

IoT BASED SMART ROBOT

Project report submitted in partial fulfillment of the requirement for the degree of

BACHELOR OF TECHNOLOGY IN ELECTRONICS AND COMMUNICATION ENGINEERING

By

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CERTIFICATE

This is to certify that the work reported in the B.Tech project report entitled “**IoT BASED SMART ROBOT**” which is being submitted by Prakhar Tiwari (151014), Prashant Arya(151034) in fulfillment for the award of Bachelor of Technology in Electronics and Communication Engineering by the Jaypee University of Information Technology, is the record of candidate’s own work carried out by him/her under my supervision. This work is original and has not been submitted partially or fully anywhere else for any other degree or diploma.

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DECLARATION BY THE SCHOLARS

We hereby declare that the work reported in the B-Tech thesis entitled “**IoT BASED SMART ROBOT**” submitted at **Jaypee University of Information Technology, Wagnaghat** is an authentic record of our work carried out under the supervision of **Mr. Pardeep Garg**. We have not submitted this work elsewhere for any other degree or diploma.

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LIST OF ACRONYMS AND ABBREVIATIONS

WebRTC	Web Real-Time Communication
DC	Direct Current
EN	Enable Pin
GPU	Graphic Processing Unit
BCM	Body Control Module
RAM	Random Access Memory
GB	Giga Bytes
LAN	Local Area Network
BLE	Bluetooth Low Energy
USB	Universal Serial Bus
HDMI	High-Definition Multimedia Interface
CSI	Camera Serial Interface
DSI	Display Serial Interface
SD	Secure Digital
12C	Inter-IC
SPI	Serial Peripheral Interface
LED	Light Emitting Diode
IP	Internet Protocol
UI	User Interface
WLAN	Wireless Local Area Network
GPIO	General-purpose input/output

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ABSTRACT

In this ever evolving world, where everything seems important, we sometimes forget to focus on the essential things. This is why; technological advancements are taking place in this particular field, to help us live our lives with ease, not worrying about the nitty-gritty of existence. The following project is our humble take on improving quality of living. How many times has it happened that you have missed important things just because you forgot to set the alarm, or fell sick because you forgot to take medicine? The best of us commit mistakes, *to err is human*, they say. Imagine a device that assists you in completing these basic tasks successfully, so that your precious mistakes can be utilized elsewhere. This is where our assistance bot comes in. From setting alarms, to sending mails, to simply confirming today's date, it can do it all. You can also set reminders and schedules. This small little companion will make sure you accomplish your tasks, and not let time squander it away. Worried about something? The camera module on the bot can be accessed wirelessly from anywhere, so that you never have to worry about your home or your belongings while you're away. Alert systems can also be set, so that you're notified of any unfortunate circumstance. Feeling too tired to get up from your bed? Don't worry, we've got you covered. Just speak to your bot to turn down your lights, or to turn on the fan. Basically any automated electric appliance can be controlled by voice through your companion. Home automation was never this easy. All these things may not seem like much, but once you realize that you don't have to worry about all this anymore, your mind opens up to new horizons. This small little assistant will revolutionize the way you live, while making it a fun and interactive journey.

CHAPTER 1

INTRODUCTION

1.1 Introduction

A Humanoid robot is a robot with its body shaped and created to look like a human body. The plan might be for utilitarian purposes, for example, associating with human apparatuses and condition, for test purposes, for example, the investigation of AI Locomotion, or for different purposes.

Humanoid robots have been utilized for various purposes throughout the years. They have been use in everything from motion pictures to family unit servants. Designers are discovering an ever increasing number of employments for humanoid robots.

In 1495, popular creator Leonardo da Vinci structured a suit of covering that moved as though there was a genuine individual inside. It was worked by a progression of pulleys and links, and could stand, sit, move its arms, and even raise its visor to uncover nothing inside. The objective was only to divert Milanese eminence, yet present day amusements of the gadget have demonstrated that it was completely utilitarian.

In 1774, Swiss watchmaker Pierre Jacquet-Droz, his child Henri-Louis, and Jean-Frédéric Leschot fabricated a trio of automata that are still being used today. The first is "the musician"—a female robot that plays a custom-assembled organ by squeezing the keys with her fingers. The second is "the draughtsman"—a youthful kid robot that can draw four diverse images—and the third is "the writer"—another youngster robot equipped for reviewing any custom content to 40 characters in length utilizing a plume on paper. Each of the three are startlingly exact. Their eyes pursue their activities, and the artist even inhales while playing. You can see them at the Museum of Art History in Neuchâtel.

The first carefully controlled human robot was worked in 1970 at Waseda University in Tokyo. It had an appendage control framework with material sensors for strolling and grasping, a dream framework that could gauge separations, and a discussion framework that could impart in Japanese. The specialists assessed that it had the intellectual capacities of a youngster matured around one and a half. Its successor had the option to play a console by perusing a melodic score.

