



Object Detection Using Machine Learning To Avoid Accidents And Improve Road Safety

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Abstract:

At present situation the human beings are going through many accidents during the road way transportation. Simultaneously they lose their life and significant properties in those accidents. Most of the Indian roads in rural and suburbans are not ideal for driving due to faded lanes, irregular potholes, inappropriate and unseen road signs, which caused many accidents, lost lives and caused serious damage to vehicles. The most difficult task is to detect obstacles on the highway. The basic concept is to design a system that has the effect of detecting the presence of an obstacle in the track of the vehicles. In the proposed work, the Raspberry Pi, Camera module is used for object detection and image acquisition. The system can classify objects like vehicles, animals, humans, etc. Once the object is detected the system informs the user to slow down the vehicle. A sufficient analysis is carried out to consolidate the results obtained. The result analysis shows that proposed system is more precise and consumes less time than existing system.

Index Terms -object,vehicle,camera,raspberry pi,motor driver, dc motor,ultrasonic sensor,led display

I.INTRODUCTION:

One major issue that all the developed countries are facing today is death and injuries because of road accidents. In India, most people are killed in road accidents rather than diseases. According to the study, about 45% of persons died in road accidents within a year. Highway obstacle detection is one of the most complex and complex tasks in real-time systems of the machine. In this project, Accident Avoidance and Improving Road Safety with Use of Raspberry Pi for Object Detection system are proposed. We propose a method for detecting obstacles using a monocular camera mounted on a vehicle that takes light variations of the scene on the road ahead and analyzes the resulting images to perform obstacle detection. The camera is used to capture continuous real-world images. According to the images available through the camera, these images can be transmitted to the raspberry pi to perform the control actions of the car.

II.EXISTING SYSTEM

In existing System we detect the objects by using ultrasonic sensors, IR sensors ,etc.

we are operated robot different technologies like RF , Zigbee, etc.

To over come the disadvantages of this system we are moving to proposed system..

III. PROPOSED SYSTEM:

In our Proposed System we have used ultrasonic and Web Camera to detect objects. This is interfaced with Raspberry pi. If any moving object is detected by using ultrasonic, camera will activate and send signals to Raspberry pi based on that the Motor driver will get signals and the Motor will slow down or speed up.

