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A Project Phase-I Seminar Report On

Project name

Advanced Communication System for Blind Deaf People

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B.E. (ELECTRONICS & TELECOMMUNICATION)
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NOV/DEC-2021

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CERTIFICATE

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In record of bonafide work carried out by them under my guidance, in partial fulfillment of requirement for the award of Third Year Engineering (Electronics & Telecommunication) of Savitribai Phule Pune University.

Date: 10 DEC 2021

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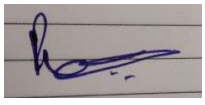

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We are ending this acknowledgement with deep indebtedness to our friends who have helped us to complete the manuscript.

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Abstract

Abstract

Now a day's technology enhancement is reaching at personalized electronic assistance but we feel that there is a requirement for an electronic translator for physically challenge people. Among them, we are focusing on blind and deaf peoples. There are difficult to do communication between them. For making system, we think about what language blind and deaf people know. The Braille Lipi has been used by the visually impaired for reading and writing. so, we providing a mechanism to type the Braille characters through the number pad of keyboard. The type Braille character is mapped to the alphabet and spoken out. by using this they can read and communicate with the world as a realization for detecting or reading blind people depend on finger point by keeping hand on letter structure. In order to make them able to read the content of the message system has to make different pattern like speaker format. on the specific time interval controller do the decoding and the deaf person can reading the content of which can presented on display. also, deaf person can connect with Mobile Phone. The connected Speaker Spock out speech of content shown on display. We also interface the camera in project camera will capture the image and match with database and image processing detected objects and faces name will spoken out for blind person.

Keywords - Blind, Deaf, Braille Lipi, Vibro, Display, Mobile Phone, Speaker, camera, image processing

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Chapter 1
Introduction and Literature Survey

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Introduction and Literature Survey

1.1 Introduction

Over 1 billion people are estimated to experience disability. This corresponds to about 15% of the world's population. Globally, at least 2.2 billion people have a near or distance vision impairment. This 1 billion people include those with moderate or severe distance vision impairment or blindness due to unaddressed refractive error (88.4 million), cataract (94 million), glaucoma (7.7 million), corneal opacities (4.2 million), diabetic retinopathy (3.9 million), and trachoma (2 million), as well as near vision impairment caused by unaddressed presbyopia (826 million)

Over 5% of the world's population – or 430 million people – require rehabilitation to address their 'disabling' hearing loss (432 million adults and 34 million children). It is estimated that by 2050 over 700 million people – or one in every ten people – will have disabling hearing loss.

We find out the what difficulties faced by blind person deaf person. We got a common difficulty between them that means its is a communication barrier. They can't communicate even through call or text. Language Barrier is created while they try to communicate. The deaf are not able to hear sound they only watch and mostly blind people are unaware of writing skills so there's a need of communication between them. every time they need physical assistance while performing communication. Also teaching these special humans is a major challenge In market many types of devices are available with one function in one device so we decided to develop which will make conversation convenient and more accurate. The project will make them self-sustainable. we find out what language the known. How they can communicate between them.

Project consist of 2 parts: -

1. Communication from Blind to Deaf-Dumb person.
2. Communication from Deaf-Dumb to Blind person.

1.1.1 If Deaf-Dumb Person do the Communication with Blind Person, then how he can do?

The Deaf-Dumb person can read anything with watching display that means watch with eyes and also, he can write with his hand or type with hand. hence, his skill of the watching and typing so we used this skill for project. He can type his words on mobile and send to controller display; but blind person cannot watch this display, the blind person do communication only with hand sensing, voice hearings so the word on display which can to present on Braille lipi format board of system which made by us and he can sense the using hand. And also he can hear the speech of text is displayed.

1.1.2 If Blind Person Communicate with Deaf -Dumb Person then how he can do ?

The Blind person can understand anything with hearing with ear and also, he can sense the with his hand. and write with his braille language or speck out. We used this skill for our project.
blind person can type word in their language of Braille Lipi and send to system then it change into our alphabets this alphabets send to mobile display. and also spoken out on speaker. the deaf person can read this content with watching display.

1.1.3 What is Braille

The main part of system is braille lipi .This was derived in 1825 by Louis Braille, a blind Frenchman. Each braille character or cell is made up of six dot position, arranged in a rectangle containing two column of three dots each a dot may be raised at any of six positions to form sixty four possible subset

1.1.4 What is braille cell

The Braille system comprises of a cell per character and these themselves consist of six embossed or raised dots arranged as three rows and two columns. These six cells allow 26 =64 characters to be represented, being split up into 26 letters. The Braille cell use world-wide. The different languages use different unique codes, mapping the alphabets, numbers and punctuation symbols to Braille cells according to NCD. Braille cell is represented as follows shown in figure

1.1.5 Braille lipi alphabets

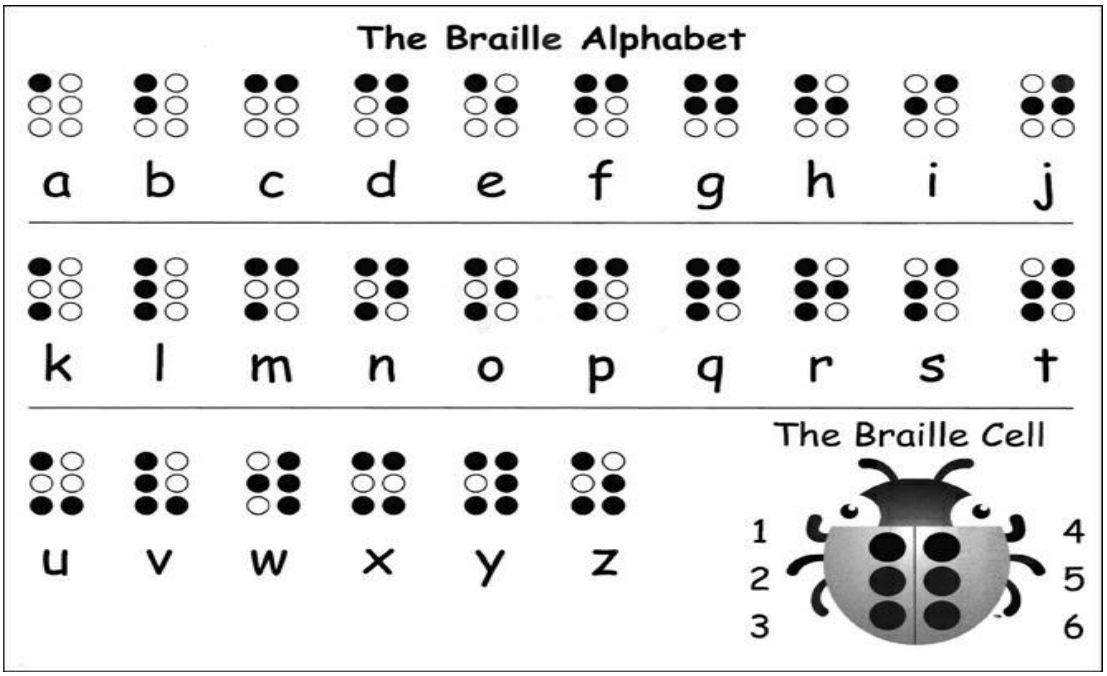


Fig. 1.1.5: Braille lipi alphabets

1.2 Literature Survey System

There are several types of braille systems. These types appear with many features, but nearly with the same task. In the next two sections, a discussion about the braille system that exists and the scientific topic of some braille applications is presented. In addition, we make a comparison between all of them.

This section will show the famous braille devices in the markets, their specifications, features and limitations.

1. **Perkins braille writer (Six-key entry) :** A braille Writer contains a row of keys across the lower part of the device corresponding to the six dots in the braille, which is analogous to a traditional typing machine. The writer produces a paper with raised dots. The raised braille dots that are made can be read with the fingers.

   Features

   The first type that enable braille users to read and write, and is reasonably expensive.

   Limitations

   Very heavy, not portable, difficult to learn and need special people that are familiar with braille signs to read, write and communicate with the blind person

2. **Braille sense :** The braille Sense is a braille note taker. It is an electronic device that combines 9 key Perkins-style keyboard and 32 cell braille display, allows users to create and read files.

   Features

   Read Texts, take notes, can communicate with other blind people have the same device.

   Limitations

   Very expensive, hard to learn and needs time to deal with it.

3. **Jot-A-Dot braille :** Jot a Dot is a newer innovation in braille writing. Jot a Dot has a standard 6 dot braille keyboard. It has cell indicators showing the position of the embossing head on the line that you are writing

   Features

   Easily carried as a personal item, light (weight less than bound), and use light weight paper.

   Limitations

   Has the same limitation as Perkins braille writer (Six-key entry).

This section discusses some scientific braille projects, summarizes them and makes a comparison between them in the next section.

1. **Paper Name: Braille Band: Blind support haptic wearable band for communication using braille language**

   Author: Savindu H.P.,Iroshan K.A.,Panangala C.D., Perera W.L.D.W.P., De Silva A.C. (MIEEE)

   Details: Connectivity between the Braille Band and the phone is established using Bluetooth. It consists of six nodes in three bands worn on the arm to map the braille alphabet, which are actuated to give the sense of touch corresponding to the characters. It consists of a microcontroller, a Bluetooth module and six haptic motors

   Year: 2017

2. **Paper Name: A Low-Cost Wireless Braille System Hand Glove for Real Time Communication**

   Author: Hasan U. Zaman, Khalida Sultana Shuravi, Muntasir Kabir Sakib, Mohammad Wasee Sarwar, Department of Electrical and Computer Engineering North South University Dhaka, Bangladesh

   Details: This glove allows the person to type characters based on different braille combination using six slot sensors. The vibration in six different positions of the glove which matches to the braille code allows them to read characters. It consists of slot sensors, vibration motors, Motor Driver IC, Comparator IC Circuit, AVR Microcontroller Development Board.

   Year: 2017.

3. **Paper Name : Computerised Deaf, Dumb And Blind**

   Author: Ms. Rashmi R Gundams, Sonail S Handigundms, Sudharani S Biradar, Department Of Electronics And Communication Engineering, S D M College Of Engineering And Technology, Dharwad.

   Details: In this project image processing is used to recognize gesture, comparing that with stored database, recognizing correct expression using MATLAB and displaying output in the form of voice through voice processor. And on other side speech of blind person is transmitted to pc through mike. Speech signal is processed through MATLAB present in the pc and displaying as text through LCD by interfacing with micro controller.

   Year: 2019.

4. **Paper Name: Smart Glove for Blind and Deaf Blind People**

   Author: Riham AL Nazer , Nadeen Shaheen, Palestine Polytechnic University College of Information Technology and Computer Engineering.

   Details: The Smart-Glove has a set of pushbutton switches. Blind user can write messages through pressing pushbuttons located on the Smart-Glove. Hence different Pushbutton patterns correspond to different braille codes. These braille codes are sent by Bluetooth to the mobile, where they are converted to display the corresponding alphabets, words and sentences.

   Year: 2018

5. **Paper Name : Gesture Aided Speech for Deaf and Mute**

   Author: Dipti Jadhav Dr. Amiya Tripathy Department of Computer Engineering, Don Bosco Institute of Technology Mumbai, India

   Details: Mute people communicate via sign language. Sign language uses gestures to convey meaning simultaneously combining various hand shapes and orientations, hand movements or body and facial

   expressions to express the speaker's thoughts. In order to overcome the problems associated with vision based systems the glove based or hardware device is used.

