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IOT Home Automation System

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Abstract- Internet of Things (IOT) conceptualizes he idea of remotely connecting and monitoring real world objects through the internet. When it comes to our house, this concept can be incorporated to make it smarter, safer and automated. This IOT project focuses on a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and raises an alarm optionally. Besides, the same can also be utilized for home automation by using same set of sensors. The Internet of Things (IOT) belief system looked as an exceptionally unique and radically distributed networked system composed of a very large number of identifiable smart objects. These objects can convey and interface among themselves, with end-users or different elements in the system. The proposed system reduces the resources like manpower and time In this project, IOT technology has been adopted in which internet used as a tool to connect and exchange the data among the different types of devices

Keywords- Home Automation System, Mobile app, Internet of Things (IoT), energy efficiency

I. INTRODUCTION

We live in an exciting time where more and more everyday things are becoming smart. Appliances have sensors and can communicate to other things and can provide control to more things. The Internet of Things, IoT, is in a huge way and people are rapidly inventing new gadgets that enhances lives. The price of microcontrollers with the ability to talk over a network keeps dropping and developers can now tinker and build things inexpensively IoT based home automation project is done using low cost ESP8266 Espino ESP-12 Wi-Fi Module, It uses relays and few simple components, four electrical devices can be controlled and temperature can be monitored ESP-12 is low-cost module is used here Homes of the 21st century will become more and more self- controlled and automated due to the comfort it provides, especially when employed in a private home A home automation system is a means that allow users to control electric appliances of varying kind.

Many existing, well- established home automation systems are based on wired communication. This does not pose a problem until the system is planned well in advance and installed during the physical construction of the building But for already existing buildings the implementation cost goes very high In contrast, Wireless systems can be of great help for automation systems. With the advancement of wireless technologies such as Wi-Fi, cloud networks in the recent past, wireless systems are used every day and everywhere

II. LITERATURE SURVEY

There are several researches related to home Automation Platform using IOT device Along with this in the past, the research on the IOT has been made along with the study on various applications of internet of things. The growth of Internet of Things (IOT) in future is totally depending upon us. This paper has presented a design and prototype implementation of new home automation system

that uses Wi-Fi technology as a network infrastructure connecting its parts. Hence, they concluded that the required goals and objectives of home automation system have been achieved The system design and architecture were discussed, and prototype presents the basic level of home appliance control and remote monitoring has been implemented. Finally, their system is better from the scalability and flexibility point of view than the commercially available home automation system This system is designed to be low cost and expandable allowing a variety of devices to be controlled. The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet

III. PROROSED WORK

The Node MCU unit is the microcontroller or the main controlling unit of the system. The user uses the mobile application in setting commands for functioning of the appliances. The mobile application interprets the command form in user in voice or switch mode and sends signal to the Node MCU unit, over a wireless network established by Wi-Fi communication

Component Used

ESP8266

Figure 1: ESP8266

Node MCU is an open-source platform based on ESP8266 which can connect objects and let data transfer using the Wi-Fi protocol. In addition, by providing some of the most important features of microcontrollers such as GPIO, PWM, ADC, and etc., it can solve many of the project's needs alone.

16X2 LCD Matrix

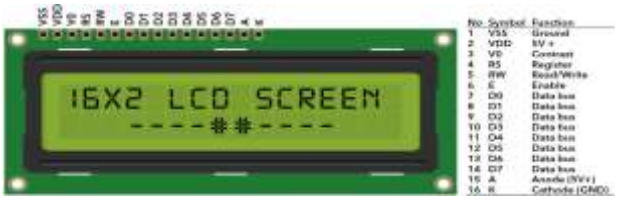

Figure 2: 16X2 LCD Matrix

An LCD (Liquid Crystal Display) screen is an electronic display module and has a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines.In this LCD each character is displayed in 5x7 pixel matrix The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols This LCD has two registers, namely, Command and Data Command registers stores various commands given to the display Data register stores data to be displayed The process of controlling the display involves putting the data that form the image of what you want to display into the data registers, then putting instructions in the instruction register

