

SELF DRIVING CAR

Using Image
Processing and
Raspberry Pi



INTRODUCTION

A self driving car using Image Processing & Raspberry Pi -
Arduino UNO in Master-Slave architecture.





OBJECTIVE

Maintain car in Lane and cross all the hurdles coming in the way successfully.

- Maintain car inside the lane *i.e.* remain in the middle of the lane.
- Overtakes the car in front.
- Stops at a definite distance at Stop Sign.
- Stops at Red light sign.
- Operating Red light using Google Assistant.

APPLICATION

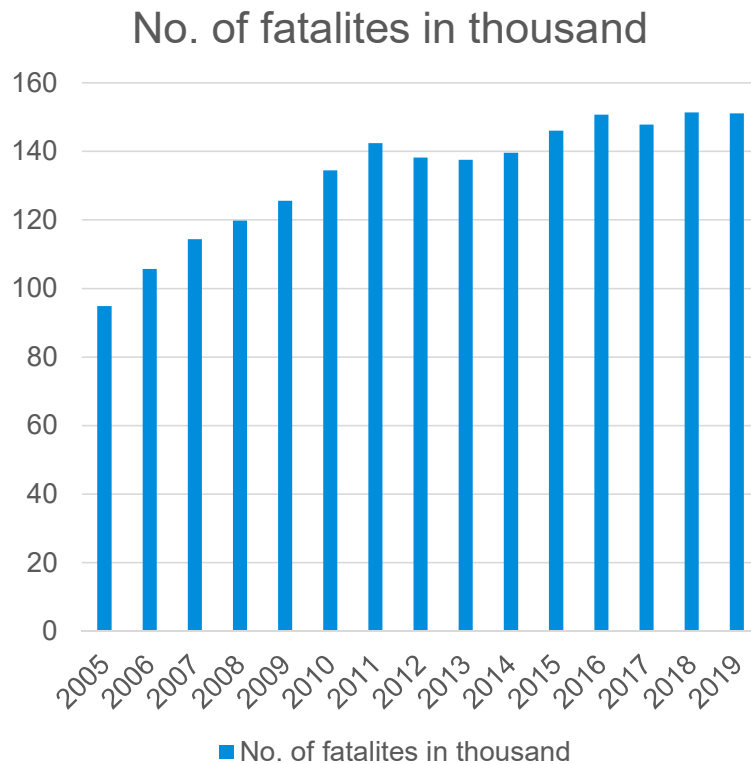
Can enhance road safety, particularly in India.

Driverless cars are poised to shake up multiple industries and provides with a list of benefits.

- One of the prime reasons of these scary figures is “Non adherence of Traffic Laws”.
- Equity: Self-driving technology could help mobilize individuals.
- Environmental Impacts
- Energy Conservation
- Increase in productivity.

ADD A FOOTER





Road Accidents in India

India Ranks 1st in the world, overtaking China(2nd) with almost 3 times of their numbers.