   Year: 2018

6. **Paper Name: Text to Speech Conversion Using Raspberry Pi for Embedded System.**

   Author: P.V.N. Reddy Professor, Department of ECE, S V College of Engineering, Tirupati, A.P, India.

   Details: This speech synthesis system also known as SMaTTS, was developed with user-friendly graphical user interface (GUI).The algorithms for SMaTTS system were developed and were compared. The overall performance of the system is analysed using categorical estimation (CE) for a comprehensive analysis.

   Year: 2012.

1.2 Comparison between Braille products and Braille projects

Comparison	Size	Cost	Advantage	Method	Limitations/ Future Scope
Perkins braille writer	Big	5000Rs-20000Rs	Used for reading and Writing	It is 6 keypad typewriter which used for read, write	Very heavy, not portable, difficult to learn, Know Braille
Jot-A-Dot braille.	Average	3000-15000Rs	Small Typewriter compare Perkins	6 dot braille keyboard. Which use for braille typing	Same as Perkins
Braille sense	Average	Up to 15000Rs	Used for reading and Writing	combines 9 key Perkins-style keyboard and 32 cell braille display	Very expensive, hard to learn
Braille Band	Small	Not Specified	Communication barrier removed	For the vibration the Motor use as band	Voice facility require, some time vibration not sense
Hand glove	Small	Not Specified	Size is reduced of previous project	Vibration motor are used on Glove	Voice facility require, due to adding ckt. on glove it is heavy
Computerised system	Average	Not Specified	Special People Communication Possible	Using Image Processing and MATLAB software convert gesture to text	Not portable, need software,
Hand gloves	Small	Not Specified	Size in size, portable	Vibration motor use on figure of gloves	Sometimes vibrative not sense due to use by button vibrator
Gesture Aided Communication	Small	Not Specified	Small in Size	Mapping of gesture to resistance with the help of voltage divider network	Implement without using gloves
Our Project	Small	Not Specified	Simple to use Portable	Brille board and speech conversion Image processing	-

Fig. 1.2 Table of Previous Project review.

Chapter 2

System Specification and Block Schematic

Chapter 2

System Specification and Block Schematic

2.1 Project Objective

1 To make a System which is helpful for special People.
2 To make a System stable system.
3 To make a System as portable.
4 To make a System user friendly.
5 To make a low-cost communication system.
6 To make a System which a part of Image processing

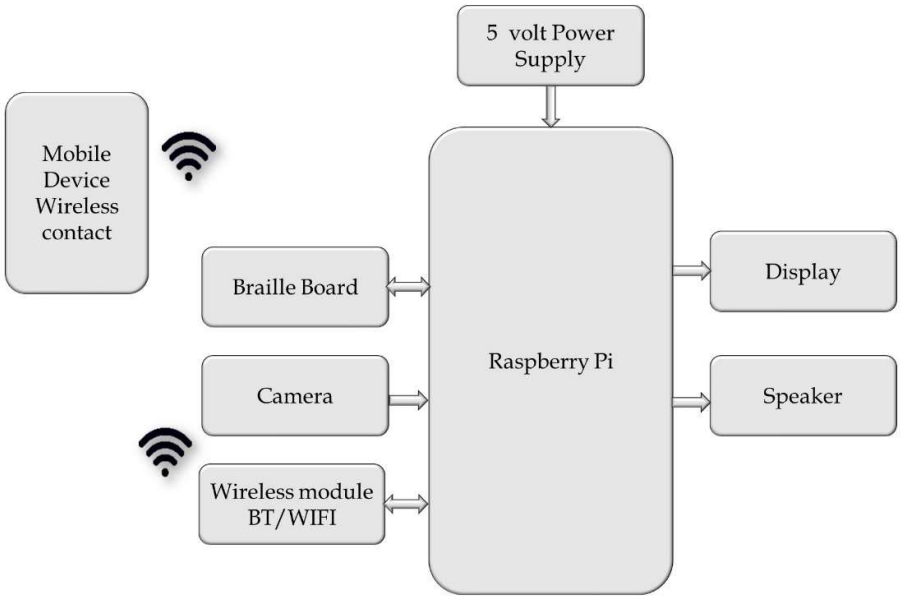
2.2 System Specification

1 Operating Voltage: -5V
2 Sensitivity :- 95 % ± 5%
3 Character gap :-400 - 2000ms
4 Accuracy:- 90% ±5%
5 Speed :- 4-6 words/minute.
6 Mobile android version :- 8+ android version
7 Connectivity range: -10 m
8 Operating Frequency :- 2.45GHz.
9 Transmission rate :- 6 words/minute
10 Speaker Output power :-65dB -100dB
11 Image Detection :- 95% ±5%

2.3 Block Diagram

This system consists with raspberry pi controller, Braille board keyboard, Camera, Speaker, Wireless device, and 5volt power supply. The block diagram is given as follows in fig no 2.3.1:

Controller : Any System have main unit as a controller. In our case we used the Raspberry pi 3B+ model controller. The controller can control all project action. That means the controller take signals from the braille board, camera, and also from wireless module. The controller can do work which is save in that. After checking with database, it will give outputs to speaker, braille board, wireless module.



Block diagram

Fig. 2.3: Block dig. of Project

Braille Cell Keyboard : Blind person type using braille cell keyboard what he/she want to say to deaf-dumb. This braille board is implemented with help of braille cell dot. This board gives inputs and takes ouput aslo. This block consists with push switch and vibro motor.it send the signal to controller the controller can get signal and check with data base and do action accordingly.

Camera : we interface the usb camera for detect faces, objects. We captured images automatically and sends to controller the controller can match with data base and after finding result, the result will spoke out through speaker.

Speaker : the Speaker is used for the to spoke out the text is displayed or controller generated. That means controller convert text to speech format and this speech we listen with help of speaker.

Wireless Module : The Wireless Module is used to receive data from mobile phone and also use for to send data from controller to the mobile phone. This is used for crate wireless channel between mobile phone and controller.

Mobile Phone : Mobile Phone is used by the deaf-dumb person to communicate with blind using wireless connectivity. The deaf person can connect with blind person with the help of mobile. and this mobile connected to the controller hence he connects with blind person.

Chapter 3

Circuit Diagram

Chapter 3

Circuit Diagram

3.1 Circuit diagram:

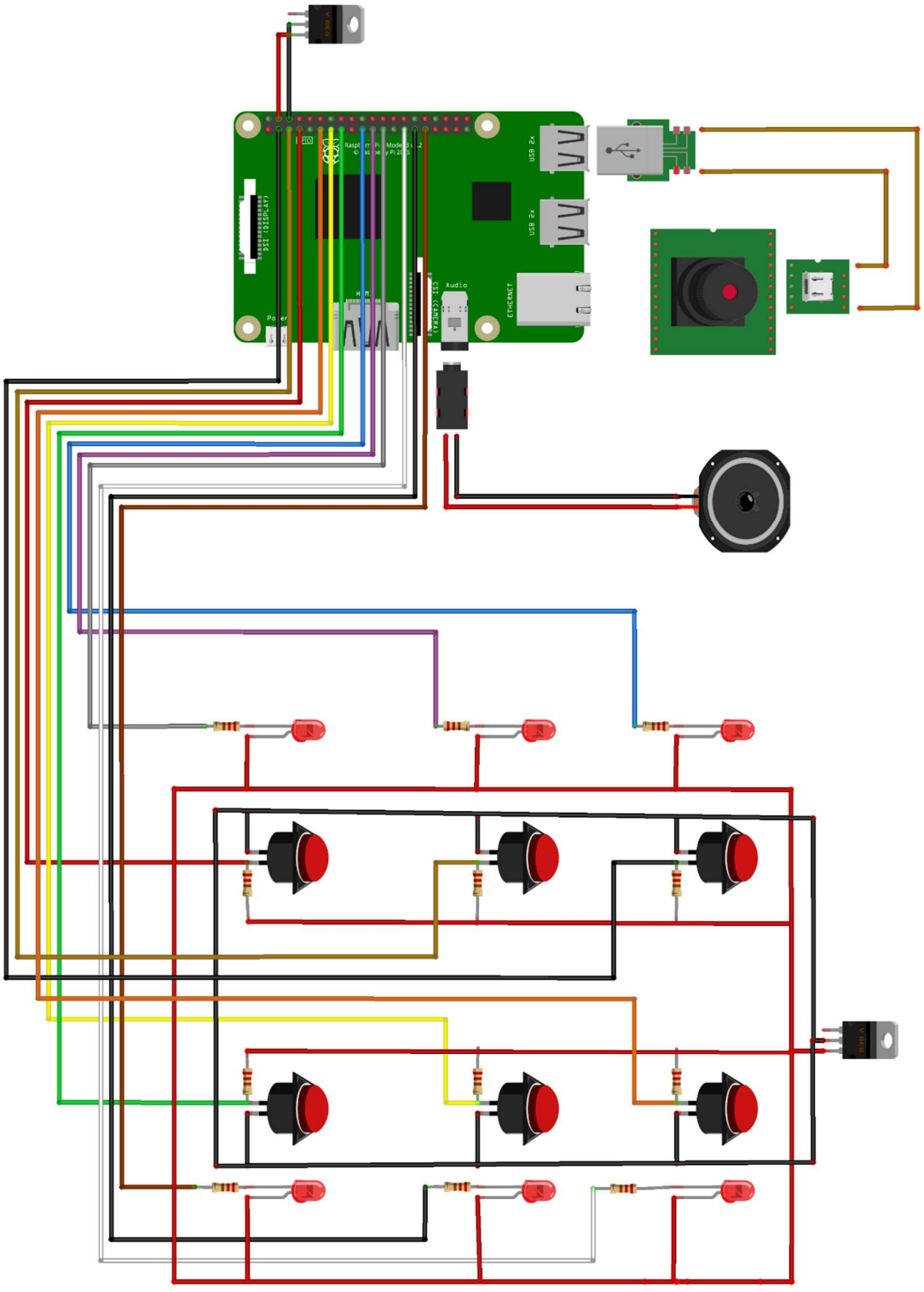


Fig. 3.1: Circuit diagram of Project

3.2 Circuit Diagram Description:

1) Raspberry pi 3B+ Used the GPIO Pins of raspberry pi as (3, 5, 7, 11, 13, 15) these pins are used for Button
2) Speaker : It is connected to the 3.5mm audio jack.
3) Camera : The USB camera connect to USB port.
4) 5 volt Power supply : Connect to 5-volt supply to controller.

For circuit diagram implementation we used the fritzing software. In that software add raspberry pi and connect the pins as mention in previously. We connect the push switches with pull up register. When switch pressed then low signal give to the controller. Also we interface the camera using USB port and connect the speaker at headphone jack slot. and another connection is implemented in raspberry pi is a wireless connection from mobile phone to raspberry pi which connected with Bluetooth.

Chapter 4

Hardware Description

Chapter 4

Hardware Description

3.1 List of Components

Raspberry pi 4B+
USB Camera
Push Switches
Speaker
3.5 mm Audio jack
5volt Power supply
Resister

3.2 Introduction

With less no. of components, we make a system which is more effective and useful. We used the raspberry pi 4b+ as controller and push switch is used as the input give to raspberry pi. and Speaker used as the output. We connect USB camera to raspberry pi and also connect the specker with 3.5mm audio jack

3.3. Components Details

1.Raspberry pi 4B+

Raspberry Pi Foundation recently released their latest version of the Raspberry Pi 4 with a RAM of 8GB. This is an addition to the already exciting Raspberry Pi 4 versions which are 1GB, 2GB, and 4GB. After the release of this new 8GB RAM version, everyone got excited to hear about it, but many people might be thinking about what they can really do with an 8GB RAM on a Raspberry Pi. We hope this blog will help you understand the potentials of the Raspberry Pi 4 8GB

When Raspberry Pi 4 got released, they released three versions, which are 1GB,2GB, and 4GB RAM, but once they dropped the price of 2GB to match with the 1GB version, 1GB version was not fit to compete with the rest anymore.

