Home Automation System Based on IOT using Cellular Devices

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ABSTRACT

This project is to develop a home automation system using Arduino Uno microcontroller which may be used to control the house appliances through mobile application via the internet. Nowadays, individuals have smartphones with them all the time; therefore it is sensible to control home appliances using golem app, that you'll be able to use to manage electrical home appliances with a simple click and these commands are sent via the web. In this project, we've got an inclination to tend to use the ESP8266 computer network module and Arduino Uno. Using this, we have a tendency to square measure attending to be ready to management lights, electrical fans, and other home appliances through a mobile. The appliances square measure connected to relays that unit controlled by the Arduino Uno. Unlike most getable home automation system at intervals the market, the planned system is ascendible that one server can manage many hardware interface modules as long as a result of it exists on computer network coverage. The system supports an outsized vary of home automation devices like power management components and security components. The planned system is better from measurability and adaptableness purpose of browse than the commercially get able home automation systems.

Keywords : ESP8266, Computer Network, Arduino Uno, Home Automation System, IOT, GPRS, HAP

I. INTRODUCTION

An IOT system controls electronic device at home whether you are inside or outside the house. A smart home is one, that is equipped with lighting, heating, and electronic devices that can be controlled remotely by smartphone or via the internet.

ESP8266 Wi-Fi module is a wireless communication technology, which is used to provide a hotspot through which devices can connect. The router will assign a unique IP address to the module for establishing a connection between smartphone and ESP8266.

Arduino UNO is an open-source platform which consists of both, a physical programmable circuit board (often referred to as a microcontroller) and software that runs on your computer, used to write and upload computer code to the physical board.

1.2. Aim and Objectives

The project aims at designing an advanced home automation system using a 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.

Controlling Home Appliances via Application:

To develop an application that includes the features of switches and appliances. Switch Mode can be used to control the switches of home appliances.

Controlled by any Device capable of Wi-Fi (Android, iOS, PC):

To make the home appliance flexible to control any device capable of Wi-Fi connectivity and will be able to control the home appliance from the remote location.

Extensible platform for feature enhancement:

The application is to be highly extensible, with the possibility of adding features in the future as required.

II. METHODS AND MATERIAL

2.1. Related Work

Central Controller-based Home Automation System

A central controller-based home security system can be implemented by combining many homes into a secure network with a control node dedicated to each locality depending on the number of users. There are few central or chief control nodes with high processing power, which controls these nodes. There must be a considerable number of homes in the locality to implement this system. So that it will be cost effective and maintainable. A person having central control and its data will be able to know about a home's private information from the data at its disposal, like if a room AC is off or on. This may cause serious privacy concerns. A home automation

Security System called Smart Eye using GPRS also uses a central controller, to which many individual home controllers are connected [5]. This system proposes a real-time monitoring system and home automation. The user can view the house using live camera feeds. The system notifies the homeowner by mobile phone using GPRS, Smart Eye uses video cameras for security. This proposed system is also not suitable for securing single homes but is suitable for a group of homes. This central controller-based security system is difficult to implement and can cause some very serious privacy concerns.

Bluetooth-based Home Automation System:

The work of N. Sriskanthan et al. [6] shows the implementation of a home automation system using Bluetooth. They used a number controller enforced on a laptop that was connected to a micro-controller based mostly sensing element and device controller. Home Automation Protocol (HAP) is planned to form the communication between devices potential. The system permits more than one device controller to be connected to the host controller. The work of H. Kanma et al. [7] conjointly proposes a home automation system using Bluetooth which will be accessed remotely through GPRS. The paper mentioned dominant and change home devices together with fault detection and medicine remotely. The work conjointly talks regarding providing associate natural philosophy user manual on the phone using Bluetooth and also the web.

2.2. System Architecture

Our projected system is associate degree Arduino primarily based home automation through with Arduino connected to a Wi-Fi associate degreed controlled via a humanoid app or a social media network. This technique deals with safety in the home and sensible home technologies which is able to be cost-effective. diagram of the projected system is shown in Fig.

The system has 2 components, namely; hardware and software system. The hardware system consists of Arduino Uno board, Arduino Wi-Fi and residential appliances. The package consists of a java based mostly automaton application additionally C language is employed to piece the Arduino Uno board. during this system, the elements used square measure the Arduino Uno board, Arduino Wi-Fi. These hardware elements ar utilized in order to manage the house appliances. Arduino Uno board can facilitate to develop Associate in Nursing interface between the hardware and therefore the computer code application. this method conjointly consists of a computer code application that is developed mistreatment robot. The Arduino Wi-Fi can facilitate in transmittal and receiving the input given by the user.

Home automation is the process of controlling home appliances automatically using various control system techniques. The electrical and electronic appliances in the home such as fan, lights, fire alarm etc., can be controlled using various control techniques.The controlling device for the automation in the project is a Microcontroller. The data sent from PC over Wi-Fi will be received by Wi-Fi module connected to Microcontroller. Microcontroller reads the data and decides the switching action of electrical devices connected to it through Relays. The Microcontroller is programmed used embedded 'C' language.
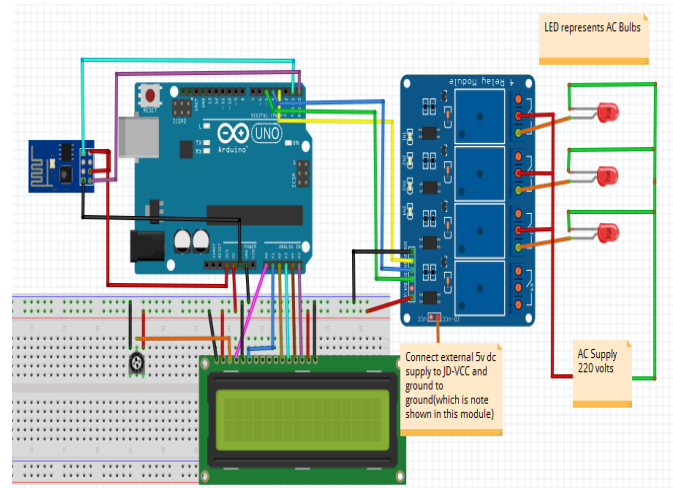