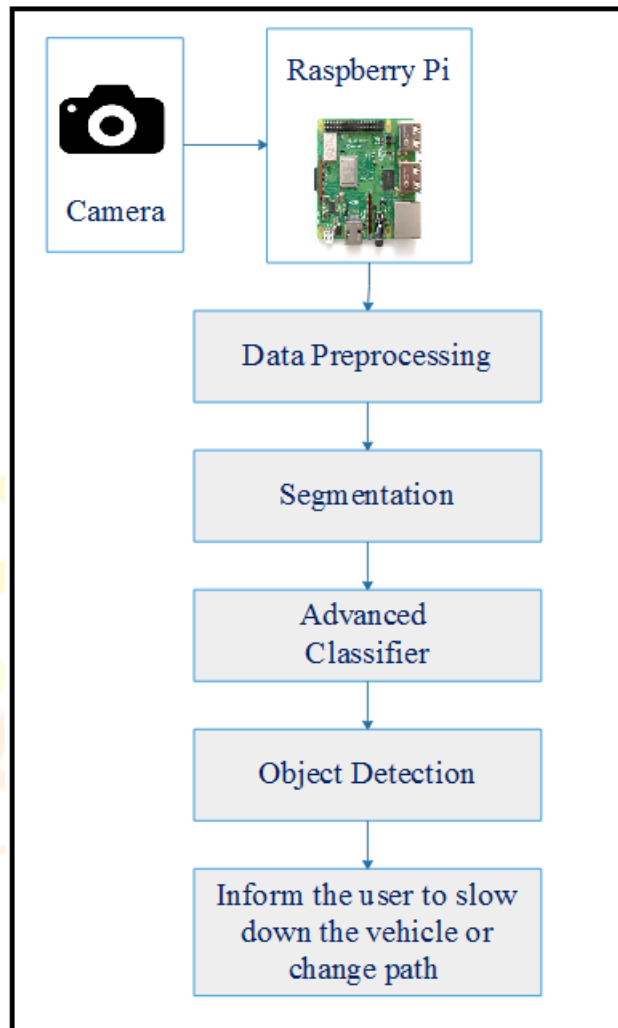
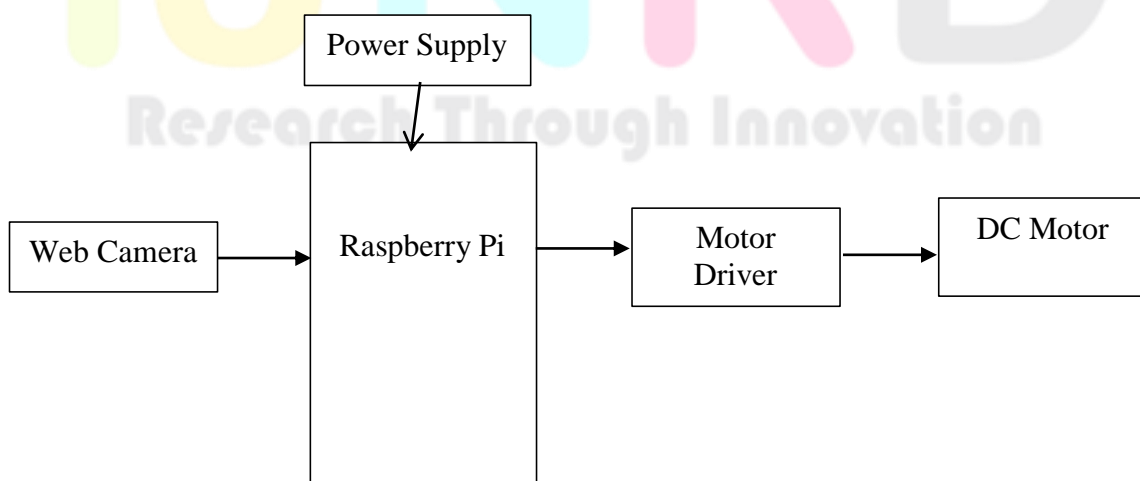


Fig1: flow chart of proposed system

Fig2 BLOCK DIAGRAM:



3.2:ADVANTAGES:

- More reliable
- Low cost
- More compatible

3.3:APPLICATIONS:

- Homes
- Industries
- To track objects
- Mines

IV.COMPONENTS DESCRIPTION:**4.1:HARDWARE COMPONENTS REQUIRED:****4.1.1:RASPBERRY PI:**

Raspberry PI 3 It is a sort of development board which has the modules like WIFI and Bluetooth comes on board, we can connect any form of sensors to raspberry pi3 through the GPIO pins. it has forty GPIO pins 4 USB ports ,1 LAN port ,1 port for electricity supply and it has on board provided with 1gb RAM



Fig 4.1:RASPBERRY PI

4.1.2:WEB CAMERA:

A webcam is a small digital video camera directly or indirectly connected to a computer or a computer network.

Webcams come with software that needs to be installed on the computer to help users record video on or stream it from the Web. Webcams are capable of taking pictures as well as high-definition videos, although the video quality can be lower compared to other camera models.



Fig4.2:WEB CAMERA

4.1.3:MOTOR DRIVER:

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. Dual H-bridge Motor Driver integrated circuit (IC).

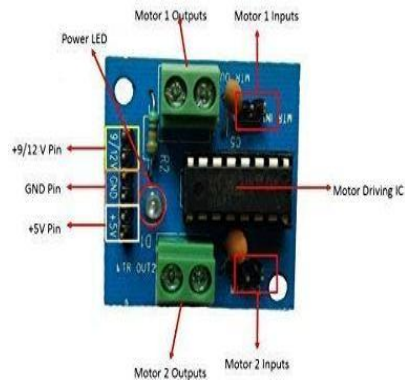


Fig4.3:MOTOR DRIVER

4.1.4:DC MOTOR:

A machine that converts D.C power into mechanical power is known as a d.c. motor. Its operation is based on the principle that when a current carrying conductor is placed in a magnetic field, the conductor experiences a mechanical force. The direction of this force is given by Fleming's left hand rule and magnitude is given by;

$$F = BIl \text{ newton's}$$

Basically, there is no constructional difference between a D.C. motor and a D.C. generator. The same D.C. machine can be run as a generator or motor.

