Design And Implementation of Vision Based Intellegent Vehicle System

Tamilselvi T[1], Preethi R[2], Shinygrace R[3], Subashini P[4]
[1, 2, 3, 4] Dept of Electronic and communication Engineering,
[1, 2, 3, 4] Nadar saraswathi college of engineering and technology,

Abstract- *Road safety is the major issue faced by the number of vehicle owners across the world. In recent years, a lot of research work has been carried out in detection of traffic signs automatically. Traffic sign provide essential information for warning, guiding people to make their movements easier, Safer and more convenient. Traffic signs are detected by the feature extraction, having ability of detection and identification of traffic signs. The proposed project deals with the automatic recognition of traffic signs using MATLAB and Image Processing techniques. The proposed concept deals with concept of recognition of traffic signs and then displaying them on a LCD screen. The system is to detect traffic signs correctly so that drivers can be alerted and react properly to the encountered traffic situations. We have used feature-based method for traffic sign detection. In this method the image of the traffic sign was cropped and matched with the original image, identifying the key points in both the images, and match between those points to find similarity. The over-speed is one of the main issues. To stop the accident, there are different prohibitory indications are displayed with the side of the street. These are designed to show rule or warn in order to avoid accidents.*

Keywords- Feature Extraction , LCD , MATLAB, Pattern matching, Traffic sign etc

I. INTRODUCTION

Automatic traffic sign recognition has long been an interesting research area in image processing, one specific area with practical importance is automatic traffic sign recognition. A robust traffic sign detection algorithm is an essential part of applications like automatic vehicle control, navigation, etc. Many researchers have been done on this topic and have shown promising. Traffic Sign detection System is a computer vision application and it supports drivers to follow the restrictions and obey the regulations via utilization of image processing techniques. The system recognizes the traffic signs and warns the driver about the sign. Traffic Signs having standard in shapes and colors that are defined by the governments and they remain unchanged within the country. Drivers easily recognize them because colors and shapes of the signs are very different from the natural environment. The dominant color in urban environments is green whereas the used colors are blue and red in the traffic signs. The shapes of the signs are triangle, circle or rectangle, which are difficult to see in the nature. According to modern requirements intended for vehicle safety there must be noted that effective driving can often be more dependent on computer systems that vehicles include rather than the actual driver. Nowadays, one of the most crucial concerns of the automobile manufacturers is to boost safety. As the volume of vehicles increases the actual probability of site visitor's accident also boosts. There are many reasons to occur traffic accident. The over-speed is one of the main issues. To stop the accident, there are different prohibitory indications are displayed with the side of the street. These are designed to show rule or warn in order to avoid accidents. Unfortunately, sometimes on account of lack of concentration or lack of knowledge about the actual prohibitory signs the driver doesn't obey the basics and drive the vehicles according to their own want, leaving these signs or fulfills his want the driver put himself in to a very danger situation and turn a participant in accident. If there is really a system which can enforce to follow these prohibitory indications may avoid these sorts of accidents. In the last few decades automobile industry computer vision has also improved fast at the same time, as a reaction to this some systems developed on obstacle detection and path detection as be a support to driver. However, traffic sign detection is really a wide research place which still must be worked on. The main advantage of traffic signs detection is to reduce the risk imposed on the driver of the vehicle while driving, as well as increasing the information content. This method is expected to be implemented in vehicles as an integrated system. The user of this system will be the driver who will have to get visual warning when the traffic sign is on the path of the vehicle.

II. OBJECTIVES

The main objectives of the project are

- To apply image processing techniques to automatically detect the traffic signs using MATLAB
- To implement algorithms to make the developed system efficient

- To Interface Arduino to MATLAB so that the detected sign can be send to Arduino
- To interface LCD to Arduino and write and Arduino program to communicate with the MATLAB to Display the sign recognized.

