

Vision to the Blind

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INTRODUCTION

- The biggest challenge for a blind person, especially the one with the complete loss of vision, is to navigate around places.
- They could easily move around their house without any help because they know position of everything in the house. But when it comes to outdoor less known place, navigation becomes very difficult. The user need to enter the destination address of the place that he needs to go.
- Another difficulty is that the stick which is used by blind people gives them a partial idea of the neighbouring obstacle.



AIM

To construct a assistant for visually impaired people which will help them in outdoor navigation and indoor avoiding obstacles on path.

OBJECTIVE

- Keeping in mind the end goal to enhance the personal satisfaction for visual debilitated or visually impaired individuals, in this work we concentrate on growing new advancements to help these people to get to the open-air condition in walking on road.
- In this framework, we will recognize a hindrance utilizing ultrasonic sensor. Obstruction discovery sensor will also be implemented.



BLIND PERSON



OBSTACLE
DETECTION

GPS NAVIGATION
SYSTEM



These are the features running on
Raspberry Pi



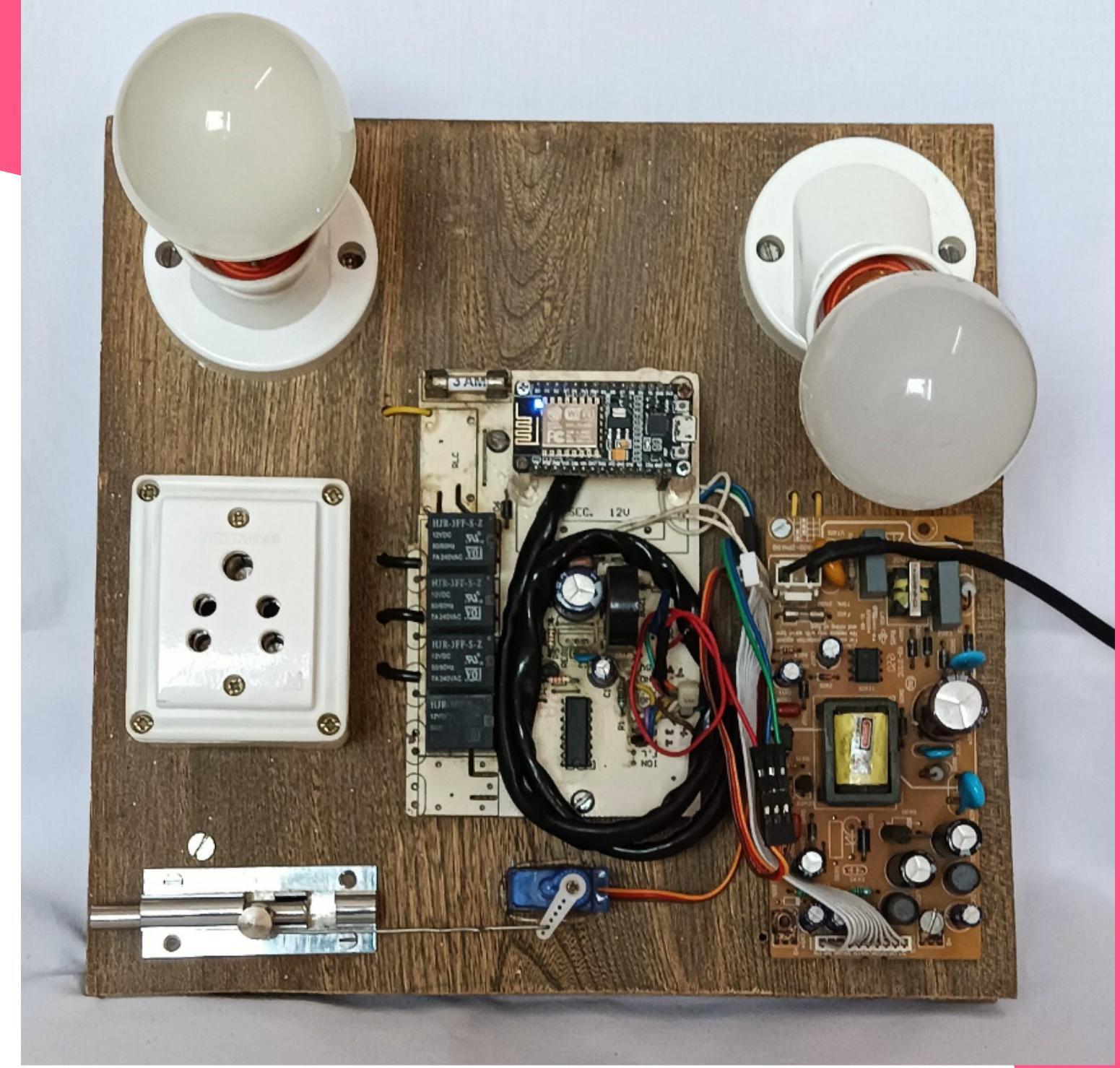
HOME
AUTOMATION
SYSTEM

VOICE
ASSISTANCE
SYSTEM



HOME AUTOMATION SYSTEM

- The home system is a discrete system installed in the home of blind person.
- The user can easily control the appliances of his house using the system.
- The system works by sending the https request from raspberry pi to the ESP8266 microcontroller.
- Various appliances can be connected to the system including the lock of door