LED

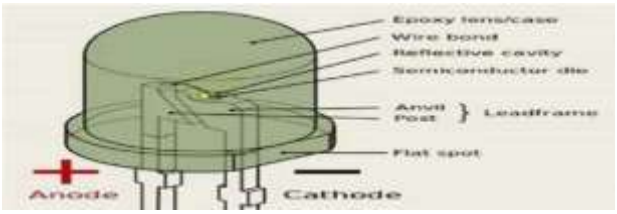

Figure 3: LED

A light-emitting diode (LED) is a semiconductor device that emits light when an electme current is passed through it. Light is produced when the particles that carry the current (known as electrons and holes) combine together within the semiconductor material.

Since light is generated within the solid semiconductor material, LEDs are described as solid-state devices. The term solid-state lighting, which also encompasses organic LEDs (OLEDs), distinguishes this lighting technology from other sources that use heated filaments (incandescent

and tungsten halogen lamps) or gas discharge (fluorescent lamps)

PCB

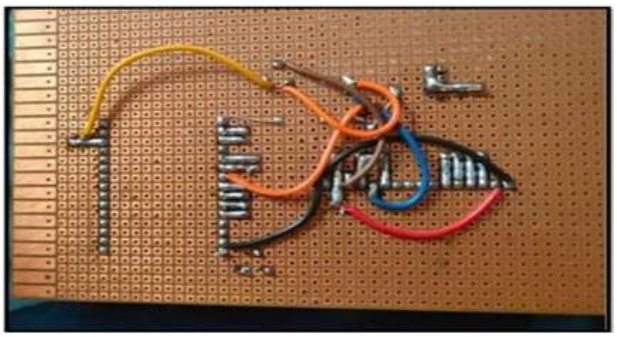

Figure 4: PCB

Printed circuit board (PCB) is a highly reliable and durable physical circuit design that has become an essential component of any electronic device. Printed circuit boards are made of a very thin substrate board embedded with electronic components interconnected using thin-layer of copper interconnecting traces Image. The board substrate is usually made of fiberglass composite epoxy substrate or other laminate materials. The circuit will contain both active and passive components. With more advanced and smaller component availability it is possible to accommodate a very large and complex circuit in a small PCB design. PCBs are of three types Single side, Double side, and multi-layered boards Single-sided boards have the components on one side of the substrate Double side have components on both sides In a multi-layered board, multiple layers of printed circuits are separated by insulation layers. In double- sided and multilayer PCBs components are interconnected by drilling holes at appropriate points and plating them with conducting materials

Bread Board

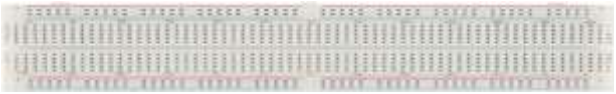

Figure 5: Bread Board

A breadboard is a rectangular board with many mounting holes. They are used for creating electrical connections between electronic components and single board computers or microcontrollers such as Arduino and Raspberry Pi the connections aren't permanent and they can be removed and placed again. In fact, you can even replace components to customize your project or work on a completely different one, using the same breadboard The vertical columns of the breadboard are called terminals, while the horizontal long rows are called power rails because they are mostly used to connect the power supply to the breadboard The positive rails are indicated by red lines, while the negative rails are indicated by black ones

Working

The Home Automation System is operating with Node MCU ESP8266 controller and the command is given by the Blynk application in a mobile phone using the WiFi network. The Node MCU ESP8266 has an inbuilt Wi-Fi module and the devices connected with Home Automation System. Both Wi-Fi is connected with an authentication token. The heart of today's project is the Wi-Fi enabled board that needs no introduction to the ESP8266 based Node MCU_ development board. It is an open-source platform for developing Wi-Fi based embedded systems and it is based on the popular ESP8266 Wi-Fi module, running the Node MCU firmware Node MCU was born out of the desire to overcome the limitations associated with the first versions of the ESP8266 module which was not compatible with breadboards. It was difficult to power and even more difficult to program The Node MCU board is easy to use Low cost and that quickly endeared it to the heart of makers and it is one of the most popular boards today For this project two channel relay modules are added to the ESP8266 board. The project flow involves the control of Node MCUs GPIO from a webpage on any device connected on the same network as the board. The status of the GPIO's control the coil of the relays and causes the relay to alternate between normally open(NO) and normally close(NC) condition depending on the state of the GPIO, thus effectively turning the connected appliance "ON" or "OFF Now the operation is gone by giving supply either Micro USB or Vin, GND. It can operate by Blynk application in mobile phone te, Android or iPhone by manual and via Google Assistant with

