Road Traffic Sign Recognition and Vehicle Accident Avoidance System

[1]Paresh Kothawade, [2]Prof. A. M. Maske

[1,2]Department of E&TC, Dhole Patil College Of Engineering, Pune, India.

[1]kothawadeparesh@gmail.com, [2]ashishmaske@rediffmail.com

Abstract— **Traffic sign recognition and vehicle accident avoidance system gets a of interest late by huge scale associations, e.g., Apple, Google and Volkswagen and so on driven by the market requirements for smart applications, e.g. Automatic Driving and Driver Assistance Systems , Mobile Eye, Mobile Mapping and many more. In this paper, traffic sign recognition and vehicle accident avoidance system is utilized to keep up traffic and maintain a strategic distance from vehicle, caution the occupied drivers, and avoid activities that can lead a vehicle. An on-going programmed sign recognition and detection can support the driver with safety. System propose automated real time system which will capture the traffic sign and show it at driver dashboard with front obstacle exact distance on screen. In this system PiCam is connected with Raspberry Pi and it is used to capture pictures of traffic sings. Screen is utilized to show the system output .This framework is configuration to maintain a strategic distance from vehicle happening on street.**

Index Terms- **PiCAM, Raspberry Pi, Ultrasonic sensors, Traffic Sign recognition.**

I. INTRODUCTION

A huge number of traffic sign affirmation structures have been made since the 1980's. First courses of action were focusing on optical based little scale redid hardware in order to keep up a vital good ways from computational multifaceted nature and other contemporary adaptable enrolling related requirements. As demonstrated by the world vehicle road mishap report, India has the top most nation for vehicle road mishap inside the world. Framework should make vehicle driver progressively careful about breaking separation and traffic signs. In this paper, framework propose using raspberry pi and PiCam with ultrasonic sensor, which will caution driver about traffic signs proceeding road and at the same time keep up a vital good ways from front accident using programmed breaking after vehicle enters in breaking separation zone.

II. RELATED WORK

EnisBilgin, et al. [1] depict the characteristics of speed signs, necessities and inconveniences behind executing a consistent base structure with embedded system, and how to oversee numbers using picture taking care of techniques subject to shape and estimation examination. The paper moreover exhibits the techniques used for game plan and affirmation. Concealing examination moreover accept an unequivocally noteworthy activity in various different applications for road sign acknowledgment, this paper centers to various issues concerning reliability of concealing recognizable proof due to light conditions, so

nonappearance of concealing model can drove an unrivaled game plan. In this errand lightweight systems were chiefly used on account of confinement of persistent based application and Raspberry Pi capacities. Raspberry Pi is the standard concentration for the use, as it gives an interface between sensors, database, and picture getting ready outcomes, while also performing abilities to control periphery units (USB dongle, reassure, etc.).

Yi Yang, et al. [2] depict traffic sign affirmation expect a critical activity in driver accomplice systems and sagacious free vehicles. Its continuous introduction is appealing despite its affirmation execution. This paper intends to oversee progressing traffic sign affirmation, i.e., confining what kind of traffic sign appears in which area of an information picture at a fast dealing with time. To achieve this goal, we at first propose a brisk revelation module, which is on various occasions speedier than the present best recognizable proof module. Our acknowledgment module relies upon traffic sign suggestion extraction and request dependent on a concealing probability model and a concealing HOG. By then, we gather from a convolution neural framework to further gathering the recognized signs into their sub classes inside each super class. Preliminary outcomes on both German and Chinese boulevards show that both our acknowledgment and plan methodologies achieve comparable execution with the front line procedures, with essentially improved computational viability.

