

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 8, Special Issue 2, March 2019

Traffic Sign Detection to Avoid Accidents by Using Image Processing & Raspberry Pi

Jeya Anusuya S, Edward Paulraj J, Anitha G, Anjali Devi P, Chevandhi R

Associate Professor, Department of Electronics and Communication Engineering, T.J.S Engineering College,
Peruvoyal, India

Assistant Professor, Department of Electronics and Communication Engineering, T.J.S Engineering College,
Peruvoyal, India

Students, Department of Electronics and Communication Engineering, T.J.S Engineering College, Peruvoyal, India

Students, Department of Electronics and Communication Engineering, T.J.S Engineering College, Peruvoyal, India

Students, Department of Electronics and Communication Engineering, T.J.S Engineering College, Peruvoyal, India

ABSTRACT: At present situation the human beings are faced many accidents during the road ways transportation. At the same time they lose our life and valuable properties in those accidents. To avoid these problems the system designed with the help of Raspberry pi. The Digital image processing plays important role in the sign capturing and detection system. The image processing algorithms to takes the necessary action for resizing the captured signs. The objective of the proposed work is to implement the available technique to detect the obstacles, Edge detection, stop board and red traffic signal for an autonomous car that takes action according to traffic signal with the help of raspberry pi3 board. The system also uses ultrasonic sensor for distance measurement for the purpose of speed control of vehicle to avoid collision with ahead vehicle. Raspica meramodule is used for signboard detection and ultrasonic sensors are used to get the distance information from the real world. The proposed system will get the image of the real world from the camera and then masking and contour techniques are used to detect the red signals of the traffic and To determine the traffic board signs like stop board system will use Machine learning technique to determine the stop words. So vehicles will be able to take action and reduces the chances of human errors like driver mistakes that results road accidents. The coding for this whole system is in python and for image processing open cv is used that is much efficient as compare to the matlab. Ultrasonic sensor is used for the obstacle detection in place of camera because distance finding from the camera is more complex and computational as compare to the ultrasonic sensor. Ultrasonic sensor directly gives the obstacle distance in front of it without more complex computations.

KEYWORDS: Raspberry pi3, traffic signal detection, Obstacle detection, Edge detection, Climate Notification, python.

I. INTRODUCTION

Every person, whether a passenger, driver, pedestrian would have noticed along the roadside various sign board that serve important purposes. These important road paraphernalia help us as route guides, warnings and traffic regulators. As control devices for traffic, signs need full attention, respect and appropriate driver's response. With the advent of motorized traffic and its increasing pressure on road, many have adopted pictorial signs and standardized their signs to facilitate international travel, where language differences would create barriers. In adverse traffic conditions, the driver may not notice traffic signs, which may cause accidents. In such scenarios, automatic road sign detection comes into effect.

The main objective of proposed system is to detect the road sign automatically while driving and control the speed or makes the turn according to that Road sign. Road sign recognition is used to warn the distracted driver, and prevent



International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 8, Special Issue 2, March 2019

his/her actions that can lead an accident. The goal is to avoid accidents by both manual and automation process in which all the actions will be performed based on the detected Road signs. A real-time automatic speed sign detection and recognition can help the driver, significantly increasing his/her safety. To avoid accidents and traffic jam road signs are generally placed near curved areas, hospital zones, school zones etc. Driver has to view the road signs and control the speed or makes the turn according to it. Due to various issues, drivers are less attentive to road signs which lead to accidents. In Existing System, an idea is proposed to avoid accidents in which road signs are recognized automatically by web camera using Image processing techniques and Raspberry Pi

Our worked focused on a low cost, off the shelf solution, specifically, a mini embedded computer Raspberry Pi. In order to provide fast processed results, this system aimed to demonstrate use of simple shape recognition algorithms and open source optical character recognition (Tesseract OCR) on Raspberry Pi. Tesseract OCR is an open source optical character recognition module for various operating systems.

II. METHODOLOGY

Due to low budget we used a two wheel chassis for the car and implemented all the techniques that gives accurate results

- Traffic red/green signs and signal detection
- Obstacle detection
- Speed to overtake
- Edge detection
- Climate notification
- MEMS

III. SYSTEM REQUIREMENTS HARDWARE REQUIREMENTS

- 1) Raspberry pi3,
- Traffic signal detection,
 - DC Motors
 - Camera
 - Ultrasonic Sensor
 - Temperature Sensor

SOFTWARE REQUIREMENTS

- Python software
- OpenCV

IV. SYSTEM REQUIREMENT SPECIFICATIONS

Hardware & Software Requirement RASPBERRY PI3

Raspberry pi is a small chip of single board computer. There are various model of raspberry available in the market i.e. the Raspberry Pi1 Model B, Raspberry Pi1 Model B+, Raspberry pi2, Raspberry Pi3 Model B. These all are differ in memory capacity and hardware features like Raspberry pi3 has inbuilt Bluetooth and wifi modules whereas in previous version these modules were not available .It has 1.2 GHz 64- bit quad core ARMv8 CPU with 1GB of RAM.

