

# Automatic Road Traffic Sign Detection Using MATLAB

V.Venmathi ME<sup>1</sup> Y.Divya<sup>2</sup> K.R.Hema<sup>3</sup> S.Hemalatha<sup>4</sup>

<sup>1,2,3,4</sup>Department of Electronics and Communication Engineering

<sup>1,2,3,4</sup>SNS College of Engineering, Coimbatore, Tamil Nadu, India

**Abstract**— This paper presents a method for detection and recognition of traffic signs. We proposed a new recognition approach of traffic signs, which has the feature of introducing automatic detection through image processing. We designed and built a prototype system by implementation of C and Open CV library. The experimental results show that our approach could have good prospects for automatic detection and recognition of traffic signs. As when human observe a traffic sign, a two-stage procedure is performed by first locating the sign according to its unique shape and color, and second paying attention to content inside the sign. In the detection module segments, the input image in a YCBCR colour space and then it detects road signs by using the image processing method. The experiment is to detect the road signs under varying lighting, rotation and translation conditions. Traffic road sign detection and recognition is important to transport system with a camera while driving in the road. This paper presents and overview the, traffic road sign detection and recognition we developed and implemented the procedure to extract the road sign natural complex image. The main objective of this paper is to design and construct a system which can automatically detect the direction of the road sign. This paper is based upon a major approach to detect the traffic sign. In this paper, we will demonstrate the basic idea of how to detect the traffic signs and extract it. This system will play an important role for the detection purpose of specific domains like schools, traffic sign, universities, hospitals, offices etc.

**Key words:** Roadsign recognition (RSR), Automatic detection, Classification, Segmentation, Cropped images

## I. INTRODUCTION

Traffic signs play a vital role in building a safe traffic environment as they regulate the traffic sign, give drivers information on traffic restriction, possible direction, and road quality, and guide drivers the place where they would go. Almost traffic signs have specific shapes and colour patterns to allow a driver to easily identify them without excessive stress, because an omission of traffic signs might lead to a serious accident, especially at the intersection of the main street. Therefore, as automatic traffic sign recognition systems are useful to prevent traffic accidents, the development of such systems are fortune social demand. To this end, many different approaches for automatic traffic sign recognition have been proposed in the past, which have been realized computer vision by using techniques of computer vision and vehicle video system. Because of the difficulties associated with the video data acquisition by the car vibration, by changes in the colour of the traffic signs and by weather related factors such as fog, rain and snow, the problem of traffic sign recognition is still a challenging task in spite of the many previous studies.

– Although many images included traffic signs have been needed for the achievement of a high recognition

accuracy, their acquisition is laborious and time-consuming

- The task of manually checking and indicating every traffic sign to generate a training data for learning the algorithm also is long.
- These approaches need to reacquire and reconstruct a training data set whenever the recognized traffic signs change or the environment that traffic signs were located changes.

In this paper, we discuss the traffic sign recognition system, training data which have the same performance as the conventional traffic sign recognition systems. To this end, we have developed a new traffic sign detection and recognition system, which has the feature of introducing image processing in each recognition stage of the system. Recently, the recognition processes have often been implemented by Neural networks (NN) or Support Vector Machine (SVM) and many approaches have been published. Although in fact these approaches have achieved a relatively high recognition accuracy for traffic signs, a large number of the training data have been needed. Compared to sign detection where simple image processing techniques can be used. In past approaches SVMs played an important role in road traffic sign detection systems. Tested several features over different classifiers including Nearest Neighbor, sparse representation and SVMs. In joint transmission correlation is used to match signs in joint power spectrum domain. Deep neural networks is used in and experimented on German dataset.

## II. LITERATURE SURVEY

According to the a brief over view of traffic sign detection methods by Abhinav V. Deshpande this paper reviews the popular traffic sign detection methods which are prevalent in the recent literature the methods are divided into three types color based, shape based and learning based. This paper include with two phase studies how the presented methods are used to design complex traffic signs detection systems. The effective approach of road sign detection and recognition for Driver Assistance Systems (DAS) drastically improved as compared with past decade. Express highways equipped by increasing lane size made up with cement concrete. Though it increases the speed of the vehicle but it leads to misleading to serious effects. While considering from driver point of view there may be chances of neglecting traffic signs while driving.

