



**K.L.E. SOCIETY'S**  
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(Affiliated to KARNATAK UNIVERSITY, DHARWAD)  
**HUBBALLI -580031**



**BCA DEPARTMENT**

**2019-20**

**A Dissertation Report**  
**On**

# **SMART HOME AUTOMATION**

Submitted in partial fulfillment of the requirement for the  
award of the degree

**BACHELOR OF COMPUTER APPLICATION**

Submitted by : **Rahul Anvekar**  
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**2019-20**

## **CERTIFICATE**

This is to certify that the project entitled **SMART HOME AUTOMATION** is a bonafied work carried out by the student team Ms. Harshada Hiremath- Reg No 217060 and Mr. Rahul Anvekar - Reg No 217036, in partial fulfillment of the award of degree of Bachelor of Computer Application during the year 2019 – 2020. The project report has been approved as it satisfies the academic requirement with respect to the project work prescribed for the award of BCA Degree.

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**Guide**  
**( Prof Sridevi)**

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**Principal**  
**(Prof Jyoti Maned)**

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**External Examination:**

**Name of the Examiners**

**Signature with date**

1.

2.

## **DECLARATION**

We here by declared that the project report entitled **SMART HOME AUTOMATION** submitted in fulfillment of requirement of BCA VI Sem Project work for the award of Degree in Bachelor of Computer Application of KARNATAK UNIVERSITY, Dharwad during the academic year 2019-20.

We further declare that this project report is the result of our original work and has not been submitted to any other organization or institute for the award of any degree or diploma.

Date:

Place: Hubballi

**Sign**  
**(Student Name)**

## **ACKNOWLEDGEMENT**

It's our pleasure to thank all the individuals who have directly or indirectly helped and motivated us in the fulfilment of completion of the project work.

We thank **ProfJyoti. Maned, KLESociety's P C Jabin Science College, HUBBALLI** for having given us all encouragement and motivation for making this project work successful.

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Finally, we would like to thank our family and friends for their constant motivation and inspiration that kept us going.

**Sign**  
**(Student Name)**

## **ABSTRACT**

The HomeAutomation is a wireless home automation system that is supposed to be implemented in existing home environments, without any changes in the infrastructure. HomeAutomation let user to control the home from his or her computer and assignation's that should happen depending on time or other sensor readings such as light, temperature or sound from any device in the HomeAutomation network.

The home automation becomes important, because it gives the user the comfortable and easily for using the home devices. The implementation and design of wireless home automation control used two methods, WLAN technology and RF remote control handheld to control of the selective home devices with integral security and protected system. The devices has been distributed in each room has its own board, these boards are connected to the desktop personal computer (PC) through one serial port RS-232 via microcontroller. The software consist of Assembly language for programming microcontroller (AT89C51 and AT89C2051) and visual basic language that use to communicate between PC and two boards, also it use to design Graphical User Interface (GUI) which involving all devices needed to display in Home PC screen . The system is low cost and flexible with the increasing variety of devices to be controlled. With advancement of Automation technology, life is getting simpler and easier in all aspects. In today's world Automatic systems are being preferred over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IoT is the latest and emerging internet technology.

**Dedicated**

**To**

**\*\*\*\*\***

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## **I. Introduction**

Today, technology has become an integrated part of people's lives. It has, and continues to influence many aspects of daily life and has allowed better social interaction, ease of transportation etc. Home automation or sensible home may be delineated as introduction of technology within the home atmosphere to provide ease and protection to its occupants. By using the technology of the internet of things, the examination and execution of home automation have got additional average.

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. General-purpose input/output (GPIO) is a generic pin on an integrated circuit or computer board whose behavior—including whether it is an input or output pin—is controllable by the user at run time. GPIO pins have no predefined purpose, and go unused by default.

IoT refers to the networked connection of everyday objects, which are often equipped with more intelligence. IoT will increase the use of the Internet by integrating every device for interaction via embedded systems, which leads to a distributed network of devices communicating with objects as well as other devices. Thanks to rapid research in underlying technologies, IoT is opening lot of opportunities for a large number of applications that promise to improve the quality of our lives. Internet of things allows the sense of control across different objects with the help of a network infrastructure. Statistics show that IoT will consist of more 50 billion objects by 2020. IoT systems are less complex with better space complexities and easy architecture. It plays an important role in providing secure and flexible environment and it also maintains the living standard. Home automation system using IoT is a way through which one can explore and control home appliances or devices with the help of internet connection.

IoT based home automation is a way of making home smart. Smart Homes can be described as technology within the home environment to provide convenience, comfort, security and energy efficiency. Using embedded system one can easily make a smart home and objects. Home automation can control each and every appliance or device with the internet. There was time when home automation was done with the help of Bluetooth and still it is existing with internet (wifi). In today's world each and every one is using internet on mobile as well as computer. Internet has become the basic need for everyone and thus internet can be used for controlling the basic devices or appliances like TV, lights, fans, Air conditioners and much more. There were systems which used only Bluetooth for home automations but now advance research leads to new technology which is known as internet of things. Controlling and handling the objects is the main objective for home automation using internet. System is designed in such a way that it can be implemented easily and design is secured and portable. System uses web as well as android smart phone for controlling objects.



## **II. Objectives**

The main objective of this project is to develop a home automation. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving wireless controlled switches.