Fig. 2.2. System Architecture

2.3 Existing Methodology

The recent developments in technology which allows the utilization of Bluetooth and wireless fidelity enabled completely different devices to own capabilities of connecting with one another. employing a wireless fidelity protect to act as a small internet server for the Arduino eliminates the necessity for wired connections between the Arduino board and laptop that reduces value and permits it to figure as a standalone device.T he wireless fidelity protect desires affiliation to the web or from a wireless router or wireless hotspot and this might act because the entrance for the Arduino to speak with the web. With this in mind, associate internet-based home automation system for remote of home appliances is meant.

III. PROPOSED SYSTEM

Proposed Approach/Work
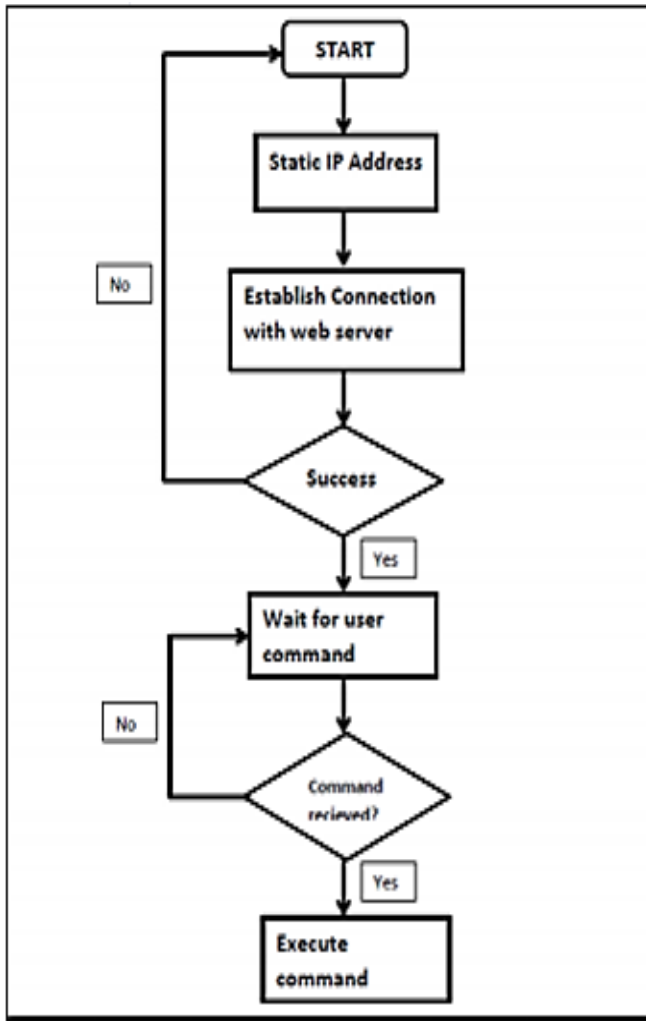
Fig 3. Flowchart for connection establishment and command execution

A low value and economical good home system ar conferred in our style. this method has 2 main modules: the hardware interface module and also the computer code communication module. At the center of this method is that the Arduino smallcontroller that is additionally capable of functioning as a micro net server and also the interface for all the hardware modules. All communication and controls during this system labor under the microcontroller. It offers change functionalities to regulate lighting, fans/air conditioners, and different home appliances connected to the relay system. and every one these are often controlled the robot smartphone app or net applications.

Home automation is that the method of dominant home appliances mechanically exploitation varied system techniques. The electrical and electronic appliances within the home like the fan, lights, hearth alarm etc., may be management exploitation varied control techniques.

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IV. RESEARCH METHODOLOGIES

4.1 Analysis

Home automation has become more and more popular in recent years. It aims at helping people manage the home appliances freely and build an autonomous environment in home. The aim of this project is the home automation with full security and controlling the home appliances using wireless communication as Wi-Fi. We design this smart home system with the implementation of related software and hardware.

The main objective of this project is to automate homes, using Arduino Uno microcontroller. It can be used to control the home appliance through mobile application via the internet. Nowadays people have smartphones with them all time so it makes sense to control home appliances using android app. It can be used to control electrical home appliances with a simple click via the internet.

In this project, we are using a module named ESP8266 as wifi system and Arduino Uno as a

platform to control light, fan and other home appliances.

V. CONCLUSION

It is over that HOME AUTOMATION SYSTEM victimization ARDUINO was a hit. this method consists of associate Arduino-Uno board, a Wi-Fi Module, associate robot phone, power sockets, home appliances, associated a robot Application. it's easy and is value effective. Also, it is over that the objectives of this project are with success met and that they square measure as follows: create a wireless home automation system controlled by a Smartphone specifically associate robot device. Designed associated implement cost-efficient home automation system nevertheless an economical one. Designed an easy and a secure system to regulate home appliances particularly aimed to help elders and disabled.

VI. REFERENCES

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