



Color detection in real time traffic sign detection and recognition system

KEYWORDS

Dr. Dipti M. Shah

Professor , G. H Patel Post Graduate, Department of Science & technology. Sardar Patel University, V.V.Nagar

Parul D. Sindha

Ph.D. Scholar, CHARUSAT, Changa

ABSTRACT Traffic or Road sign Detection and recognition is a real time system. It is also known as a Driver Assistant System(DAS) which is useful to the driver to provide information regarding the traffic rules, instructions and information given on the road at the time of driving. Basically red and blue colors are used for traffic signs. In this paper color detection algorithm is described.

Introduction

A traffic sign detection and recognition system is basically a real time system. Traffic sign detection and recognition system is a Driver Assistant System (DAS). Using this technology traffic signs are detected and recognized which is erected at road sides. The field of road sign recognition is not very old; the first paper appeared in Japan in 1984 [4]. Lots of work has been done in last decade in this field.

Colour and shape are dominant visual features of traffic signs with distinguish characteristics and are key information for drivers to process when driving along the road. Colour is regulated not only for the traffic sign category (red = stop, yellow = danger, etc.) but also for the tint of the paint that covers the sign, which should correspond, with a tolerance, to a specific wavelength in the visible spectrum. [3]

This paper gives the brief information regarding the traffic signs recognition system and describes the color detection algorithm. This algorithm can be used to detect the red and blue color. Traffic signs or road signs are signs erected at the side of or above roads to provide information to road users. In the earlier time stones and wooden signs were used. Later, signs with directional arms were introduced. Now a day pictorial signs are used which use symbols rather than words. Such signs were first developed in Europe and adopted by the most of the countries.

Types of traffic signs

There are several hundreds of traffic signs available to handle different situation at the time of driving. They can be classified into three main categories:

- Mandatory Signs
- Cautionary Signs
- Informatory Signs

Mandatory Signs: These signs require the driver to obey the signs for the safety of other road users. These signs use red circular or octagon boarder with white blue or background and black pictogram.

Cautionary Signs: These signs are for the safety of drivers and advice them to obey these signs. Generally it uses red triangle with white background and black pictogram.

Informatory Signs: These signs provide information to the driver about the facilities available ahead, and the route and distance to reach the specific destinations. These signs use rectangle shape of blue boarder with white background and black pictogram.

Figure 1 shows the examples of traffic signs.



Figure 1: (a) Mandatory Signs , (b) Cautionary Signs and (c) Informatory Signs

Challenges in Traffic Sign Recognition

Following are the problems which can be faced by in natural environments:

· Lighting conditions

Lighting condition cannot be same every time, it is changeable and not controllable. Lighting is different according to the time of the day, season, cloudiness and other weather conditions, etc.[2]

· The presence of other objects.

Sometimes objects other than the traffic sign board are surround the traffic signs. This produces partial occlusions, shadows, etc. [2]

Basic structure of traffic sign detection and recognition system

The following steps are performed to find and recognize the traffic signs:

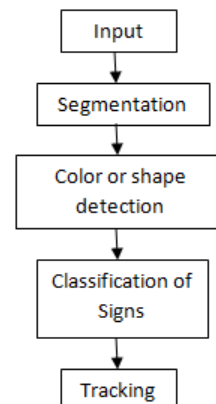


Figure 2: Flow of Traffic Sign Detection and Recognition

Input: Video file captured by the camera mounted on the top of the vehicle desk can be used as an input

Segmentation : The segmentation block generates a number of binary masks to separate the objects of interest from the background

Color and Shape Detection: Information about traffic symbols, such as shape and color can be used to place traffic symbols into specific groups. A common implementation is the identification of the color (i.e. Red or Blue) and the shape of the blob, and its classification into a small number of reference shapes (i.e. equilateral triangle, the octagon, the rectangle and the circle).

Classification : This is the step where the decision has been made that whether the selected sign is in the predefined list or not.

Tracking : Tracking is the act of following a sign through several frames.

Color Detection algorithm

In this real time system interested colors are red and blue. Red color identification is useful to recognize the mandatory signs and cautionary signs, whereas blue color identification is useful to recognize the informative signs. The following steps are performed to identify the color which can be used in signboard identification erected on the road side.

Step 1: Frame acquisition.

Step 2: Subtract the red/blue component from the frame.

Step 3: Remove the noise.

Step 4: Convert the image to binary image.

Step 5: Remove Small objects.

Step 6: Make a group of connected components.

Step 7: Find out the boundary and centre point of the connected component.

Figure 3 shows the result produced at the end of each step of the above algorithm.

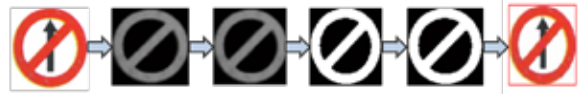


Figure 3: results of color detection algorithm

Conclusion

In previous research work it can be noted that no one method is found which produced 100% success result. Some methods work only with day time. Some are not appropriate for bad weather condition etc. In this paper color identification algorithm is proposed which can be used to recognize the red and blue color from the frames capture by cameras.

REFERENCE

- [1] <http://www.indiandrivingschools.com/informatory-signs.html> | [2] A. de la Escalera, L.E. Moreno, M.A. Salichs, and J.M. Armingol. Road traffic sign detection and classification. Industrial Electronics, IEEE Transactions on, 44(6):848859, Dec 1997. | [3] XW Gao, L. Podladchikova, D. Shaposhnikov, K. Hong, and N. Shevtsova. Recognition of traffic signs based on their colour and shape features extracted using human vision models. Journal of Visual Communication and Image Representation, 17(4):675685, 2006. | [4] Hasan Fleyeh. Road and traffic sign color detection and segmentation-a fuzzy approach. 2005. |