- Comfort or ease of control
  - Entertainment
  - Security
  - User friendly
- 
- a. The home automation systems are used for controlling the indoor & outdoor lights, to control electrical appliances like fan and so on using various control systems with appropriate hardware components.
  - b. It aims at helping people manage the home appliances freely and build an autonomous environment in home.
  - c. The aim of this project is the home automation with controlling the home appliances using wireless communication as Wi-Fi. We design this smart home system with the implementation of related software and hardware.

## **III. Feasibility Study**

Automation, always a Team task and a single person cannot accomplish it alone. We cannot say to automation as a sub part of any project. Automation is also a kind of whole project which requires initiation, planning, monitoring, execution, reviews and control. If there is any need of Automation somewhere then surely there should be an objective also for the same. During analysis sticking with the Objective that what to automate is very much needed as sometimes what happened like for example if we are analyzing the Automation for any recurrent task can lead to automate the process in sub parts. So, if it is the case then have small objectives analyze it in parts and consolidate it to see, what the benefits of the same are globally now.

Analyzing any of the Application, recurrent cumbersome task, huge data operations tasks or Non Regression Tests. Before start analyzing the features to be automated, document them or write them somewhere that where exactly we need to put more focus may be on any of the functionality of the application, may be any of the objects on the Web Page, may be complex SQL queries usage, application delays, back-end services etc. This is the first step which makes us more confident that yes we can handle the tough scenarios and here after documenting them and manual analysis, it is good to prepare small automation scripts.

**Economic Feasibility**

The economic feasibility is related to prices of required material to run the system; these prices are relevant to suitable hardware and required software cost. After analyzing all the aspects for automation, we can move ahead for the exact development costs for this automation. My experience says it is good to use Work break down structure here as it will be very easy for anyone to have answers during proposal presentation with Management or with Client.

**Technical Feasibility**

One of the most important aspect as this derives the future team for the automation as well as the skill set we need to accomplish the task. Documenting all these needs will provide us the knowledge that how much cost we are saving using open source and or if we need total licensed tools that what all can be the yearly savings using this automation if we are spending on tools also. Usually this is also one of the question arises now a day's what you are using, any training needs, any tool purchase. All of the above questions will become negligible if we initially take care that we should go with current knowledge as well open source tools or frameworks of the team. Why this happens because it is not necessary that you are building automation for a customer only sometimes we automate for ourselves and if it is the case for the customer. We can say, Sir there will be no extra cost on tools and technology because we already have skills required, we have tools n framework and no extra cost is needed. Surely, customer feels more confident towards solution.

One of the most integral parts of feasibility study is the left manual intervention time during running the automation. Sometimes, what happened we take this into consideration after completing automation and then we realized that we have to put this much of manual effort also to run the same like in preparing inputs, environment preparation, results analysis etc. It is very much important to document this manual intervention and with steps to be followed for the same because may be while analyzing this manual effort; we can come up to introduce a small macro or small script which prepares our inputs etc.

**Organizational Feasibility**

Operational feasibility is a measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development. Operational feasibility reviews the willingness of the organization to support the proposed system. This is probably the most difficult of the feasibilities to gauge. In order to determine this feasibility, it is important to understand the management commitment to the proposed project. If the request was initiated by management, it is likely that there is management support and the system will be accepted and used. However, it is also important that the employee base will be accepting of the change.

## IV. Technical Requirements

### Hardware Requirements:

**Processor : core i5**  
**RAM : 4GB**  
**Hard Disk Space: 16GB**  
**Graphics Card: AMD**  
**Mobile Interface: Wi-Fi, Bluetooth**

### Software Requirements:

**Operating System: raspberian**  
**Program Language: python**  
**IDE Used: python 2.7**  
**Web Server: IBM blue mix**

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### Operating System:

**Reason of Use :** Raspbian is a Debian-based computer operating system for Raspberry Pi. There are several versions of Raspbian including Raspbian Stretch and Raspbian Jessie. Since 2015 it has been officially provided by the Raspberry Pi Foundation as the primary operating system for the family of Raspberry Pi single-board computers. Raspbian Is the Best All-Around Operating System. Raspbian is the “official” operating system of the Raspberry Pi and because of that, it's the one most people will want to start with. Raspbian is a version of Linux built specifically for the Raspberry Pi. A Raspberry Pi is a compact computer board which offers endless opportunities. Simply plug in your TV, keyboard, mouse and power supply, and you are ready to go. There is a whole family of Raspberry Pi's available to you, each providing various functionalities. There are also add-on boards available to enable other uses, such as camera and LCD display modules. The great thing about Raspberry Pi is that it is suitable for almost all age groups. Whether it's introducing programming to children, or used by engineers to make complex computer-controlled systems, anyone can use one.

Based on the Linux distribution Debian Wheezy, Raspbian has been optimized for the Raspberry Pi. It was developed by a small team independent of the Raspberry Pi Foundation who support the educational goals of the foundation. Raspbian is currently the recommended operating system by the Raspberry Pi Foundation.

Python is a high-level, interpreted and general-purpose dynamic programming language that focuses on code readability. The syntax in Python helps the programmers to do coding in fewer steps as compared to Java or C++. The language founded in the year 1991 by the developer Guido Van Rossum has the programming easy and fun to do. The Python is widely used in bigger organizations because of its multiple programming paradigms. They usually involve imperative and object-oriented functional programming. It has a comprehensive and large standard library that has automatic memory management and dynamic features.