Priyanka D. et al. [3] portray this work hopes to

complete traffic light and sign area using Image planning strategy for a self-decision and vehicle. Traffic Sign Recognition system is used to direct traffic signs, alert a driver and request certain exercises. Snappy healthy and ceaseless customized traffic sign revelation and affirmation can support the driver and in a general sense augmentation driving security. Customized affirmation of traffic signs is in like manner critical for a robotized shrewd driving vehicle or for a driver help system. This is a visual based endeavor i.e., the commitment to the structure is video data which is continually gotten from the web cam is interfaced to the Rasp-berry Pi. Pictures are pre-arranged with a couple of picture taking care of strategies, for instance, Hue, Saturation and Value (HSV) concealing space model system is used for traffic light area, for sign disclosure again HSV concealing space model and Contour Algorithm has been used. The signs are recognized reliant on Region of Interest (ROI). The ROI is recognized reliant on the features like geometric shape and shade of the article in the image containing the traffic signs.

WangCanyong et al. [4] delineate the quick improvement of society and economy; vehicles have ended up being practically one of the invaluable strategies for vehicle for each house-hold. This makes the road traffic condition progressively tangled, and people would like to have a savvy Vision-helped application that outfit drivers with traffic sign information, direct driver exercises, or help vehicle control to ensure road prosperity. As one of the more critical limits, traffic sign disclosure and affirmation, has transformed into a hot research course of researchers at home and abroad. It is generally the use of vehicle cameras to get consistent road pictures, and after that to recognize and perceive the traffic signs experienced all over the place, in this way giving exact information to the driving system. Regardless, the road conditions in the genuine scene are jumbled. After various significant lots of persistent work, examiners have not yet made the affirmation structure sensible, and further research and improvement are so far required. Generally, traffic signage has been perceived and arranged using standard PC vision systems, yet it in like manner puts aside amazing exertion to physically process noteworthy features of the image. With the headway and progression of science and development, a consistently expanding number of analysts use significant learning advancement to deal with this issue. The rule reason that the significant learning technique is comprehensively recognized is that the model can get acquainted with the significant features in-side the image autonomously from the planning tests, especially for certain cases that don't have the foggiest thought how to design the part extractor, for instance, explanation affirmation, target acknowledgment Wait. In light of the utilization of road traffic sign disclosure and affirmation, this article fixates on the exactness and high capability of

distinguishing proof and affirmation.

III. PROPOSED SYSTEM

An ongoing sign recognizable proof and acknowledgment can support to the driver, basically growing driver security. Traffic sign acknowledgment is used to recognize traffic signs, alert the involved drivers, and hinder driver exercises that can lead a mishap.
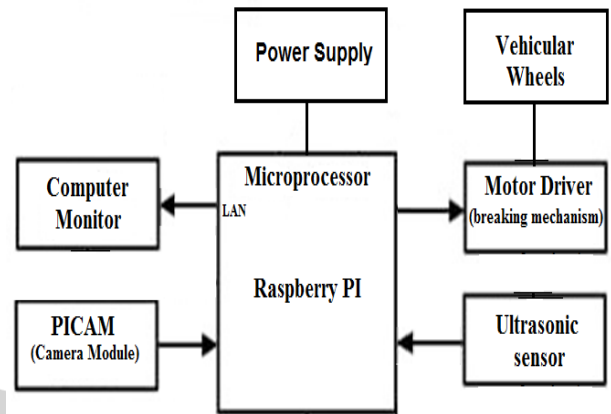

