Abstract—Voice Controlled Home Automation is a very useful project for the adults and physically disabled persons, who are not able to do various activities efficiently when they are at home and need one’s assistant to perform those tasks. With the Voice Recognition the complication of wiring in case of wired automation is prevented. With the use of Bluetooth Home Automation considerable amount of power saving is possible and it is flexible and compatible with future technologies so it can be easily customized for individual requirements. Voice recognition system provides secure access to home. In the recent years, the Home Automation systems have seen rapid changes due to introduction of various wireless technologies. Home Automation industry is growing rapidly, this is fuelled by the need to provide supporting systems that are made to ease our life. Automation systems is supposed to be implemented in existing home environments, without any changes in the infrastructure. The automation is based on recognition of voice commands and uses Bluetooth modules along with microcontroller. This paper presents the overall design of ‘Voice Controlled Home Automation’, which we are currently developing. The automation recognizes voice commands given by the user and transfers it to our microcontroller which detects the voice command and proceeds with the switching accordingly. We are using Raspberry Pi microcontroller module & Bluetooth module HC05 to implement our vision. Further we are trying to implement the same on a more user friendly and bigger scale. The home automation system is intended to control all lights and electrical appliances in a home or office using voice commands.

Keywords—automaton; Raspberry Pi; low cost; wireless; bluetooth; android.

I. INTRODUCTION

The demography of the world population shows a trend that the elderly population worldwide is increasing rapidly as a result of the increase of the average life expectancy of people. Home automation is one of the major growing industries that can change the way people live. Some of these home automation systems target those seeking luxury and sophisticated home automation platforms; others target those with special needs like the elderly and the disabled. The aim of the reported ‘Voice Controlled Home Automation’ is to provide a system that can respond to voice commands and control the on/off status of electrical devices, such as lamps, fans, television etc., in the home. The system should be reasonably cheap, easy to configure, and easy to run. An integrated platform for home security, monitoring and automation by using microcontroller. The system should be connected to a LCD screen, which would provide the user current system status. So that the user can easily control the appliances. The user should be able to control all the appliances from any point in their home, so a wireless controller should be provided.

A typical wireless home automation system allows one to control house hold appliances from a centralized control unit which is wireless. These appliances usually have to be specially designed to be compatible with each other and with the control unit for most commercially available home automation systems. The project demonstrates a system that can be integrated as a single portable unit and allows one to wirelessly control lights, fans, air conditioners, television etc., and turn on or off any appliance that is plugged into a wall outlet. The overall system is controlled from a smartphone application. This sends the voice commands in binary sequence to microcontroller. This is done by using a Bluetooth module. The microcontroller unit takes decision and perform the required decision.

II. REVIEW OF LITERATURE

i) Speech Recognition System, Massey Smart House

The concept of Smart House aims to integrate technology into houses to a level where most daily tasks are automated and to provide comfort, safety and entertainment to the house resident. In order to maintain a natural medium of communication, the house employs a speech recognition system capable of analysing spoken language, and extracting commands from it. The application now utilizes the Microsoft Speech Application Programming Interface (SAPI), a software layer which sits between applications and speech engines and The Microsoft Speech Recognition Engine (MS SRE), which is free to use. MS SRE can be optimized using Context Free Grammar (CFG) to give enhanced recognition in the intended application. Speech synthesis is achieved using any SAPI compliant text to speech engine. Further
developments will focus on designing a telephony system using Microsoft Telephony Application Programming Interface (TAPI), that will allow the house to be remotely controlled from anywhere in the world. House residents will be able to call their house from any part of the world and regardless of their location the house will be able to respond to and fulfill their commands.

ii) **Home OS**

Innovation is breeding heterogeneity and complexity that frustrates even technically-savvy users’ attempts to improve day-to-day life by implementing functionality that uses these devices in combination. For instance, it is impossible for most users to view video captured by their security camera on their smartphone when they are not at home. Heterogeneity across devices and across homes also makes it difficult to develop applications that solve these problems in a way that work across a range of homes. To simplify the management of technology and to simplify the development of applications in the home, we are developing an “operating system” for the home. HomeOS provides a centralized, holistic control of devices in the home. It provides to users intuitive controls to manage their devices. It provided to developers high-level abstractions to orchestrate the devices in the home. HomeOS is coupled with a HomeStore through which users can easily add obtain applications that are compatible with devices in their homes and obtain any additional devices that are needed to enable desired applications. We conducted studies to both understand the difficulties that people face today in managing modern technologies in the home and understand how they would like to manage and secure them in an ideal world. Based on these findings, we have developed a research prototype of HomeOS. Our current prototype includes support for a range of devices (e.g., switches, cameras, TVs) and applications. Experimental results show that it is easy for developers to write applications and for non-technical users to manage their home networks with HomeOS.