CAMERA

Camera is used to take the continuous images to get the traffic signs and signals from the real world. According to the images available through the camera we can send these images to the raspberry pi to perform car's control action.

MOTOR DRIVER IC L298

L298 is known as a dual bidirectional motor driver which is based on dual H-Bridge Motor driver IC. This circuit allows you to control two DC motors independently in either direction. It is a commonly used component for prototypes

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 8, Special Issue 2, March 2019

and hobbyist projects, as it is easy to use and interface the L298 with a Raspberry Pi or an Arduino. Other than its minimal design, it also provides an onboard 5V regulator that you can use to power your 5V circuits very conveniently. In this, locally available L298 based motor drivers (L298 breakout board) are used because they all are essentially the same which makes setup a little easier and Controlling a DC Motor is easy with a Raspberry Pi.

PYTHON SOFTWARE

Python is a high level, general purpose programming language used widely in industries and research work also used in making general purpose projects. Its software comes in various version i.e. IDLE python 2, python 3 also in these two types different version of python IDLE are available for programming the python language.

OPEN CV

It stands for Open Source Computer Vision. It has a library of programming functions mainly for real time computer visions. It has over more than 2500 optimized algorithms for set of classical algorithm as well as for the state of art algorithms in the computer vision is basically used for image processing in which we used it for the face detection, object detections, image recognition, traces and also for other functions.

BLOCK DIAGRAM & WORKING

1) **SIGN DETECTION:-**In the discovery stage the picture is pre-handled, improved, and sectioned by sign properties, for example, shading, shape, and measurement. They yield of sectioned picture contains potential data.

I. Mandatory signs: These types of signs are always

available in a round shape with red border. *II. Caution-ary signs:* These types of signs are always available in triangular shape with red border. *III. Information signs:* These types of signs are always available in square shape with blue border. *IV. Additional signs:* All the signs except for the above types of codes known as additional signs.

2) **SPEED TO OVERTAKE:-**In this project using ultrasonic sensor and image processing we can get the exact speed to overtake a vehicle ahead of us. When any vehicle comes at the range of my car ultrasonic sensor gives the distance of the next car at regular interval and backside ultrasonic sensor also gives the distance of the result so by getting distance of the next car at regular time we can calculate the maximum speed of our car to overtake the next vehicle that is ahead of my car.

3) **Edge Detection:-**It is an image processing technique for finding the boundaries of objects within images. It works by detecting discontinuities in brightness. Edge detection is used for image segmentation and data extraction in areas such as image processing, computer vision, and machine vision.

4) **OBSTACLE DETECTION:-**A camera provides rich information that can be processed to extract a large collection of heterogeneous information for the robot to make decisions. A single image allows, for example, to detect colored items, obstacles, people, etc.

5) **Climate Notification:-**In temperature monitoring system that consists of sensor and raspberry pi. The system will function like this when sensor detect out of range temperature level, it will send alert notification via email & sms to desired people through raspberry pi.

V. ADVANTAGES

- 1) Low cost
 - Simple to implement

VI. CONCLUSION

The driver helping system has been presented in this paper. The basic idea is to recognize and classify the traffic signs from an input image. The image processing technique used in this system is based on the SURF algorithm. Finally, the recognition and classification of these potential road signs is done according to a database of road sign patterns and control the speed according to it. The performance of this idea depends on the quality of the input image, in relation to its

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 8, Special Issue 2, March 2019

size, contrast and the way the signs appear in the image. This system is fully based on automation process which replaces the existing manual operation. Automation process, in turn decreases the human error, increases the accuracy, processing speed and reliability. In this report, a method to make a self-responding robot car is represented. Working of different hardware components are described. A way to find the stop signs board and red signals have been defined and also way to detect the obstacles. All methods and algorithm mentioned in this paper are successfully implemented in a robot car of chassis having two wheels.

