Savvy - The Personal AI Assistant with IoT Based Smart Home and Avant Grade IoT Enabled Securities

[1]Shreekant Gosavi, [2]Akshay Sambare, [3]Prof. Manoj Vairalkar
[1]Student, [2]Student, [3]Professor
Guru Nanak Institute of Engineering and Technology, Nagpur , India

Abstract **- In this project we have created our own AI assistant as 'Savvy' Voice Command System as an Intelligent Personal Assistant (IPA) that can perform numerous tasks or services for an individual. These tasks or services are based on user input, location awareness, and the ability to access information from a variety of online sources (such as weather or traffic conditions, news, stock prices, user schedules, retail prices, telling time, local traffic, travel assistant, events, notification from social applications plus one can ask questions to the system, invoke its wolframalpha cloud otherwise from Wikipedia. The key difference between google assistant and our assistant is that our assistant has capability to solve mathematical question on screen within a second that's of google assistant can't do that computation. Using Raspberry Pi as a main hardware to implement this model which works on the primary input of a user's voice. Using voice as an input to convert into text using a speech to text engine. It can control the home appliance like light, fan, TV, AC etc through voice command given through Savvy AI assistant which reduces human efforts by controlling the appliances from the place we are in. Make a simple home into SMART Home using different sensors connected using IoT. It also provides IoT based security using a trained camera with ML model and also using some other sensors like IR etc. We also created a website additionally from this site also user can control home appliances from any part of the world.**

keywords **- Savvy, AI, Assistant, Raspberry pi, Python, Sensors, IoT, Smart Home, Security**

I. INTRODUCTION

A virtual assistant, also called AI assistant or digital assistant, is an application program that understands natural language voice commands and completes tasks for the user. As electronic technologies are advancing, the field of home automation is increasing rapidly. There were various smart systems have been proposed where the control is via Bluetooth, internet etc. Design of Controlling Home Appliances through voice recognition using Raspberry pi as well as providing security is an attractive option to homeowners. Automation have a continuously increasing and very important role in the industrial and economic world as well as in the daily experience. However, cost and ease of installation and use are still barriers to widespread adoption. The goal of this paper is to design a low cost, open source, and flexible system with increasing variety of devices to be controlled. The voice recognition-based home automation systems for paralyzed and old people can make system more user friendly and easy to operate. Home automation system for old or disabled people will offer raised quality of life for them. In this system, we use Raspberry pi which is a high performance, low cost computer. Raspberry Pi have several generations of computer systems which have different configuration.

In this project we have implemented our own AI assistant using python language and its several libraries including pyttsx3,smtplib,wolframalpha,Wikipedia,twilio,request,speech-recognition etc. The assistant has named as Savvy has capability to do all of task and also can solve complex mathematical questions. Google API's are used to recognize the voice commands. It receives the commands and tells the system to perform desired function with the desired appliance. The system also tracks the current state of the appliances and other functionalities can be added to the system with simple codes and devices. Python is used as the main programming language. Along with home automation, security is also provided in this system.

For example, intelligent home control project focused on designing home control system's that provides intelligent services for users based on active sensor network. Secondly, Home automation using raspberry pi project deals with controlling home appliances remotely through any Wi-Fi capable mobile device. Smart home system project based on aurdino proposed a system which controls home appliances along with security. Smart home project based on sensing mechanism provides home automation with increased functionalities such as alarm based smart lock, smart water tank, mosquito sensing.

Lastly, more practical research to emphasize a real implementation has been done as well. We have created our our python based AI assistant and made home automation using Raspberry Pi and and that Savvy AI Assistant to control electronic appliances anywhere and implemented IoT based home security. By the rapid developments of new technologies, monitoring, controlling services have been started to be served along with internet as an instrument providing interaction with machinery and devices. The system can be used in several places like banks, labs, hospital and other sophisticated automated system, which reduces the hazards of unauthorized entry. The main reason to develop this system is to save time and man power along with security and convenience. Controlling home appliances through voice along with security makes this system.

II. LITERATURE SURVEY

In this section, we briefly survey the existing works for intelligent personal assistant and home network systems and, based on their main contributions, try to classify them into three types: Decision Support oriented, Service Provision oriented and Real Implementation oriented. First, some work has focused on how to make the decisions for the home networks more efficiently. Usually other project/product available in market require smart bulb to connect with Google assistant or Amazon Alexa assistant and these smart bulb cost around Rs900. But in our project, we have implemented this using a simple Rs10 bulb so this will be helpful to everyone. Since we are using our own custom build AI assistant Savvy using which we made this happen as a cost-effective project. Compared to existing work, this paper focuses on use of our own custom build Savvy AI assistant for daily task and entertainment helpful for blind, physically disabled people and home automation through voice recognition using raspberry pi along with security. It makes the users more convenient and comfortable. Our system provides home automation with additional functionalities such as gas detection, locking gas valves and IoT based security using ML trained camera and with the use of other sensors etc.

It uses several artificial intelligence techniques, including natural language processing, speech recognition, face recognition, and reinforcement learning, written in Py-thon, PHP and. Also used internet-connected power switches to control most of the appliances that were not connected to the internet, thus enabling it to turn ON and OFF power remotely. One of the challenges that we encountered was simply connecting and communicating with all the different systems when internet is slow.

