

Smart Home Automated Control System Using IOT

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ABSTRACT

IOT(Internet of Things) is defined as any physical device which is connected to the internet is referred as IOT. The main purpose of this project is to control any load through the internet network with the help of "cloud remotely" on the basic principle of IOT. The IOT can be any device with any kind of built-in-sensors with the ability of collecting and transferring data over a network without manual intervention. A Home Automation System, based on the IOT, makes the consumers life easier, more comfortable, faster and more secure.

In this paper we use cloud process to store various information and we use "Google assistant" to execute the output. Cloud computing system helps to connect the surroundings devices, so that one can find it easy to access anything and everything at any time and any places. This system is designed to be cost efficient and it allows a variety of devices to be controlled.

KEYWORDS

IOT, Cloud, Google Assistance, Wireless Technology.

Introduction

IOT based home automation system aims to control devices of our home appliances through IP or cloud computing. Internet of things(IOT) plays a major role in many fields like business sector, agriculture, manufacturing products, etc., The microcontroller in IOT is known as ESP8266 which is from Espressif system.

This is the state of art microcontroller which is the first of its kind to have an Inbuilt wi-fi transceiver and microcontroller which also receives commands from any remote location web, access to control the electrical loads.

Automation is the method of operating a variety of engineering processes, equipment, machinery

and other applications with the mechanism of control systems. Also there will be no human intervention in this method.

The method of operating home appliances without human intervention is known as Home automation using various control system techniques. The electronic appliances such as fire alarm, fan, outdoor lights, lights, kitchen timer, etc., in the home can be automated using various control techniques.

The cloud is used to send the sensor data to the Google assistant through Wi-Fi module and then a decision tree is implemented which decides the output of the electronic devices and also it is used to achieve the power control and local data exchanging.

Aim of the Project

The project aims at designing an advanced home automation system using normal web server and Wi-Fi technology. The devices can be switched ON/OFF and sensors can be read using a Personal Computer (PC) through Wi-Fi. Home automation has different kinds like remote control home automation, mobile phone home automation. This project is based on a wireless control home automation system, which could help to save energy like electricity and lots of physical strength using the internet.

The Internet of Things technology is used to come in with innovative idea and large development space for smart homes to improve the living standards of life. The growth of the Internet of Things will reform a number of sectors, like healthcare, automation energy, transportation, etc. Cloud computing can be used in such case to implement the IoT infrastructure that augmented with sensors and actuators to monitor and control “things” from anywhere. Cloud computing provides scalable computing power, storage space and applications, for developing, maintaining, running home services, and accessing home devices.

Home Automation

Home automation has different kind like remote control home automation, mobile phone home automation.

This project is based on wireless control home automation system, which could help to save energy like electricity and lots of physical strength using internet.

Home automation system is the procedure how people can get automated performance from all devices which we cannot get with our physical efforts.

Voice Recognition based Home Automation

The wireless communication between the smartphone and the Arduino UNO is done through Bluetooth technology. This will be more helpful for handicapped and aged people who want to control appliances by speaking voice command. The disadvantage of this method is that communication between voice recognition tool and user is dependent on signal to noise ratio (SNR). The accuracy of the system will be less if the noise of the voice signal is high since it affects the communication highly.

Literature Survey

This paper describes about the home automation using internet of things and wireless sensor network [1]. The aim of this project is to extend the home automation to the large scale environment faster and smart [2]. This system uses mobiles or computers to control basic home appliances and function automatically. The proposed system is a distributed home automation system, consists of server such as Wi-Fi module, sensorsetc [3]. The exciting opportunities yet to increase the connectivity and relationship of home devices for home automation purposes to the internet.

Existing System

[1] Bluetooth based home automation system using cell phones: The smart home concept in the system increases the standard of living. 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.

[2] SMS Based Home Automation System: This system presents style and model implementation of a basic home automation system based on SMS technology. Sensors and actuators are directly connected to hardware small controller through appropriate interface. System supports a good vary of home automation devices; power management components, security, transmission applications, and telecommunication devices.

Working Principle

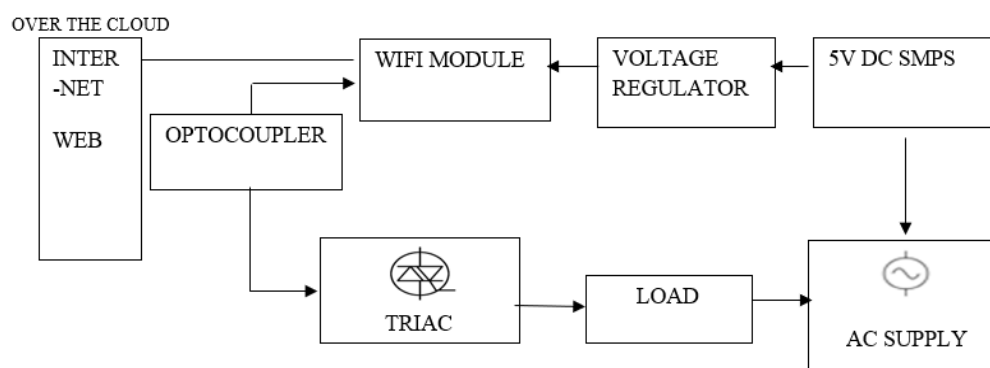


Fig. 1.Block diagram

A Wi-Fi Module is used to access the internet configured with any nearby wireless modem. Loads can be controlled and monitored using a web page. The user can give commands through the allotted IP and these commands are received by Wi-Fi module. The program within the Wi-Fi Module executes the received commands based on which the load gets activated through TRIAC and Opto-coupler interfaced to Wi-Fi Module.

