TRAFFIC SIGN RECOGNITION: A SURVEY

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Abstract: *It is a challenging task of variability of sign approaches for classification and detection in current environment. Traffic sign recognition system includes steps of detection, recognition. They plays important role as they provide information about guidelines, warnings for their safe journey. They are mainly used for comfort and safety.*

Keywords: *Traffic Sign Recognition, Neural Network Algorithm, Hough Transformation Algorithm, SVM Classifiers, Translation of Images, Features Based Method*

1. Introduction

Detect and recognize the traffic signs would be helpful to the driver. There are other object that are similar to traffic signs, which results in detecting and recognizing signs difficultly. So, there are some areas or methods by which we can detect and recognize our signs:

a) Detection of the location of sign in the image: ROI segmentation is also a good approach works with threshold generation. It find the region of interest segmentation by using their visual information like color etc. It generate threshold and based on this it classify the traffic sign. Sign recognition process is done by using various techniques, by training and testing the features.

b) Edge detection and thinning: In this, we have to convert it into binary image. Its goal is to reduce edge thickness. It leads to increase the accuracy and detection speed.

c) Clustering and identification of region: In this, we identify the co-ordinates of the rectangle. Then clustering is done according to the pixel distance.

d) Shape check: In this, the shape of the sign is measured by its angle.

e) Classification of sign:If there are many entries in our database, we can classify our sign by the appropriate use of classifier to match their features.

The various types of Traffic Signs are:

a) Mandatory Signs: These are those signs which requires to obey by the driver for their safety. These have red circular border. There are 38 mandatory signs.

b) Cautionary Signs: These signs are advised to obey for the safety. These have red triangle border with white/blue background. There are 40 cautionary signs

c) Informatory Signs: These signs provide information about route, distance. These have blue rectangle border with white background. There are 18 informatory signs.
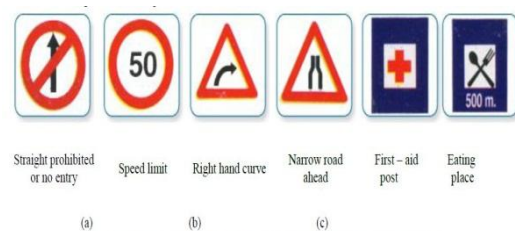

Figure 1: (a) Mandatory Signs , (b) Cautionary Signs and (c) Informatory Signs

Fig.1. Types of Signs [8]

2. RELATED WORK

Auranuch Lorsakul1 and JackritSuthakorn, "Traffic Sign Recognition for Intelligent DAS, URAI 2007: This proposed TSR with neuralnetwork techniques. In this, the images are first pre-processed with various techniques such as Gaussian filter. They use neural method because it reduces cost for real time application. The accuracy can onlybe seen in that images which have complex background [2]

Monica Singh, DevDuttYadav, Avinash N., Ho Gi Jung, 2009: This proposed TSR algorithm which is able to recognize all the traffic signs in day timings only. It also works well as speed controller. [3]

M. A. Garc´ıa-Garrido, M. Ocana, ¨ D. F. Llorca, M. A. Sotelo, E. Arroyo and A. Llamazares, IEEE, 2011: It represents recognition of traffic signs under day and night conditions. They assume that the detection algorithm includes two factors: first, algorithms, whose values are changed at any time depending on histogram function, and second, Hough transformation which uses the information from every individual. Two SVM models have been used for the classification of all signs. [4]

Zsolt T. Kardkovacs, Zsombor Par ´ oczi, EndreVarga, Ad´ am Siegler, P ´ eterLucz, 2011: It describes real time TSR system which integrates color, shape of the traffic signs. It depends on color acquisition framework, Hough algorithm and independent recognition module. It results in less accuracy. [5]

Karla Brkic, "An overview of traffic sign detection methods",2011: The color, shape, and learning based are the methods used for detection. It says that if each car has high resolution color camera, GPS receiver and odometer, etc. then the problem of traffic sign recognition is reduced. [6]

JackGreenhalgh and MajidMirmehdiSenior Member, IEEE, 2012: This proposed a novel system for the traffic sign detection and recognition. They uses SVM classifier to classify data with support vectors and hyper plane. It states that accuracy can be enhanced if support vector differentiates form hyper plane. [7]

Dr. Dipti M. Shah, Paru D. Sindha, Phd Scholar, Changa, "TSR using Translation of Images", IJARCSSE, 2014: It proposed that there is not an appropriate method which gives 100% accuracy.This method is used to match the images with previously images to classify the signs. [8]

Dilip Singh Solanki, Dr. Gireesh Dixit, "TSR using Feature based method", IJARCSSE, 2015: It prposed that feature based method is used to find new images in relative to its reference and target image. It is used for only those images that show non-repetitive texture patterns. They state that OCR method will be used in future. [9]

3. TECHNIQUES

Hough Transformation Algorithm: It is one of the techniques used for extracting features. It is used to find points of object with respect to different shapes by voting procedure. In short, it is used to detect shapes of the images.

Neural Network Algorithm: A neural network can be done to perform a function by adjusting the values of the weights.. Network function is determined by the interconnections between elements.
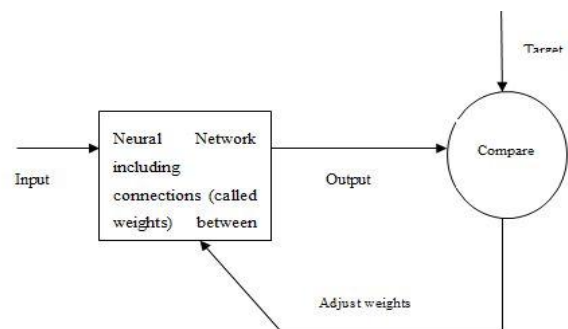

Fig. 2. Neural Network

SVM Classifier: It is a technique used for binary classification. It is to detect a hyper plane which separates different data into different classes.

Translation Method: In this, the traffic sign image is matched with original image by the centroid of the image stored in our database.

Algorithm:
  a) Image frame is fetched.
  b) Color is detected.
  c) Template of sign is created.
  d) If color is blue then there is rectangle shape, then jump to step (f)
  e) If color is red and y coordinate is less than 55, shape is circle, else triangle.
  f) Database is traced with respect to the shape.
  g) Image is translated with respect to the centroid of image present in database.

h) If threshold value lies between -5 to 5, then points are matched.

i) If coordinates value is greater than 30, images are matched.

j) End.

Feature Based Method: It is one of the method used to recognize the traffic signs. In this, the sign image is cropped and matched with original image. Then, feature extraction is done in both images to find the accuracy.

4. CONCLUSION

In present, there are various techniques that are used to detect and recognize the traffic signs for the road safety. In this, I discuss various types and techniques by which we can recognize the region or shape of the road signs. The research is going on to improve the results such as accuracy.

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