2 Lights, 1 Socket, 1 Lock connected



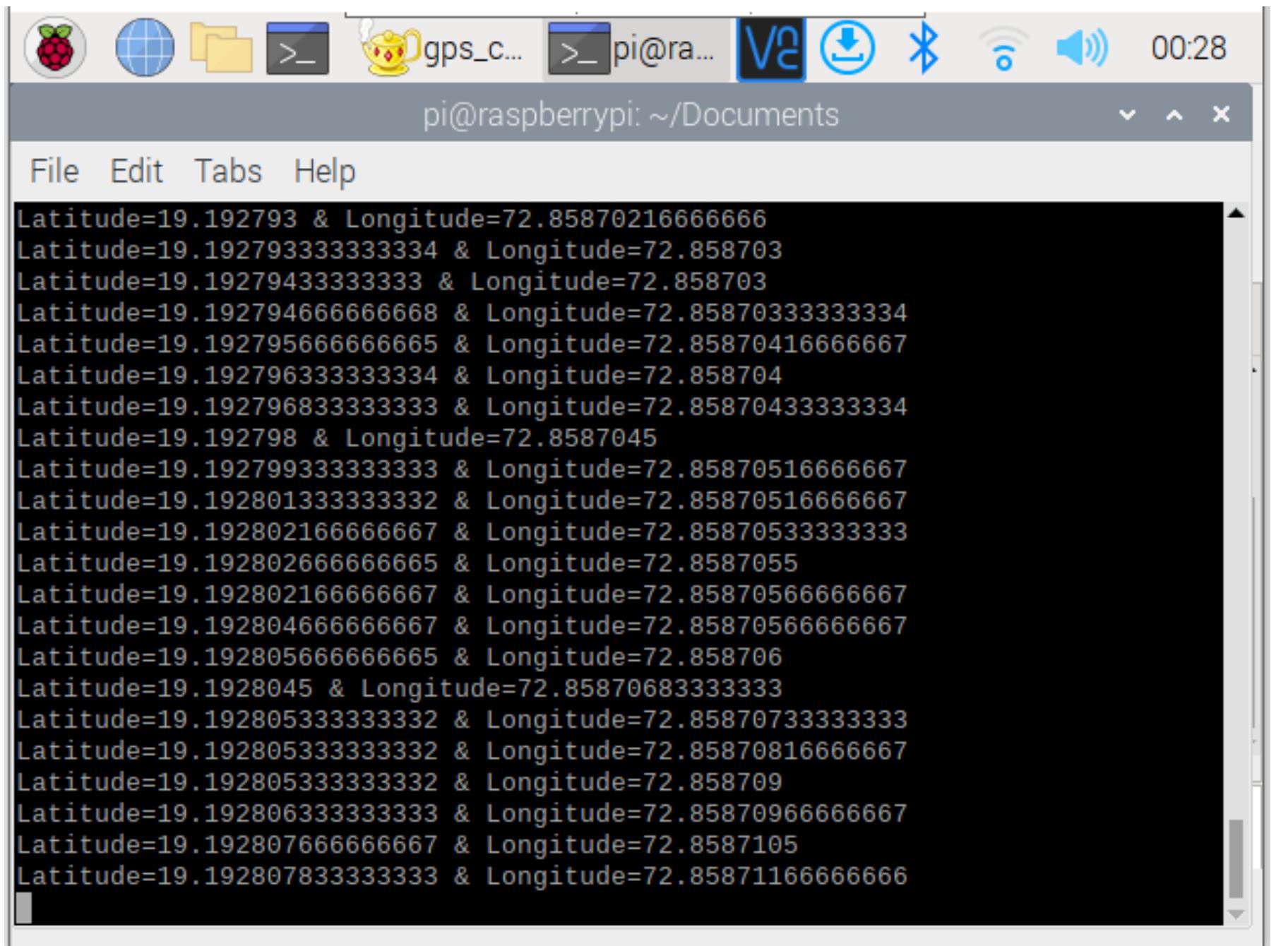
Turning on lights Unlocking the door

- Here the the appliances are turned on by sending the request from raspberry pi.
- In this system we aren't using any third party software, hence its a very cheap and reliable home automation system



OUTDOOR GPS NAVIGATION SYSTEM

- The Raspberry Pi receives GPS signal from neo 6m module, which is converted into latitude and longitude.
- The blind gives raspberry pi his destination location to the raspberry pi.
- The co ordinates are then used with Google Maps api to retrive the route.
- The system communicates via audio to the user, providing helping him to navigation to his destination.