In 2000, one of the world's most celebrated robots was first gathered. Honda structured and created Asimo as a multi-practical versatile colleague that could help individuals with poor portability. It could perceive objects, motions, sounds, and faces, enabling it to communicate with people, and was able to do completely self-ruling route with a top speed of 1.8 m.p.h. Later overhauls knock that to 3.7 m.p.h. what's more, added the capacity to climb stairs—something it fabulously neglected to do in its first show in December 2006 yet effectively finished a month later

1.2 Types of Humanoid Robot

In the present society we might not have the innovation accessible to make them as top to bottom as the ones in the films, however we do have humanoid robots that can clean our floors, engage us, and do intriguing tasks. The following is a rundown of the most creative humanoid robots that have been created:-

1. ASIMO - ASIMO (Advanced Step in Innovative Mobility) is a robot that stands 3' tall and is basically a mix of an iPod and a space suit. It has an assortment of sensors, more than 6 hours of charge, and 57 degrees of opportunity, excluding its hands. This humanoid robot can stroll here and there the stairs, control questions, and even lift them up. Truth be told, it was the principal robot to exhibit that it could "run" at around 3.7 miles 60 minutes. It additionally reacts to voice directions, recognizes hand signals, incorporates discourse, and can move dependent on clamors.
2. PETMAN - Also known as Protection Ensemble Test Mannequin, PETMAN was initially created to test hazardous materials suits for military faculty. It exhibits how a genuine warrior would need to wear defensive garments in sensible circumstances. This humanoid robot will move openly, walk, twist, and perform diverse workout. It might not have the same number of top to bottom highlights as ASIMO however it has extraordinary equalization and runs somewhat quicker.
3. NAO - NAO was created under a similar logic as ASIMO yet it is altogether littler and accessible to the overall population at \$8000.00. It's very flexibility and has dextrous hands. The NAO can train social aptitudes and are a helpful showing instrument for instructing others on robots and robot innovation. You can likewise program them to move to music.
4. ATLAS - ATLAS is basically the up and coming age of PETMAN that was intended for inquiry and salvage endeavors. It has laser rangefinders, stereo cameras, and expressive hands. It doesn't show up as human as PETMAN just due to the sheer measure of equipment expected to influence the humanoid robot to work, yet it is as yet an amazing bit innovation.
5. Martin Kelly's Head - This model is incredibly human-like as it copies the substance of Martin Kelly and can perform human-like articulations. In contrast to other automated humanoids, this bit of apparatus isn't as mechanically progressed as its engineers concentrated more on the masterful parts of the plan as opposed to the innovative ones.

1.3 Motivation

Humanoid robot is a brilliant innovation which is getting to be fundamental these days. It has numerous advantages which have been talked about in goals. In organizations, however in all parts of our life humanoid robot can be utilized. Be that as it may, the essential foundation required for humanoid robot is high transfer speed association, speakers, receivers, top notch camera and a couple of different devices. With these set up, we can make correspondence to individuals in remote territories without intrusion. The use of humanoid robot is expanding and with continuous increment in web speed we should see it getting to be basic in couple of times.

1.4 Objectives

Prominent objectives of a humanoid robot system are [1]:

- **To Fulfill Business Objectives**

It provides support in correspondence among different individuals. For business, it prompts smoothening correspondence among workers and bosses. We can put our valuable thoughts, records, recordings and different information at that particular time. It spares energy and is at last an incentive for business.

- **Low Expense**

In a humanoid robot meeting, many people are gathered together in a room. It resembles to be in a spot where you cannot be present at that moment of time. You don't need to venture out the various goals for gatherings. It spares a ton of voyaging and settlement money. It very well may be utilized to chop down extra cost of use.

- **Modernization**

In today's world all that we are doing on the planet and in the nations is a piece of modernization and globe balance. Envision a specialist having the option to help someone else in an immature country, analysts assisting individuals in different nations, individuals

sharing their insight and encounters and so on. The motivation behind why there is a boost in the market of humanoid robot in developing nations like United States and United Kingdom. The administrations of numerous nations have additionally begun utilizing this innovation for correspondence between various services.

- **Increasing of resources**

In an association, humanoid robot will enable us to provide good co-ordination between customers, representatives and providers. It will help in profitability up to 50 percent because of brisk basic leadership, sparing travelling cost, sparing travelling time.

- **Hiring made comfortable**

The strategy for utilizing workers is an extremely extensive method. It requires investment and is restricted to just territories of human reach. You can plan numerous meetings with individuals and can likewise save the videos for future references. This can assist an organization with evaluating the best competitor. We can likewise select from universe and pick amongst numerous individuals.