**IDE:**

**Reason of Use :** The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards, mice and cases). However, some accessories have been included in several official and unofficial bundles.

**Web server: IBM Bluemix** is a cloud platform as a service (PaaS) developed by **IBM**. It supports several programming languages and services as well as integrated DevOps to build, run, deploy and manage applications on the cloud. **Bluemix** is based on Cloud Foundry open technology and runs on SoftLayer infrastructure.

**Relay:** Relays are switches that open and close circuits electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized. When a relay contact is Normally Closed (NC), there is a closed contact when the relay is not energized. In either case, applying electrical current to the contacts will change their state.

Relays are generally used to switch smaller currents in a control circuit and do not usually control power consuming devices except for small motors and Solenoids that draw low amps. Nonetheless, relays can "control" larger voltages and amperes by having an amplifying effect because a small voltage applied to a relays coil can result in a large voltage being switched by the contacts.

**HDMI to VGA Adapter Converter:**

A high quality, high performance, convenient and compact electronic device which converts the digital HDMI video signals which are outputted from Raspberry Pi, into an analogue signal required by the widely used VGA based computer displays still regularly used around the world. Why Buy? Unlike the majority of HDMI to VGA adapters marketed for the Raspberry Pi, this sleek HGMI to VGA converter will automatically carry the audio signal to the audio port on the side of the device, meaning no complicated setup to have both a VGA monitor and speakers Set Up RPi Converter > VGA Cable > Monitor Product Features

Simple device design in the form of a small adapter with integrated VGA socket output, with short cable complete with HDMI plug for connection to the HDMI socket on Raspberry Pi.

No external power supply is required, and in operation, the device is plug and play.

The device handles display resolutions of up to 720p/1080i/1080p (the maximum resolution is limited by the resolution supported by the connected display device).

Input: Integrated Type-A HDMI plug

Output: Standard female DE-15 connector.

Material: 99% high-purity oxygen-free copper wire core, 30μ gold-plated terminals for minimal signal loss, and gold-plated HDMI plug for high abrasion resistance.

This adapter is used to display the whole code and its intermediate between computer system and raspberry pi

## V. System Analysis

A Problem definition Home automation systems face four main challenges [3], these are high cost of ownership, inflexibility, poor manageability, and difficulty achieving security. The main objectives of that research is to design and to implement a cheap and open source home automation system that is capable of controlling and automating most of the house appliance through an easy manageable web interface to run and maintain the home automation system. The proposed system has a great flexibility by using WiFi technology to interconnect its distributed modules to home automation server. That will decrease deployment cost and will increase the ability of upgrading, and system reconfiguration. System will make use of secure wireless LAN connections between distributed hardware modules and server, and secure communication protocols between users and server. B. Proposed system feature The proposed system is a distributed home automation system, consists of server, hardware interface modules. Server controls hardware one interface module, and can be easily configured to handle more hardware interface module. The hardware interface module in turn controls its alarms and actuators. Server is a normal PC, with built in WiFi card, acts as web server. The web server software is developed using asp.net technology, so web server should support asp application and .net frame work 4.0, like IIS7.0 for windows OS. System can be accessed from the web browser of any local PC in the same LAN using server IP, or remotely from any PC or mobile handheld device connected to the internet with appropriate web browser supports asp.net technology through server real IP (internet IP).

Our designed system has application layer prototype. The application is able to synthesize the speech data with the help of Google Voice Reorganization. The Synthesized data are analyzed and further processing is carried out. In layman words, our design system provides features of controlling the home appliances using voice Commands. The use of socket programming is performed to connect the android application with the raspberry pi. This further adds security to our system. The data are received only by the server at the specified port and data are further analyzed. Our project is different in a sense it has its own software level application to control the home Appliances.

### Literature Survey details:

An Wi-Fi based home automation system mainly consist three modules, the server, the hardware interface module, and the software package. The figure shows the system model layout. Wi-Fi technology is used by server, and hardware Interface module to communicate with each other. The same technology uses to login to the server web based application. The server is connected to the internet, so remote users can access server web based application through the internet using compatible web browser. Software of the latest home automation system is split to server application software, and Microcontroller (raspberry) firmware. The raspberry software, built using python language, using IDE comes with the microcontroller itself. Raspberry software is culpable for gathering events from connected sensors, then applies action to actuators and preprogrammed in the server. Another job is to report the and record the history in the server DB. The server application software package for the proposed home automation system, is a web based application built using asp.net. The server application software can be accessed from internal network or from internet if the server has real IP on the internet using any internet navigator supports asp.net

technology. Server application software is culpable of, maintain the whole home automation system, setup, configuration. Server use database to keep log of home automation system components, we choose to use XML files to save system log. Fig. The proposed home automation system layout.

This system uses mobiles or computers to control basic home control and function automatically through internet from anywhere around the world globally, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy. The proposed system is a distributed home automation system, consists of server i.e. Wi-Fi module, sensors. Server controls and monitors the various sensors, and can be easily configured to handle more hardware interface module (sensors). The raspberry board, with built in Wi-Fi module acts as web server. Automation System can be accessed from the web browser of any local PC using server IP, or remotely from any PC or mobile handheld device connected to the internet with appropriate web browser through server real IP (internet IP). Wi-Fi technology is selected to be the network infrastructure that connects server and the sensors. Wi-Fi is chosen to improve system security (by using secure Wi-Fi connection), and to increase system mobility and scalability.