A screenshot of a terminal window titled 'gps_c...' with the command 'pi@raspberrypi: ~/Documents'. The window displays a series of latitude and longitude coordinates. The text in the terminal is as follows:

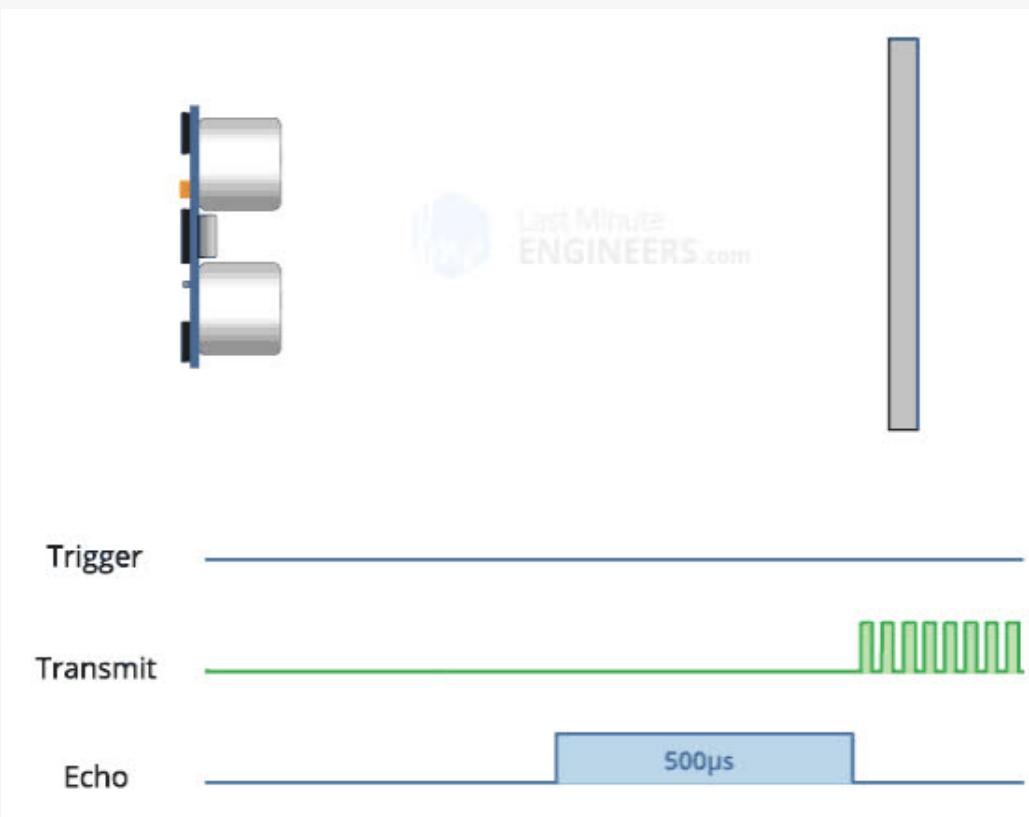
```
Latitude=19.192793 & Longitude=72.85870216666666
Latitude=19.192793333333334 & Longitude=72.858703
Latitude=19.19279433333333 & Longitude=72.858703
Latitude=19.192794666666668 & Longitude=72.85870333333334
Latitude=19.192795666666665 & Longitude=72.85870416666667
Latitude=19.192796333333334 & Longitude=72.858704
Latitude=19.192796833333333 & Longitude=72.85870433333334
Latitude=19.192798 & Longitude=72.8587045
Latitude=19.192799333333333 & Longitude=72.85870516666667
Latitude=19.19280133333332 & Longitude=72.85870516666667
Latitude=19.192802166666667 & Longitude=72.85870533333333
Latitude=19.192802666666665 & Longitude=72.8587055
Latitude=19.192802166666667 & Longitude=72.85870566666667
Latitude=19.192804666666667 & Longitude=72.85870566666667
Latitude=19.192805666666665 & Longitude=72.858706
Latitude=19.1928045 & Longitude=72.8587068333333
Latitude=19.19280533333332 & Longitude=72.8587073333333
Latitude=19.19280533333332 & Longitude=72.85870816666667
Latitude=19.19280533333332 & Longitude=72.858709
Latitude=19.19280633333333 & Longitude=72.85870966666667
Latitude=19.192807666666667 & Longitude=72.8587105
Latitude=19.19280783333333 & Longitude=72.85871166666666
```