1.5 Project Layout

The Humanoid robot consists of Raspberry Pi 3B board connected with the L293D driver interfaced chips and is connected with the DC motors. The camera is use in the UI which is a server on the Raspberry Pi and can be accessed via WLAN. A user interface (UI) on any Wi-Fi enabled mobile or pc provide connections with the systems robot and give controls operation. Camera provides the one on one interaction both of video i.e. from the bot to the user. The project functioning layout is shown in Figure 1.1 as follows:

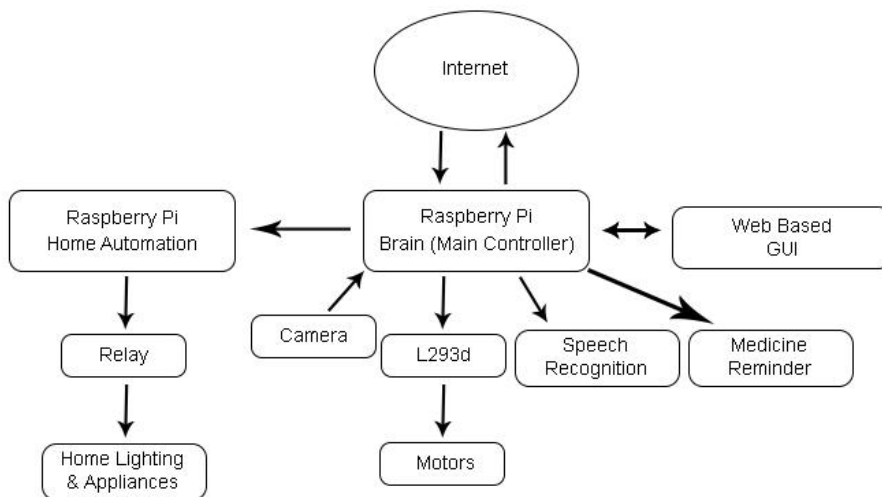


Figure 1.1: System layout

The voice recognition flow chart is shown in Figure 1.2 as follows:

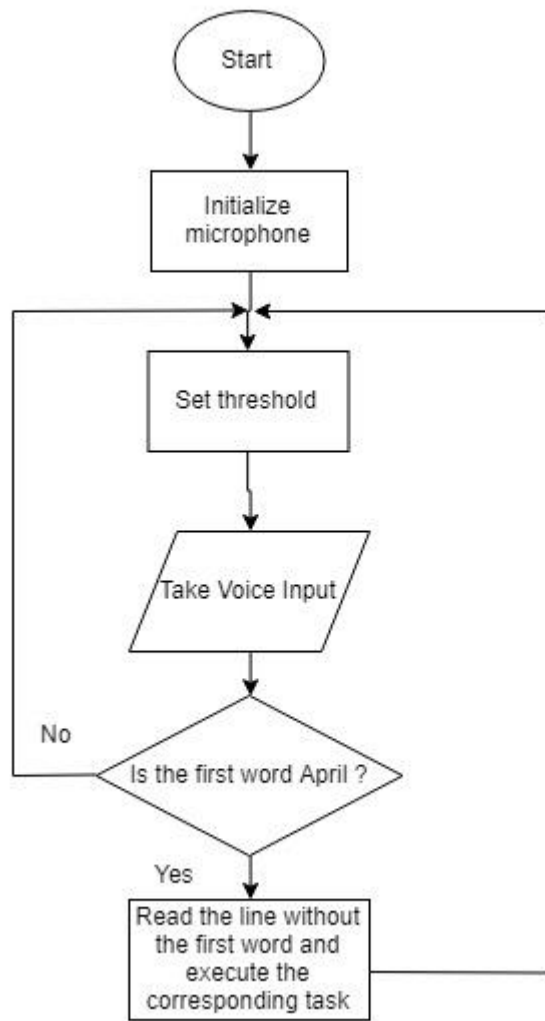


Figure 1.2: Voice recognition layout

The complete project layout is shown in Figure 1.3 as follows:

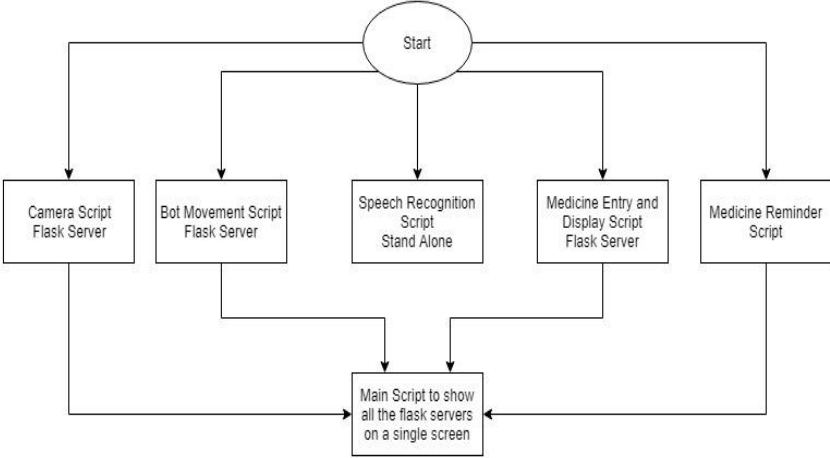


Figure 1.3: Humanoid Robot layout

1.6 Literature Review

In the papers [2] the plan is executed to control and screens the humanoid robot framework utilizing the online applications. It upgrades the client experiences by giving the user simple to utilize, simple to deal with, convenient, simple to get to and thus makes it fitting to utilize. All the past utilized humanoid automated control framework were work area or computer based were introduced in work area and henceforth were never compact. This framework is made utilizing web programming improvement. It provides us a bit of the image through which we will coordinate the robot specifically bearing. Its control is performed by "Python based Flask User Interface" that is executed utilizing JS and PHP. The electronic interfaces do not require earlier establishment as it very well may be gotten to from anyplace simply utilizing the internet browser. Subsequently this framework can be gotten to from work area or PDA just without the assistance of internet explorer with web association.

This exploration [3] centers around how a humanoid mechanical framework, the client who control the robot and general population near the robot team up with one another so robot achieves its ideal area. This framework pursues the individual via self-ruling route. It controls the sensor that handling that precisely tells impediments. This exploration is centered on a two intelligent plan of humanoid robot "Hugo" and "Margo" of Virtual Go robots. There are numerous business robots currently in market that are simply done for public like specialists, parental figures, and corporates and so on [4]. The vast majority of this just has bolt buttons which will control the robot. It gives live video assistance that client find in rural area and explore with it. What's more, because of headway in versatile innovation the robot can be explored from anyplace as it simply needs great web association with accessible transfer speed and low bundle misfortune.

A few robots are there in market which gives helped route which moves them through obstructions and equalization if there should be an occurrence of differed landscape. Yet, doing this whole robot is as yet not ready to move securely or acknowledged by others socially. Thus this exploration principally centers on exploring nature in safe and socially way utilizing the two procedures programmed and self-loader. Its aspects will be provided as significance as it's provided to capacities & innovation.

CHAPTER 2

HARDWARE SPECIFICATIONS

2.1 L293D

For moving the DC motor, we need L293D IC in the structure. These are utilized as the driver that is for the highest ebb and flow half-H driver. These engine drivers use less energy flag as information and transform them into high energy flag as yield. These drivers go about as enhancer. The L293D is planned so they can give bi-directional current upto the scope of 650mA with voltage go from 5V to 35V. The 2 H-connect circuit under the chip drive the engines in synchronization with the heading. Our project contains 4 drivers in each L293D IC. The driver one and two are empowered by 1, 2 EN pin while driver three and four are empowered by 3, 4 EN pin. The info control pins are 3, 8, 11 and 14 while their yield pins are 2, 7, 10 and 15 separately [5].

The DC engine can't be interacted straightforwardly with the GPIO of Raspberry Pi as GPIO just surrenders most extreme current to 15mA at voltage 3.2V. Though the motor requires high proportion of energy reaches from 50mA to 320mA at 10V. Consequently the L293D engine drivers are utilized to control the DC engines. The following is the image of L293D IC :

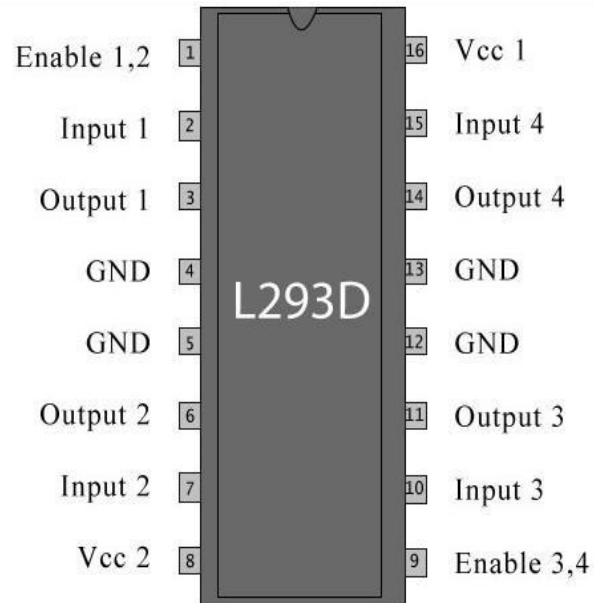


Figure 2.1: L293D [6]

2.2 DC MOTORS

Four 100 RPM 12V DC Motors have been used for the movement of the robot.

2.2.1 12V DC Motors

- Weight 124 grams.
- Shaft diameter of 6mm
- Speed of 100 rpm
- Torque of 1.2 kg-cm
- No load current of 60mA max and load current of 300mA max.

DC motors are required to move the humanoid robot. With the help of motors, the robot is able to move in any direction i.e. front, back and turn left or right.