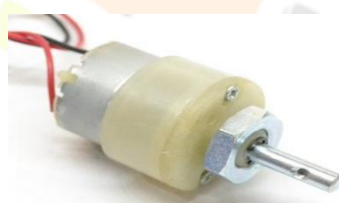


Fig4.4:DC MOTOR

4.1.5:ULTRASONIC SENSOR:

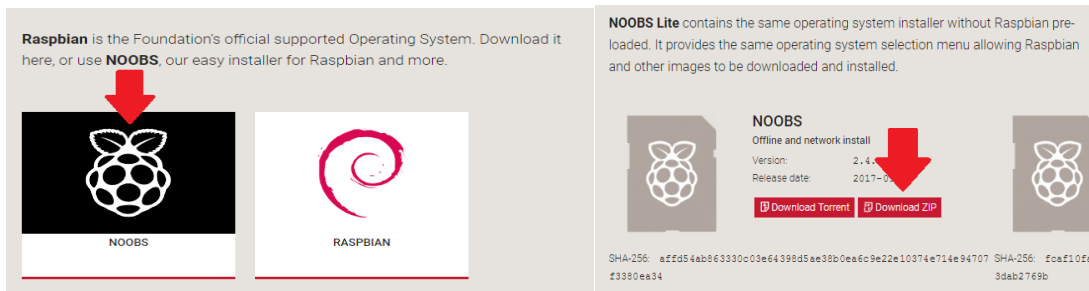
An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear).



Fig4.5:ULTRASONIC SENSOR

4.2:SOFTWARE REQUIRED:

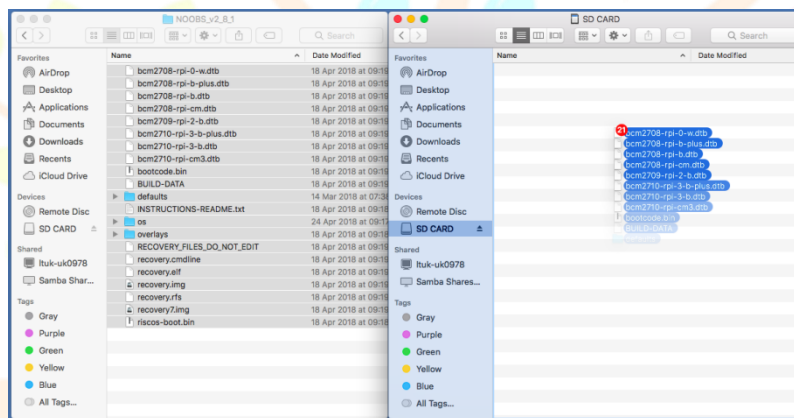
4.2.1:NOOBS SOFTWARE



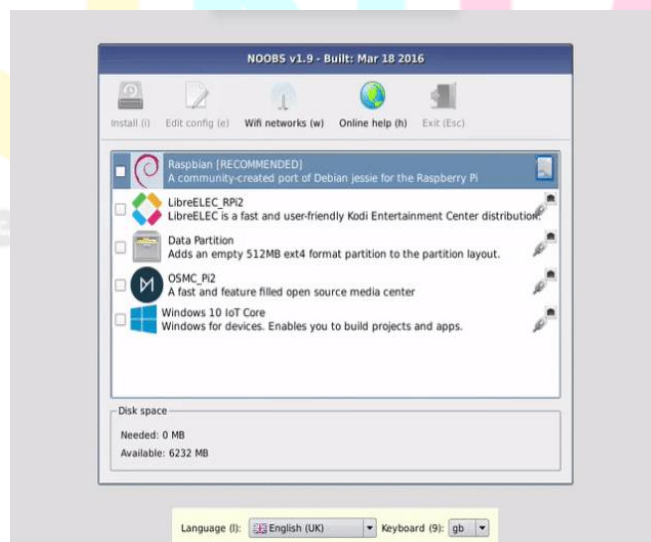
Set up your SD card:

- Format the SD card using SD Formatter 4.0
- Download NOOBS
- Extract NOOBS from the zip archive
- Copy all the files to SD card

Copying Noobs to Formatted SD Card



Noobs installation After Inserting SD card in Raspberry Pi



Raspberry pi setup:



V:RESULT AND DISCUSSION:

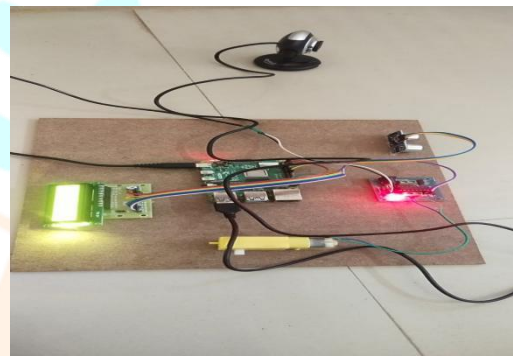
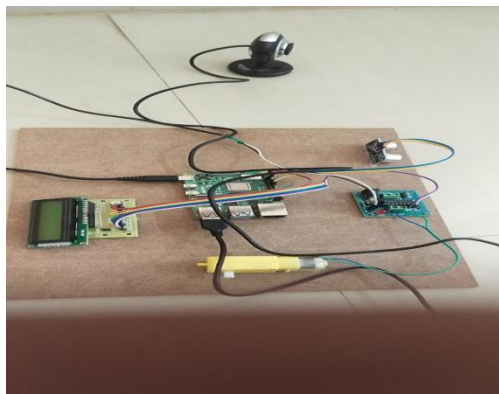


Fig5.1:WORKING MODAL OF PROPOSED SYSTEM .

Fig5.2:WHEN WE POWER ON THE SYSTEM,IT WILL BE WORKS ON AUTOMATIC OBJECT DETECTION.

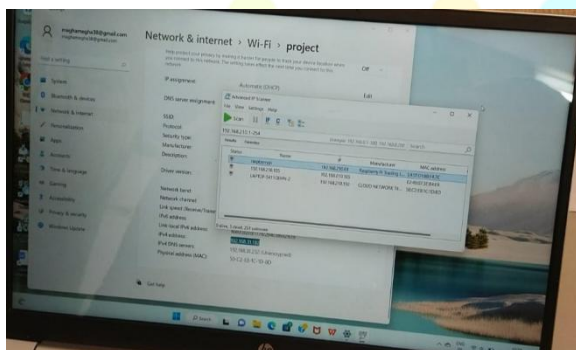


Fig5.3:WHEN WE GO TO ADVANCED IP SCANNER WINDOW .

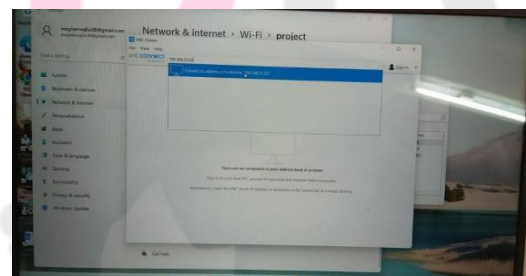


Fig5.4:WHEN WE GO TO VNC VIEWER WINDOW AND ENTER THE RASPBERRY PI IP ADDRESS.

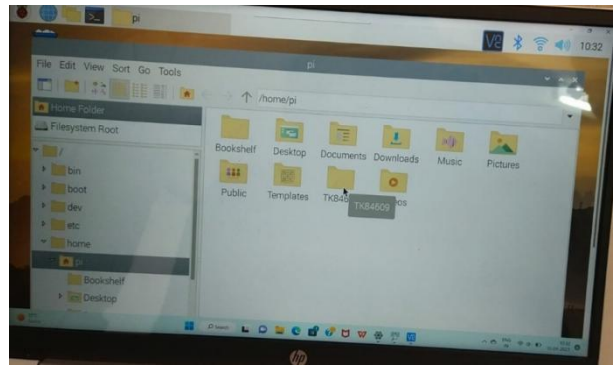
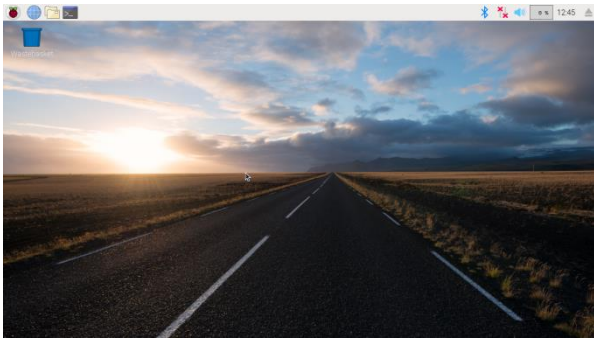


Fig5.5: WHEN WE ARE OPEN THE RASPBERRY PI DESKTOP.