Receiving data from neo-6m sensor



INDOOR OBSTACLE DETECTION

- This indoor obstacle detection uses HC-SR04 ultrasonic sensor to send ultrasonic waves and outputs the return time.
- The blind gets the alert signal when any object comes too closer.



```
Distance: 39.81 cm
Distance: 39.78 cm
Distance: 39.77 cm
Distance: 39.79 cm
Distance: 39.8 cm
Distance: 39.77 cm
Distance: 39.75 cm
Distance: 39.83 cm
Distance: 39.76 cm
Distance: 39.79 cm
Distance: 39.77 cm
Distance: 39.83 cm
Distance: 39.81 cm
Distance: 39.78 cm
Distance: 39.83 cm
Distance: 39.74 cm
Distance: 39.76 cm
Distance: 39.75 cm
Distance: 39.78 cm
Distance: 39.8 cm
Distance: 39.77 cm
Distance: 39.78 cm
```

Receiving data from US sensor

VOICE ASSISTANT SYSTEM

- Many a times blind person feels lonely.
- To help him interact with someone we integrated a voice assistant system.
- The system has many voice commands such as telling a joke, quote, motivating the blind.
- This system works by predefining various commands and rest are fetched from an API

```
=> hello
Hi, Idris! May I share with you a quote?

=> sure
Change your thoughts and you change your world.

=> great thought
You are absolutely right!

=> I am getting bored
Do you want some music?

=> absolutely
<a href="http://www.msn.com/en-us/music">click here to search and listen music</a>

=> what are you doing
I'm answering weird questions.

=> han han
What city do you live in?

=> Mumbai
You live in mumbai?

=> yeah
Mumbai is a nice place!

=> thank you
You're very welcome.

=> what's today's date
Today is November 08, 2022.

=> exit
Goodbye
```

A conversation with assistant

ML FEATURES

SCAN
CURRENCY

READ TEXT

IDENTIFY FACE

READ BILL

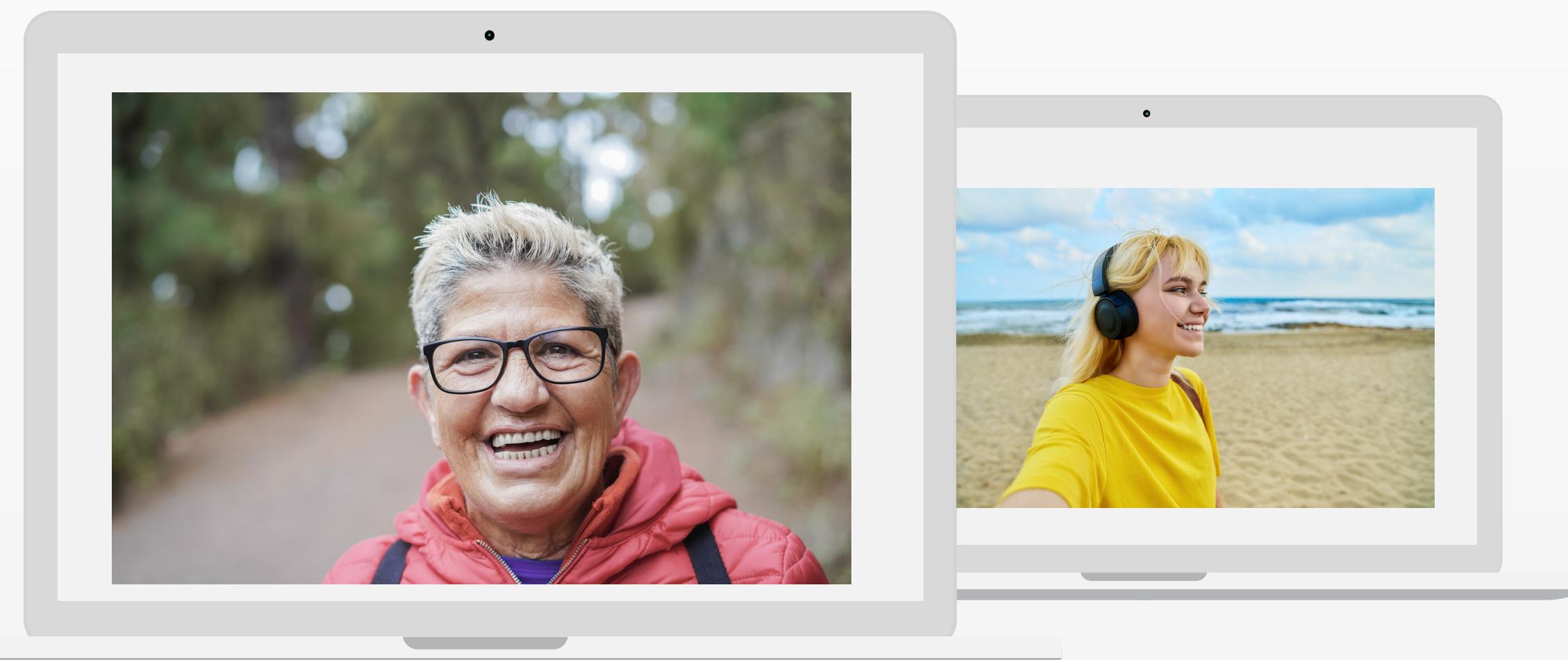
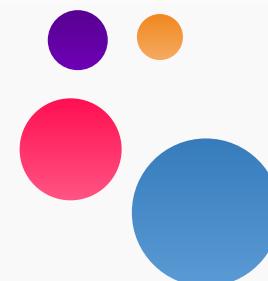
CHECK
SURROUNDING