The following is the image of a 12V DC motor :

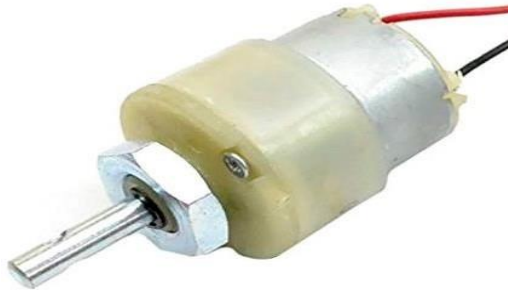


Figure 2.2: 12 V DC Motor [7]

2.3 RASPBERRY PI 3 MODEL B

The Raspberry Pi 3 Model B is the latest update to the 3rd-age Raspberry Pi family. To interact with the humanoid robot, equipment and program combined it will require a microprocessor as its brain. This is executed by utilizing the Raspberry pi. It is utilized as a microprocessor as well as a server. It compiles and executes all the code and has the languages installed for programming that are utilized to control the versatility of humanoid robot. The Raspberry Pi contains a Linux based Operating System which is flashed in a bootable SD card. This SD card contains all the files to boot the Raspberry Pi and acts as a storage medium to store the code of the humanoid robot.

The DC motor can't be interacted straightforwardly with the GPIO pins of Raspberry pi as the GPIO pins just supply max energy of 23 mA at voltage 3.4V. While the motor required high proportion of current between 50 mA to 320 mA at 10V DC. Thus the L293D driver IC is utilized to supply the required current to the DC motors.

The Raspberry Pi 3 Model B+ is the most recent item in the Raspberry Pi 3 territory, gloating a 64-bit quad center processor running at 1.4GHz, double band 2.4GHz and 5GHz remote LAN, Bluetooth 4.2/BLE, quicker Ethernet, and PoE capacity through a different PoE HAT. The double band remote LAN accompanies secluded consistence confirmation, enabling the load up to be planned into finished results with fundamentally diminished, remote LAN consistence testing, improving both expense and time to showcase.

The Raspberry Pi 3 Model B+ keeps up the equivalent mechanical. The following is the image of Raspberry Pi 3 Model B+ :

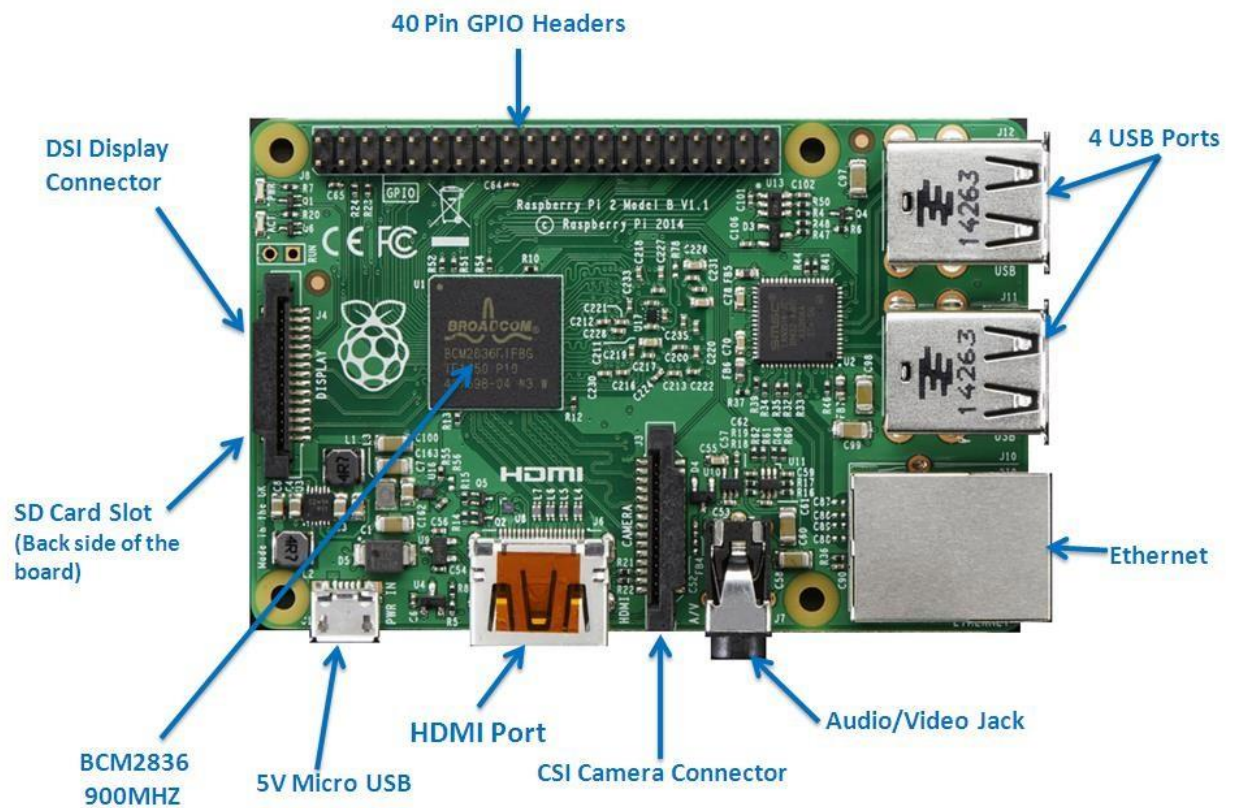


Figure 2.3: Raspberry pi 3B [8]

Operating System:

Operating system flashed in SD card is Raspbian Stretch, a Linux based Operating System designed for use on the Raspberry Pi.