#### 1. Power Line Home Automation System

This automation is inexpensive and doesn't require additional cables to transfer the information, but uses existing power lines to transfer the data. However, this system involves a large complexity and necessitates additional converter circuits and devices.

#### 2. Wired Home Automation System

In this type of automation, all the home equipment are connected to a main controller (programmable logic controller) through a communication cable. The equipment is attached with actuators to communicate with the main controller. The entire operations are centralized by the computer that continuously communicates with the main controller.

#### 3. Wireless Home Automation

This is the expansion and advancement of wired automation which uses wireless technologies like IR, Zigbee, Wi-Fi, GSM, Bluetooth, etc., for achieving remote operation. As an example, the GSM based home automation provides the controlling of home equipments by an SMS to the GSM modem.

## VI. Modules

Raspberry Pi 3 is an upgrade to a next generation main processor and improved connectivity with Bluetooth Low Energy (BLE) and BCM43143 Wi-Fi on board. Additionally, the Raspberry Pi 3 has improved power management, with an upgraded switched power source up to 2.5 Amps, to support more powerful external USB devices. The Raspberry Pi 3's four built-in USB ports provide enough connectivity for a mouse, keyboard, or anything else that one feel the RPi needs and can add even more still use a USB hub. Keep in mind, it is recommended that use a powered hub so as not to overtax the on-board voltage regulator. Powering the Raspberry Pi 3 is easy; just plug any USB power supply into the micro USB port. There's no power button so the Pi will begin to boot as soon as power is applied, to turn it off, simply shut down the Pi 3 and then remove power. The four built-in USB ports can even output up to 1.2A enables to connect more power hungry USB devices (This does require a 2Amp micro USB Power Supply). On top of all that, the low-level peripherals on the Pi make it great for hardware hacking. The 0.1" spaced 40-pin GPIO header on the Pi gives access to 27 GPIO, UART, I2C, SPI as well as 3.3 and 5V sources. Each pin on the GPIO header is identical to its predecessor the Model B+. There are two giant upgrades in the Pi 3. The first is a next generation Quad Core Broadcom BCM2837 64-bit ARMv8 processor, making the processor speed increase from 900 MHz on the Pi 2 to up to 1.2GHz on the Pi 3. PIN DESCRIPTION: GPIO are the standard pins that simply be used to turn devices on and off. I2C (Inter-Integrated Circuit) pins allow connecting and talking to hardware modules that support this protocol (I2C Protocol). This will typically take up 2 pins. SPI (Serial Peripheral Interface Bus) pins can be used to connect and talk to SPI devices. UART (Universal Asynchronous Receiver/Transmitter) are the serial pins used to communicate with other devices. DNC stands for do not connect. The power pins pull power directly from the Raspberry Pi. GND are the pins used to ground the devices. The relay module is a separate hardware device used for remote device switching. With it you can remotely control devices over a network or the Internet. Devices can be remotely powered on or off with commands coming from Clock Watch Enterprise delivered over a local or wide area network.

## VII. System Design



The proposed System incorporates basically with the following four modules.

- 1) Raspberry Pi GPIO Connection A fully functioning Raspberry Pi running a reasonably recent build of Raspbian Linux that is connected to home network through wired or wireless that home network has internet access through a router that uses NAT that is comfortable using Pi's command line interface.
- 2) Web Server Module A web server is needed to create a link between the remote user and the Raspberry Pi. A Web server is a program that, using the client/server model and the World Wide Web's Hypertext Transfer Protocol (HTTP), serves the files that form Web pages to Web users (whose computers contain HTTP clients that forward their requests). The user can access the webserver using the port number of the respective raspberry PI. The webserver used here is apache2.
- 3) User Interface The user interface is a combination of HTML, JavaScript, and CSS. The user interface(UI) is everything designed into an information device with which a human being may interact including display screen, keyboard, mouse, light pen, the appearance of a desktop, illuminated characters, help messages, and how an application program. Later the user interface is linked with the webserver. The webserver hosts the user interface as a web page.
- 4) Linking Module The last module is to link the python script with the web module.