The proposed system is designed to help the driver about the road sign detection to avoid road accidents. The automatic road-signs recognition which helps driver to increase safety and driving comfort.

The road sign recognition system is divided into two stages, the first stages is detection stage, It is used to detect the signs from a whole image, and the second stage is classification stage that classifies the detected sign in the first stage into one of the reference signs which is presents

in the dataset. In the detection stage, the input image is YCBCR color space, and then it detects road signs by the image processing method.

The classification module present determines road signs by using an artificial neural network (ANN). This experiment has shown that the proposed system is robust enough to detect and the recognize road signs under varying lighting, rotation and translation conditions.

### III. EXISTING SYSTEM

#### A. Detection of salient sign regions

Saliency detection aims to find whatever attracts human visual interest. A commonly used property for saliency definition is "isolation" of regions.

#### B. Paper sliding-window strategy

It is adopted for our category detector. From each window, we extract color, gradient and shape features and integrate them into integral channel feature . Features used include colors (LUV, 3 channels), gradient magnitude (1 channel) and shape information (FHOG with 6 orientation bins, 23 channels). Note for shape information, we augment the previous method in [10] by using FHOG to replace simple gradient orientations. FHOG is short for Felzenszwalb's HOG feature and contains contrast sensitive and insensitive orientation channels as well as texture channels. .

### IV. METHODOLOGY

Real time road sign detection system has been developed by several stages of operations .To achieve a successful road sign detection system we use following methodologies:

- 1) Literature study on different road sign detection methods and image processing.
- 2) Analyze the existing method for road sign Detection.
- 3) Study and design for the proposed system.
- 4) Implement the proposed design of the road sign detection
- 5) Evaluating the output performance of the system.

The performance of the system has been tested and achieved its desired output. It was captured by a digital camera and able to detect road sign properly.

### V. PROPOSED METHODS

This section describes the proposed road sign detection methods and recognition of traffic signs with out driver, by using the web camera .Main work in this area classified in two parts road sign detection and road sign recognition.

#### A. Detection of Road Signs

The detection of the road signs is more complex .Majority of the researches use either color information or shape information to detect the road sign .In this paper work the color segmentation is used to eliminate all background objects present in the road sign image.Most of the papers uses the RGB space color combination to find the road sign.But RGB color space has disadvantage that it is very sensitive for varying illumination,therefore to overcome this problem in this paper work we uses YCbCr color spaces for detecting the road signs.Shape detection is the second approach for road sign detection which is stronger to change in illumination conditions as it detect shape of sign, Though

transformation is used to detect a shape of the sign. But in this paper we use fast radial transformation for detecting square, triangular and octagonal road sign robustly and efficiently.

#### B. Road Sign Recognition

Many recognition methods have been proposed such as normalized correlation based pattern matching using road sign data base. Support vector machine is also good technique which is able to recognize our target. Neural networks is also the best option of recognition and classification of road sign. While using neural networks considerable amount of computation must be performed to convert the objects into the presentation space .In this paper we use web camera to detect the road sign and the robot will perform depends upon the sign which is recorded in the camera.

#### C. Block Diagram

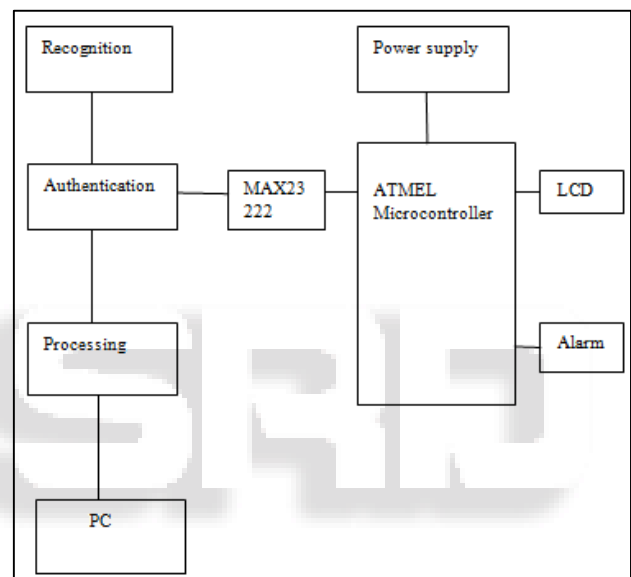


Fig. 1:

### VI. EXPERIMENTAL RESULTS

In this process, we represent the experimental evaluation of the proposed traffic sign detection and recognition system. Each image of the evaluation of the proposed system was captured in various scenes with car mounted camera and involves two or three traffic signs. The resolution of each image 2448x1624 pixel. A prototype system was implemented in MATLAB and the image processing operations were handled by the open CV library. An example of the recognized result of traffic signs for day and night hours. Even though the image quality is low during night, the performance of recognition is highly recognized and detected.