GPIO pins:

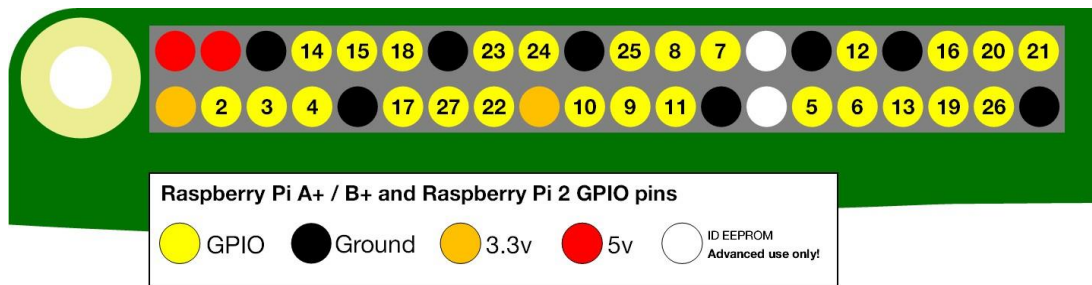


Figure 2.4: GPIO Pins [9]

The main and the most important feature of a Raspberry Pi are its GPIO (General Purpose Input/Output) pins. Any of its GPIO pins can be assigned (in programming) as an Input, Output or an information or yield stick and utilized for a large variety of purpose. The numbering of the GPIO pins on the Raspberry Pi isn't in any numerical order; GPIO pins 0 and 1 are available on the board (physical pins 27 and 28) However are saved for other functions.

Output:

The high level output of the GPIO pins of the Raspberry Pi is 3.3V whereas its low level output is 0V.

Input:

A GPIO pin can read digital input of voltages 3.3V (Logic Value 1) and 0V (Logic Value 0).

The output of the GPIO pins are controlled and used to drive the motor driver of the humanoid robot.

2.4 RELAY BOARD

Item particulars incorporate the quantity of channels, physical measurements, input range, and yield extend. Hand-off sheets with opto-isolators give segregation between control flag and yield controls. Programming based apparatuses can be utilized to compose bunch records, and Light Emitting Diodes (LEDs) give are utilized as visual pointers. Most transfer sheets have 2, 4, 8 or 10 channels. Each channel has a transfer switch with a yield appraised up as far as possible, for example, 250 VAC/5 amps. Some hand-off sheets have an extra attachment for a power pack association. Other can be controlled remotely, or through Radio Frequency (RF). RF transfer sheets may utilize an auto-move calculation to counteract the unapproved capture attempt of transmissions. RF transfer sheets with transmitters and beneficiaries utilize different channels.

Transfer sheets are utilized in a wide range of uses. A few items are utilized to control lights, motors, and other electronic gadgets in modern and business applications. Others are additionally used to control warmer temperatures, or are utilized in power exchanging applications Relay sheets that are intended for explicit kinds of mechanical hardware are likewise accessible. The following is the image of Relay board – 2 channels:



z

Figure 2.5: Relay Board [10]

CHAPTER 3

SOFTWARE SPECIFICATIONS

3.1 Python IDLE –

Python IDLE (short for coordinated advancement condition or incorporated improvement and learning condition) is an incorporated advancement condition for Python, which has been packaged with the default usage of the language since 1.5.2b1. It is bundled as a discretionary piece of the Python bundling with numerous Linux disseminations. It is totally written in Python and the Tkinter GUI toolbox (wrapper capacities for Tcl/Tk). There are currently two versions of Python available online Python 2 and Python 3. The difference between the two is just the syntax difference.

3.2 Raspbian –

Raspberry Pi being an ARM based microchip having 1GB RAM can't deal with substantial OS so Linux based OS is most appropriate for it. So for this reason an exceptional Debian based OS called Raspbian OS was presented uncommonly for Raspberry Pi. Its most recent adaptation is Raspbian extend. It is a Linux based OS henceforth closer to the Kernel and it is simpler to control the equipment from it. It requires lesser space to introduce and the execution is quicker as it is light weight.

3.3 Rufus –

Rufus is a utility that helps position and make bootable USB streak drives, for example, USB keys/pen drives, and memory sticks, and so on. It very well may be particularly valuable for situations where you have to make bootable USB establishment media from bootable ISOs (Windows, Linux, UEFI, and so on).