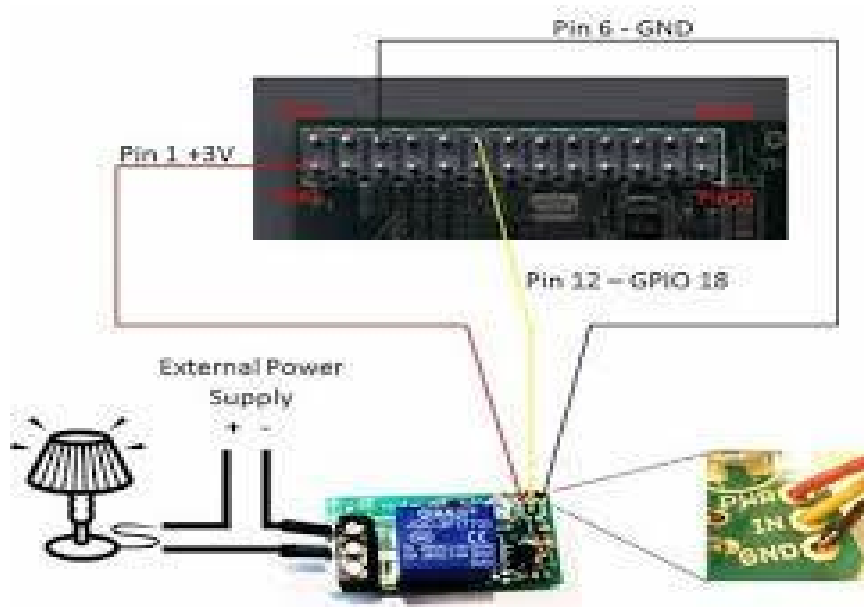
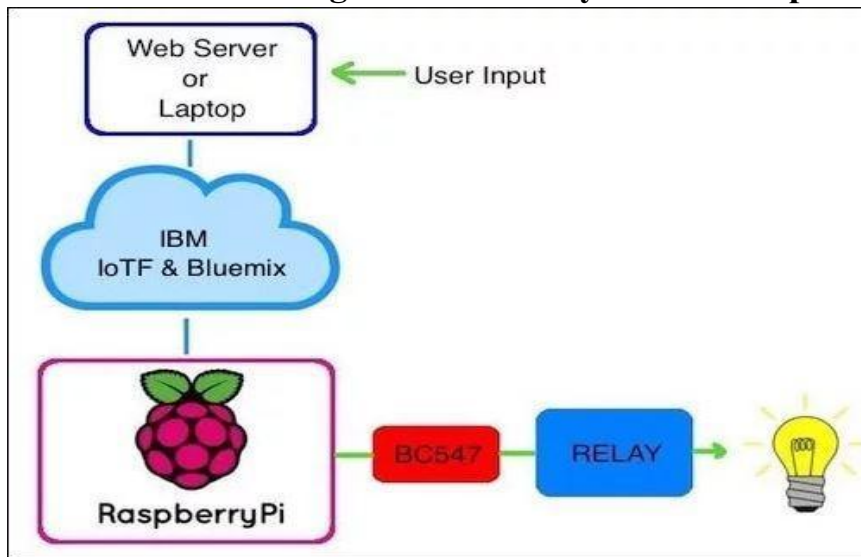
## VIII. Standard Technologies Included

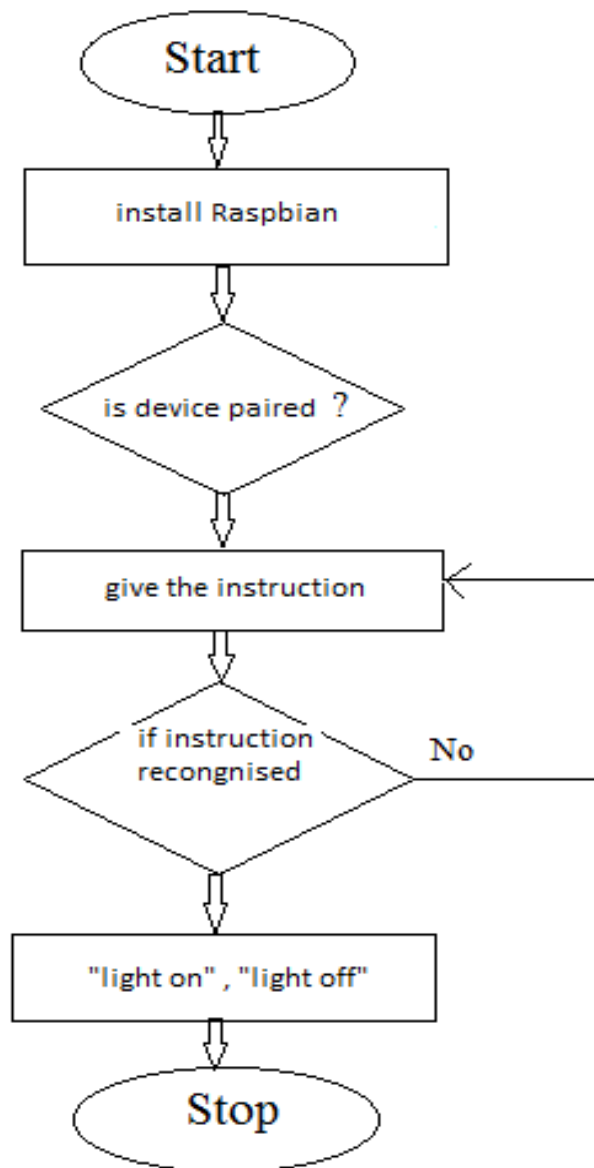
An The primary operating **standards** for **home automation technology** are these four: Wi-Fi, Z-Wave, ZigBee, and Bluetooth Low Energy (BLE). ... Other **standards**, or protocols, include X10, Intron, Thread, and Universal Power line Bus (UPB). Here's a closer look at how those different **technologies** work.

In the actual era of smart homes and smart grids, advanced technological systems that allow the automation of domestic tasks are developing rapidly. There are numerous technologies and Applications that can be installed in smart homes today. They enable communication between home appliances and users, and enhance home appliances' automation, monitoring and remote control capabilities.