The 2GB version of the Raspberry Pi 4 is powerful enough to function as a Desktop computer for daily use with most of your tasks such as running software, doing programming, web browsing, etc. Also, it is able to do some decent multitasking.

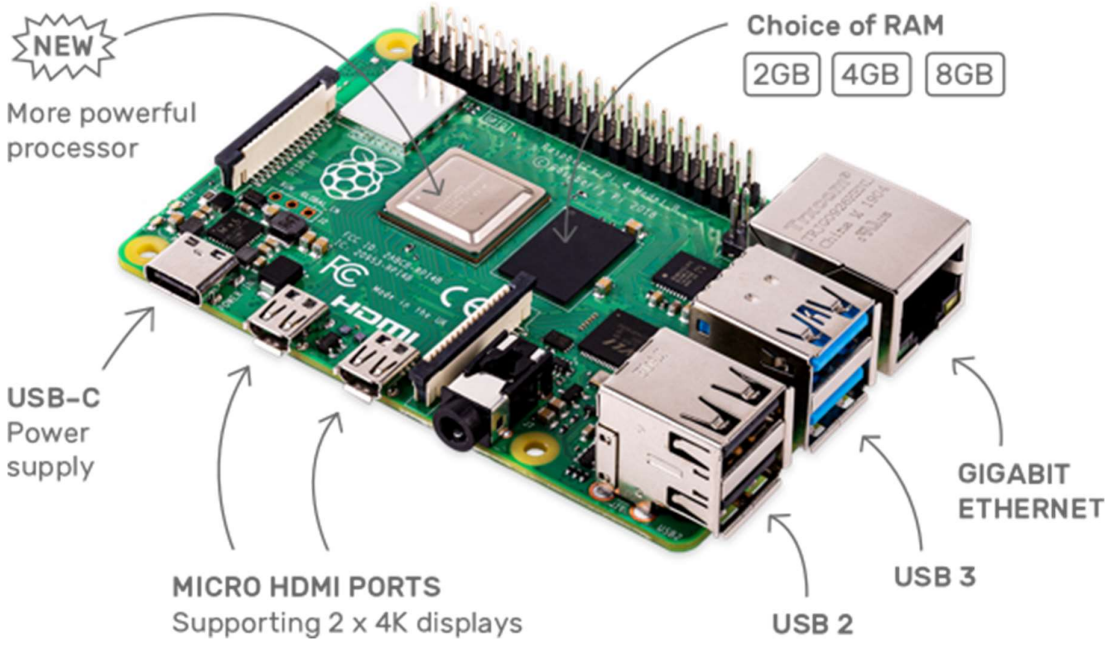


Fig. 4.3.1.1: Raspberry Pi 4B 2 GB RAM

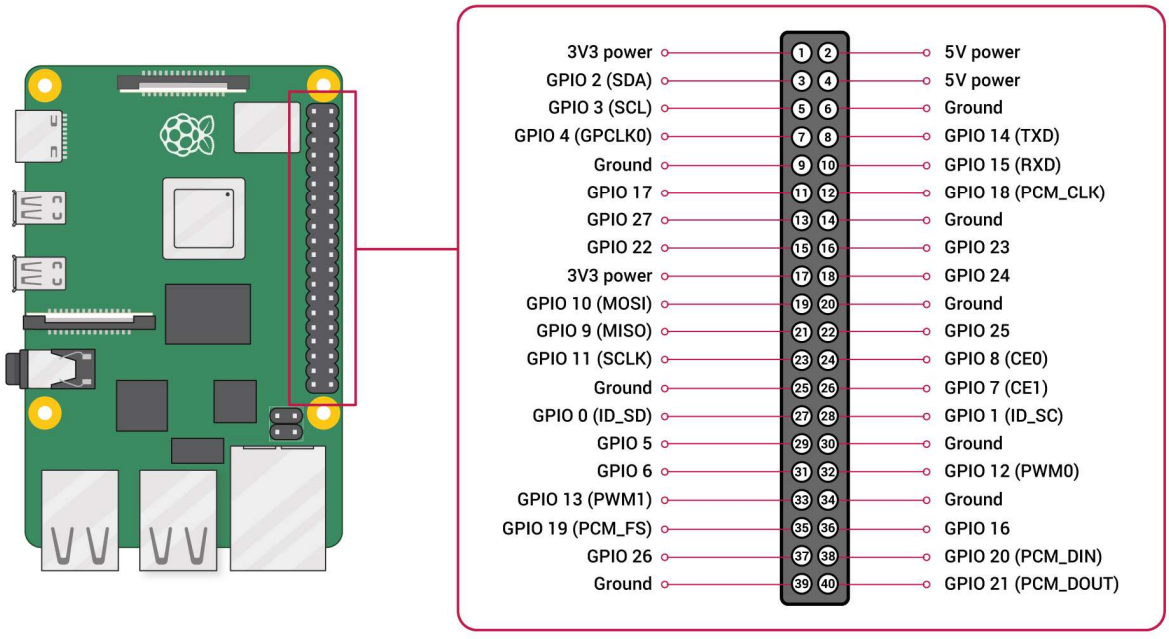


Fig. 4.3.1.2: Raspberry Pi 4B+ Pin dig.

Specification:

- CPU :- Quad core Cortex-A72 (64-bit) @ 1.5GHz
- GPU :- H264 (1080p60 decode, 1080p30 encode) OpenGL ES 3.0 graphics, H.265 (4kp60 decode)
- RAM :- 2GB.
- Operating Voltage Range :- 5V with 3A minimum
- GPIO PORTS : -28 I/O Pins
- LAN :- Available
- PoE :- Enable
- WIFI :- Available
- Bluetooth :- 5.0
- SD Card :- Available
- HDMI :- 2- Port with 4k Display (mini-HDMI)
- PWR Exp Header :- Not Available
- Power Source :- DC Power Jack, mini USB-C Port
- Expansion Connectors :- 40 Pins (SPI, I2C, LCD, UART, PWM, SDIO)
- USB :- 2×2.0, 2×3.0
- Camera :- CSI
- Display :- DSI
- Operating Temperature :- 0 – 50 degree

2. USB Camera

Fig. 4.3.2: USB Camera

This article is about connecting cameras with USB. For connecting displays to cell phones through the Micro-USB port, see Mobile High-Definition Link. The USB video device class (also USB

video class or UVC) is a USB device class that describes devices capable of streaming video like webcams, digital camcorders, transcoders, analog video converters and still-image cameras.

The latest revision of the USB video class specification carries the version number 1.5 and was defined by the USB Implementers Forum in a set of documents describing both the basic protocol and the different payload formats

Specification:

- Image Sensor - 1/7" CMOS Sensor.
- Image resolution- 16.0 Mega pixel.
- Frame rate- 30fps.
- Lens view angle- 54 degree.
- Focus distance-4cm – infinity.
- Image format-RGB24,l420.
- Power consumption-160mW.

3. Push Switch

Fig 4.3.3: Push button

A push-button (also spelled push button) or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal.[1] The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many UN-biased buttons (due to their physical nature) still require a spring to return to their UN-pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing, slapping, hitting, and punching.

Specification:

- Current Rating: 3A 125VAC; 1.5A 250VAC
- Insulation Resistance: 100 Megohms (min.) at 500VDC
- Dielectric Strength: 1000V RMS (min.), 1 minute
- Temperature Rating: −13 to +185 F (−25 to +85 C)
- Electrical Life: 6000 cycles
- Mechanical Life: 100,000 cycles
- Terminal Type: Solder Lug
- Mounting Hole: 500 (12.7)

4. Speaker:

Fig 4.3.5: Speaker

The purpose of speaker is to produce audio output that can be heard by the listeners. Speakers are the transducers that used to convert the electromagnetic waves into sound waves. It receives audio input from computer or audio receivers. The input fed to speaker is in analog or digital form. Analog speakers simply amplify electromagnetic waves into sound waves while digital first convert the signal into analog and then amplify it.

Sound produced by the speaker is defined by frequency and amplitude, where frequency determines how high or low the pitch of the sound is. Amplitude or loudness of the speaker is defined by the change in the air pressure created by the speaker's sound waves.

Specification

- Nominal Size: 20 mm
- Impedance: 8 Ohm ± 15% at 1 KHz 1V
- Resonant frequency: 750 Hz± 150 Hz at 1V
- Sound pressure level: 86 dB/w ± 3 dB
- Response: 10 dB (max)
- Input power: 0.5W
- Handling capacity: 1W
- Operation must be normal at program source of 0.5W
- Buzz, rattle, etc. must be normal at sine wave of 2 V
- Magnet Size: 8 x 1 mm
- Heat test: 60 ± 2° C
- Humidity test: 40 ± 2° C

5. 5 Volt Power Supply:

Fig 4.3.6: 5Volt Adapter

Every model of Raspberry Pi requires a low amount of power compared to a standard desktop PC. Despite hardware improvements, the latest Raspberry Pi 3 only marginally increases its power draw over previous versions.

The Pi 3 has a recommended power supply of 5.1V at 2.5A, which covers most situations. Earlier models demanded a lower draw of 5V at 1A, but in practice, greater amperage is usually preferable.

For low-power projects, you can reduce the amperage quite a bit before it affects performance or stability.

Specifications:

- Input Voltage (V): 100 ~ 280 VAC @50 ~ 60Hz.
- Input current (mA): 100.
- Output Power: 5V 3A.
- Load regulation (%): ±5.
- Input Plug: 2-Pin EU type.
- Output Plug: Micro USB Plug.

6. Resistor

Fig 4.3.7: Resister

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat, may be used as part of motor controls, in power distribution systems, or as test loads for generators.

7. 3.5mm Audio cable

Fig 4.3.8: 3.5mm Audio Cable

A phone connector, also known as phone jack, audio jack, headphone jack or jack plug, is a family of electrical connectors typically used for analog audio signals. The standard is that a plug (described as the male connector) will connect with a jack (described as female).

Specifications:

- Connect mini-stereo audio equipment up to 1.5m.
- Molded cables with built-in strain relief
- 3.5mm Male to Male connectors

Chapter 5

Software & Program

Chapter 5

Software & Program

5.1 Information

This list includes the Operating Systems typically in NOOBS and more

- Raspbian
- OSMC
- RISC OS
- Rasp BSD
- BMC64
- Etc.

For project implantation we used the raspberry pi so we downloaded the Raspbian OS. Raspberry Pi OS (formerly Raspbian) is a Debian-based operating system for Raspberry Pi. Since 2015, it has been officially provided by the Raspberry Pi Foundation as the primary operating system for the Raspberry Pi family of compact single-board computers. The first version of Raspbian was created by Mike Thompson and Peter Green as an independent project. The initial build was completed in June 2012

Raspberry Pi OS is highly optimized for the Raspberry Pi line of compact single-board computers with ARM CPUs. It runs on every Raspberry Pi except the Pico microcontroller. Raspberry Pi OS uses a modified LXDE as its desktop environment with the Open box stacking window manager, along with a unique theme. The distribution is shipped with a copy of the algebra program Wolfram Mathematica and a version of Minecraft called Minecraft: Pi Edition (note that Minecraft: Pi Edition is no longer installed as of the Debian bullseye update) as well as a lightweight version of the Chromium web browser.