The Cloud-based-Networking system helps to store and maintaining data over the Internet location. This helps users to have access to the data from any location on the planet.

IoT users can send commands to the hub even from a distant or remote location over the cloud network. The sensors will receive the signal from the hub to trigger and perform the user-requested action. The status of the action will be updated by hub. Once the action is performed, it will be taken to the cloud network and in this way users can control and monitor very aspects of their smart homes.

NODEMCU ESP8266

NodeMCU is an open-source based firmware developed for the ESP8266 wifi chip. By exploring functionality with the ESP8266 chip, NodeMCU firmware comes with the ESP8266 Development board/kit i.e. NodeMCU Development board. NodeMCU Kit/board consists of ESP8266 wifi enabled chip. The ESP8266 is a low-cost WIFI chip developed by Espressif Systems with TCP/IP protocol. There is Version 2 available for NodeMCU Development Kit NodeMCU Development Board v1.0 (Version 2), which usually comes in black coloured PCB.

Relay

A relay is an electrically operated switch. Electromagnet is used to operate a switching mechanism or other operating principles are also used by the relays. Relays are used to control a circuit by a low-power supply.

The operating principle of relay is a magnetic field is created by the current flowing through the coil which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw switch.

WI-FI Module

Wi-Fi is a networking technology used for exchanging the information between two or more devices without using cables or wires. There are different types Wi-Fi technologies are A, B, G, N and AC. Here, in this project Wi-Fi module is used to receive commands from the internet and activate loads through TRIAC & Op-to-coupler by executing a program written within the Wi-Fi module.

OPTO-Coupler

The package of light emitting device and light sensitive device without any electrical connection is called as an Op-to-coupler or Op-to-isolator. Connection between the light emitting devices & light sensitive devices, beam of light is used. The light emitting device is an LED and light sensitive device is a TRIAC. Thus, Op-to-coupler and TRIAC are used to drive loads based on the signal received from the Wi-Fi module.

Voltage Regulator

It is an electronic device used for regulating voltage in a power system. There are various types of voltage regulators are used such as variable voltage regulator & fixed voltage regulators which

are subdivided into several types like electro-mechanical, automatic voltage regulator, linear, hybrid regulators, etc. Here, we are using 3.3V voltage regulator to provide required power supply to a Wi-Fi module from 5V SMPS power supply.

Web Server

A web server is a program that serves content using the HTTP protocol. This content is frequently in the form of HTML documents, images, and other web resources, but can include any type of file. The content served by the web server can be pre-existing or generated on the file. In addition to the web-based application, the service runs on IOS and Android.

Cloud Computing

The cloud based approach provides a secured real time monitoring and controlling via internet over different systems at home from any desired location, without the need for a large memory to store devices data, or any added hardware. Cloud computing relies on sharing or storing the data which is given as input through the web server.

Using a mobile application as a user interface and a microcontroller to connect different devices, the user can also control the devices using the cloud networking.

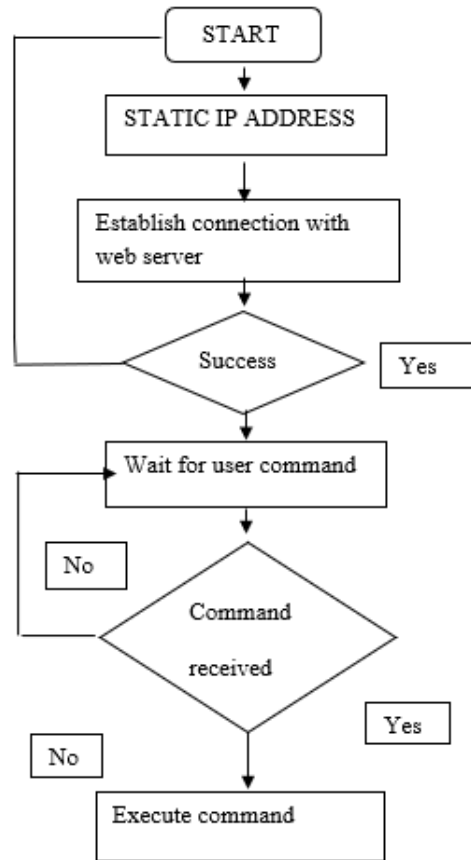
1. Advantage

- High efficiency than the existing systems.
- It is compact and portable.
- Easy and flexible to operate.
- Cheaper and high reliability.

2. Disadvantage

- Complexity.
- Short range monitoring.
- High data speed required.

Flow Chart



Future Goal

There are a variety of enhancements that could be made to this system to achieve greater accuracy in sensing and detection.

- a. There are a lot of other sensors that can be used to increase the security and control of the home like pressure sensors that can be put outside the home to detect that someone will enter the home.
- b. Changing the way of the automated notifications by using the GSM module to make this system more professional.
- c. Future scope for the home automation systems involves making homes even smarter. Homes can be interfaced with sensors including motion sensors, light sensors and temperature sensors and provide automated toggling of devices based on conditions. Home automation offers a global standard for interoperable products
- d. A smart garage that can measure the length of the car and choose which block to put the car into it and it will navigate the car through the garage to make the parking easy for the homeowner in his garage.

Conclusion

The aim of this work is to control home appliances automatically through a voice based by Control. This application is not bounded by distance constraint. The home automation system has

been experimentally proven to work satisfactorily by connecting sample home appliances to it and the appliances were successfully controlled by a wireless mobile device.

This application is highly consistent and proficient for the elderly people and differently able person on a wheel chair who cannot reach the switch, for switching ON/OFF the device.

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