## IX. Data Flow Diagram And Entity Relationship Diagrams



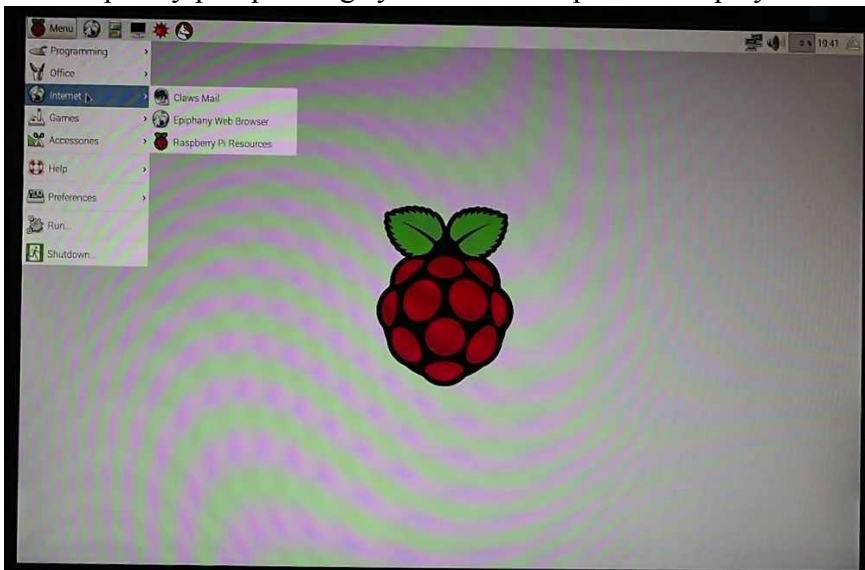
**X. Software Flowcharts / Algorithms**

## XI. Form Design And Outputs

### Screen shots and Description

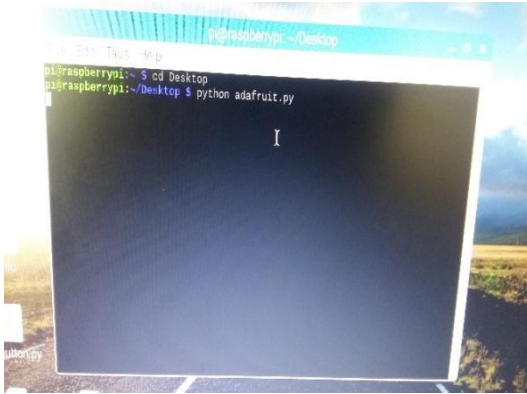


Raspberry pi is connected relay board through jumper wires, Display is connected to pi through HDMI to VGA Adapter Converter and power supplied. Key board and mouse also connected to pi. GPIO 39 pin is connected to ground of relay, and GPIO 14 i.e. 8 is connected to IN of relay and 5V is connected to VCC of relay board. So that Raspberry pi Operating system will be up in the display.

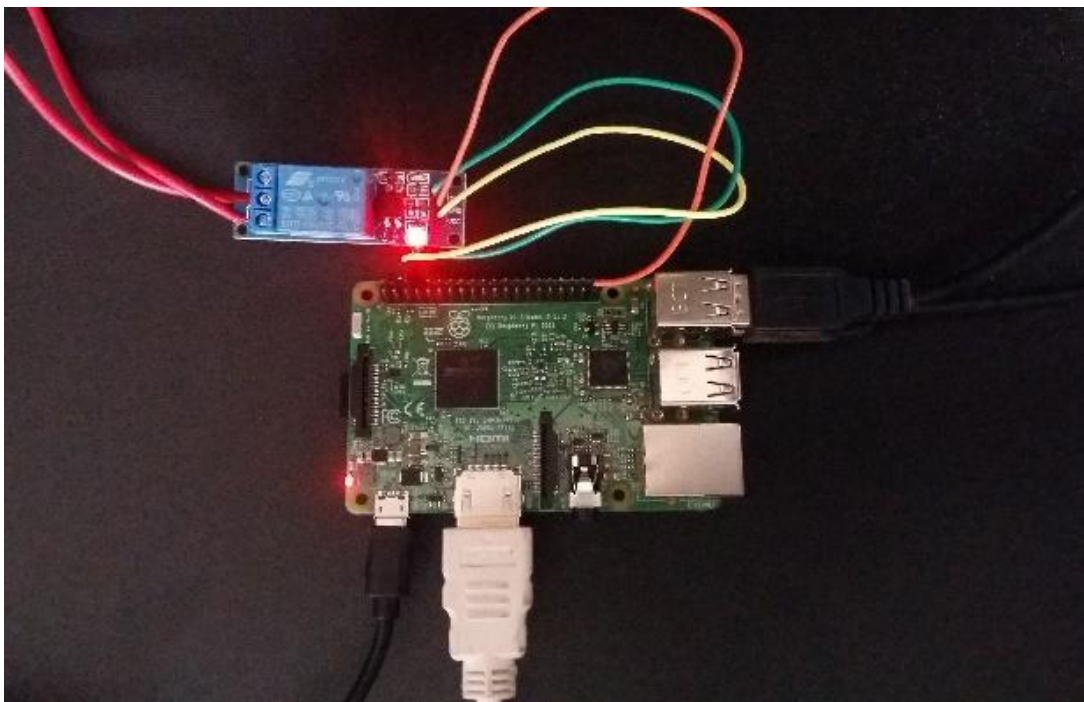


Once Raspberry pi Operating system is up we have downloaded all necessary files and libraries.

And then wrote the fan switch on and off code with importing all the necessary files. Code is implemented in notepad and saved under .python exe. Whole program wrote in python and run in command prompt



Once power up the components get the power and get on.