III. RELATED WORK

In this project to detect the traffic sign, HIS color model followed by circle detection is used. The regions detected by color detection cannot be determined to the exact sign region. In this method the edge of interested regions is traced to get their contours after morphologic operations. Then to find the target region, Hough circle transform is applied. The object has been detected and extracted after the previous two steps. We next recognize the symbol in the destination area. The image is preprocessed to remove noise. To obtain a clear silhouette boundary of the traffic indication symbol Edge detection and segmentation are used specifically to the image. Shape context is based on the contour of the object.

IV. PROPSED WORK

This project points to deal with real-time traffic sign recognition, i.e. localizing what type of traffic sign appears in which area of an input image at a fast processing time. To achieve this objective, a two-module framework (detection module and classification module) is proposed. In detection module, the input color image is transformed to probability maps by using color probability model. Then the road sign proposals are extracted by finding maximally stable external regions on these maps.

V. METHOLOGY

In the proposed method, the traffic speed limit is detected using RNN classifier. The input image is pre processed and extracted the features using feature extraction algorithm. The extracted features are then used with Hough transform and it identifies the speed limit mentioned in the image. The classifier classifies the image with speed limit and other data, RNN classifier is used to extract the correct data and display the limitations indicated in an image.

A. *Data Acquisition phase*:

This is where the proposed strategy begins. For the suggested study, traffic signpictures of six different images, including 30speed, speed breaker, animal caution, 50 speed, school zone, cross zone are taken in Indian roads using a DLSR camera .The number of images taken from database and they are used in the job.

B. *Pre-Processing*:

In this project to detect the traffic sign, HIS color model followed by circle detection is used. The regions detected by color detection cannot be determined to the exact sign region. In this method the edge of interested regions is traced to get their contours after morphologic operations. Then to find the target region, Hough circle transform is applied. The object has been detected and extracted after the previous two steps. We next recognize the symbol in the destination area. The image is preprocessed to remove noise. To obtain a clear silhouette boundary of the traffic indication symbol Edge detection and segmentation are used specifically to the image. Shape context is based on the contour of the object.

C. *Histogram*:

A histogram is bar graph that shows a distribution of data. In image processing histograms are used to show how many of each pixel value are present in an image. Histograms can be very useful in determining which pixel values are important in an image. From this data you can manipulate an image to meet your specifications. Data from a histogram can aid you in contrast enhancement and Thresholding. In order to create a histogram from an image, use the imhist function. Contrast enhancement can be performed by the histeq function, while thresholding can be performed by using the graythresh function and the im2bw function.

D. *Frame work module*:

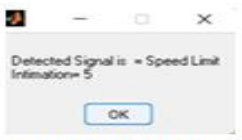
To achieve this objective, a two-module framework (detection module and classification module) is proposed. In detection module, the input color image is transformed to probability maps by using color probability model. Then the road sign proposals are extracted by finding maximally stable external regions on these maps.