5.2 Raspberry Pi OS Installation and Setup

- **5.2.1 OS Install**

  we install the Raspberry pi 64bit Raspbian OS in raspberry pi .The ARMv8-A architecture, which encompasses the 64-bit AArch64 architecture and associated A64 instruction set, was first introduced into the Raspberry Pi line with Raspberry Pi 3 in 2016. From that point on, it has been possible to run a full 64-bit operating system on our flagship products, and many third-party operating systems are available. However, we have continued to build our Raspberry Pi OS releases on the 32-bit Raspbian platform, aiming to maximise compatibility between devices and to avoid customer confusion.

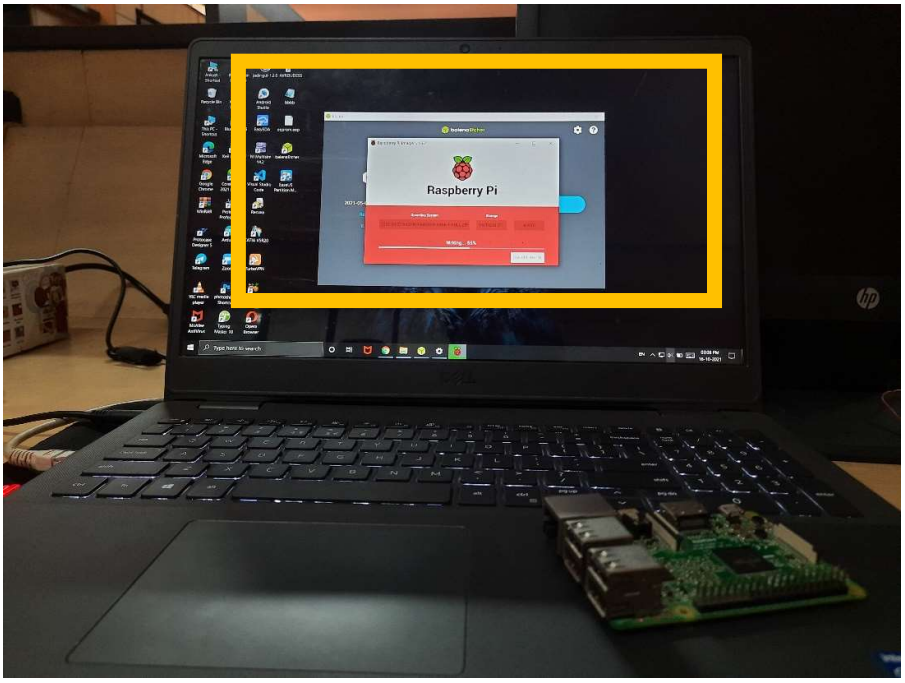


Fig 5.2.1: Installing OS

- **5.2.2 Install The Conky for which is used for visualization of memory, storage, network, os version**

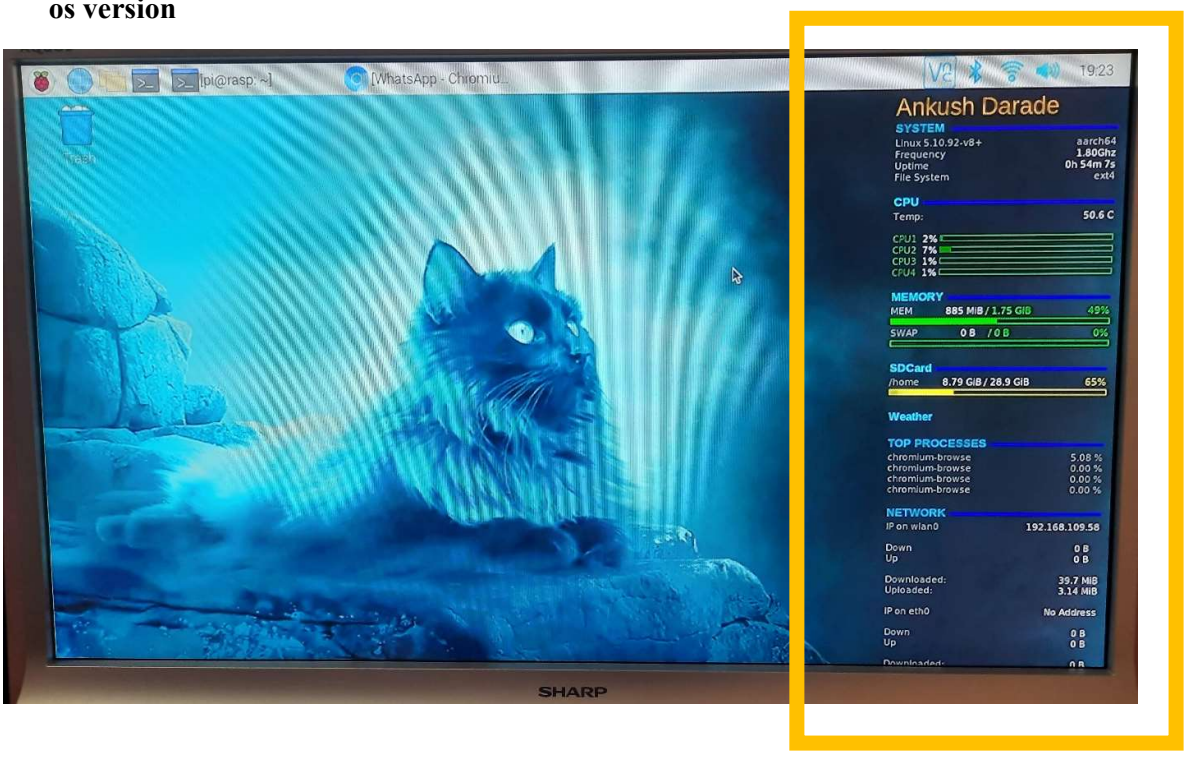


Fig 5.2.2: Installing Conky

- **5.2.3 Increases Swap Memory for multiple operation swap memory use as extra RAM**

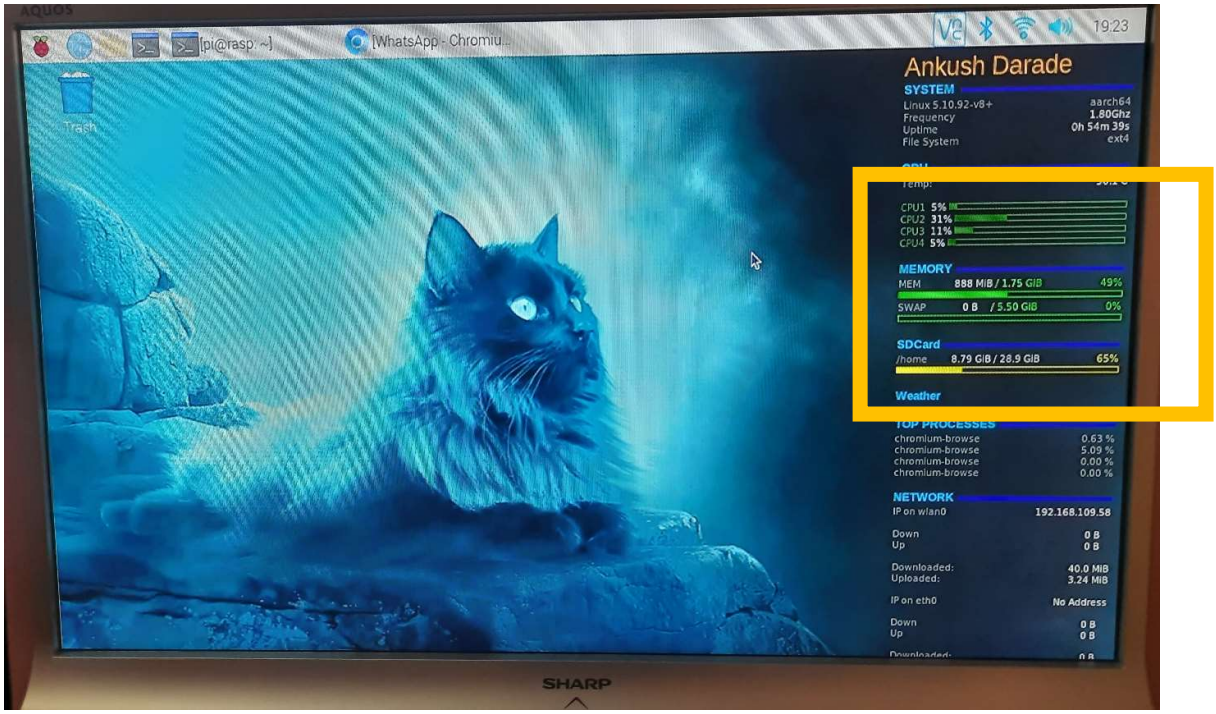


Fig 5.2.2: Increase Ram

5.3 Program

We Done Programming of project with python language. Python have a multiple library inbuilt so we use this. We divide the program in 3 parts 1st is program for to read the braille character which input given by blind person and send to the mobile display. After that 2nd part is receive a message which send by mobile and spoke out text in speech and lastly 3rd part is camera take photo and with help of Image Processing it match with data base and speaker will spoke out the detected name.

A. The program of project consists with following Algorithm:

1 Start the program.
2 Initialize the raspberry pi.
3 Initialize the 6 pins for push switch.
4 Initialize the camera and speaker.
5 Check the input is available.
6 Check input available from the braille input board.
7 Convert binary input to hex code.
8 Check hex code with data base.
9 Convert text into speech format give to speaker.

10 Check input available for camera.

11 Camera input check with data base.

12 Convert text /content into speech for spoke out.

13 Check input from wireless device is available.

14 Check wireless input with data base and convert text into speech format.

15 repeat all process.