3.4 Flask Python Framework –

Flask is a small scale web system written in Python. It is delegated a smaller scale system since it doesn't require specific instruments or libraries. Applications that utilize the Flask system incorporate Pinterest, LinkedIn, and the network site page for Flask itself. In our venture Flask Framework is utilized for the video streaming UI. It is a Python based system for making neighbourhood host and video streaming. It takes the pictures from OpenCV library and makes a video by utilizing a stream of frames from the camera .

3.5 OpenCV Library –

OpenCV is a library of Python that intended to tackle PC vision issues. Python is a broadly useful programming language created by Guido van Rossum that turned out to be exceptionally well known in all respects rapidly, for the most part in light of its effortlessness and code intelligibility. OpenCV was worked to give a typical framework to PC vision applications and to quicken the use of machine recognition in the business items. Utilizations models to perceive face and helps python in getting to the web camera. Utilizations stream of pictures to make a video by consolidating them.

3.6 Python Speech Recognition –

Python has a module that can be used for Speech Recognition using Google Speech Recognition APIs, Google Cloud Speech API. These APIs are free hence the only way to communicate with the API is by using a python script. The script needs internet access to communicate with the APIs. The method to use these scripts is by setting a threshold of audio on the received audio and then recording the audio which is above the threshold. The recorded audio is then sent to the API and converted to text. The API returns the converted text to the script.

3.6 WEB UI APPLICATIONS

First Feature:

The first feature is controlling the robot with help of a Web Based UI controller in which buttons are given to move the robot in all the direction and to stop the robot. We can see whatever the robot will be watching through the robot's eyes i.e. camera. The video is live streamed on a flask server. The user can see the live stream and then with its help the user, control the robot movement. The following screenshot is this features achieved output.

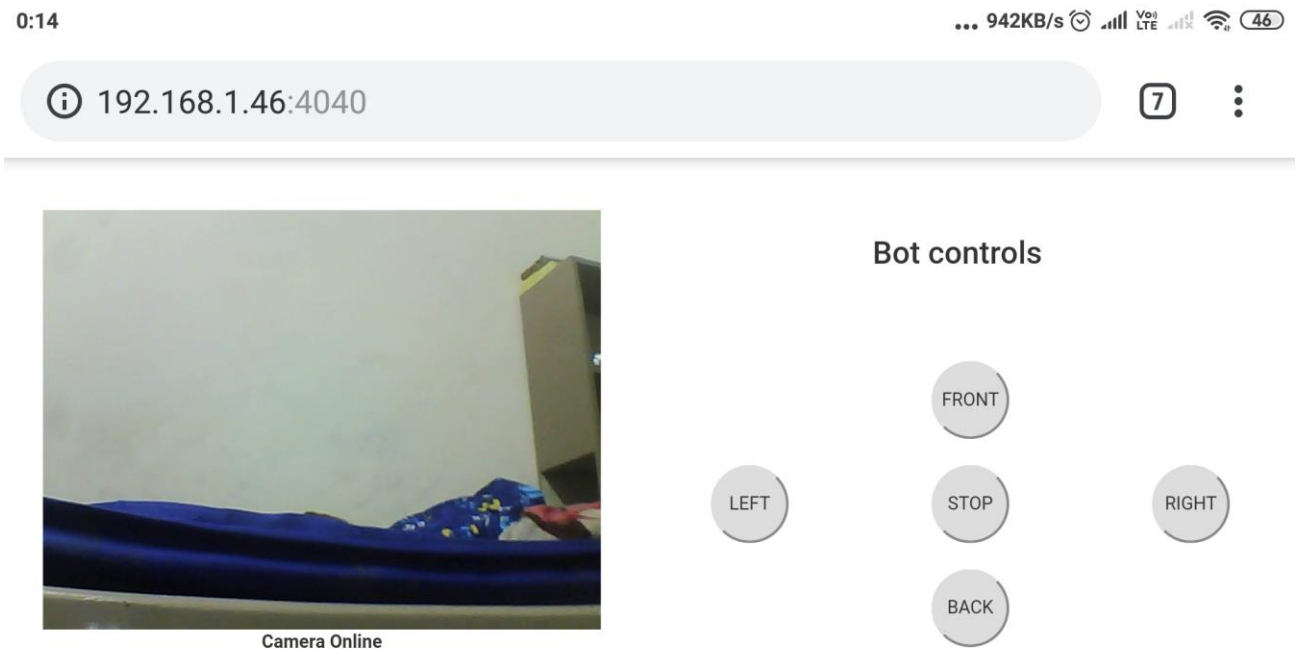


Figure 3.1: Humanoid Robot controller

Second Function:

It also let you to set reminder for the medicines with the time and the amount to be taken which will be reminded by the voice module for 30 sec. The reminder takes the medicine input from a database hence it keeps the reminder saved for the next day also after reminding about the medicine once. The following screenshot is this features achieved output.