And relay is connected to power source and another side to fan. Switch on the AC switch and then once all the set up done on the internet of things and pass the command

## **XII. Implementation and Software source code**

A Proposed Home Automation System layout As mentioned the proposed home automation system consists of three main modules, the server, the hardware interface module, and the software package. The following figure (1), shows the proposed system layout. Secure WiFi technology is used by server, and hardware interface module to communicate with each other. User may use the same technology to login to the server web based application. if server is connected to the internet, so remote users can access server web based application through the internet using compatible web browser. The proposed home automation system is designed as a tool for the casual user. A casual user; shall be defined as one possessing general knowledge of the Microsoft Windows operating system and general knowledge of using the Internet by employing a standard browser such as Microsoft Internet Explorer General user; who will have the most use of the system functionality. Administrator; who will control the access and permissions policy of the system, and can add and delete user accounts, anything that a general user can perform, the administrator can also perform.

Implementation of the whole system is very easy. Once the whole connection is made as per the Design explanation user can easily set up the system. Usually in other cases of home automation developers will develop a small application which fit to the smart phones through that whole system is going to the work. But proposed system is very simple as off now we have only done with computer system.

```
import RPi.GPIO as GPIO
import urllib2
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BCM)
channel = 7
GPIO.setup(channel, GPIO.OUT)
true = 1
while(true):
    try:
        response =
urllib2.urlopen('http://192.168.43.3/ha/buttonStatus.php'
)
        status = response.read()
    except urllib2.HTTPError, e:
        print e.code

    except urllib2.URLError, e:
        print e.args
except KeyboardInterrupt:
    GPIO.cleanup()

    if status=='ON':
        print 'Turned On'

GPIO.output(channel, False)
    elif status=='OFF':
        print 'Turned Off'
```

```
GPIO.output(channel, True)
```

### **XIII. Testing**

Testing is vital for the success of the system. Software testing reviews the specification, design and coding of the system and helps in software quality assurance. It focuses on finding operational flaws in the system. So that the software becomes error-free and prevents failure. Testing is a process of executing a program with the intent of finding an error. A good test is one that has a high probability of finding a yet undiscovered error. Thus, systematic test should be carried out that uncovers different types of error with minimum amount of time and effort. Testing is also carried out to see if the performance requirements have been met. Testing is also a good indication for software reliability. Testing is carried out at various stages. In this project, I did unit testing and system testing during the testing phase. System should not be tested as a single, monolithic unit. The testing process should therefore proceed in stage where testing is carried out incrementally in conjunction with system implementation. Errors in program components may come to light at a later stage of the testing process. The process is therefore an iterative one with information being fed back from later stage to earlier parts of the process. The various strategies that were used in testing this software were as follows:

1. Unit Testing
2. Integration Testing
3. System Testing
  - a. Validation Testing
  - b. Black Box Testing
  - c. White Box Testing
4. Acceptance Testing.

#### **1. Integration Testing:**

Integration testing is of two kinds: Bottom-Up integration and TopDown Integration. For this system, Bottom-Up Integration Testing was carried out. Bottom-up Integration is the traditional strategy used to integrate the components of a software system into a functioning whole. Bottom-up integration consists of a Unit Testing, followed by the Sub System Testing, and testing of the entire system. Unit testing has the goal of discovering errors in the individual modules of the system. The primary function of Sub-System testing is to verify operation of the interface between the modules in the subsystem. System testing is concerned with the decision-logic, control flow, recovery procedures, capacity.

#### **2. User Acceptance Testing:**

The user acceptance test verifies that the system's procedures operate up to system's specifications and that the integrity of the data is maintained. It involves the execution of Procedure Test, Performance Test and Peak-Load Test.

#### **Unit Testing:**

Individual components are to ensure that they operate correctly. Each component is tested independently, without other system component. This system was tested with the set of proper test data for each module and the results were checked with the expected output. Unit testing focuses on verification effort on the smallest unit of the software design module.

This is also known as module testing.

a. Validation Testing:

The validation testing can be defined in many ways, but a simple definition is that, validation succeeds when the software functions in a manner that can be reasonably expected by the end user.

b. Black Box Testing:

Black Box Testing is done to find the followings:

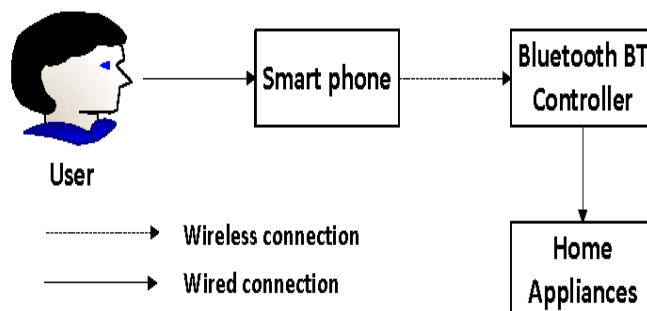
- a. Incorrect or missing functions.
- b. Interface errors.
- c. Error in external database access.
- d. Performance error.

c. White Box Testing:

White-box testing (also known as clear box testing, glass box testing, transparent box testing, and structural testing) is a method of testing software that tests internal structures or workings of an application, as opposed to its functionality.

## XIV. Overview

automation system.



