TRAFFIC SIGN RECOGNITION USING IMAGE PRE-PROCESSING

Chiragsingh Patil[1], Madhuri Sali[2], Vishwabharti Patil[3], Prameya Deshpande[4], Prof. Milind Rane[5]
[1,2,3,4,5]Vishwakarma Institute of Technology, Pune

Abstract
This paper describes a software application for traffic sign recognition (TSR) using image pre-processing. This paper presents a Graphics Processing Unit (GPU) implementation of traffic sign detection and recognition. The applications are work in some stages.An image pre-processing step and detection of regions of interest (ROIs), the potential traffic signs detection, where the ROIs are compared with each shape pattern. A recognition stage using a cross-correlation algorithm, where each potential traffic sign, if validated, is classified according to the database of traffic signs. By the recognizing sign that controls on the vehicles speed. Finally, the previous stages can be managed and controlled by a graphical user interface.

Keywords: Image processing, Traffic sign recognition; visual pattern recognition; image segmentation; boundary detection; cross-correlation functions

I. INTRODUCTION

Digital image processing uses algorithms to process digital images. However, due to the high costs of computers at this time, the digital imaging process was too expensive for many to even consider. Although it may seem recent Since 1970, digital image processing bloomed as computers became cheaper and hardware became available. With the fast computers and signal processors available in the 2000s. Computer vision is increasingly used in the field of intelligent transport and traffic sign recognition is a very important part of this images could be processed in real time and digital image processing has become the most common form of image processing. These systems are typically based on detecting a region of interest (ROI), in which the traffic sign is located, using characteristics such as color and geometric form.

Traffic sign detection and recognition are important functions in an Advanced Driver Assistance System (ADAS). A traffic sign detection and recognition system often contain three stages: pre-processing, detection and recognition. Much research is being carried out to improve the accuracy and precision of detection and recognition. This work is focused on improving the hardware efficiency that is to minimize the processing time using a GPU-based accelerator. Typically, feature extraction and pattern classification algorithms are computationally intensive. The main objective is to reduce the computing time of the program considerably so that the traffic signs can be detected and recognized in real-time.

II. RELATED WORK

There are several existing works that detect and recognize multiple traffic signs using the common features such as shapes and colors. However, the works present primarily focus on the algorithms themselves instead of the actual processing time on hardware platforms, which prevents those designs from becoming practically useful. On the other hand, some works consider a tradeoff between accuracy and its computing time but data sets that they use were varied. Without evaluating using the same standard data set, it is difficult to compare their reported results.

Standard traffic sign data sets, are built to address this issue. Researchers can use the same training and testing data set to measure the performance of their designs. In addition, image

resolution is another important factor that can affect the processing time and accuracy.

III. SYSTEM IMPLEMENTATION

In this paper, we present a system for detection and recognition of traffic signs that have been successfully applied to Spanish traffic signs. The detection and recognition system consists of three stages.

1) Segmentation: Blobs are selected from the input image by using HSI color space. White signs are detected in the image with the help of achromatic decomposition.

2) Shape classification: Blobs are then classified at this stage. It uses linear SVMs.

3) Recognition: The recognition process uses SVMs with Gaussian kernels. Different models are used for different colors and shapes.

System description :

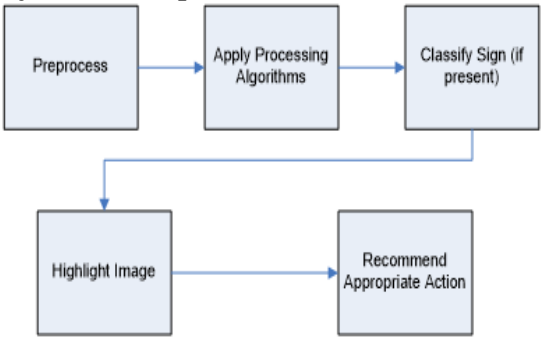

Fig 1. Block diagram of the system

IV. PERFORMANCE AND EXPERIMENTS

Basic Circuit:

1. The program is loaded into the R Pi.
2. Feed for the program is given using a webcam connected to the R Pi.
3. The program controls the driver circuit depending on the sign present in front to assist the driver.

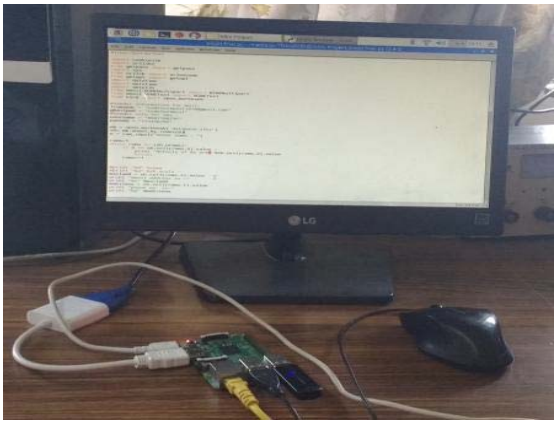

Fig 2. Experimental Setup

Algorithm:

1. Start
2. Check for rectangles in the view of the camera
3. Divide the rectangle into 4 parts viz. left, center, right, top.
4. Check for truth table of the left turn, straight, right turn.
5. Display the name of the turn near the rectangle.
6. End

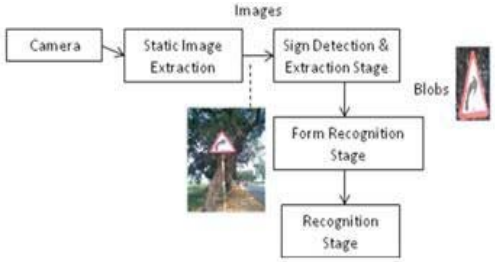

Fig.3.Image representation of system

V. RESULTS

In the result, it shows the traffic sign shown on the phone's screen detect its direction like Left, Right, Center, top.

