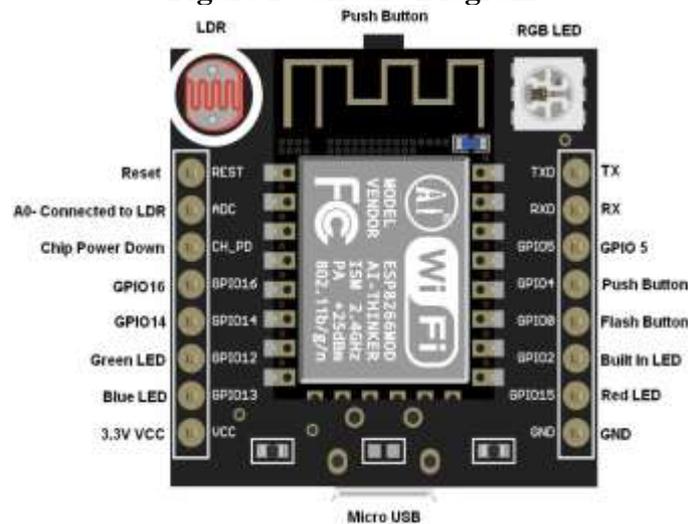
Figure 1: Circuit Diagram

Figure 2: Node MCU

RELAY [ADS0128]: The relay [ADS0128] is a transformer powered by electricity. It has a row of entering terminals as well as a row of functioning touch terminals for manipulating one or more signals. There will be a range of contacts or a few touch shapes on the transfer. No contacts, NC contacts, or a combination of the two are present. Relays are utilized when you need to control many circuits with a single signal or when you need to control circuits with independent low power signals [8]. Long-distance telegraph circuits were the first to use relays as signal amplifiers. Relays re-energize themselves by passing signals from one circuit to the next. To execute the logical banking process of converting AC power to DC power, relays were commonly utilised in telephone exchanges and early computers. The Relay is shown in Figure 3.

DC FANS: DC fans are powered with a potential of fixed value such as the voltage of a battery, it is used for drying people, also used in the cooling of IC in C. P. U , and is shown in Figure 4.

Figure 4: Dc Fan

Figure 3: Relay

BLYNK: Blynk is an IoT and Android platform that allows you to control Arduino, Raspberry Pi, and other devices over the internet [5]. This is a virtual dashboard that allows to build a graphical user interface for your business by dragging and dropping widgets. [1] Blynk is a web developer. To put it another way, the hardware you choose should be able to connect to the Internet. Some forums, such as the Arduino Uno, require an Ethernet or Wi-Fi connection to communicate, while others, such as the ESP8266, Raspberry Pi with Wi-Fi dongle, Particle Photon, and Spark Fun, do not. Blynk forums are already connected to the Internet [10]. Even if you don't have the defense, you can connect to your computer or computing device using USB bit complicated.

Figure 5: Blynk

ARDUINO IDE: The Arduino IDE is a cross-platform application written in C and C++. It can program and upload to an Arduino compatible board, but it can also upload to a third-party development board using a third-party core [6]. The Arduino IDE uses the program avrdude to convert executable code into a hexadecimal text file that is loaded into the Arduino board's firmware by a loader program. Figure 6 presents the layout of Arduino IDE.

Figure 6: Arduino IDE

CONNECTING WIRES: Connecting wires allows currents or signals to move from one point in the circuit to another. This is because it requires a medium through which a signal or current can pass. In a simple circuit, the wires are supplied from the terminals of the power supply, such as the power supply.

Wi-Fi HOTSPOT: Wi-Fi hotspots are regions with reachable wi-fi networks. The time is generally maximum to consult wi-fi networks in public regions together with airports and espresso shops. Users also can create their very own cell hotspots through use of outside gadgets that may hook up with cell telephones and cell tele cell smartphone networks [2].

Working:

The domestic automation machine works with the Node MCU ESP8266 controller, and instructions are supplied via way of means of the Blynk utility at the cellular telecellsmartphone over the Wi-Fi community The coronary heart of today`s undertaking is the Wi Fi enabled board that wishes no creation to the ESP8266 and primarily based on Node MCU board.

It is an opensource platform for growing Wi-Fi is primarily based on embedded structures and on famous ESP8266 Wi -Fi module, jogging the Node MCU firmware. Node MCU is preferred over ESP8266. The ESP826 has many constraints and now it is no longer well suited with breadboards. It becomes tough to program it. The Node MCU board is simple to use, low price and high speed of operation. For this undertaking channel relay modules are brought to the ESP8266 board. The undertaking waft includes the manipulate of Node MCU's GPIO from a web site on any tool linked at the identical community because the board. The repute of the GPIO's manipulate the coil of the relays and reasons the relay to change among generally open (NO) and generally close (NC) circumstance relying at the kingdom of the GPIO, as a consequence successfully turning the linked appliance "ON" or "OFF".