BLOCKDIAGRAM

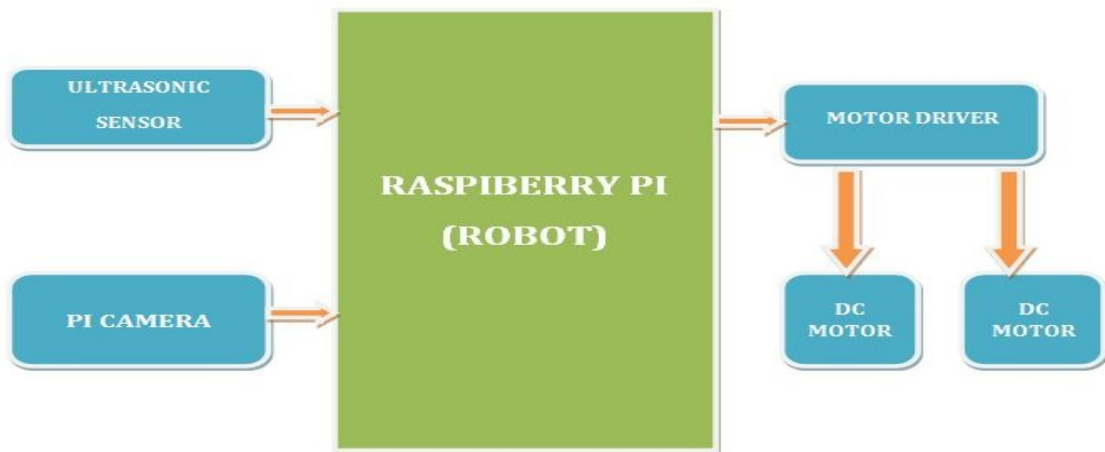
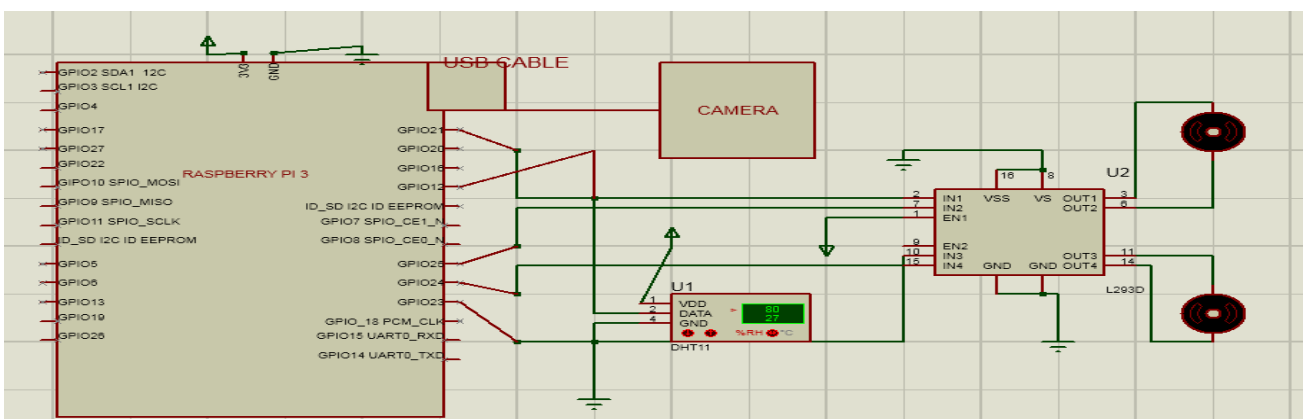


Fig. 1. Block diagram of the system



For future enhancement, more advanced resolution camera and advanced processors can be used in order to detect the sign perfectly and quickly. A System should be developed to monitor the rear end vehicle during the turnings so that the automation process will ensure more safety.

To enhance it more in the future machine learning algorithms can be used so it can be able to determine each objects. The current performance is good but to make it more efficient it is necessary to implement it using machine learning and other algorithms so it will understand more things. So in future to make it more advance it.



ISSN(Online): 2319-8753
ISSN (Print): 2347-6710

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 8, Special Issue 2, March 2019

REFERENCES

1. Ching-Hao Lai, Chia-Chen Yu, "An Efficient Real-Time Traffic Sign Recognition System for Intelligent Vehicles with Smart Phones", IEEE International Conference on Technologies and Applications of Artificial Intelligence, 2010.
2. P.Shopa, Mrs. N. Sumitha, Dr. P.S.K Patra.(2014),
3. Traffic Sign Detection and Recognition Using OpenCV", International Conference on ICICES2014 - S.A.Engineering College, Chennai, Tamil Nadu, India.
4. Dr. D. Y.Patil., , A Road Sign Detection and the Recognition for Driver Assistance Systems"International Conference on Energy Systems and Applications (ICESA 2015).
5. <https://www.raspberrypi.org/> - The official website of RaspberryPi.
7. Mark Lutz, Learning Python: Powerful Object-Oriented Programming: 5th Edition (O'Reilly Media 2013).