A. GO RIGHT

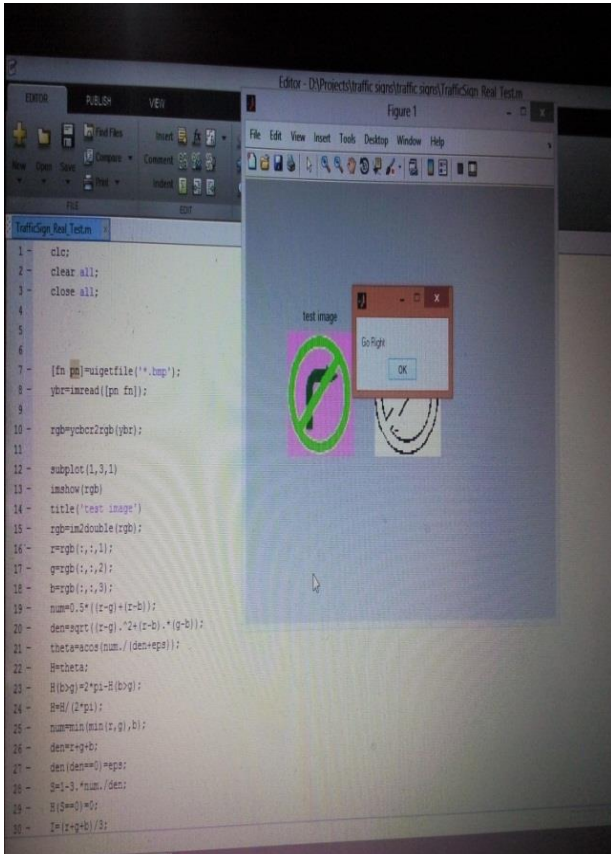


Fig. 2:

B. GO LEFT

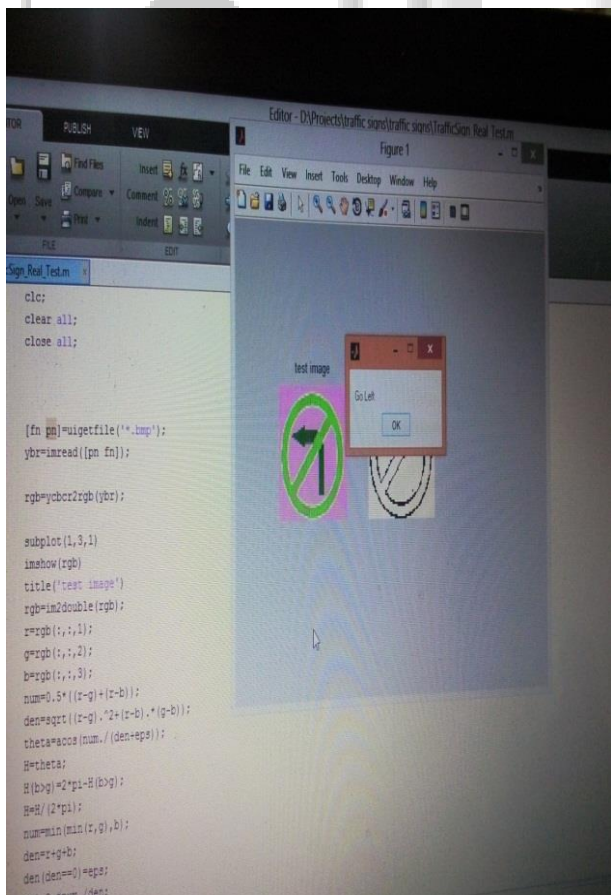


Fig. 3:

VII. CONCLUSION

This paper deals with object detection in outdoor environments which are use full for automatic traffic sign detection to take some decisions about their speed, trajectory and send a warning signal indicating over speed, warn or limit illegal maneuvers. It works only red object detection. This technique is different for detecting road sign. It helps researchers because it is time effective one.

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