B. The flow chart of project program:

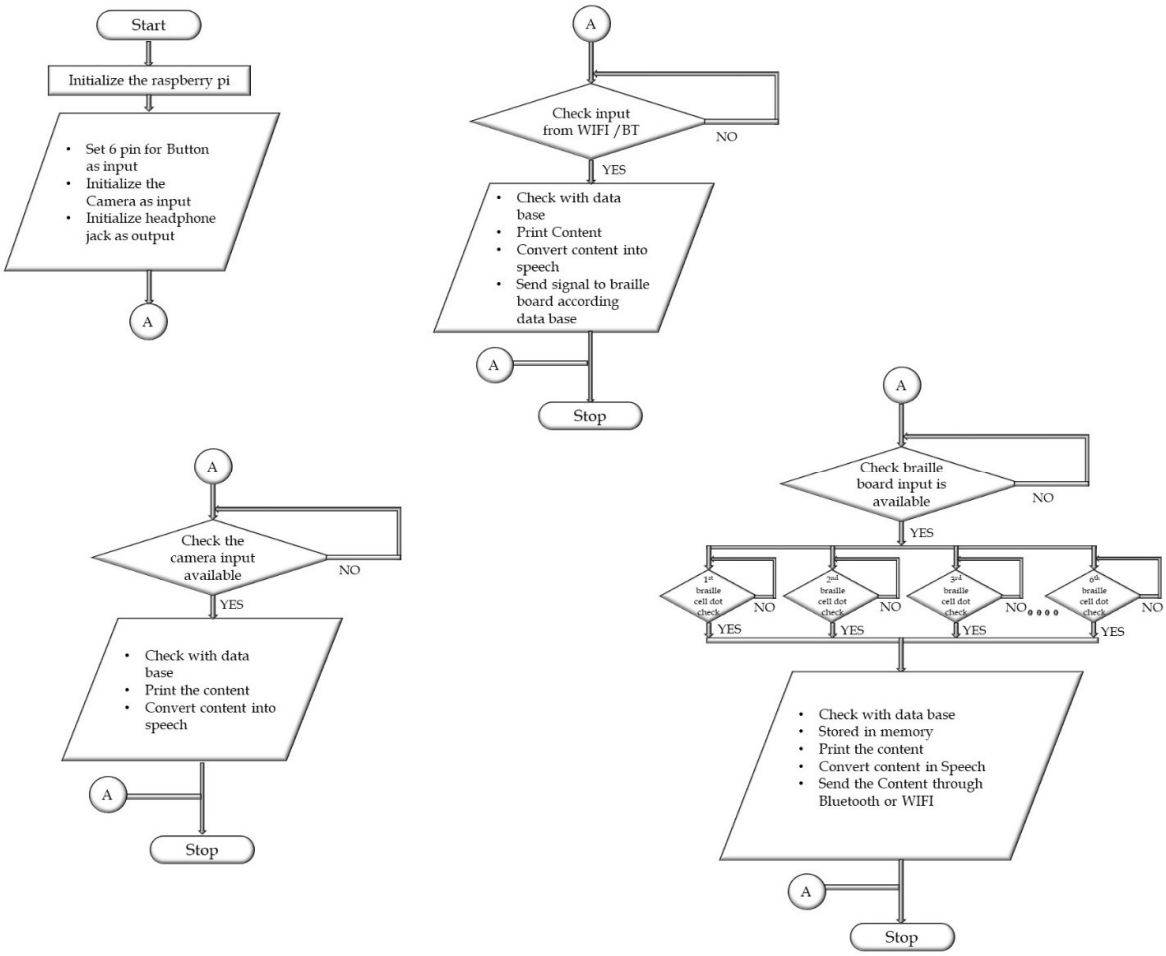


Fig 5.3 B: flow chart of program

C. Program of Project:

Import important library for project

```
#! /usr/bin/python
# import the necessary packages
import sys #import system function
import os
import cv2
import imutils
from imutils.video import VideoStream
from imutils.video import FPS
import face_recognition
import numpy as np #import numpy library
import pandas as pd # imprt pandas for arry opeation
import pickle
import time #import time fpr delay
import RPi.GPIO as GPIO # Import Raspberry Pi GPIO library
import requests
import serial #import serial port
```

Serial Port Setup and Create Channel

```
pyVER=sys.version
os.system('python -m serial.tools.list_ports')
d=pyVER
e=0
r=1
while(e!=-1):
    e=d.find('/dev/rfcomm0')

ser= serial.Serial('/dev/rfcomm0')
#os.system('sudo python /home/pi/Desktop/combine_project/bt_connect.py')
def receive():
    f=ser.readline()
    f=f.decode('utf-8')
    n=f
    os.system("espeak '"+str(f)+"' ")
#     os.system("espeak -p 95 '"+f+"' -vaf+f3 ")
    print(n)
```

Setup of Input pin

```
GPIO.setmode(GPIO.BOARD)

B1 = 7
B2 = 11
B3 = 13
B4 = 15
B5 = 19
B6 = 21

GPIO.setup(B1, GPIO.IN)
GPIO.setup(B2, GPIO.IN)
GPIO.setup(B3, GPIO.IN)
GPIO.setup(B4, GPIO.IN)
GPIO.setup(B5, GPIO.IN)
GPIO.setup(B6, GPIO.IN)

#Initialize 'currentname' to trigger only when a new person is identified.
currentname = "unknown"
#Determine faces from encodings.pickle file model created from train_model.py
encodingsP = "encodings.pickle"
#use this xml file
cascade = "haarcascade_frontalface_default.xml"
# load the known faces and embeddings along with OpenCV's Haar
```

Set Hex Code in List

```
dict1 = {'0x1f':'A',
         '0xf':'B',
         '0x1b':'C',
         '0x19':'D',
         '0x1d':'E',
         '0xb':'F',
         '0x9':'G',
         '0xd':'H',
         '0x2b':'I',
         '0x29':'J',
         '0x17':'K',
         '0x7':'L',
         '0x13':'M',
         '0x11':'N',
         '0x15':'O',
         '0x3':'P',
         '0x1':'Q',
         '0x5':'R',
         '0x23':'S',
         '0x21':'T',
         '0x16':'U',
         '0x6':'V',
         '0x28':'W',
         '0x12':'X',
         '0x10':'Y',
```

Image capture Image and encoding

```
    # to 500px (to speedup processing)
    frame = vs.read()
    frame = imutils.resize(frame, width=500)
    # Detect the fce boxes
    boxes = face_recognition.face_locations(frame)

    # convert the input frame from (1) BGR to grayscale (for face
    # detection) and (2) from BGR to RGB (for face recognition)
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
    rgb = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)

    # detect faces in the grayscale frame
    rects = detector.detectMultiScale(gray, scaleFactor=1.1,
        minNeighbors=5, minSize=(30, 30),
        flags=cv2.CASCADE_SCALE_IMAGE)

    # OpenCV returns bounding box coordinates in (x, y, w, h) order
    # but we need them in (top, right, bottom, left) order, so we
    # need to do a bit of reordering
    boxes = [(y, x + w, y + h, x) for (x, y, w, h) in rects]

    # compute the facial embeddings for each face bounding box
    encodings = face_recognition.face_encodings(frame, boxes)
    names = []
```

Shell

Image Processing and encoding image

```
        if True in matches:
            # find the indexes of all matched faces then initialize a
            # dictionary to count the total number of times each face
            # was matched
            matchedIdxs = [i for (i, b) in enumerate(matches) if b]
            counts = {}

            # loop over the matched indexes and maintain a count for
            # each recognized face face
            for i in matchedIdxs:
                name = data["names"][i]
                counts[name] = counts.get(name, 0) + 1

            # determine the recognized face with the largest number
            # of votes (note: in the event of an unlikely tie Python
            # will select first entry in the dictionary)
            name = max(counts, key=counts.get)

            #If someone in your dataset is identified, print their name on the s
            if currentname != name:
                currentname = name
```

Face object identification

```
            #If someone in your dataset is identified, print their name on the s
            if currentname != name:
                currentname = name
                print(currentname)

        # update the list of names
        names.append(name)

    # loop over the recognized faces
    for ((top, right, bottom, left), name) in zip(boxes, names):
        # draw the predicted face name on the image - color is in BGR
        cv2.rectangle(frame, (left, top), (right, bottom),
            (0, 255, 225), 2)
        y = top - 15 if top - 15 > 15 else top + 15
        cv2.putText(frame, name, (left, y), cv2.FONT_HERSHEY_SIMPLEX,
            .8, (0, 255, 255), 2)

    # display the image to our screen
    cv2.imshow("Facial Recognition is Running", frame)
    key = cv2.waitKey(1) & 0xFF

    # quit when 'q' key is pressed
    if key == ord("q"):
        break

    # update the FPS counter
```

Check Hex Value and Match with list and perform action

```
    if(hex_bit!='0x3f'):
        try:
            position = key_list.index(hex_bit)
            print(val_list[position])
            os.system("espeak '"+(val_list[position])+"' ")
            q=q+str(val_list[position])
        except:
            if(hex_bit=='0x2f'):
                q+=" "
                print("space_added")
                #add space
            if(hex_bit=='0x3b'):
                os.system("espeak -p 95 '"+q+"' -vaf+f3")
                print(q)
                #read
            if(hex_bit=='0x37'):
                j=len(q)
                try:q=q[:(j-1)]
                except:pass
                print("last char deleted string is ="+q)
                print(q)
                #delete
            if(hex_bit=='0x3d'):
                q=q+'\n\r'
                s=bytes(q,encoding='utf-8')
                ser.write(s)
```

Chapter 6

Test Setup and Testing Procedure

Chapter 6
Test Setup and Testing Procedure

6.1 Introduction

For the implementation of this project, we used a simple circuit. we divide project in three parts, communication from deaf-dumb person to blind person, also the communication from blind person to deaf-dumb person. And last is Object and face Detection for Blind Person. This system made with few components like one controller, one braille board, one camera and 5-volt supply, reduced the hardware of wireless device like wifi or Bluetooth module because of we used the raspberry pi controller.it have inbuilt wifi and Bluetooth interface. To know the procedure of project, follow the above paragraph.

6.2 Project Setup & Testing Procedure

As we described in circuit diagram, we done the connection of project and also done the programming of project as shown in flow chart. The whole system is divided in three parts:

1 Communication from Blind person to Deaf-Dumb Person.
2 Communication from Deaf-Dumb person to Blind person.
3 Object and Face Detection for Blind Person

1)Communication from Blind person to Deaf-Dumb Person:

For to implement this conversion we placed the braille key board which is consist with 6 push button which is placed like braille cell. The blind person can type using this braille keyboard what he wants to say then this signal is send to controller. controller can check with data base and convert text into speech format this speech blind person can here on speaker. This signal is sent to mobile through the Bluetooth. The received data can present mobile screen then. Deaf person can see the screen and read what the blind person what saying.

2)Communication from Deaf-Dumb Person to Blind Person:

For to implement this conversion the deaf-dumb person can type the what he wants say for blind through the mobile phone. He sends data through Bluetooth to raspberry pi. the controller can check data with data base and convert text into speech format this speech spoken on speaker. The blind person can here sound and he will get message from deaf.

3) Camera capture Image and Detect Face and Object:

The Camera can Capture the Image and Start encoding the image means convert RGB image into bit format and save the binary bit format (encoded image into bit) after that the camera take the image and this image will encode and match with data base if match found the speaker will spoke out the detected name

Chapter 7

Simulation Implementation Result

Chapter 7
Simulation

7.1. Installing Raspberry pi OS:

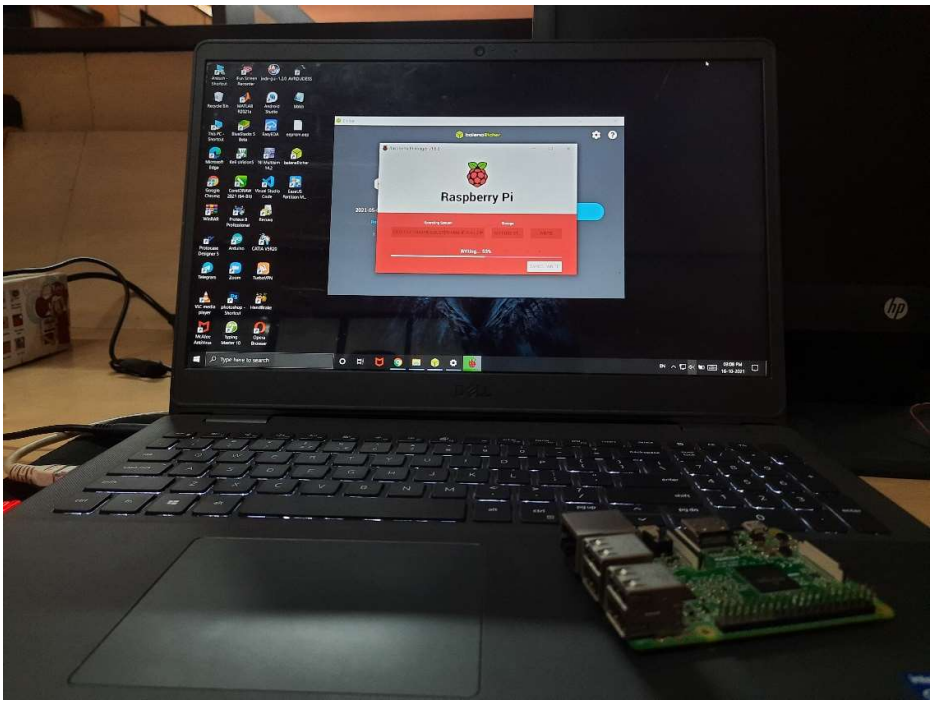


Fig 7.1: Installing Raspbian OS

7.2.Install library and Open CV :