VI. MATLAB OUTPUT

Fig: 1 Original image

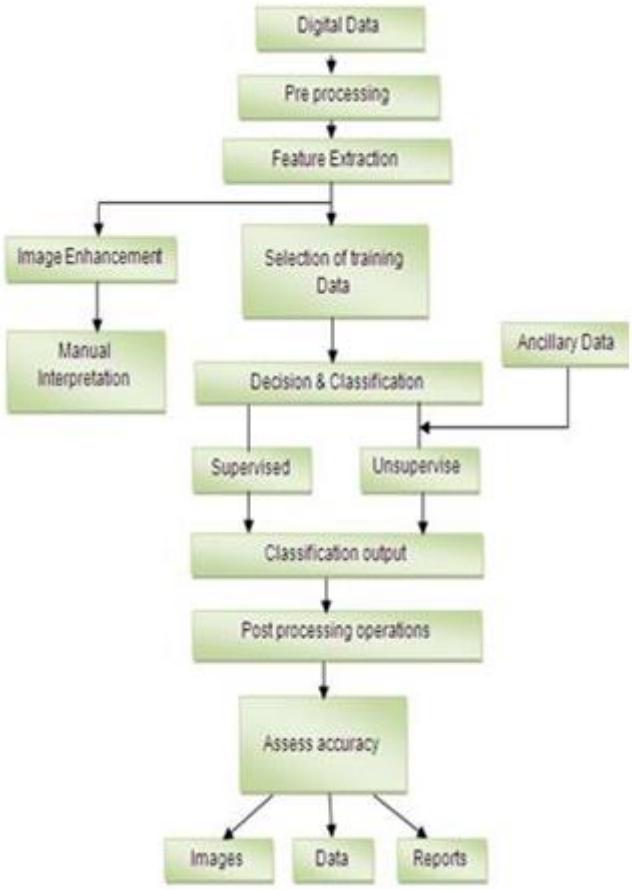
Fig: 2 Grayscale image

Fig; 3 Edge detection



Fig; 4 Output image

VII. BLOCK DIAGRAM



VIII. RESULT AND DISCUSSION

The purpose of this work was to offer a novel and successful traffic sign detection and recognition technique to TSRS design. TSRS is becoming increasingly prominent as a recent study area. To reduce substantial traffic challenges, this work employs SVM and RNN classification methods. RNN had the highest training accuracy of 99.56 percent in our trial, whereas the test accuracy was 96.40 percent. The real-time assessment results of SVM were shown, with the system performing at 98.33 percent accuracy. To handle this specific challenge, several studies have focused on SVM and RNN. Our goal for the future is to grow the number of traffic sign classes with a big amount of high-quality data, as well as to automatically manage the vehicle's speed limit. Maintaining data volume and quality is the most critical and time-consuming element of machine learning research. Our goal is to build a system that calculates the distance between an automobile and a traffic sign in order to give a comprehensive solution to traffic problems.

REFERENCES

[1] T. Baratsanjeevi, S. Deepakkrishna, M. P. Harrine, S. Sharan and E. Prabhu, "IoT based Traffic Sign Detection and Violation Control," 2020 Second International Conference on Inventive Research in Computing Applications (ICIRCA), 2020, pp. 333-339,

[2] K. Lu, Z. Ding and S. Ge, "Sparse-Representation-Based Graph Embedding for Traffic Sign Recognition," in IEEE Transactions on Intelligent Transportation Systems, vol. 13, no. 4, pp. 1515-1524, Dec. 2018.

[3] Bayoudh, K., Hamdaoui, F. & Mtibaa, A. Transfer learning based hybrid 2D-3D CNN for traffic sign recognition and semantic road detection applied in advanced driver assistance systems. Appl Intell 51, 124–142 (2021).

[4] Hasan, N., Anzum, T., Jahan, N. (2021). Traffic Sign Recognition System (TSRS): SVM and Convolutional Neural Network. In: Ranganathan, G., Chen, J., Rocha, Á. (eds) Inventive Communication and Computational Technologies. Lecture Notes in Networks and Systems, vol 145. Springer, Singapore.

[5] A. Mulyanto, R. I. Borman, P. Prasetyawan, W. Jatmiko, P. Mursanto and A. Sinaga, "Indonesian Traffic Sign Recognition For Advanced Driver Assistent (ADAS) Using YOLOv4," 2020 3rd International Seminar on Research of Information Technology and Intelligent Systems (ISRITI), 2020, pp. 520-524.

[6] Tai, Shao-Kuo, Christine Dewi, Rung-Ching Chen, Yan-Ting Liu, Xiaoyi Jiang, and Hui Yu. 2020. "Deep Learning for Traffic Sign Recognition Based on Spatial Pyramid Pooling with Scale Analysis" Applied Sciences 10, no. 19: 6997.

[7] Madhumathy, P., Nitish Kumar, H.K., Pankhuri, Supreeth Narayan, D.S. (2021). IoT Based Regional Speed Restriction Using Smart Sign Boards. In: Ahmed, K.R., Hassanien, A.E. (eds) Deep Learning and Big Data for Intelligent Transportation. Studies in Computational Intelligence, vol 945. Springer, Cham.