



## Ingenious Home Automation System

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# Ingenious Home Automation System – A Study

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## **Abstract:**

Ingenious Home Automation System is a wireless home automation system that is supposed to be implemented in existing home environments, without any changes in the infrastructure. The system consists of a central device, a server and an Android or iOS application. The central device is a microprocessor, in this case, a Raspberry PI that connects to the Internet and receives an order to control the appliances, while the Amazon Web Services (AWS) server manages users and devices, and handles the communication between the application and the central device. The application is a frontend which presents the user with a list of devices to interact with. The system lets the homeowner control home appliances by using their smartphone or tablet, and voice recognition. This should happen depending on time or other sensor reading such as lights, door sensor, windows blinds, power outlet, and door lock. All these smart appliances are made of custom circuit boards to replace home automation prototypes and all these devices will be installed in residential for used in the real world.

**Keywords:** *Home Automation System, Raspberry PI, iOS, Android, Wireless Communication, Amazon Web Services, Smart Appliances, Real World*

## 1. Project Introduction

Home automation system remains as a special segment of brand for the exclusive user though it existed for decades due to its high rate. The popularity of home automation devices has seen reuptake to scale down unneeded electricity utilization especially with the energy crisis looming in the horizon. However, there are consequential cost devaluation in implement home automation systems. Wireless system is one of the best approaches for us as we could flatten wiring rate in ordinary home automation system. By 2016, ZigBee robotization, hands-free speaker you control with voice (Amazon Echo) and Robot Rovio of smart home automation has been introduced to us.[1]

Intelligent homes enhance common safety and security mechanisms by using smart access and monitoring control. People at the age of 60 years old will frontal a trouble roughly 25% of the society by 2020.[2] The World Health Organization (WHI) has stated that at least 750 million people live with disabilities throughout the world. It is pertinent to support these patients for nursing homes or medical centre for an uncertain time by provide usable technologies and healthcare services in patients' home surroundings. The current study on smart homes specify a common analysis of smart home research. It contained a discussion on implantable, wearable devices and dependable robots.[3]

This paper is an analysis of smart home automation projects, that are organized respectively to their proposed system. The constraint and significance of various technologies and smart home components used in home automation are also been deliberated. It justifies the future challenges and current flows of smart home research that must be overwhelm to develop a viable smart home.

The objective of this study is to control and monitor wireless ingenious home system that applicable for smart devices (e.g.: light, window shade, socket power strip and door sensor state), develop a sensor device that can prevent a potential security threat by send a notification message thru smartphone, and control several smart devices using voice recognition.

## **2. Design Methodology**

### **2.1 WORKS RELATED TO THE PAPER**

#### **2.1.1 GSM Based Home Automation System**

This system presents a completely unique, stand alone, cheap and versatile GSM – ZigBee primarily based home automation system, the complete system depends on a eight bit controller named PIC (Peripheral Interface Controller) during this work. The information instrumented designed around this Microcontroller and a GSM controller facilitate the guts of the system. This device is connected to ZigBee Transceiver and it communicates with every and each node gift within our home. The GSM controller facilitate for the information follow between user and microcontroller. The GSM Controller uses portable technology to speak. From the portable, command will be sent via SMS to the controller, that successively interprets the command so actives the specified 'switch' to regulate the electrical item. As long as there\s' GSM portable signal coverage, it\s attainable to regulate all electrical things from any place within the world. The system is straightforward to work, and is secure in this solely pre-determined mobile numbers will operate the GSM Controller. The installation of the GSM Controller is comparatively straightforward and may be tailored for any existing home system, management of lights and geyser area unit done via the electrical distribution board (circuit breakers).

#### **2.1.2 Bluetooth Based Wireless Home Automation System using FPGA**

This system primarily focused on Bluetooth technology with the help of the Bluetooth module (HC-05) and Android Phone, they control the home appliances, which all connected to FPGA board. Thus, in this paper the author has mentioned the advantages of the home automation, which not only reduces the human efforts, but it is also energy efficient and time saving. Moreover, they have included that it is also help to the handicapped and old aged people to control the home appliance without any difficulties. The module needs a high range as well it can operate in different frequencies. This drawback is overcome by their model Wi-Fi based networks work at 2.4, 3.6 and 5 GHz. In addition, it can extend up to range 100m.