SAVE FACE





IDENTIFY PERSON



SCAN

COMPARE

CLASSIFY

USED YOLOV4



Let's Study Now

01

Save the image
using a camera
clicker

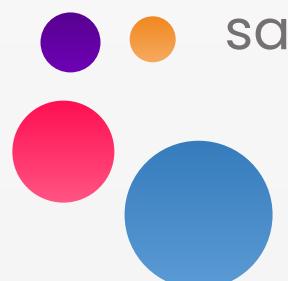
02

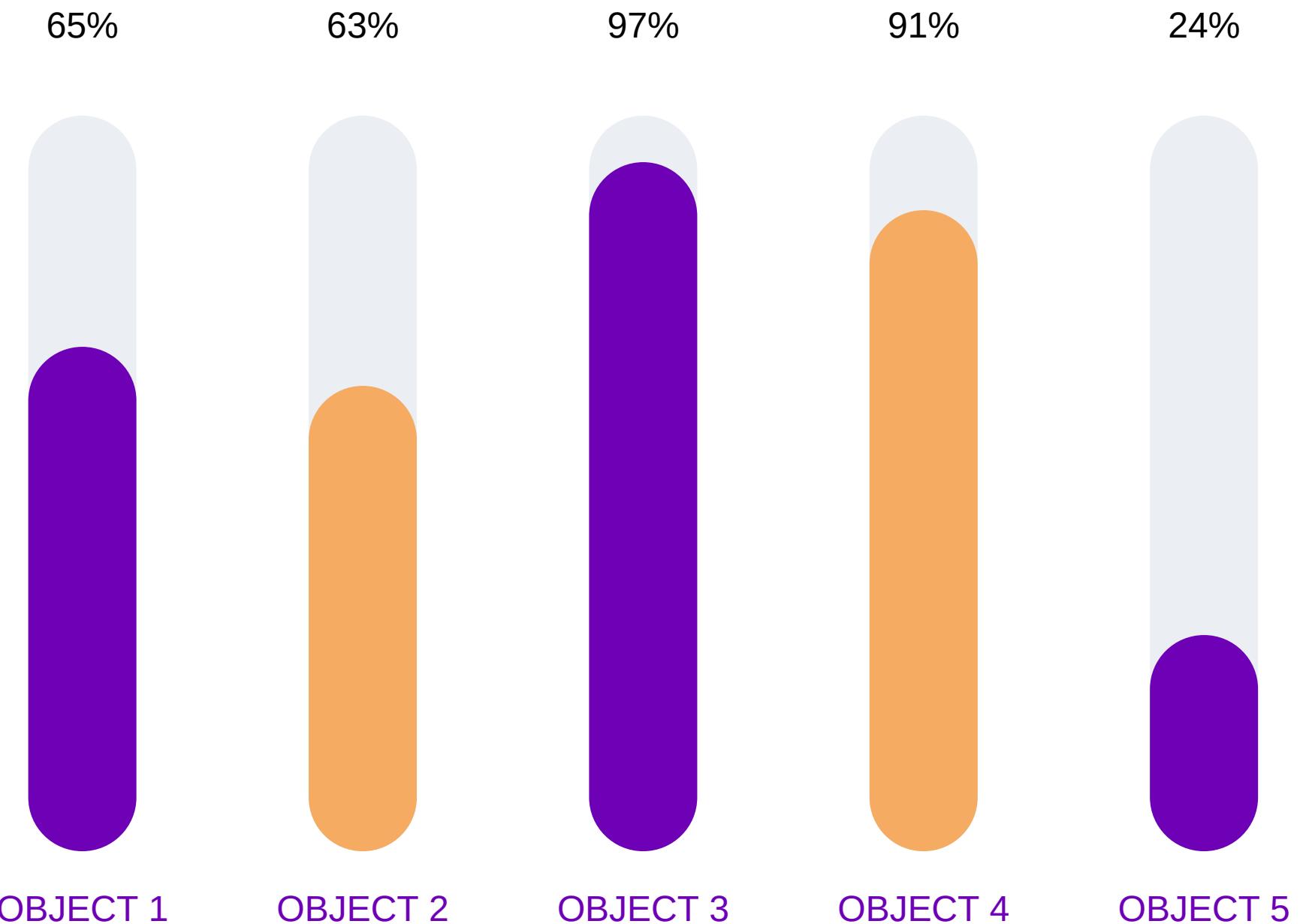
Specify the
name of the
person

```
c:\Users\Admin\Desktop\PRIYANSH\MPR\PRIYANSH\main.py:1: DeprecationWarning: The module distlib is deprecated and slated for removal in Python 3.12; see https://github.com/python/cpython/pull/10233
  import imp
  listening...
yash
yash.png written!
```

SAVE FACE

If the face of the person is not already present then this feature comes into picture the first click his image and then save it by his name.