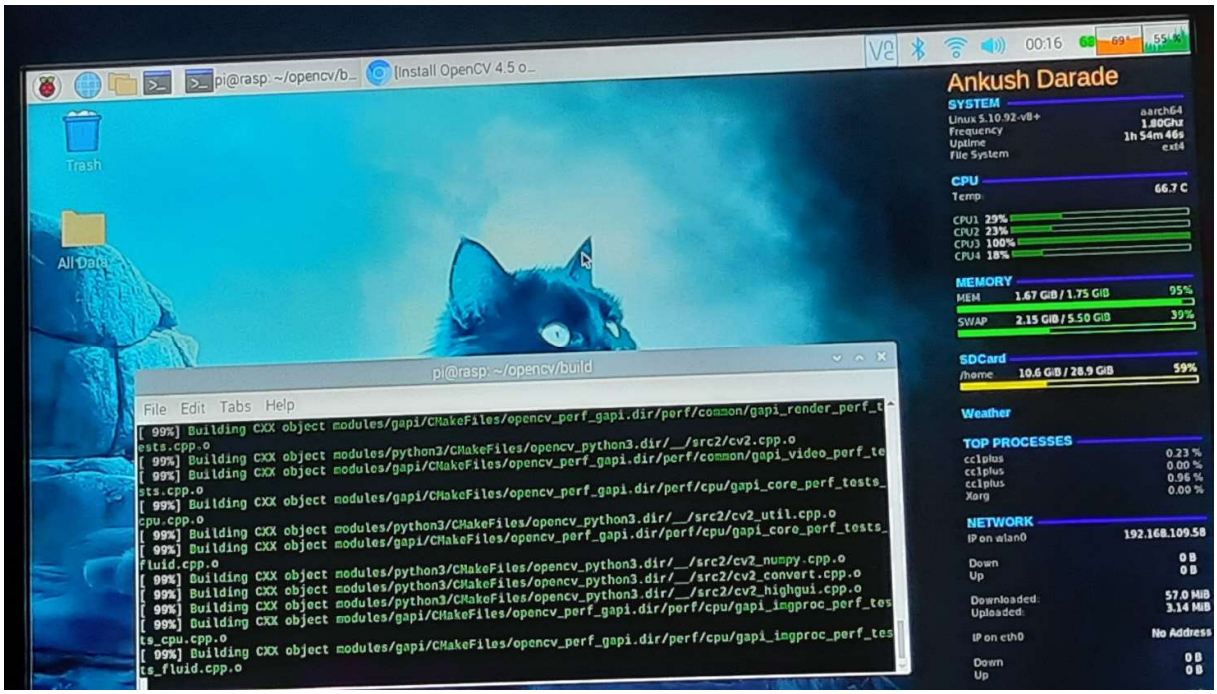


Fig 7.2 : Install Library

7.3.Save Data Base:

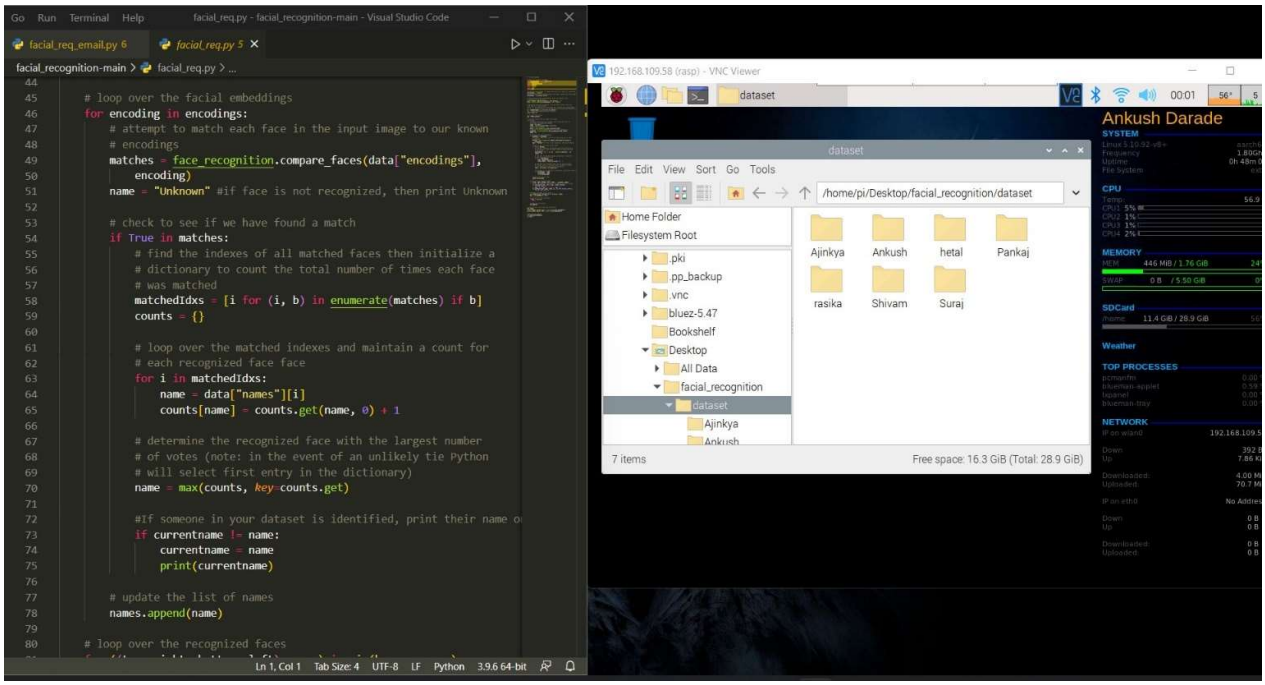


Fig 7.3.1 : Store Photo in Folder separate folder

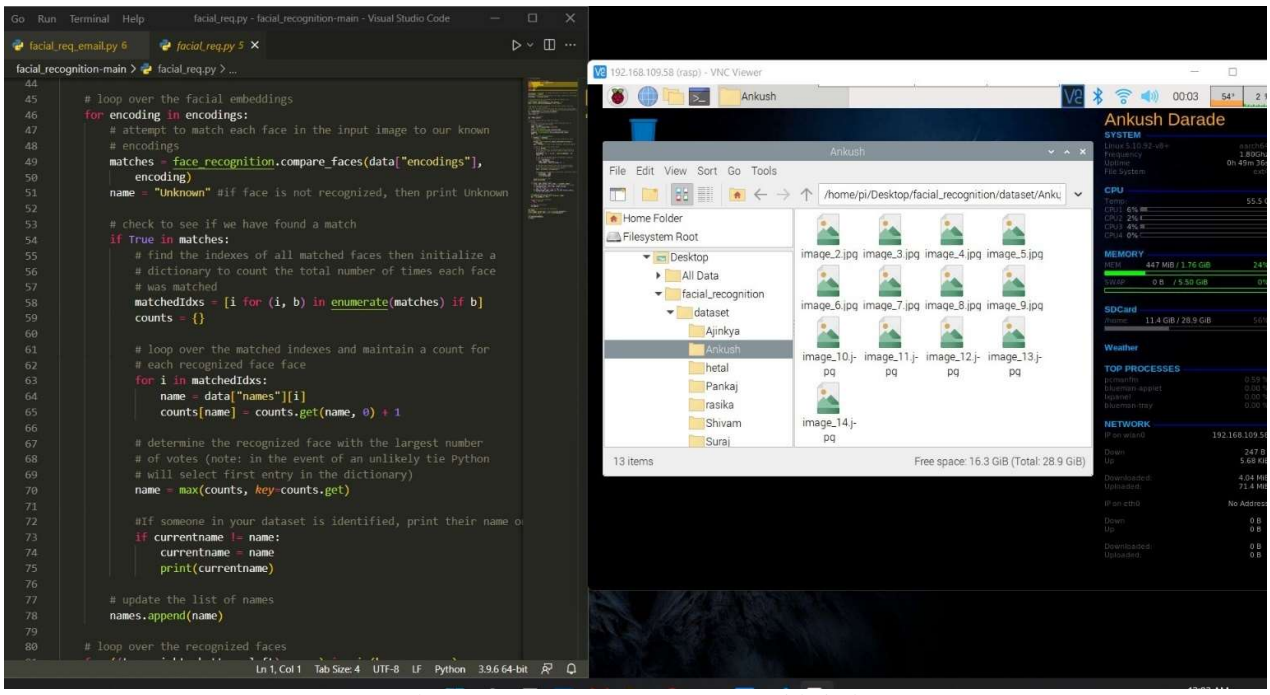


Fig 7.3.2 : Store one person Multiple image

Connection

7.4.Connection of project

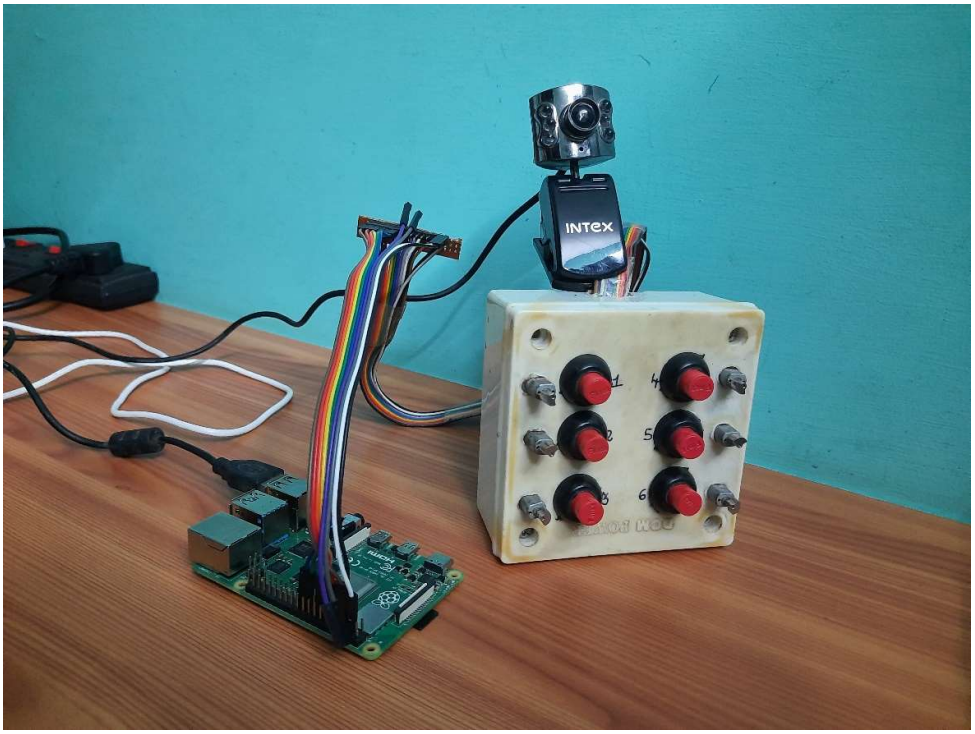


Fig 7 .4.1 : Full Connection Implantation

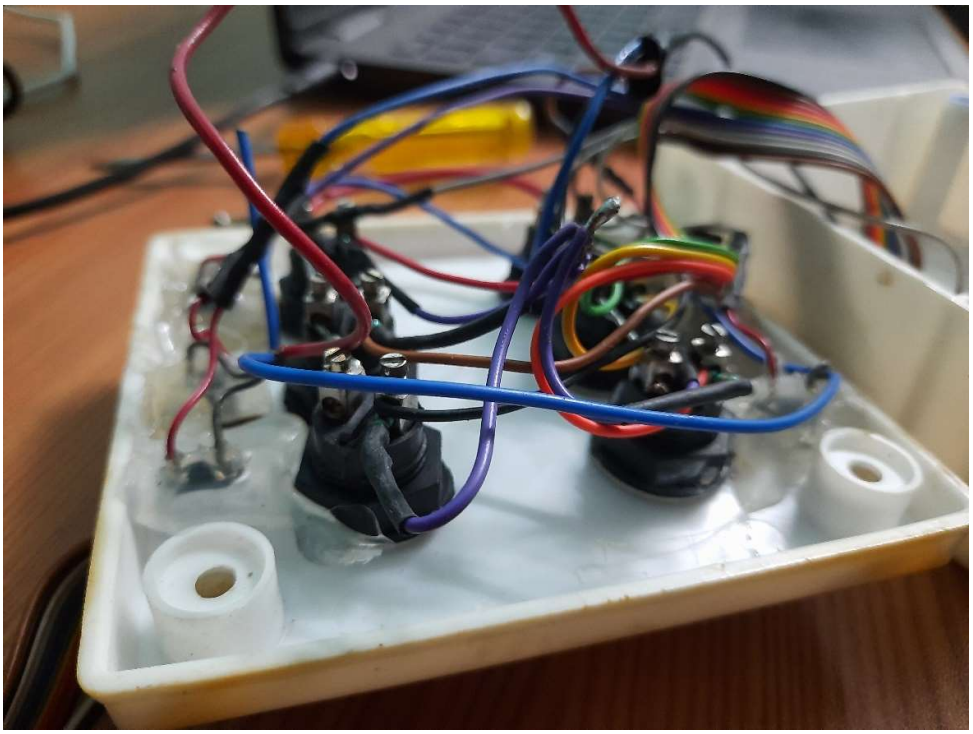


Fig 7.4.2 : Push Switch Connection Implantation

Result

7.5. Camera Can detect the Stored Faces Name and spoke out

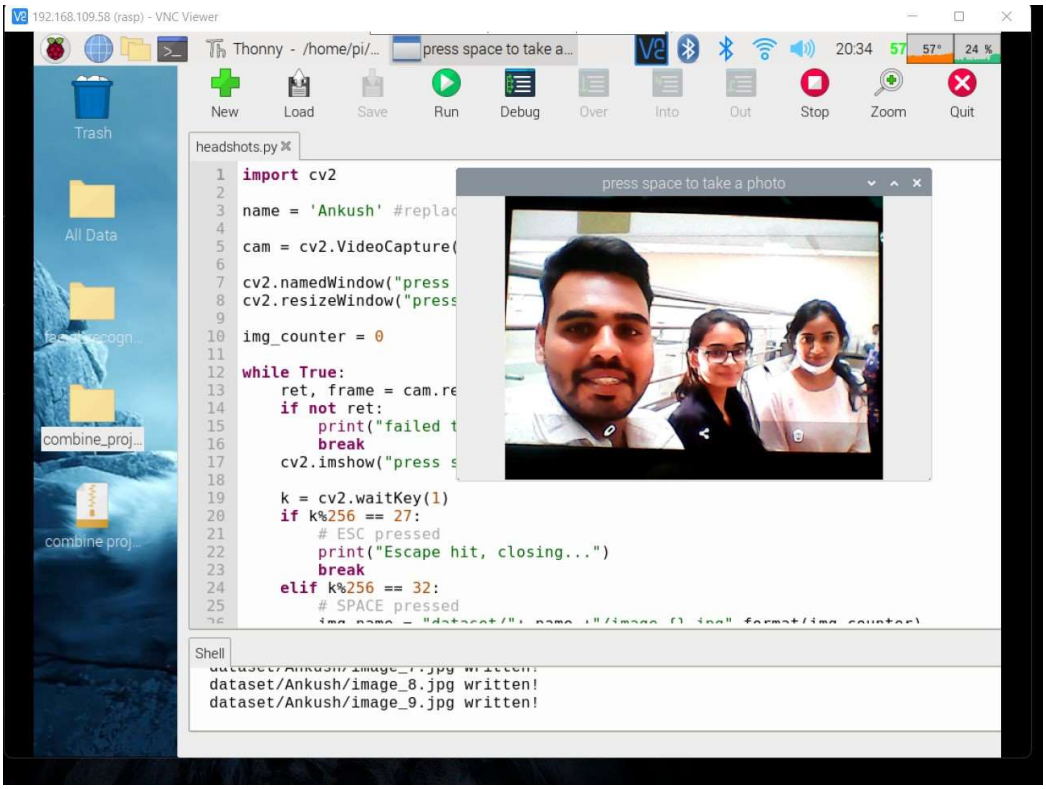


Fig 7 .5 : Image Processing

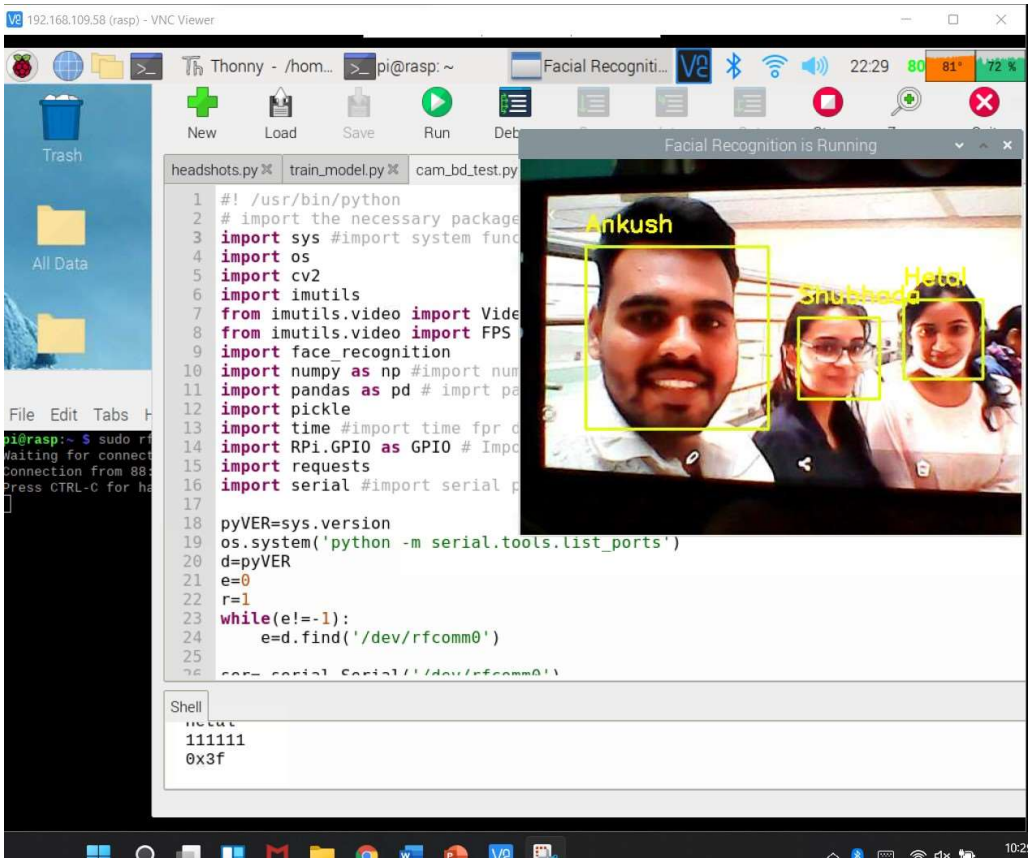
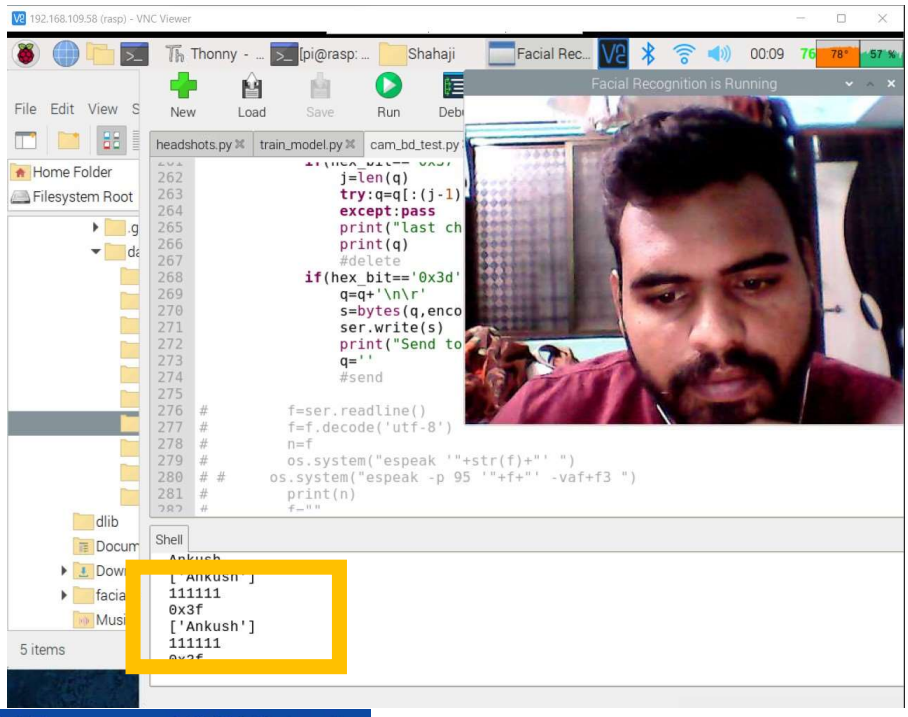
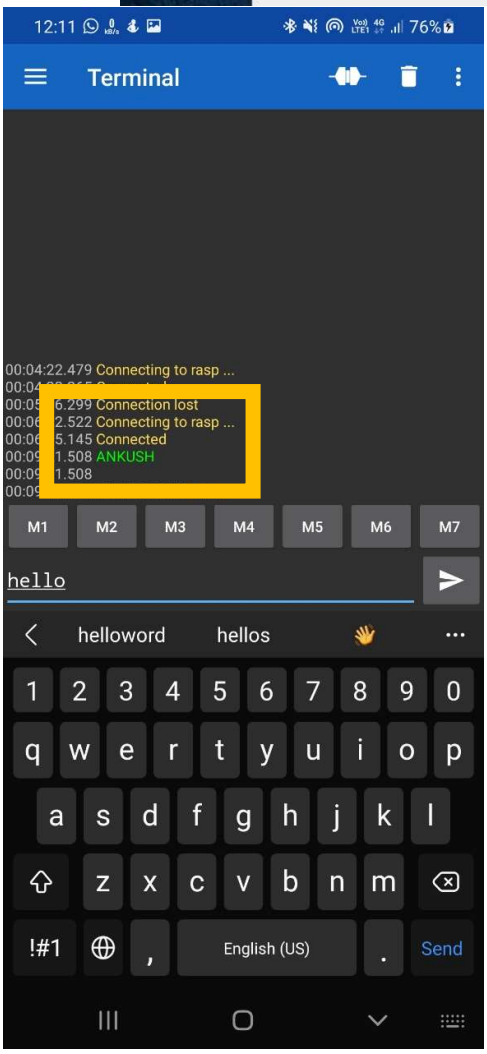