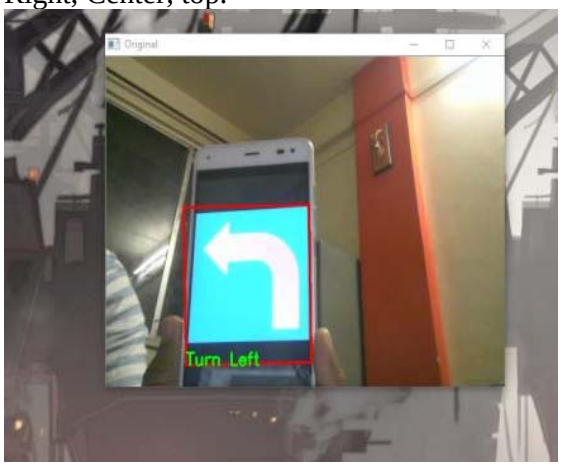

Fig.4. Direction of tragic sign towards Left

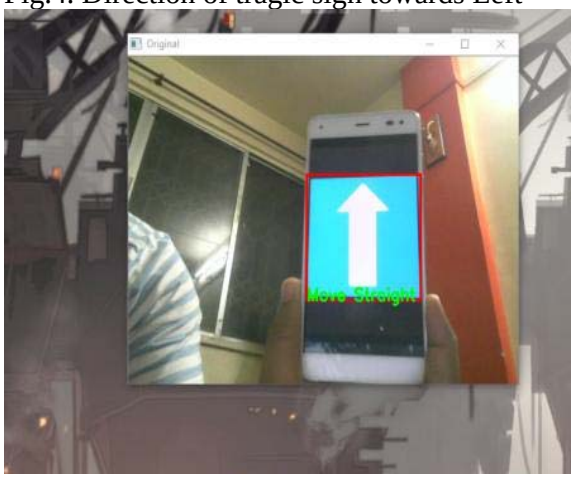

Fig 5.Direction of traffic sign towards straight

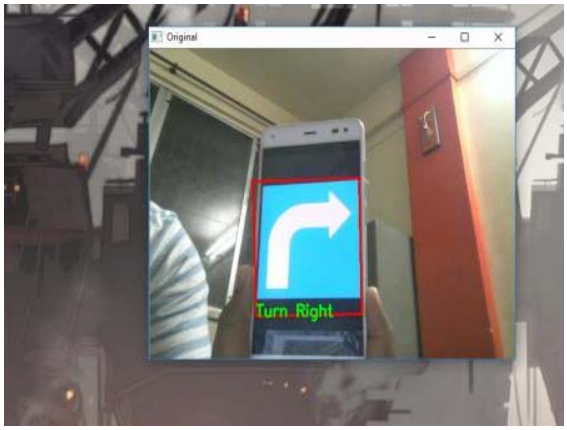

Fig.6. Direction of traffic sign towards Right

VI. CONCLUSION

The proposed algorithm is good for detecting a new explicit object based on finding position correspondences involving the reference and the target image. It can detect objects despite a new scale adjust or in-plane rotation. It can be robust to the little bit of out-of-plane rotation and occlusion. Using this method of target detection is ideally suited for objects that show non-repeating texture patterns, which promote unique attribute matches. This technique is unlikely to work nicely for uniformly-colored objects, or with regard to objects that contain repeating pattern. In future, the character of the object is going to be recognized using the well known OCR (Optical Character Recognition) Method which will be useful for driving assistance system.

VII. REFERENCES

[1] M. Mathias, R. Timofte, R. Benenson, and L. V. Gool, “Traffic sign recognition - how far are we from the solution?” in Proceedings of IEEE International Joint Conference on Neural Networks (IJCNN 2013), August 2013.

[2] S. Houben, J. Stallkamp, J. Salmen, M. Schlipsing, and C. Igel, “Detection of traffic signs in real-world images: The German Traffic Sign Detection Benchmark,” in International Joint Conference on Neural Networks, no. 1288, 2013.

[3] E. Herbschleb and P. H. N. de With, “Real-time traffic sign detection and recognition,” pp. 72 570A–72 570A–12, 2009.

[4] K. Par and O. Tosun, "Real-time traffic sign recognition with map fusion on multicore/manycore architectures," Acta Polytechnica Hungarica, vol. 9, no. 2, 2012.

[5] G. Loy, N. Barnes, Fast Shape-based Road Sign Detection for a Driver Assistance System, IEEE Intelligent Vehicle Symposium University of Parma, Italy.

[6] J. Miura, T. Kanda, Y. Shirai, “An Active Vision System for Real-Time Traffic Sign Recognition,” 2000 IEEE Intelligent Transportation Systems Conference Proceedings, pp. 52-57, Oct. 2000.

[7] Y.Y. Nguwi, A.Z. Kouzani, “A Study on Automatic Recognition of Road Signs” 1-4244-0023-6/06 IEEE CIS 2006.

[8] C.Y. Fang, S. W. Chen, “Road-Sign Detection and Tracking” Vehicle Technology, IEEE Transactions on Volume 52, Issue 5, Sept. 2003.

[9] G. Piccioli, E. De Michelli, P. Parodi, M. Campani, “A Robust Method for Road Sign Detection and Recognition,” Image and Vision Computing, vol. 14, pp.209-223, 1996.