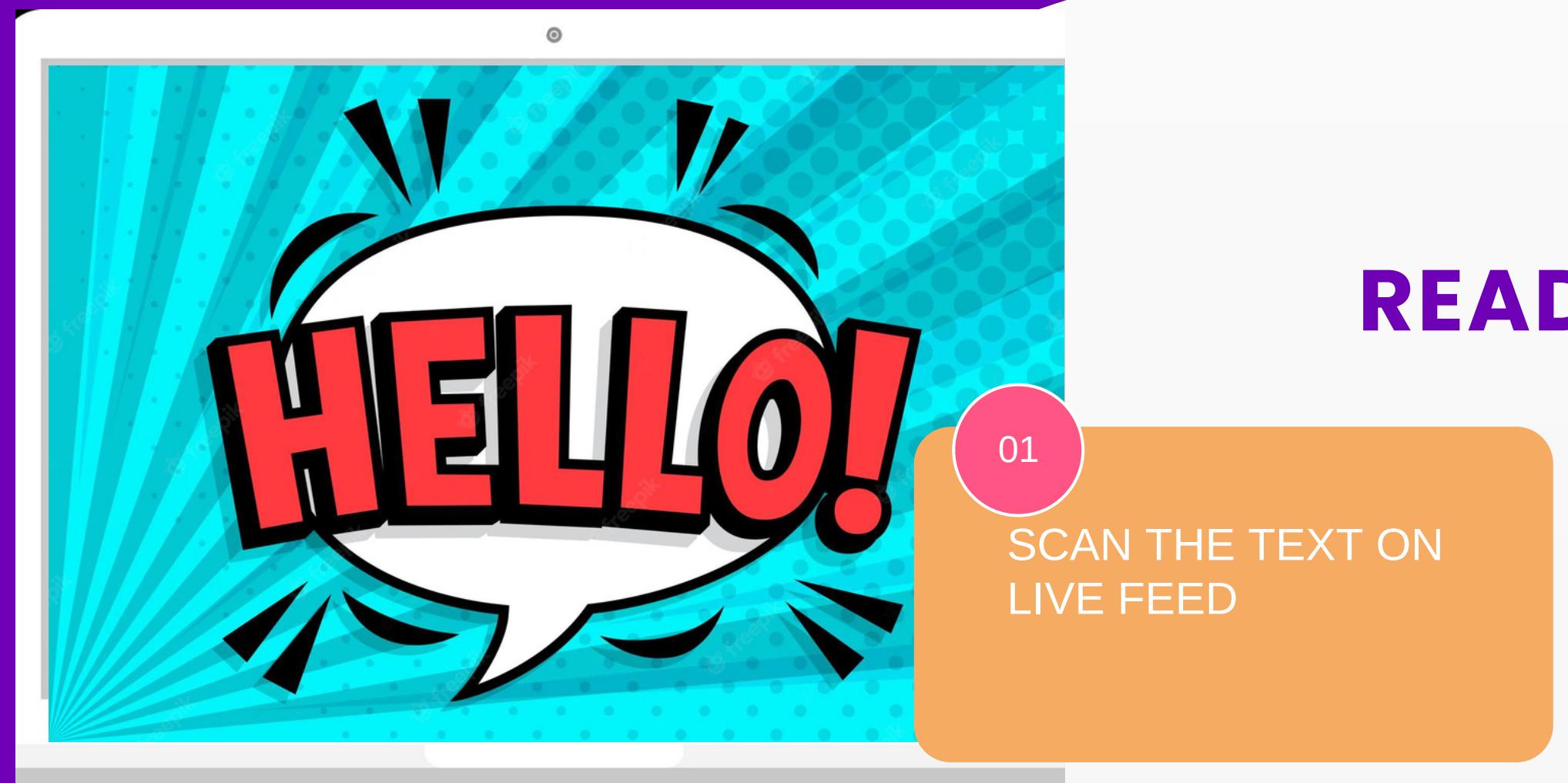




SURROUNDING CHECKER

Check all the objects near your vicinity.Upto 80 types of objects can be detected.





READ TEXT



When ever a client wants to read what is written on front of him he can use this awesome feature.

01

SCAN THE TEXT ON
LIVE FEED

02

CONVERTS IT
INTO TEXT USING
TESSERACT

Listening...
read.jpg written!
The file does not exist
Hello!



