

Home Automation using IoT

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Abstract— These With headway of Automation innovation, life is getting less complex and simpler in all angles. In this day and age Automatic frameworks are being favored over manual framework. With the quick increment in the quantity of clients of web over the previous decade has made Internet an integral part of life, and IoT is the most recent and rising web innovation. Web of things is a developing system of regular item from modern machine to buyer products that can share data and complete errands while you are occupied with other activities.Home Automation framework utilizing IoT is a framework that utilizes cell phone to control essential home capacities and highlights consequently through web from anyplace around the globe, a computerized home is at times called a savvy home. It is intended to spare the electric power and human vitality. The home robotization framework contrasts from other framework by enabling the client to work the framework from anyplace around the globe through web association.

Index Terms— IoT, NodeMCU, MQTT, LDR Sensor

1 INTRODUCTION

In home mechanization is a standout amongst the most significant things to naturally ON and OFF the home apparatuses without incorporation of human. In present days the vast majority of the robotization framework uses the mix of equipment and remote framework for controlling machines. In this task we structure and advancement of controlling of home robotization framework by means of the Wi-Fi module or Webpage server utilizing hub MCU. This venture is worry with customized control of light or whatever other home appliances[1]. The client will convey to Arduino through web by means of Wi-Fi organize. This framework is less expensive, permitting extra home machines. Its progressively Secure for us. IoT or Internet of Things is an up and coming innovation that enables us to control equipment gadgets through the web.

2 METHODOLOGY

In this Project, we talk about plan and improvement of actuation and controlling of home mechanization framework by means of Android application utilizing arduino. In this task the customized utilizing a wiring based language like C++. Web of Things is interlinked through these systems in view of the prevalence of the home robotization is improved by the nature of administration given by the gadgets.

3 LITURATURE SURVEY

Structure investigation of Microcontroller utilizing RF remote control:- This Project was created by Aru, Okereke Eze, Ihekweaba Gozie, Opara, F.K. In this venture, Home electronic gadgets whether we are inside or outside our room is control by the RF remote control divider attachment. An individual the capacity to remotely or naturally control things around the home without moving from spot to put gives by RF remote control divider attachment. A home machines is a gadget or instrument configuration to play out a particular capacity. This venture was configuration to control electrical gadgets that were associated with an AC control supply through the RF remote divider attachment ON/OFF utilizing

RF remote control whosw task is autonomous of the heading/position not at all like the infrared remote control which was observable pathway. This venture was utilizes the 89c52 microcontroller.

Android based Home Automation framework utilizing Bluetooth and Vice order:- This undertaking was created by Bhavik Pandya, Mihir Mehta, Nilesh Jain. In this undertaking the arduino microcontroller for associating the apparatuses a Bluetooth module for flag exchange and an advanced cell running the android application[2]. This venture proposed was essentially worried about the home computerization framework which utilizes bluetooth for communication between the android portable application and the apparatuses under the control of the framework.

In this paper S.Anusha, M.Madhavi, R.Hemalatha has built up an IoT based home robotization framework which utilizes a smaller scale controller and a java based android application[2]. The small scale controller utilized is ATmega328. They have additionally utilized a GSM module which causes the framework to be utilized remotely.

In this paper we presents a minimal effort and adaptable home control and checking framework utilizing an inserted small scale web server, with IP network for getting to and controlling gadgets and machines remotely utilizing Android based Smart telephone application. The proposed framework does not require a committed server PC as for comparative frameworks and offers a novel correspondence convention to screen and control the home condition with something other than the exchanging usefulness. To show the achievability and viability of this framework, gadgets, for example, light switches, control plug, temperature sensor and current sensor have been coordinated with the proposed home control framework.

In this paper Ahmed EIShafee, Karim AlaaHamed presents a design and prototype implementation of new home automation system that uses WiFi technology as a network infrastructure connecting its parts. Their system consists of two main components; the first part is the server (web server), which presents system core that manages, controls, and monitors users home. Users and system administrator can locally (LAN) or remotely (internets) manage and control system code. Second part is hardware interface module, which provides appropriate interface to sensors and actuator of home automation system[3]. Unlike most of available home automation system in the market the proposed system is scalable that one server can manage many hardware interface modules as long as it exists on Wi-Fi network coverage. System supports a wide range of home automation devices like power management components, and security components[4]. The proposed system is better from the scalability and flexibility point of view than the commercially available home automation systems.