3.   RESULTS OR OUTPUT:

The screen short of the model is presented in the foloowing figure 9.
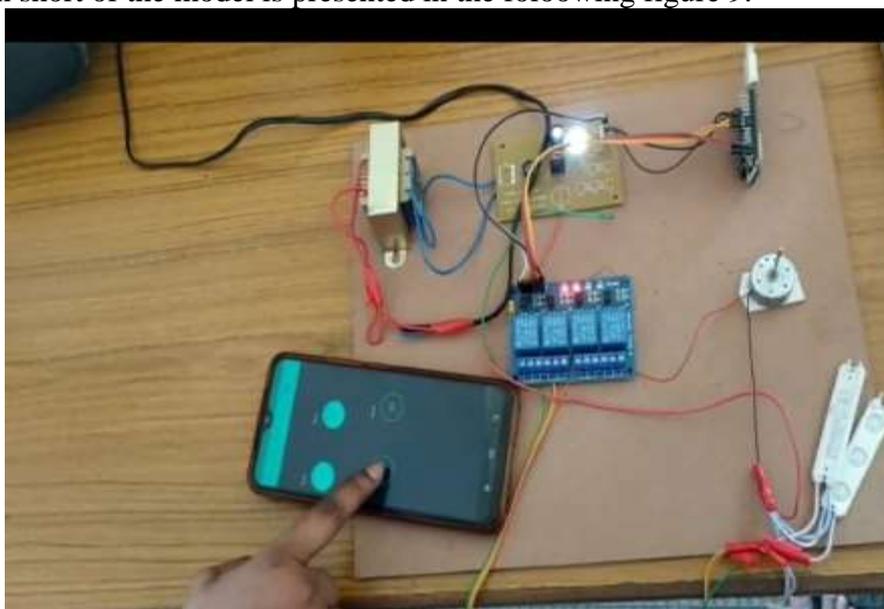

Figure 9: Model

4.   ADVANTAGES, DISADVANTAGES, AND APPLICATIONS

Merits, demerits, and applications of the proposed module are presented in this section.

Merits:

•   It has the ability to perform anywhere in the world. It is possible to obtain security against burglars at a low cost.
•   Domestic function is manipulated by voice.
•   Managing all the household electronics from a single location is very comfortable
•   Flexibility for brand new appliances and devices.
•   Increasing the level of internal security.
•   Domestic functions can be controlled remotely.
•   Efficiencies in the use of power have improved.

Demerits:
- Due to fallacious community connection can also additionally cause failure of working.
- Expensive

Applications:
- Lighting manipulations
- Lawn/Gardening control
- Smart domestic appliances
- Improved domestic protection and security
- Home air excellent and water excellent monitoring
- Better infotainment delivery
- Most leading language-primarily based totally voice assistant

5. CONCLUSIONS & FUTURE SCOPE:

Automating your house, the Internet of Things has been shown to work effectively in the laboratory by connecting simple home appliances to it and remotely managing the appliances. The designed machine not only displays sensor information such as temperature, gas, light, and movement sensor on a video display, but also operates in accordance with the requirements. The transfer, for example, is dimly lit. It also stores sensor parameters in a timely manner within the cloud. This will enable the user to assess the status of a variety of factors within the home at any time and from any location.

The machine's capabilities can be expanded to include a wide range of purposes, including domestic security functions such as snapping images of people moving around the house and storing them in the cloud. This will reduce the amount of information stored in the CCTV digital digicam, as it will report all of the time and save it. The system can be scaled up to track electricity or create climate stations. This type of machine, with appropriate adjustments, might be used in hospitals for disabled people or in industries where human infiltration is not possible or dangerous, and it could also be used for environmental tracking. Residence automation systems have a bright future ahead of them.

REFERENCES:
[1]. Luigi Atzori, Antonio Iera, and Giacomo Morabito, "The internet of things: A survey, Computer Networks", vol. 54, no. 15, pp. 27872805, 2010.
[2]. R. Piyare, M. Tazil, "Bluetooth based absolutely home automation tool the usage of mobile cellular phone" in 2011 IEEE 15th International Symposium on Consumer Electronics.
[3]. Nikhil Singh, Shambhu Shankar Bharti, Rupal Singh, and Dushyant Ku- mar Singh, "Remotely controlled home automation tool," in Advances in Engineering and Technology Research (ICAETR), 2014 International Conference on. 2014, pp. 1–5, IEEE.
[4]. Md. Sarwar Kamal, SaziaParvin, Kashif Saleem, Hussam Al-Hamadi, Amjad Gawanmeh, Efficient Low-rate Supervisory System for Internet of Things Enabled Smart Home" in ICC2017: WT04-5thIEEE International Workshop on Smart Communication Protocols and Algorithms (SCPA 2017).
[5]. Ala Al-Fuqaha, Mohsen Guizani, Mehdi Mohammadi, Mohammed Aledhari, and Moussa Ayyash, "Internet of things: A survey on allowing technologies, protocols, and applications," IEEE Communications Surveys & Tutorials, vol. 17, no. 4, pp. 2347–2376, 2015.
[6]. Meng Kun. Smart home tool format based mostly on MSP430 [D]. Suzhou: Suzhou University, 2014.05, 9-12
[7]. Vishwa Teja Mudiam Reddy, Naresh Vinay, Tapan Pokharna, Shashank Shiva Kumar Jha, "Internet of Things Enables Smart Switch."
[8]. Khusvinder Gill, Shuang-Hua Yang, Fang Yao, Xin Lu, "A ZigBee-Based Home Automation System."
[9]. Salma Nasrin, Dr. P J Radcliffe, "Novel Protocol Enables DIY Home Automation."
[10]. Carelin Felix, I. Jacob Raglend, "Home Automation the usage of GSM." [11]. Rozita Teymourzadeh, SalahAddin Ahmed, Kok Wai Chan, Mok Vee Hoong, "Smart GSM based absolutely Home Automation System".