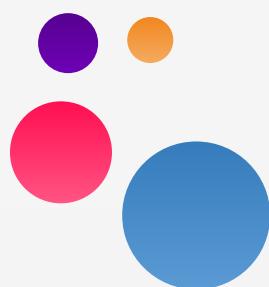
01. SCANS THE CURRENCY

02. SENDS IT WITH THE TRAINED MODEL

SCAN CURRENCY

Check the value of currency notes without even touching

```
listening...
currency.png written!
The file does not exist
0  files/20.jpg  5
1  files/50.jpg  11
2  files/100.jpg 7
3  files/500.jpg 14
4  files/2000.jpg 17
files/2000.jpg
good matches 17
Detected denomination: Rs. 2000
```





DETECTS THE DATE

DETECTS PRICE

No chances of fraud

Listening...
read.jpg written!
The file does not exist
Vota
6
• 12.59



READ BILL

Scan the bill by single command
and get all the information related
to that bill.

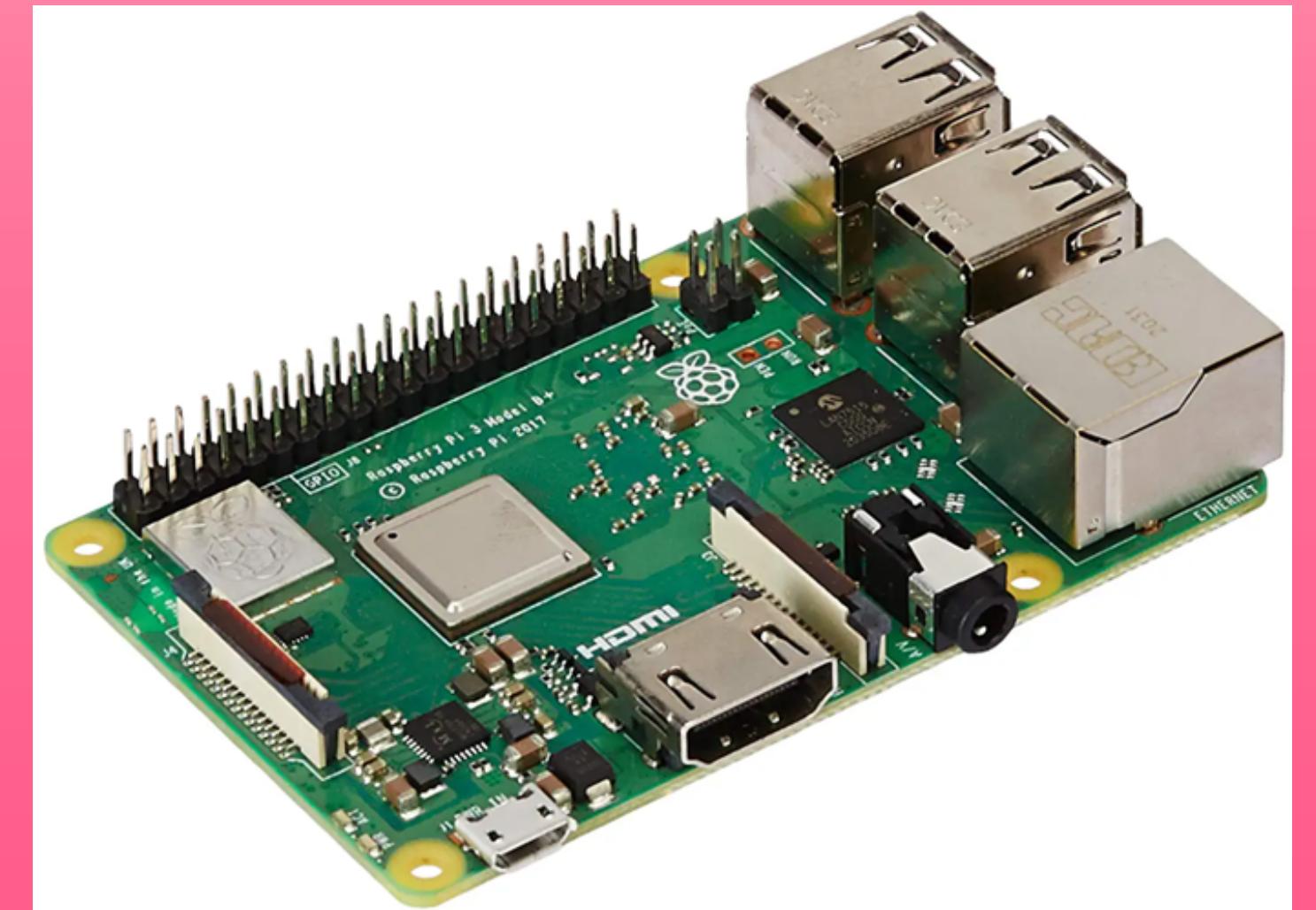


TECHNOLOGY USED

HARDWARE

RASPBERRY PI 3 :

Raspberry pi 3 is used as a development board and can be considered as a singleboard computer that uses LINUX operating system. Along with some great features, it has very fast processing speed and thus is suitable for various advanced applications.