Deaths in India due to over speeding :-

64.4%

2018

67.3%

2019

Deaths in India due to Red Light Jumping :-

1.0%

2018

1.2%

2019

HOW THINGS WOULD CHANGE WITH IT'S INTRODUCTION IN MODERN SYSTEM



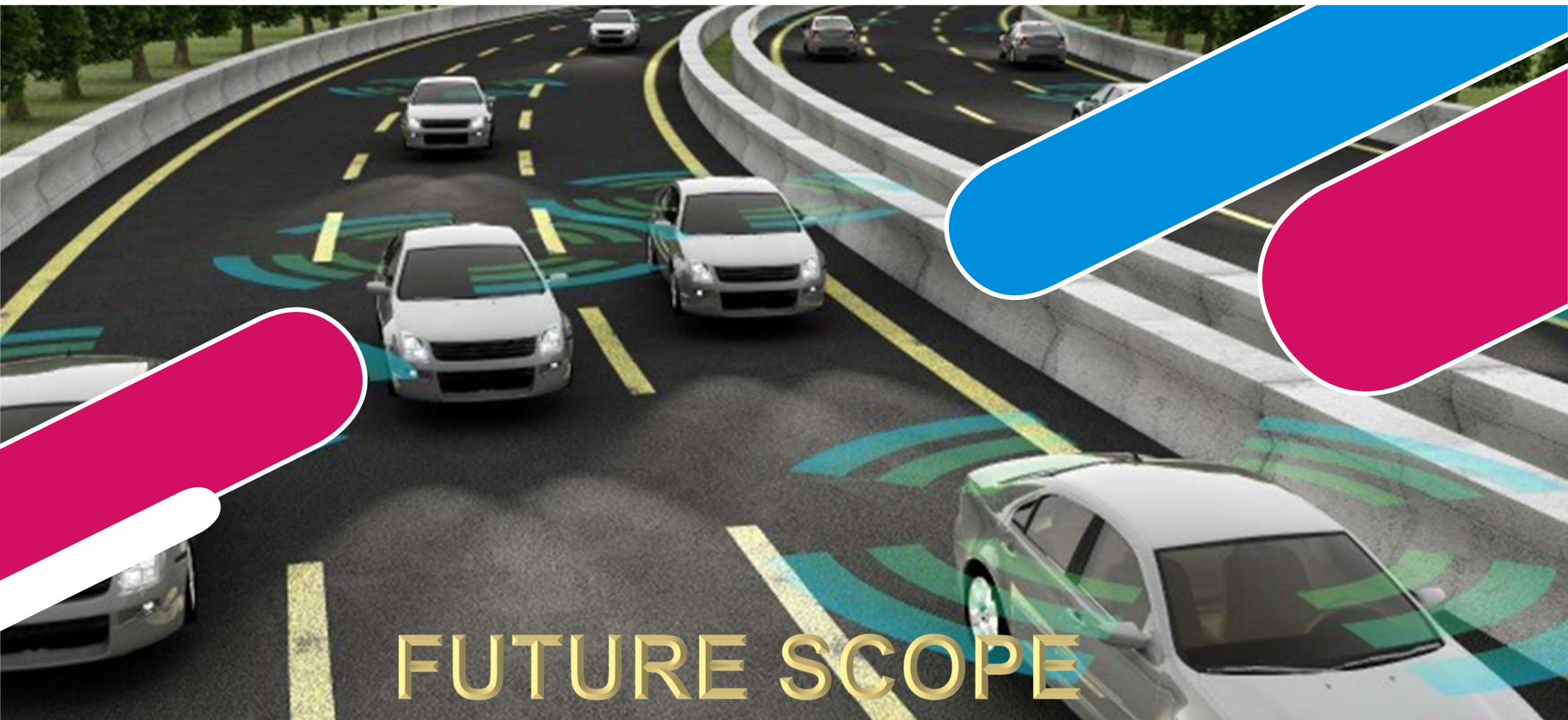
In modern times, Road Safety has become a major concern. Self Driving can effectively reduce these.

MODERNS SYSTEMS

- In Modern Vehicles, human drives it. Now the quality of driving completely depends on his/her state of mind.
- The extent to which traffic rules would be followed is a matter of driver's concern.
- A long drive can become a hectic one.

SELF DRIVING CARS

- When it comes to self driving cars, the computation and decision are taken by the computer on the basis of its model.
- We can fully ensure that traffic rules are followed while building the model.
- Long drive would become effortless.

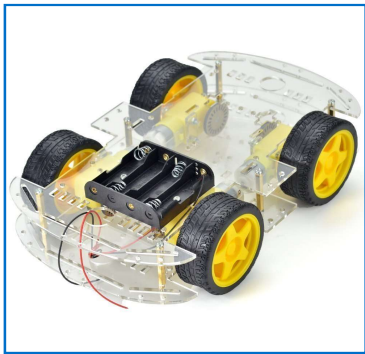


FUTURE SCOPE

ADD A FOOTER

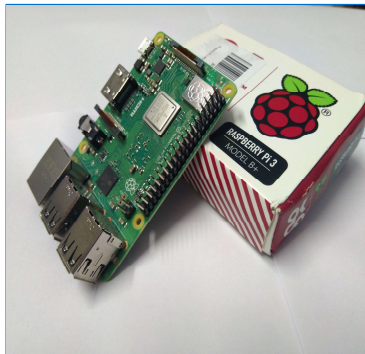
With the Introduction of 5G technologies, an “Autonomous Vehicle Safety” can be developed to ensure more safety in terms of road transport.

Hardware Requirements :-



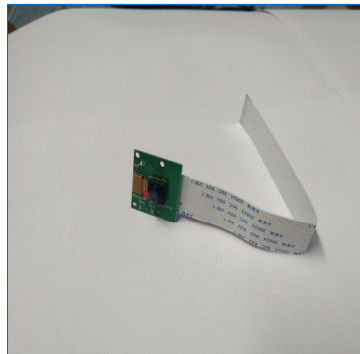
Robot Car Chassis

Motor Voltage:- 6V
Current :- 120mA



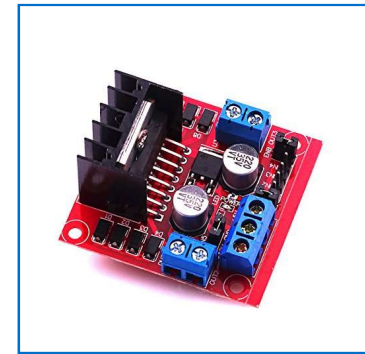
Raspberry Pi 3B+

Broadcom processor -
BCM2837B0, Cortex 64-bit SoC at
1.4GHz
2.4GHz and 5GHz IEEE
802.11.b/g/n/ac wireless LAN,
Bluetooth 4.2/BLE
Will act as a Master Device