Fig. 1: Block Diagram

Give us a chance to consider framework have two ultrasonic sensors where one is placed in the front and another behind the vehicle. With the assistance of this sensor, we can figure the separation of the various vehicles nearing us. Along these lines, framework can discover various vehicles and framework can driver from mishaps. The vehicle mishaps evasion structures dodge the road mishaps that will regularly occurring on interstates and in city traffic. These mishaps are generally happened by preoccupation, conspicuousness, and partitions darken between our vehicles.
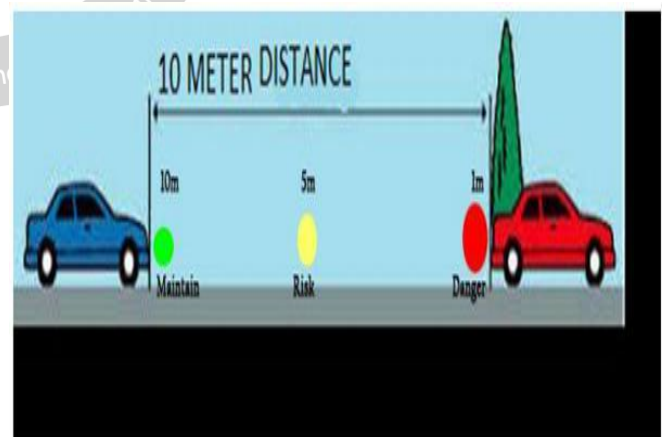

Fig. 2: Accident Avoidance System

IV. ALGORITHM

1) K-Means Algorithm

Input parameters:

1. samples : It should be of np.float32 data type, and every feature should be put in a one column.

2. nclusters(K) : Total number of clusters needed at end

3. criteria : It is the iteration termination criteria. When this criteria is satisfied, algorithm iteration stops. Generally, it should be a tuple with 3 parameters. They are `( type, max_iter, epsilon )`:

a. type of termination criteria. It has 3 flags as below:

- cv.TERM_CRITERIA_EPS - stop the algorithm iteration if specified accuracy, epsilon, is reached.

- cv.TERM_CRITERIA_MAX_ITER - stop the algorithm after the specified number of iterations, max_iter.

- cv.TERM_CRITERIA_EPS + cv.TERM_CRITERIA_MAX_ITER - stop the iteration when any of the above condition is met.

b. max_iter - An integer specifying maximum number of iterations.

c. epsilon - Required accuracy

4. attempts : Flag to specify the number of times the algorithm is executed using different initial labellings. Algorithm returns the labels that yield the best compactness. This compactness is returned as an output.

5. flags : This flag is used to specify how initial centers are taken. Basically   two flags are used for this: cv.KMEANS_PP_CENTERS and cv.KMEANS_RANDOM_CENTERS.

2) Grayscale Algorithm

Steps:

1. Get the red, green, and blue values of a pixel

2. Use fancy math to turn those numbers into a single gray value

3. Replace the original red, green, and blue values with the new gray value

ConversionFactor=255/(NumberOfShades-1)

AverageValue=(Red+Green+Blue)/3

Gray=Integer((AverageValue/ConversionFactor)+0.5)*ConversionFactor

V. EXPERIMENTAL RESULT

In propose model system worked on different sign shown in following figure. The traffic sign detection is done using Raspberry pi and Python.
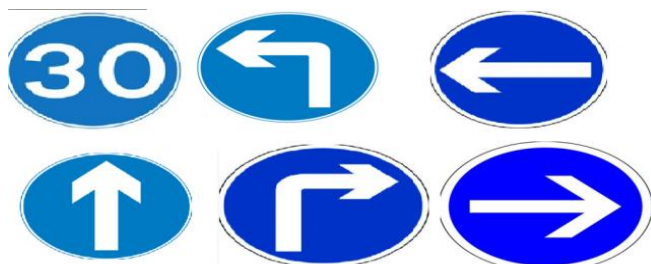

Fig 3: Traffic sign

The following figure shows the traffic sign detected output. Using this detected sign system has controlled a robot for now.
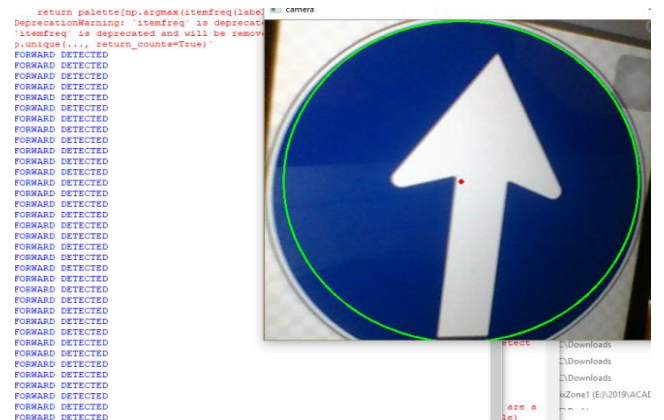