voice The Hardware is well operated according to our action

Circuit Diagram

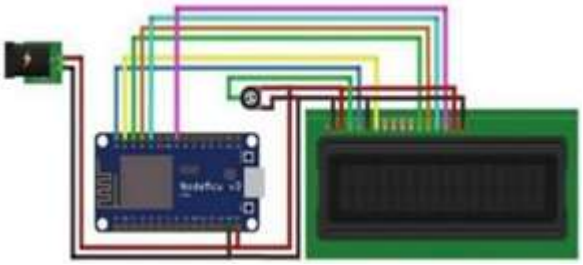

Figure 6: Circuit Diagram

- RS pin of LCD-DO pin of NodeMCU
- EN pin of LCD-DI pin of NodeMCU
- D4 pin of LCD-D2 pin of NodeMCU
- D5 pin of LCD-D3 pin of NodeMCU
- D6 pin of LCD-D4 pin of NodeMCU
- D7 pin of LCDDS pin of NodeMCU

Similarly connect pin 1. 5. 16 of LCD to GND & Pin 2., 15 to 5V VCC A 10K Potentiometer should be used at pin 3 of LCD to adjust the contrast. The whole device operates at SV

Flowchart

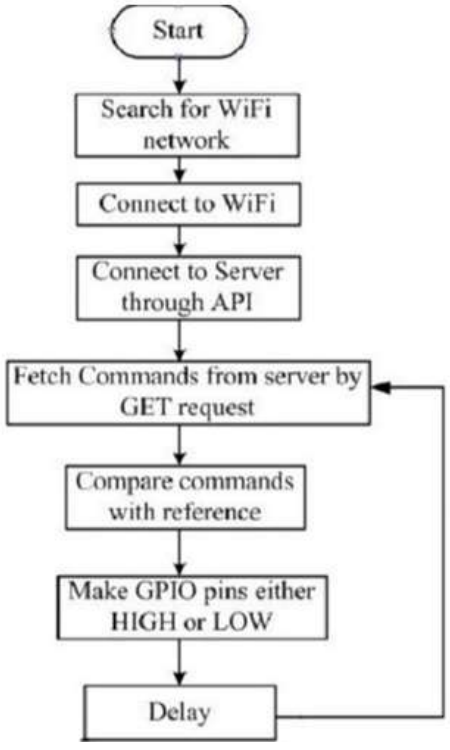

Figure 7: Flowchart

IV. EXPECTED IMPEMENTATION

The loT based Home Automation will enable the user to use Home Automation System based on Internet of Things (IoT) The modern homes are automated through the internet and the home appliances are controlled. The user commands over the internet will be obtained by the Wi-Fi modems. The Micro controller has an interface with this modem The system status is displayed through the LCD display, along with the system data This is a typical lo T based Home Automation system for controlling all your home appliances The smart home market is taking off as lot device prices come down and the general public comes to understand the benefits of these products And from smart homes, the next logical step is smart cities, which would take the lot to the next level And yet, smart homes are just one small part of our daily lives that the Internet of Things will transform in the coming year.

Application

The designed system is flexible to implement any of the below applications.

- Security at commercial places.
- Lighting at homes.

V. CONCLUSION

The Home automation using Internet of Things has been 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 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

The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple applunces to it and the appliances were successfully controlled remotely through Internet. Home automation is undeniably a resource which can make a home environment

automated People can control their electrical devices via these home automation devices and set up controlling actions through mobile. In future this product may have high potential for marketing. Further it can be lemonstrated from computer instead of mobile phones for controlling appliances of any large places like industries, hospitals institutions etc. centrally

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