### III. PROPOSED WORK

i) **Block Diagram**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Power</td>
<td>To run the microcontroller kit ATmega16.</td>
</tr>
<tr>
<td>MCU</td>
<td>The microcontroller unit ATmega16.</td>
</tr>
<tr>
<td>SD Card</td>
<td>To store data.</td>
</tr>
<tr>
<td>Bluetooth</td>
<td>To send data wirelessly form the cell phone to microcontroller.</td>
</tr>
<tr>
<td>Relays</td>
<td>To do the switching of the electrical appliances.</td>
</tr>
<tr>
<td>Cell Phone</td>
<td>To record voice command, process it and send it to microcontroller.</td>
</tr>
<tr>
<td>Speaker</td>
<td>To be used as an alarm.</td>
</tr>
<tr>
<td>AC Power</td>
<td>To supply power to the appliances.</td>
</tr>
<tr>
<td>Lights, Fan, Music, etc., appliances</td>
<td></td>
</tr>
</tbody>
</table>

![Figure 1. Block Diagram](image)

ii) **Raspberry Pi 2**

![Figure 2. Raspberry Pi 2](image)
The Raspberry Pi is a series of credit card–sized single-board computers developed in Wales, United Kingdom by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools and developing countries. The original Raspberry Pi and Raspberry Pi 2 are manufactured in several board configurations through licensed manufacturing agreements with Newark element14 (Premier Farnell), RS Components and Egoman. The hardware is the same across all manufacturers. The Raspberry Pi 2 Model B is the second generation Raspberry Pi. Compared to the Raspberry Pi 1 it has:

- A 900MHz quad-core ARM Cortex-A7 CPU
- 1GB RAM
- 4 USB ports
- 40 GPIO pins
- Full HDMI port
- Ethernet port
- Combined 3.5mm audio jack and composite video
- Camera interface (CSI)
- Display interface (DSI)
- Micro SD card slot
- Video Core IV 3D graphics core

Because it has an ARMv7 processor, it can run the full range of ARM GNU/Linux distributions, including Snappy Ubuntu Core, as well as Microsoft Windows 10 (see the blog for more information). The Raspberry Pi 2 has an identical form factor to the previous (Pi 1) Model B+ and has complete compatibility with Raspberry Pi 1. Raspberry Pi 2 Model B offers more flexibility for learners than the leaner (Pi 1) Model A+, which is more useful for embedded projects and projects which require very low power.

IV. FUTURE SCOPE

Further we are developing the system to integrate the existing wireless networks present in the houses to transmit data from mobile to the microcontroller to be able to use it at a larger scale. We propose to use voice recognition to provide security measures, so as to be able to provide restricted access to particular persons. We are developing the system so that the user can control the appliances remotely over Internet. We would increase the scale of the control of appliances such as controlling speed of fan, temperature of AC, changing particular channel of TV, choosing music tracks, etc., We are trying to develop an intuitive interface for the user so as to ease the process of controlling and make it interesting.

V. CONCLUSION

Voice Controlled Home Automation is a very different concept than what is presently available in the market. This would make automation more easy and intuitive. The people will be able to interact with the system. It also is an important aspect in the present world where people are so busy, this would help them in easing the basic functionality of their life. The world around us is going digital in every aspect we can imagine and it is happening fast, we also need to move forward with it. Our system is a great initiative step in automation, it would also provide with security. As it is based on voice recognition we can assign particular password to each user and the automation will respond to the correct passwords only. The following are the features of our system:

- Easy to use.
- Saves unnecessary power consumption.
- Low cost compared to other automation systems.
- Easy to implement.
- Could also be used to provide security measures.
- Has good processing power and can handle multiple functions at the same time.
- Uses reliable wireless connection.
- Provides security and personal customization.

REFERENCES