Home automation system using android and Wi-Fi:- The idea of automation can be dated to October 2014, When Kunal Khivensara, Gulam Hussain, Nitish Bansal, Vikas Kumar developed the idea of having a remote control. It is Wi-Fi based system. This project proposed which is very different than existing system. They were going to implement it with the help of directly Wi-Fi which fits the bill of WLAN 802.11 standards. The main advantage of this system was that it can be implemented with a wider range of not more than 200 meters. It allows communicating with a brief and small setup without zap wired connection[5]. This system could be extended for a proper HVAC.

4 PROPOSED SYSTEM

Home automation is needed to be without new wiring and to be very easy installation. The proposed system architecture generally incorporates a arduino computer for the proposed of network management and provision of web page access. It can be configure according to our home system. The user will communicated to arduino through internet via Wi-Fi network.

5 BLOCK DIAGRAM

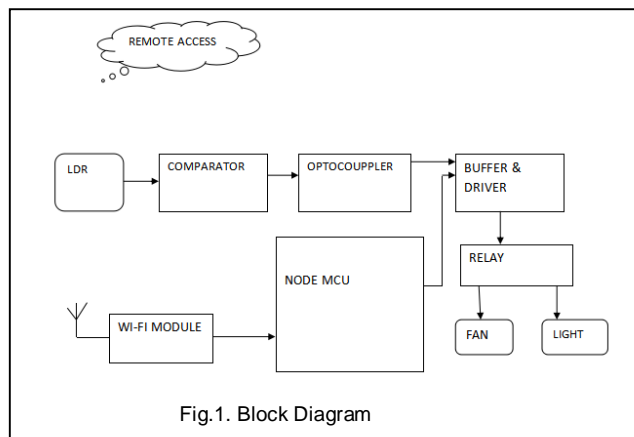


Fig.1. Block Diagram

In this project devices are controlled remotely by using NODE MCU. Mobile has to be configured by using application and connect that to NODE MCU by using Wi-Fi connection. Once the connection is established then devices can be controlled remotely. NODE MCU receives the input and according to that it generates the output. The o/p from NODE MCU is connected to BUFFER here buffer acts as logic amplified and amplifies the voltage and feed to DRIVER via by using signalling diode and driver is used to drive the Relay which will drive the LOAD (FAN ,INCANDESCENT LAMP).

Illumination control will be done by LDR the o/p of Ldr is connected to the comparator it compares the applied input with reference i/p then generates the o/p and is applied to the Optocoupler where this acts as isolator in b/w comparator and driver stage. The o/p of opto-coupler is connected to driver stage which is used to drive the relay. The relay will drive the LOAD where the load will trigger according to the illumination.

6 FLOW CHART

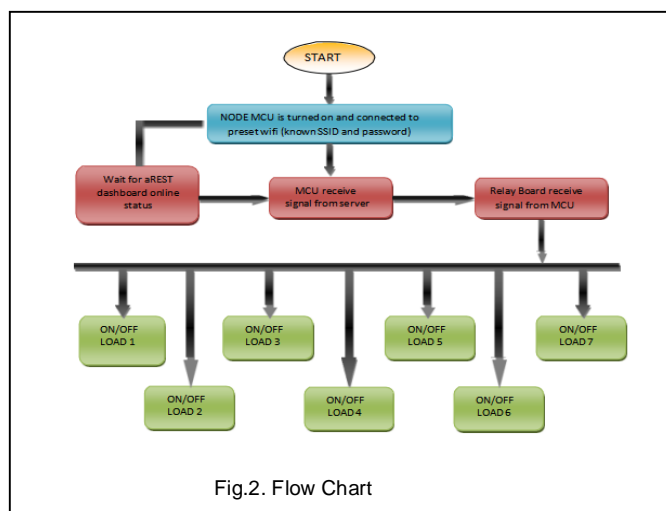


Fig.2. Flow Chart

7 HARDWARE DETAILS

1. Power supply unit

This section needs two voltages viz., +12 V & +5 V, as working voltages. Hence specially designed power supply is constructed to get regulated power supplies.