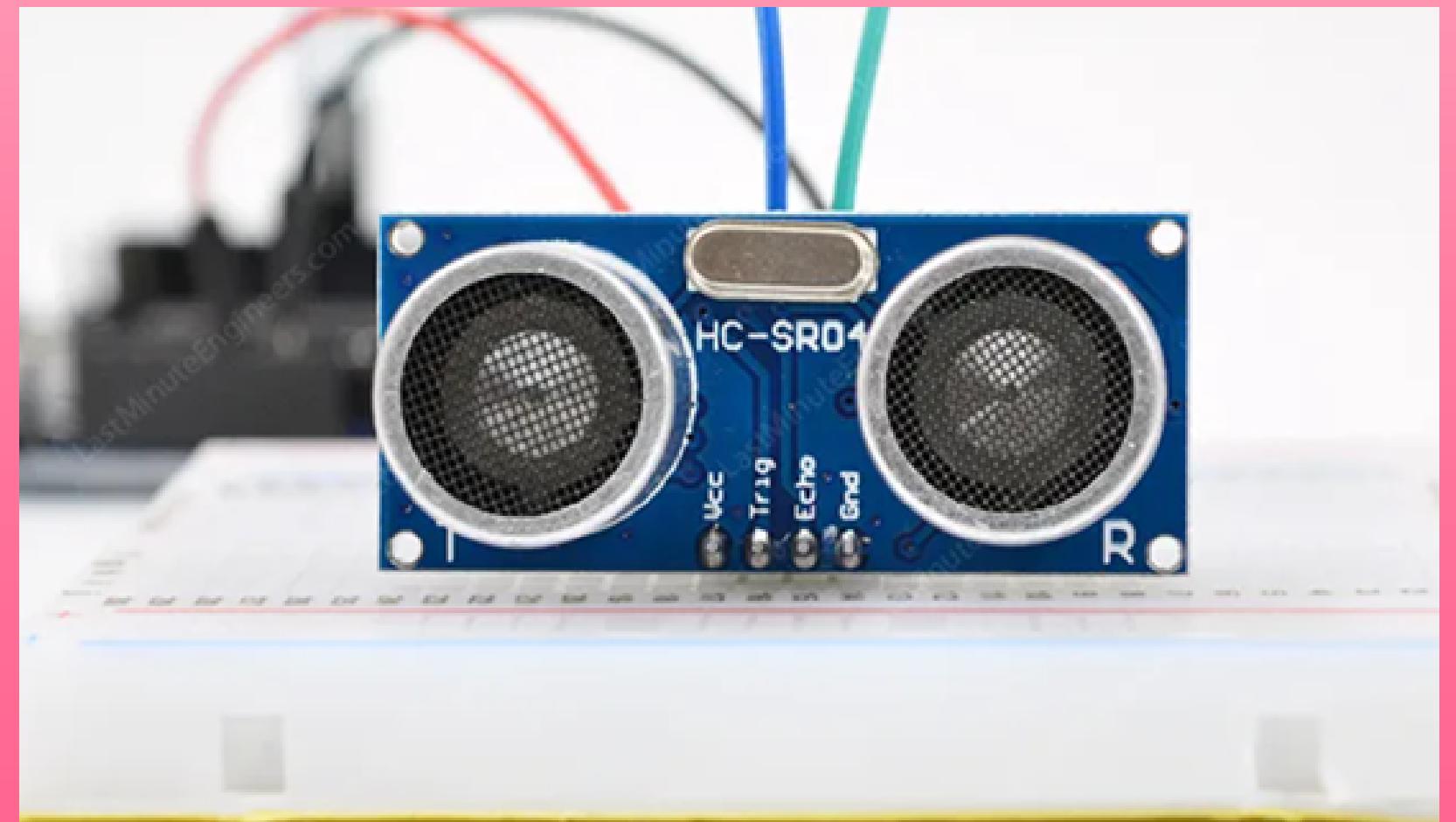
NEO-6M GPS MODULE :

In the 1960s and 1970s, the United States began work on a system of satellites that would geolocate submarines that carried nuclear weapons (NASA). By the mid 1990s, the government released a full-scale GPS system that consisted of 24 satellites to the public. The NEO-6M GPS module uses available satellites to track its location in real-time.



● HC-SR04 ULTRASONIC SENSOR :

An HC-SR04 ultrasonic distance sensor consists of two ultrasonic transducers. One acts as a transmitter that converts the electrical signal into 40 KHz ultrasonic sound pulses. The other acts as a receiver and listens for the transmitted pulses.



● MICROPHONE & SPEAKER

Microphone is used to take user input and then processed to give output in the form of audio through speaker.