III. PROPOSED SYSTEM

Fig (1) and Fig(2) shows the block diagram Voice Recognition based home automation and Security using Raspberry Pi and the interface of Savvy AI assistant. The project deals with both Software and Hardware components. The hardware part consists of input command is voice, it means controlling home appliances by voice. The block diagram consists of a Raspberry Pi , Bluetooth module , temperature sensor ,motion sensor, Gas sensor, Ethernet cable, Wi-Fi router, Relay circuit board, 5v power supply and android mobile .Python is used as a main programming language provided by Raspberry pi.

IV. SYSTEM ARCHITECTURE OF RASPBERRY PI

The **Raspberry Pi** is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote 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 and mice) or cases. However, some accessories have been included in several official and unofficial bundles. Raspberry Pi is an ARM based computer credit card in size. It is single “on chip” computing hardware. Here the raspberry pi3 model B is used. Raspberry pi 3board has 802.11 n wireless LAN and Bluetooth 4.1.and WIFI in built. We installed raspbian stretch in to the memory card used for the board. Raspberry Pi 3 has a LINUX based operating system call Raspbian. The R-pi board contains 40 general purpose input output pins (GPIO) which can be used for digital input and digital output, it contains 4 USB ports, 1 HDMI port, 3.5mm Audio jack, micro USB power supply. This board also has serial connections for connecting camera and a display.

Fig. (1) Raspberry PI Model 3B+

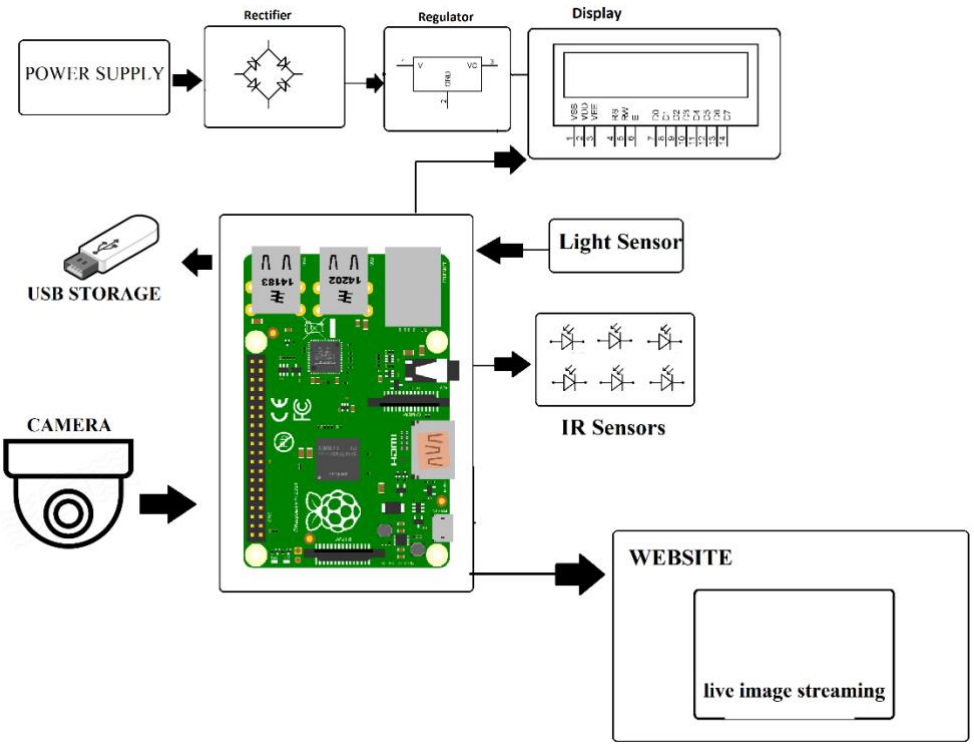

Fig. (2) Block Diagram

V. SOFTWARE DESIGN

Download the Raspbian OS from official site of raspberry pi and extract the zip file. Then download the balena etcher for installing os. You will need to use an image writing tool to install the image you have downloaded on your SD card. Connect an SD card reader with the SD card inside. Open balena Etcher and select from your hard drive the Raspberry .img Select the SD card you wish to write your image to. Review your selections and click 'Flash!' to begin writing data to the SD card. Install IP Scanner and then scan IP address of raspberry pi system connected via wi-fi. Then download putty enter the IP address of the pi .By the application of the VNC viewer we can install in the laptop we can operate through laptop.

VI. PROGRAMMING LANGUAGE

Python is the programming language. Python language is used to develop the code for the speech based Home automation system. It is a high level programming language widely used for raspberry pi. **Python** has gained a significant traction in the **IoT** development as well. **Python** is a good choice for data-intensive applications, especially when it comes to managing and organizing complex data.

VII. CONCLUSION

It can help the visually impaired to connect with the world by giving them access to Wikipedia, Calculator, Email and Music all through their voice. This model can also keep people secure as it can be used as a surveillance system which captures the voice of the person standing at the door and similarity checking. Also, it can be a source of entertainment and information for blind/visually impaired. For blind people this can be helpful to turn on/off fan, ac and for physically disabled people also to switch on/off different appliances. This model will interact with other systems by means of IOT, thus provides a fully automated system. Many experiments and results were accomplished and documented. The Voice Command System has an enormous scope in the future. Like Siri, Google Now and Cortana become popular in the mobile industry. This makes the transition smooth to a complete voice command system. Additionally, this also paves way for a Connected Home using Internet of Things, voice command system and computer vision.

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