2. Buffers (IC 4050, 16pin IC, acts as logic amplifier)

Buffers do not affect the logical state of a digital signal (i.e. a logic 1 input results in a logic 1 output whereas logic 0 input results in a logic 0 output). Buffers are normally used to provide extra current drive at the output but can also be used to regularize the logic present at an interface

3. Drivers (IC 2003, 16pin IC, acts as inverter)

This section is used to drive the relay where the output is complement of input which is applied to the drive but current will be amplified

4. Relays (Electromagnetic switch)

It is an electromagnetic device which is used to drive the load connected across the relay and the o/p of relay can be connected to controller or load for further processing.

5. IoT Device

ESP8266 Wi-Fi It is a ready-made open-source development board with ESP8266-12E chips which runs on ESP8266 Wifi from expressive systems. Modules embedded on it are: ADC, HTTP, MQTT, Wi-Fi, Web socket, SPI, bit etc[7]. It works on supply voltage of 3.3 volts. It has hardware similar to that of Arduino but has some extra features. It is simple, smart, interactive, open source, easy to program, Wi-Fi enabled IoT device. Esp8266 Wi-Fi module present on Arduino Uno is self-contained SOC with integrated TCP/IP protocol stack that provide access to your Wi-Fi network by any microcontroller.ESP8266 can either host an application or offload all functions of Wi-Fi networking by another application processor.

6. Building the firmware

There are three ways to build Node MCU firmware: Cloud build service, Docker image, Linux build environment. For building it manually default configuration in C header file(user modules.h, user config.h)is designed and made to run on all ESP modules including ESP-01(512 KB Modules)and also includes general purpose interface modules which require a maximum of two GPIO pins.

8. NODE MCU

8.1 Principle and Operation

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266[6]. It uses many open source projects, such as lua-cjson, and spiffs.

The REST framework is a complete solution to build powerful RESTful applications based on the Arduino, Raspberry

Pi and node mcu platforms. It can handle all kind of communications via Serial, WiFi, Ethernet, and much more. At first we have to create an account in dashboard.arest.in website. It is giving us a platform to control the load through relays globally. After that an API Key is generated for that particular account. It is given to our main program and the device ID is attached with it

On the other hand, Node MCU is to be connected with host device. When a Signal is given to Node MCU for controlling any of appliances(i.e. Electrical Loads) the particular Relay Switch which is connected to particular load to be controlled(ON/OFF) is getting signal from Node MCU and it is turned on as well as the load is switched on.

8.2 Advantages

- Low cost : The Node MCU is less costlier than any other IoT based Devices. Because the wifi module which is used in it is of lowest cost.
- Hardware Part: It has Arduino Like hardware I/O. It is becoming very popular in these days that Arduino IDE has extended their software to work in the field of ESP 8266 Field module version.
- Network API: Node MCU has easily configurable network API.
- Integrated Wifi Module: ESP 8266 is incorporated in NODE MCU.It is an easily accessible wifi module

9. FUTURE SCOPE

Improvements in the technology available in Automation, such as improvement in Wireless Automation solutions as well as lowering of price points as the market begins to accept Home automation usage in larger volumes. Some trends that we foresee for this phase of the industry are

- Big companies like Philips, Siemens & Schneider will eventually bring out fairly mass market automation products with appealing user interface but at a lower price point than today, and more people will be able to afford the products
- Solution offerings will slowly move to a more user friendly design, where aside from a few key components, users will be able to buy and use the Automation products themselves without the aid of any technical expert
- Some foreign players will have niche in high end automation and focus on the premium market (>20 Lakh ticket size)

10. CONCLUSION

A Smart Home system integrates electrical devices in a house with each other. The techniques which are going to use in home automation include those in building automation as well as the control of domestic activities, such as TV, fan, electric tubes, refrigerator and washing machine. After studying and understanding literature survey and other existing works, we proposed a Novel technique that will gives us better understanding of the Environmental conditions in home. Our system not only just monitors environmental conditions but it acts according to inhabitant requirement. In this paper we are planning to eliminate most of the human interaction by providing intelligent system. Development of such Smart Home

achieve by using Internet of Things technologies. By using these system we can actually manage to make low cost, flexible smart homes to adjust its environmental conditions and resolve its errors with energy saving.

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