An **overview of** home automation home Automation **system** achieved great popularity in the last decades and it increases the comfort and quality of life. ... A smart phone application is used to control and monitor the **home** appliances using different type of communication techniques. Raspberry PI is interfaced with either PC or Mobile Phone by Using Web Protocol. Raspberry PI is connected to Electronic Switching System. By Using Electronic Switching System we control various electrical devices like Fan, Tube light etc.

## XV. Advantages of Project

### 1. Security

Tap your finger to turn on the lights when you get home so you worried about what's hiding in the shadows, or in your pathways. Or automate to turn on when you aren't home to look like you are to ward off potential robbers. Door locks are another automated home product that can increase your home security.

Worried that the kids didn't lock the doors before they ran off to play? Or that someone will discover your not-so-secret hiding place for the extra key? Take control of your home safety from a simple app. With some products, you can even get an alert every time someone enters your home.

### 2. Energy Efficiency

Increase your home's energy efficiency by remotely powering off systems and appliances when they aren't in use. In addition to the standard home automation products that give you active control, some products actively monitor systems and arm the homeowner with knowledge, insight and guidance to achieve greater control and energy efficiency.

### **3. Savings**

Home automation literally pays off. When you are able to use home systems and appliances only when needed, the savings will be apparent in the first utility bill. No more wasting money on lights left on when you aren't home, or spending money on gas to drive home because you forgot to lock the door. Monetary savings are apparent, but you'll also be saving time. No wasted trips home, no running through the house turning everything off, no time spent worrying about what was or wasn't turned off.

### **4. Convenience**

Don't you hate having to rely on neighbors to watch your house when you're gone? With home automation, convenient control of your home is at your fingertips. You don't have to trust someone else with your most valued possessions.

### **5. Comfort**

Ever leave for work in the morning when it was a comfortable 68° outside only to come home to a sweltering house because the temperature shot up to 90°? Connected home products like the Sensi™ Wi-Fi Thermostats let you conveniently adjust your home temperature from the mobile app so your family is always comfortable.

### **6. Peace of Mind**

One of the biggest hidden benefits that comes with home automation is peace of mind. No more worrying if you turned off the lights, locked the door or turned off the television. For people who have a lot on their plates, being able to easily check these items off the to-do list and stop the obsessive worrying, home automation is reassuring and definitely worth the investment.

Raspberry PI is interfaced with either PC or Mobile Phone by Using Web Protocol. Raspberry PI is connected to Electronic Switching System. By Using Electronic Switching System we control various electrical devices like Fan, Tube light etc.



## **Conclusion**

The project focus on helping hand to the needful people like handicapped and the patients in hospital and in home. Technology should be used in betterment of the people lifestyle. We can add n number of features to make our life a beautiful and wonderful with technological environment. Lights and fans are the subjective elements in a common in low class or middle class room. Due to this maximum number of the people will get a good and a user-friendly environment with controls of light fans and any appliances in your smart phone or website. As smart phones, have become the crazy trending and fastest growing technology worldwide and there is a smart phone in each and every pocket. Giving access of their home in their pockets or in their hands is a challenging task that completes our objective and motto of this project. By doing so the rate of internet access and IoT will increase, people will get a good exposure to the new emerging technology and will get a curiosity to know about what technology can change the lifestyle and the problems faced by the human

Indeed, you can easily install a variety of sophisticated home automation systems to make your life simpler. Whether you choose to incorporate just a few features like lighting and door sensors or invest in all the options described above, smart home systems serve three main benefits: security, accessibility and most of all, simplicity.

Right now, home automation is continuing to evolve. Manufacturers are creating and innovating products to better suit consumers' needs. They have taken everyday belongings – coffeemakers, lamps, fans and window blinds – and turned them into automated devices, to capture information about your personal usage habits and adapt to them.

Home automation technology seeks to reduce your stress by ensuring your home is secure even when you are far away.

Homes of the future may very well come with smart home features built in, considering the rate at which these technologies are being developed and integrated into our everyday lives. Still, some people may want to install and further customize home automation devices themselves.

One common misconception about smart home technology is that it is only for younger and educated consumers with disposable income. Actually, these products appeal to people of every age, income level and demographic. They can help make any household run more smoothly.

Customers are increasingly looking for customizable devices, so that their experiences can be tailored precisely to their preferences. Additionally, they're looking for a service that goes beyond just keeping their devices connected. After all, these devices are made to act as a personal assistant to homeowners. They want a system that's cohesive and runs as one unit, that issues commands that are thoughtful and well suited for the homeowner's lifestyle without them having to say it. Whether through one-time programming or by learning to analyze activity and act on its own, these programs are built with the customer in mind.

Smart home systems will only continue to evolve and become more advanced. These days, the range of options available for purchase are constantly expanding, so that you are not limited to one size, color or shape. Many gadgets and systems are designed to

either blend in with surroundings or even stand out as a statement piece. So while smart home systems may take some time to understand and master, they will, and already are, making life easier. These devices do more than just simplify your life. Many are designed to sync up to other devices and systems so that your home automation system can continue to evolve as households progress. Thus, these technologies may also increase the real estate value of your home. As the technology for smart homes continues to evolve, the range of capabilities is only going to grow.

### **Future Enhancement**

An The next phase for the Home automation market will occur based on a few key 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

Home automation has gone through massive shifts in recent years. It is no longer just something for the rich and famous - it has become much more affordable and is being adopted by households with many different income levels.

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- a. 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.
- b. 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.
- c. Some foreign players will have niche in high end automation and focus on the premium market.

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