0:14 ... 1.0MB/s

Medicine Entry

Medicine Update

Medicine Remove

Sno	Name	Time	Dosage
-----	------	------	--------

Figure 3.2: Medicine entry page

192.168.1.46:4040

Medicine Entry

Name

Time

Dosage

submit

Medicine Update

Sno

Name

Time

Dosage

submit

Medicine Remove

Sno

submit

Sno	Name	Time	Dosage
1	Calpol	00:00	1 tablet

Figure 3.3: Reminder set to take the medicine

Third Function:

One of the important features of this project is that this humanoid robot also helps in home automation. The following screenshot is this features achieved output.

0:14

... 1.1MB/s ... LTE ... 46

Home Automation

On Off

Figure 3.4: Manual Override of Home Automation

CHAPTER 4

RESULTS AND DISCUSSIONS

The target of this task is satisfied by structuring the humanoid robot. The client adequately controls and screens the developments of humanoid robot utilizing a web application. The control activity of humanoid robot relies on the accessibility of the system. So it very well may be controlled from whenever, anyplace where organize is accessible. This humanoid framework has frame by frame video rendering highlights that make this framework livelier. The different conceivable outcomes are that notwithstanding the client coordinating the robot, numerous different clients had the option to sign on and see the video too. This makes this humanoid mechanical framework profoundly open to the two clients who need to coordinate the humanoid robot. The following screenshot is this features achieved output.

The image below (Figure 4.1) is the base body of the project.



Figure 4.1: Humanoid Robot 1

The following image (Figure 4.2) shows the internal structure of the robot.



Figure 4.2: Humanoid Robot 2

The plan of our User Interface depends on utilizing a Flask based UI, this UI is better than the HTML adaptation. Consequently this liberates the HTML from sending site pages to programs, permitting the humanoid robot server and the robot to exclusively process and transmit messages sent to and by the client. To the Humanoid robot, the flask server gave an extra advantage to this framework by enabling the humanoid robot to just keep just one session, making it more secure and only accessible to just one client at a time to reduce the hazard if multiple clients are controlling the bot. This makes this humanoid mechanical framework adaptable.

CHAPTER 5

CONCLUSION AND FUTURE SCOPE

5.1 CONCLUSION

Our inspiration for this project is basically helping people out. Imagine a senior citizen, living independently. All his needs taken care of, just with our assistance robot. We aim to build this bot with such an extensive array of functions, that this vision of ours becomes a reality.

Another valid inspiration would be an individual trying to figure out his/her way in the world. Starting a job is very hectic at times, and usually the basic things of life are ignored. Trying to focus on the employment aspect. This bot will help people manage their personal space and life with ease, while simultaneously never forgetting to do the important tasks.

We are confident that our bot can make this vision a reality. With its multiple features and immense ease of access, we aim to bring the technology of tomorrow, today.

We have exhibited the plan of this robot as a standard semi-autonomous humanoid robot. The things realized amid the execution of this venture will be actualized in the following plan.

This framework can be utilized in assortment of areas, for example, route, human-robot association and acknowledgment. We have quickly portrayed the robot in our present work in order to accomplish an easy to understand semi-self-ruling humanoid mechanical framework. The humanoid robot has an easy to understand, simple to utilize control framework. While a portion of the examination difficulties may as of now be illuminated however reconciliation of these arrangements in a solitary framework may be a difficult errand.



Figure 5.1: Humanoid Robot 3



Figure 5.2: Humanoid Robot 4

0:13

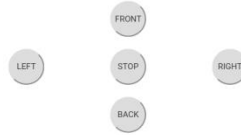
... 1.0MB/s LTE 46

192.168.1.46:4040

7



Bot controls



Home Automation



Medicine Entry

Name
Time
Dosage
submit

Medicine Update

Sno
Name
Time
Dosage
submit

Medicine Remove

Sno
submit

Sno	Name	Time	Dosage
-----	------	------	--------

Figure 5.3: Complete UI

5.2 FUTURE SCOPE

Apart from the extensive list of things our bot does, we also want it to keep our living space clean. We plan to implement a robotic hand, which dusts the surroundings whenever the bot detects unsanitary conditions around it.

Making the bot completely automated, full-fledged motor and instruction taking functionality remotely over the internet can also be implemented. No matter where you are, you can control your bot through your phone, and see what it does.

Currently, our bot can only traverse plain floors. But that is not necessarily how it will be. Implementing a 3 wheel concept which will assist the bot to climb stairs and traverse uneven terrains can also be done.

Holo lens is a type of spectacle which is used to reflect the projection of a screen on our lens of the spectacle so that we can see the video stream while doing our daily task. It would use a raspberry pi and a screen to project the video.

The things got the hang of amid the usage of this task will be utilized in the following structure. We will almost certainly actualize both self-sufficient and semi-self-ruling framework. It will bolster pursue the individual and achieve the goal work consequently. This self-ruling capacity can be structured utilizing AI, man-made consciousness and neural systems. It will bolster crash evasion and programmed driving. The structure of the robot can be modified for performing different kinds of errands like picking things, opening entryway and so forth by adding hands and improving the body of the robot.

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