

Traffic Sign Board Detection and Voice Alert System Along with Speed Control

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Abstract - Road traffic constitutes a major part in the problem of society. As the road traffic is increasing day by day there is a necessity of following the traffic rules with proper discipline. Traffic rules consist of traffic sign boards and traffic signals which are meant to be followed by everyone in the society. To provide a comprehensive assistance to the driver for following the traffic signs, Traffic Sign Board Detection and Voice Alert System along with Speed Control. The signboards are captured using camera installed in the vehicle. The captured image will undergo for image processing by SURF algorithm in MATLAB and identify the signboard. This gives the driver a sort of assistance which alerts the driver and reduces the work of the driver. The main goals of this project are detection, and recognition and gives voice alert to the driver. Speed will be controlled automatically according to the signboard.

Key Words: Traffic Sign Board, Image processing, SURF Algorithm, MATLAB, Voice Alert

1. INTRODUCTION

Millions of people are injured annually in vehicle accidents. Most of the traffic accidents are the result of carelessness, ignorance of the rules and neglecting traffic signboards, both at the individual level by the drivers and the society at large. The magnitude of road accidents in India is alarming. This is evident from the fact that every hour there are about 56 accidents taking place similarly, every hour more than 14 deaths occur due to road accidents. When someone neglects to obey traffic signs, they are putting themselves at risk as well as other drivers, their passengers and pedestrians. All the signs and signals help keep order in traffic and they also are designed to reduce the number and severity of traffic accidents. Some drivers believe that some traffic signs are simply not necessary.

All road signs are placed in specific areas to ensure the safety of all drivers. These markers let drivers know how fast to drive. They help to create order on the roadways and are employed to provide essential information to drivers. Traffic signs include many useful environmental information which can help drivers learn about the change of the road ahead and the driving requirements. Signs which are taken out of specific places or not visible as a result of wear and tear can pose undesirable risks to drivers. They also tell

drivers when and where to turn or not to turn. In order to be a terrific driver, you need to have an understanding of what the sign mean. Road signs are designed to make sure that every driver is kept safe.

Our system will able to detect, recognize and infer the road traffic signs would be a prodigious help to the driver. The objective of an automatic road signs recognition system is to detect and classify one or more road signs from within live colour images captured by a camera.

In this base paper we provide alertness to the driver about the presence of traffic signboard at a particular distance apart. The system provides the driver with real time information from road signs, which consist the most important and challenging tasks. Next generate an acoustic warning to the driver in advance of any danger. This warning then allows the driver to take appropriate corrective decisions in order to mitigate or completely avoid the event. However, sometimes, due to the change of weather conditions or viewing angles, traffic signs are difficult to be seen until it is too late. First, it is necessary to select the hardware equipment to solve this problem. The second stage is based on colour processing, or object detection method based on rapid colour changes. Image processing technology is mostly used for the identification of the signboards. The alertness to the driver is given as audio output. If the driver is not following the alert the automatic braking system get activated and the speed of the vehicle get regulated based on the signboard.

2. EXISTING SYSTEMS

Road traffic constitutes a major part in the problem of society. Some existing methods deals with the automatic detection and recognition of traffic sign is a challenging problem, with a number of important application areas, including advanced driver assistance systems, road surveying, and autonomous vehicles. While much research exit on both the automatic detection and recognition of symbol-based traffic sign, and the recognition of text in real scenes there are far less research focused specifically on the recognition of text on traffic information signs. This could be partly due to the difficulty of the task caused by problem, such a illumination and shadow, blurring, and sign deterioration. There are projects on traffic sign detection and alert. That project mainly works as a mobile application.

Speed control system is not implemented in the existing systems along sign detection.

Driver gets advance information about the upcoming hurdle. Also the costly and not practically to place transmitter in each and every signboard. Only after login to the application then getting the alerts. LCD is used only for testing purpose. Bluetooth to transfer data to the android mobile. For the demo concern, android mobile is used to display images. As a future product, the embedded unit and android application will be integrated in a single unit. Accuracy high and the suffers from poor weather conditions. The complete set of road traffic signs used in our training data and recognized by the system. Candidates for traffic symbols are detected as MSERs. The MSERs are regions that maintain their shape at several levels when the image is thresholded. Detection method was selected due to its robustness to variations in contrast and lighting conditions. The detecting candidates for road signs by border colour, the algorithm detects candidates based on the background colour of the road sign because they persist within the MSER process.

3. PROPOSED SYSTEM

3.1 Overview of the System

Very often we see that many road accidents take place. This can be due to driver's ignorance of traffic signals and road signs. As the road traffic is increasing day by day there is a necessity of following the traffic rules with proper discipline. Traffic signboard detection is an important part of driver assistant systems. The basic idea of proposed system is to provide alertness to the driver about the presence of traffic signboard at a particular distance apart.

The project can be entirely divided in to two sections

1. Sign Detection and Alert
2. Speed Control

The system provides the driver with real time information from road signs, which consist the most important and challenging tasks. It generates an acoustic warning to the driver in advance of any danger. This warning allows the driver to take appropriate actions in order to avoid the accident. Image processing technology is mostly used for the identification of the signboards. The alertness to the driver is given as an audio output. Automatic braking system gets activated and the speed of the vehicle gets regulated based on the signboard.