Fig 7 .5.2: Face Detection

7.6. Communication from Blind to Deaf Person



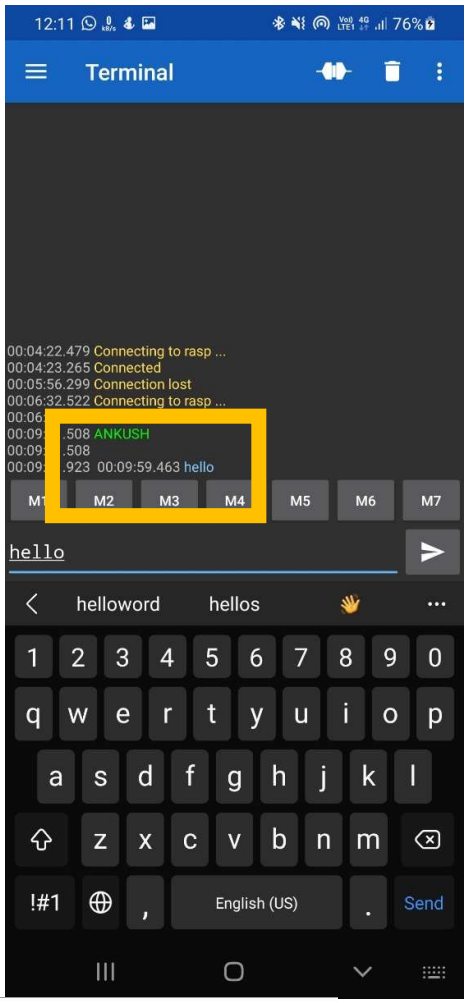


- When the blind wants to send Ankush word to the deaf-dumb then user presses the braille board pattern.
- Then the code is converted to text using controller.
- Then the controller sent the message to the deaf-dump's mobile device using Bluetooth.
- Then Ankush is received and Displayed on the Mobile Device

Fig 7.6.1. : Communication From Blind to Deaf People

7.7. Communication From Deaf to Blind Person

- When the Deaf-blind wants to send “Hello” text to blind then enters the text on the mobile device.
- Then the code is sent to the controller through the Bluetooth
- Then the controller receives the message and it convert text to speech
- The message sent by the deaf-dump is read by the controller and output is delivered by the speaker.



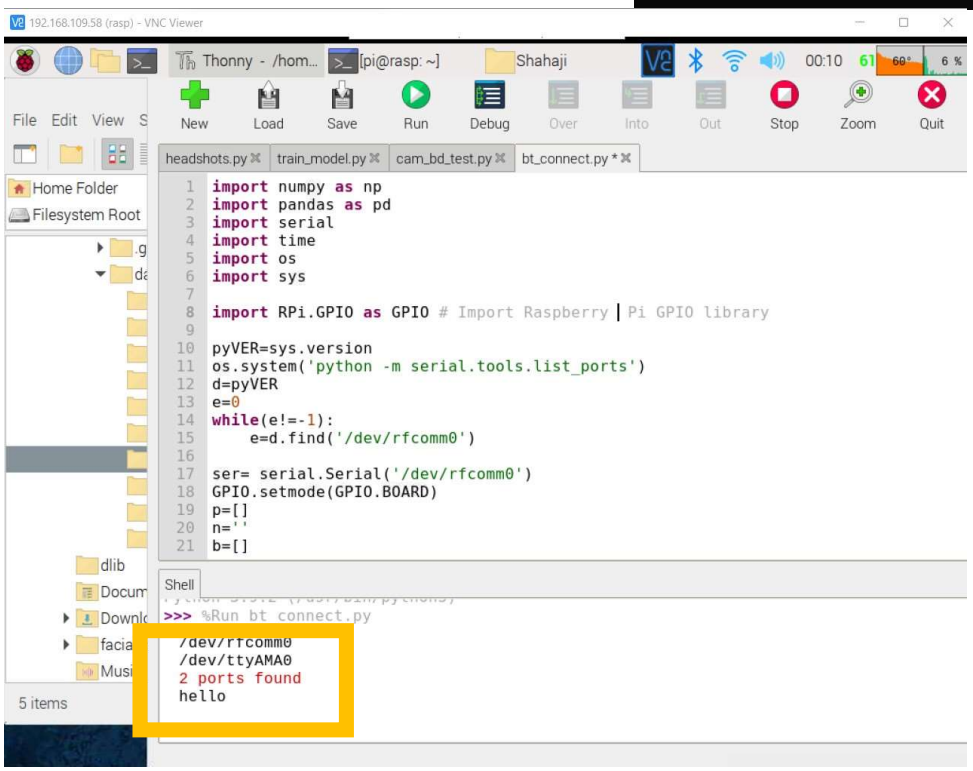


Fig 7.6.2. : Communication From Deaf to Blind People

Chapter 8

Advantage, Disadvantage & Applications

Chapter 8
Advantage, Disadvantage & Applications

8.1 Advantages

1. Easy communication between blind people and deaf-dumb people.
2. Able to read any message generated by the deaf people.
3. Portable personal assistance for physically challenged persons.
4. This project will consume minimal power and is easy to carry.
5. Face Detection Useful for blind person

8.2 Disadvantage

1. Some Time camera take time for processing.

8.3 Applications

1 This system is helpful for physically challenged people to read real time entered message and can make different kind of people like blind and deaf-dumb.

2 It is used to communicate between blind and deaf-dumb person.

3 Use in school of these special people for teaching and for checking their understanding/knowledge.

4 Use As attendance Monitoring System.

Chapter 9

Conclusion and Future Scope

Chapter 9
Conclusion and Future Scope

9.1 Conclusion

With the help of raspberry pi, camera, Braille Board, and mobile phone we build this system this system is used for to remove barrier created between blind person and deaf person. This system performs multiple action like checking the input from braille board check camera input and check with data base convert text into speech format and send text to mobile. receive data from mobile and again check with database and convert text to speech. The Camera can scan the image and match with data base and if match found speaker spoken out name. Like that all this operation performed by controller and give successful output.

9.2 Future Scope

In future we find out small controller can perform all actions on it. and also add the facility of text reading with help of camera for blind person. We can add the speech to text converter facility in this project. And also, we can add virtual call facility with interfacing of the GSM module.

Chapter 10

10.1 Project Completion Plan

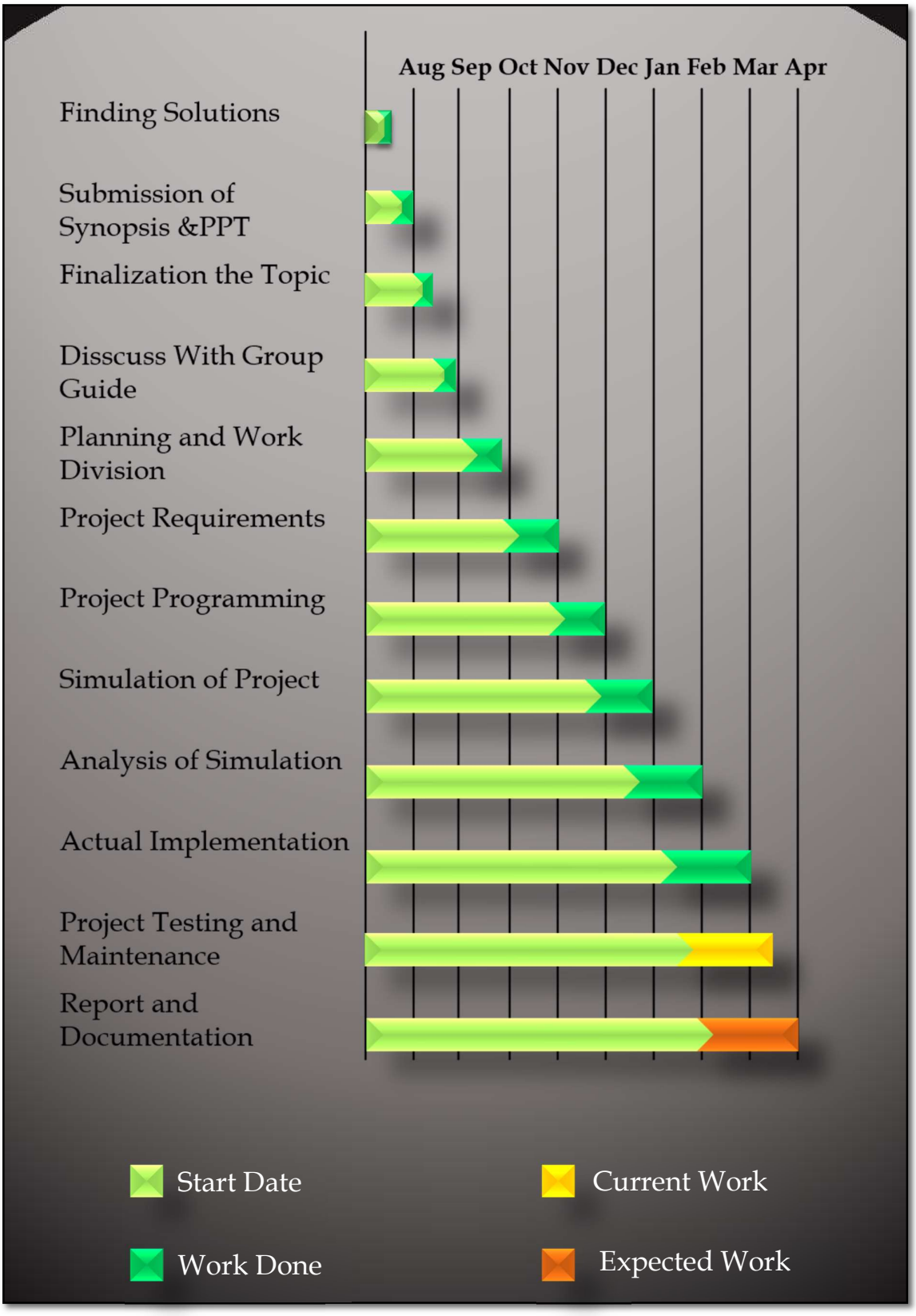


Fig 10.1: Planning structure

10.2 Bill of Material/Component List

Sr. No.	Component name	Quantity	Cost
1	Raspberry pi 3B+	1	4899
2	Micro SD Card 64 gb	1	1000
3	USB Camera	1	2000
4	PUSH switch	6	115
5	Vibretors Motor	6	800
6	8-ohm Speaker	1	450
7	3.5mm Audio jack wire	1	120
8	5volt Adapter	1	550
9	Band wire	2	80
10	Connecting wire	3	60
11	LED	10	50
12	Resister	15	15
13	Soldering metal	1	30
14	Zero PCB	1	80
Total			9450

Fig 10.2: Project cost

Reference

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9 Raspberry pi https://www.amazon.in/dp/B07BFH96M3/ref=cm_sw_em_r_mt_dp_6AP5MJ4W4R28QFFZS0HG

10 Sd card https://www.amazon.in/dp/B08GYBBBBH/ref=cm_sw_em_r_mt_dp_NVK509K3ZX4VSR68C4BM

11 Camera https://www.amazon.in/dp/B08KT89BWX/ref=cm_sw_em_r_mt_dp_5EF0SX3FFSMJSWQ31SBC?_encoding=UTF8&psc=

12 https://www.pharmabraille.com/pharmaceutical-braille/the-braille-alphabet/

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