



## Traffic Sign Detection and Recognition System Using Translation of Images

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**Abstract:** Traffic sign detection and recognition system is basically a system for intelligent vehicle which guide the driver to obey the traffic rules. These are the traffic rules which are represented in a small pictorial form, erected at road sides. Traffic sign detection and recognition system is also known as Driver Assistant System(DAS). Proposed work represents the matching process of two signs to recognize the captured sign. Translation of an image is used to match two images.

**Keywords:** Traffic signs, translation, DAS.

### I. INTRODUCTION

Traffic rules are the rules which regulate the traffic and help the driver to drive the vehicle safely. Traffic signs are pictorial representation of the information which is used to regulate traffic and give the information about the road and traffic rules. These rules are not just pictorial representation but also depicted sing small sentences. Traffic sign and rules are used for road users and drivers. This paper describes the process to detect and identify the traffic signs. Translation of images concept is used to produce output.

### II. 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 [4]. Total 38 mandatory sign are available for the safety of road users.[1]

**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.[4] Total 40 cautionary signs are available for the safety of drivers.[1]

**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.[4] Total 18 informatory signs are available for the drivers as well as for the road users.[1]. Figure 1 shows the examples of traffic signs.



Straight prohibited or no entry

Speed limit

Right hand curve

Narrow road ahead

First – aid post

Eating place

(a)

(b)

(c)

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

### III. 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 boards are surround the traffic signs. This produces partial occlusions, shadows, etc. [2]

### IV. TRAFFIC SIGN IDENTIFICATION AND CLASSIFICATION

Traffic signs can be identified using color. Mandatory and cautionary signs are in red and informatory signs are in blue.[3]. Signs ca classification can be done in two steps:

1. Color recognition
2. Shape identification.

If the color of the sign is blue then the captured sign is informatory. If the color is red and the y coordinate of centroid is greater than 55, the sign is cautionary sign otherwise the sign is from mandatory sign category. [5]

### V. TRAFFIC SIGN MATCHING

Using translation method the temporary image file template of the sign which has to identify is translated according to the centroid point of the image file which is stored in a knowledgebase as shown in following figure 2.



Figure 2 (a) binary image translation (b) translation process

In above figure (a) image is translated according to the centroid of the stored image from knowledgebase. After translation all the points are matched with the previously stored template. In matching process if point is considered as a matching points if it lies between (+5,-5) variation. In this paper 30 has been taken as threshold value after testing number of images. If total number of matching points are greater than 30 then the captured sign can be considered as a matching sign with the stored template.

Algorithm to match the sign using translation method.

- Step 1: Fetch the video frame.
- Step 2: Detect Color (Red/Blue).
- Step 3: Create a template of input sign.
- Step 4: If the color is Blue than shape= rectangle (informatory sign), go to step 6 else step 5.
- Step 5: If the color is red and Y coordinate of the centroid is less than 55 than shape=Circle(Mandatory sign) else shape =Triangle(Cautionary sign).
- Step 6: Trace the knowledge base according to the shape.
- Step 7: Translate the input image according to the centroid of the stored image.
- Step 8:If the coordinates lies between threshold ( -5 to +5) difference , consider the coordinated as matching points.
- Step 9: If matching points >threshold value ( 30) than images are matched. Retrieve audio and text information of the image from the template.
- Step 10: End.

The above algorithm is implemented and tested on large numbers of images. It produces satisfactory result compared to the existing method.

### VI. 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 matching algorithm using translation method is proposed which is used to match the captured image with the previously stored images from the knowledgebase to classify the traffic signs from the collection of signs.

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