Fig5.6: WHEN WE ARE OPEN THE TK84609 FILE.

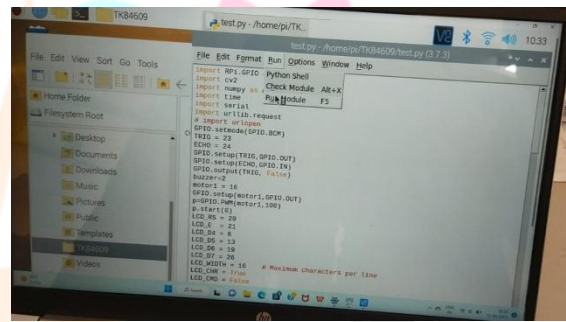
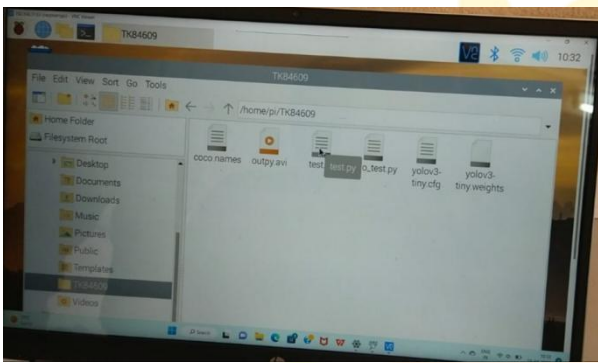


Fig5.7: WHEN WE ARE OPEN THE TEST.PY FILE.

Fig5.8: ONCE OPEN THE TEST.PY FILE AFTER RUN THE CODE IN PYTHON IDE 3.7.3

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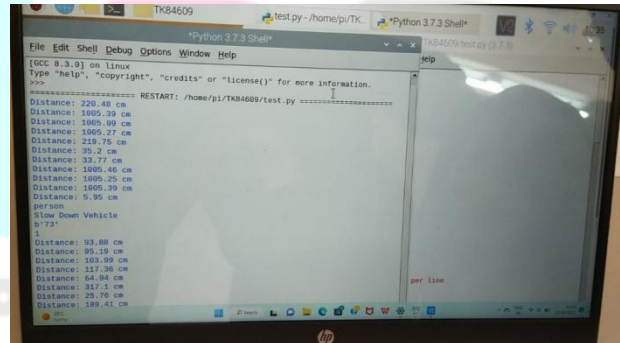
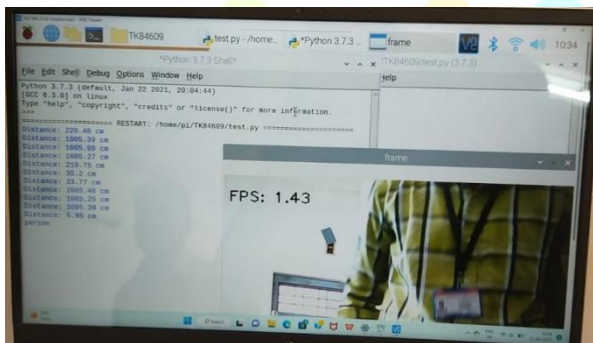


Fig5.9: WHEN WE GIVE THE INPUT AS A OBJECT.

Fig5.10: THEN OUTPUT WILL BE SHOWN DISTANCE OF THE TARGET

VI.CONCLUSION:

Driving with too short of a safety distance between the vehicles is a common problem in road traffic, which often results in traffic accidents as a consequence. The number of vehicles is increasing day by day and because different road conditions, accidents can occur between vehicles, human as well as animals, so object detection is very important. The main goal of this project is to develop object detection for accident avoidance and improving the Road Safety with Use of Raspberry Pi. A user-friendly visualization approach of the detected images is provided in this project.

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