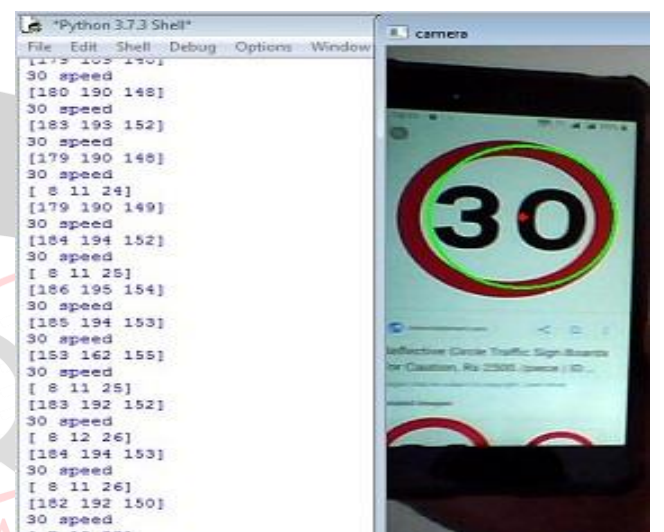Fig 4: Traffic sign detected output
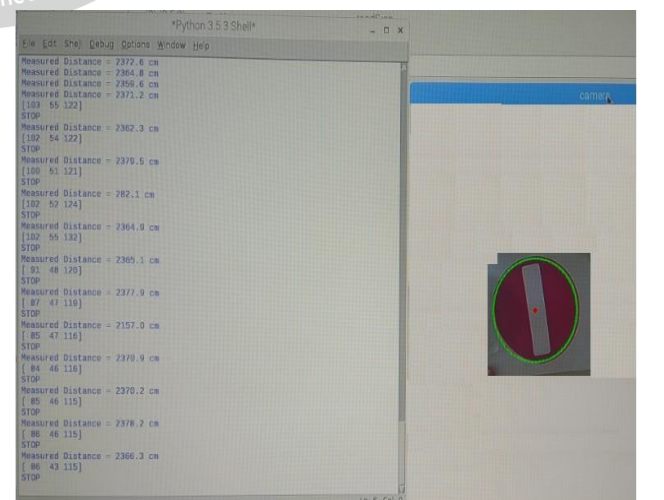