5MP Pi Camera

5MP Raspberry Pi
Camera V1.3
Capable of 2592 x
1944 pixel static
images



L298 Motor Driver Module

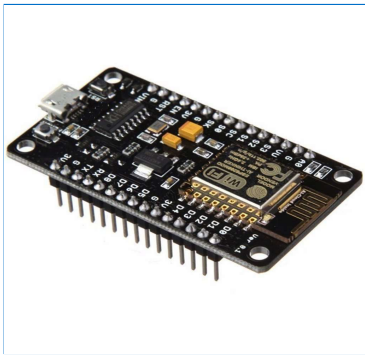
L298 motor driver IC and
has an on-board 5V
regulator
Can control 2 DC motors
with directional and speed
control



Power Bank Power Source

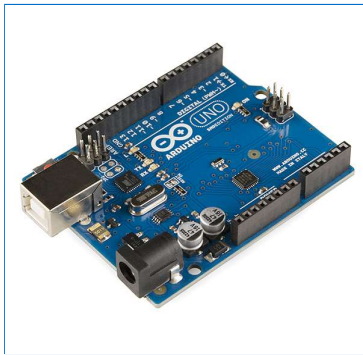
ADD A FOOTER

Hardware Requirements :-



ESP 8266

Wi-Fi microchip, with a full TCP/IP stack and microcontroller capability



Arduino UNO

Microcontroller board based on the ATmega328P
Will act as a Slave Device



SD Card

32GB SD Card for the memory of Raspberry Pi



RJ-45 Ethernet

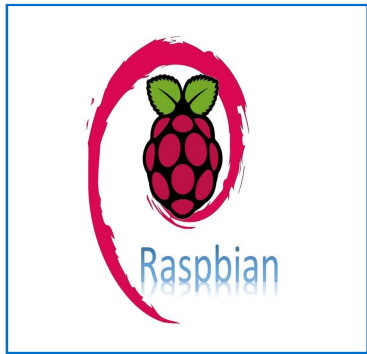
Cat7 RJ45 Ethernet patch cable
Transmission of up to 10 Gigabits per second



Raspberry Pi Attachment

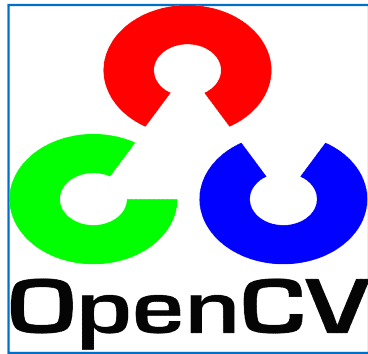
Heat Sink,
Raspberry Pi Case,
5V DC Fan

SOFTWARE REQUIREMENTS :-



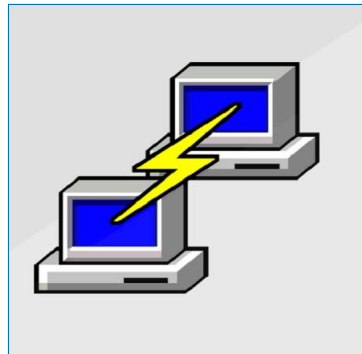
Raspbian OS

Raspberry Pi OS 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.



OpenCV

OpenCV is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez.



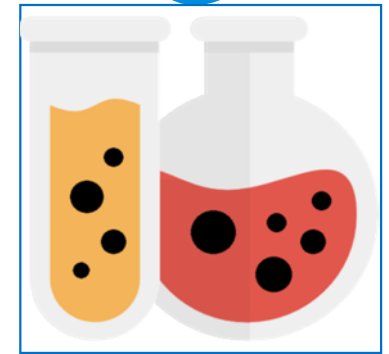
PuTTY

PuTTY is a free and open-source terminal emulator, serial console and network file transfer application. It supports several network protocols, including SCP, SSH, Telnet, rlogin, and raw socket connection.



Advance IP Scanner

Reliable and free network scanner to analyse LAN. The program shows all network devices, gives you access to shared folders, provides remote control of computers (via RDP and Radmin), and can even remotely switch computers off.



Cascade Trainer GUI

Cascade Trainer GUI is a program that can be used to train, test and improve cascade classifier models. It uses a graphical interface to set the parameters and make it easy to use OpenCV tools for training and testing classifiers.

SOFTWARE REQUIREMENTS :-



Remote Desktop Connection

Microsoft Remote Desktop app to connect to a remote PC or virtual apps and desktops made available by your admin.



Virtual Network Computing

Virtual Network Computing is a graphical desktop-sharing system that uses the Remote Frame Buffer protocol to remotely control another computer.



balenaEtcher

balenaEtcher is a free and open-source utility used for writing image files such as .iso and .img files, as well as zipped folders onto storage media to create live SD cards and USB flash drives.



Arduino IDE

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

REFERENCES



- ❑ https://morth.nic.in/sites/default/files/RA_Uploading.pdf
- ❑ <https://www.raspberrypi.org/blog/raspbian-stretch/>
- ❑ <https://docs.opencv.org/master/d1/dfb/intro.html>
- ❑ <https://www.balena.io/etcher/>
- ❑ <https://www.microsoft.com/en-in/p/microsoft-remote-desktop/9wzdncrfj3ps#activetab=pivot:overviewtab>
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- ❑ <https://amin-ahmadi.com/cascade-trainer-gui/>

THANK YOU!

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BT/17/002