## 2.2 PROPOSED SYSTEM

Ingenious Home Automation System can be described as introduction of technology within the home environment to provide convenience, comfort, security and energy efficiency to the home owners. Adding intelligence to home environment can provide increased quality of life. With the introduction of the Internet of Things (IoT), the research and implementation of home automation are getting more popular. Presently many researches have done that provide many home automation facilities with the proliferation of IoT. Ingenious Home Automation System usually is comprised of three main parts:

1. Main Controller (Raspberry PI)
2. Interfaces
3. Control Methods

### 2.2.1 System Block Diagram

In this system, we are going to make a home automation system using ESP8266 Wi-Fi module and Raspberry PI Model 3. With the help of these modules, we will be able to control lights, electric fan, window shade, socket and other home appliances through a Wi-Fi application using smartphone or tablets. All the appliances will be connected to relays, which are controlled by the Raspberry PI.

ESP8266 and Raspberry PI together act as a web server and it will send control commands through the mobile application, OpenHAB.

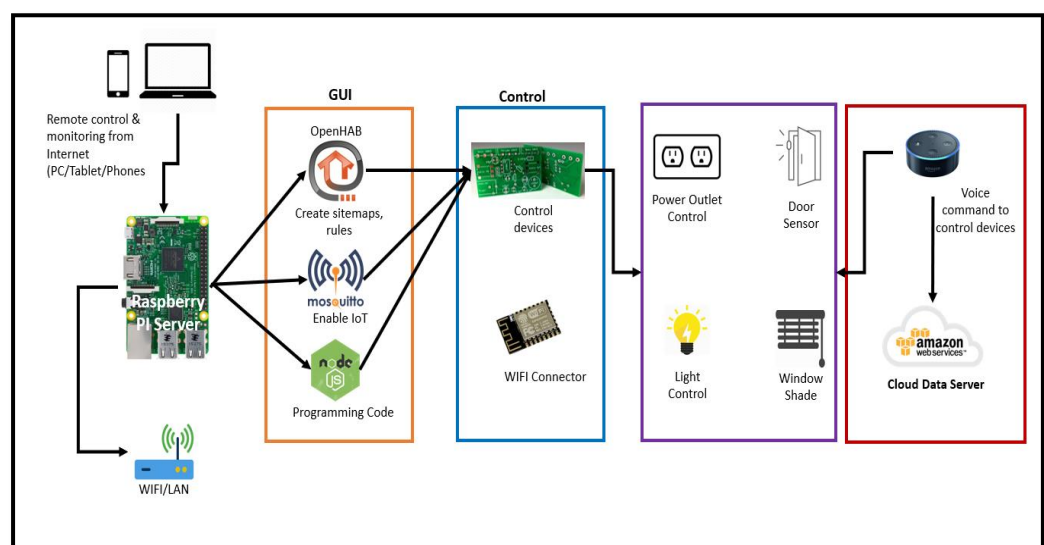


Figure A

### 2.2.2 Implementation

This project offers an important feature of ingenious home automation. In ingenious home, home owner can control their house by using the Graphical User Interface. Figure B shows the interface of this system.



Figure B

### 2.3. METHODOLOGY

The methodology of this project design can be divided into two (2) sections; hardware and software implementations. The hardware implementation consists of the development of the main controller, custom circuit board, sensor devices and the smart home while the software implementation focuses on the programming of the microcontroller, graphical user interface and voice recognition using embedded C, Nodejs and Angular.

### 2.4. CONCLUSION

This paper describes Raspberry PI module and presents its potential deployment in smart home environment. Examples of prototype application in ingenious home automation are illustrated. This system has attractive features such as window shade. In this perspective, raspberry PI is emerging network technology and is capable to satisfy such requirements.

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