Fig 5: 30 speed detected output
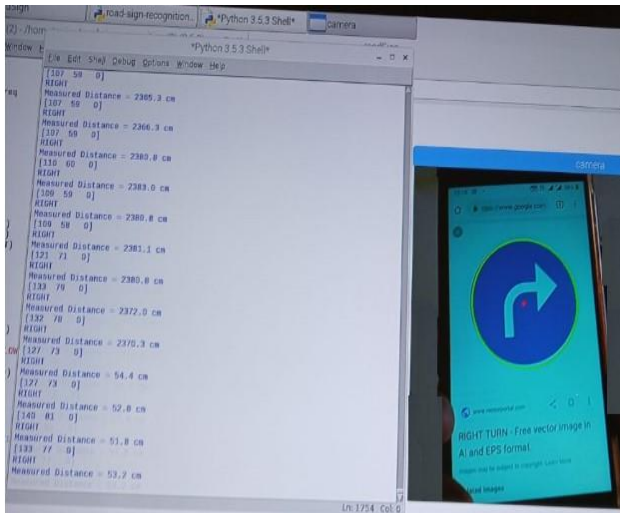

Fig 6: Stop sign detected output
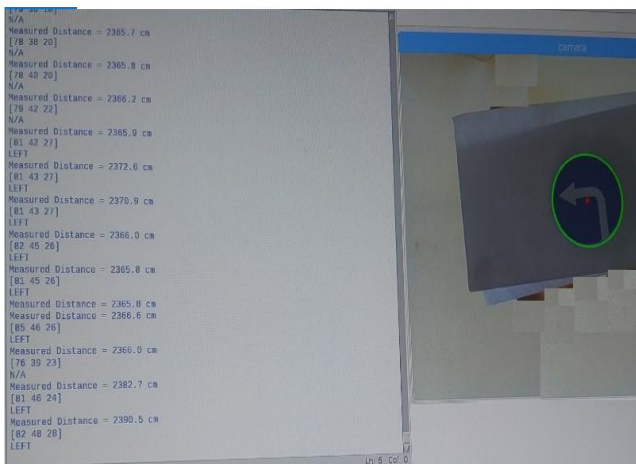
Fig 7: Right turn sign detected output

Fig 8: Left turn sign detected output

This is proposing prototype model for traffic sign detection and vehicle accident avoidance system model. The prototype contains Raspberry pi, pi camera, ultrasonic sensor and robot chassis.
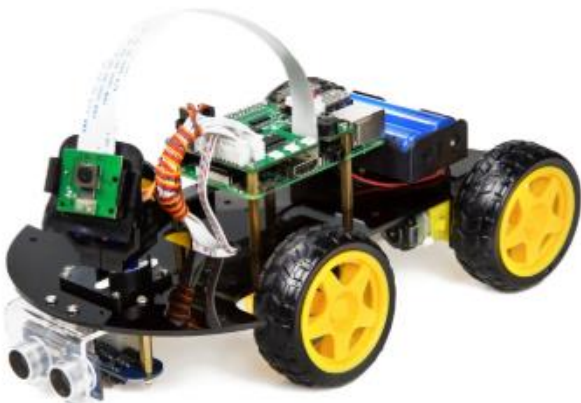

Fig 9: Propose system prototype model

VI. CONCLUSION

In this paper, PiCAM is recognizing the traffic sign on street and alert to the driver. On the off chance that the driver has disregarded the traffic sign, at that point automatic braking system will be actuated by Raspberry Pi microcontroller. Then again, framework will consistently track front vehicle distance utilizing ultrasonic sensor, and breaks will be connected by distance. This will keep away from the vehicle accidents because of sign board carelessness, likewise this will drivers to keep up safe distance between the vehicles. This will likewise maintain a strategic distance from the accidents happening because of head-on impact. The alarm on dashboard will make driver constantly mindful of the street status.

REFERENCES

[1] EnisBilgin, Dr. Stefan Robila, "Road Sign Recognition System on Raspberry Pi", IEEE, 2016.

[2] Yi Yang, HengliangLuo, HuarongXu, and Fuchao Wu, "Towards Real-Time Traffic Sign Detection and Classification", IEEE, Transactions on Intel Ligent Transportation Systems, 2016.

[3] Priyanka D, Dharani K, Anirudh C, Akshay K, Sunil M P, Hariprasad S A, "Traffic Light and Sign Detection for Autonomous Land Vehicle Using Raspberry Pi", Proceedings of the International Conference on Inventive Computing and Informatics (ICICI 2017), IEEE Xplore Compliant - Part Number: CFP17L34-ART, ISBN: 978-1-5386-4031-9.

[4] Wang Canyong, "Research and Application of Traffic Sign Detection and Recognition based on Deep Learning", IEEE Conferences, International Conference on Robots & Intelligent System (ICRIS), 2018.

[5] Traffic Light and Sign Detection for Autonomous Land Vehicle Using Raspberry Pi", IEEE, International Conference on Inventive Computing and Informatics, ICICI, 2017.

[6] "OpenCV Documentation", 2015. Web-http://opencv.org/

[7] "Raspberry Pi Foundation", 2015. Web-https://www.raspberrypi.org/