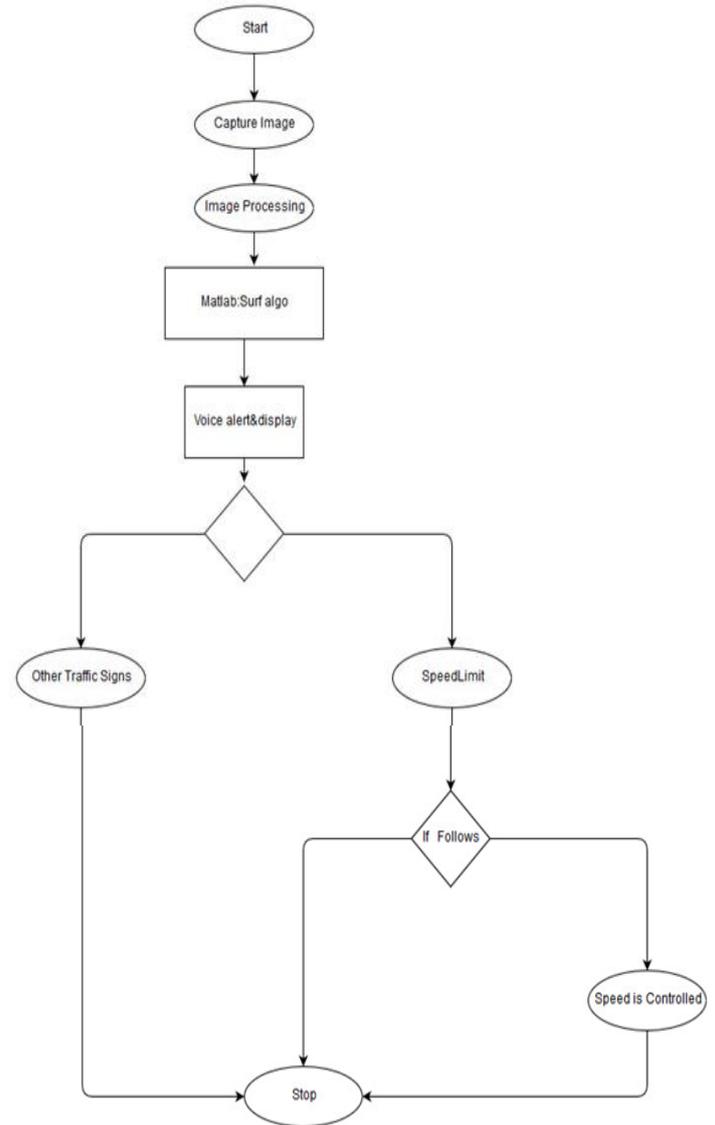


Figure 1: Flow chart of the System

3.2 Working of the System

The camera is placed at the front of the vehicle will capture the image of the traffic sign board. Then the data is sent to the MATLAB program in the system where it is compared and recognize the traffic sign from the database using the SURF algorithm. It also provide voice alert to the driver using the tts command through the speaker. After identifying the traffic sign there will be corresponding display of the command through the LCD. When the system identified traffic sign boards of speed limit, stop, turning, hump and such speed reducing signboards the speed of the vehicle is reduced to certain range gradually if the speed of the vehicle is above the limit. At this time if the driver tries to accelerate the speed of the vehicle above the limit it cannot be done for certain range of the time.

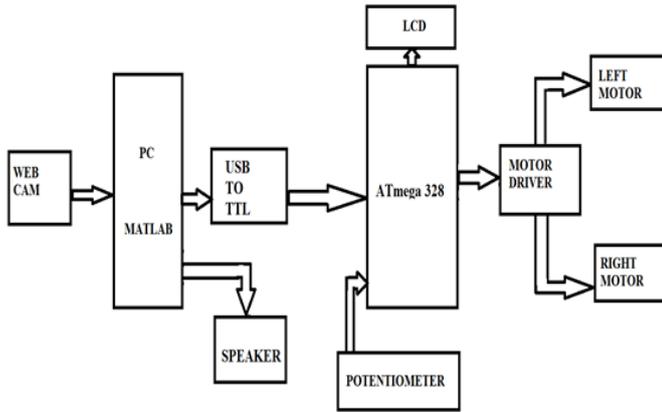


Figure 2: Block Diagram of the System

3.3 Surf Algorithm

The SURF (Speed Up Robust Feature) algorithm is in itself based on two consecutive steps (i) feature detection (ii) description.

The main steps coming under this algorithm are:

- i. Multiscale Analysis
- ii. Feature Detection
- iii. Feature Description
- iv. Feature Matching

SURF multiscale representation based on box filters. Comparison with linear scale space analysis. Interest point detection. Invariant descriptor construction and comparison. Experimental validation and comparison with other approaches.

4. RESULT AND DISCUSSION

The proposed system can operate at a range of vehicle speeds and was tested under a various conditions. Also our proposed system will save the valuable life by preventing accidents due to the negligence of traffic signs. The project is mainly focus on majority of the society who used to travel especially the night travelers and it also helps traffic police to reduce the traffic issues. The main idea for this project is from the road accidents that take place due to driver's ignorance of traffic signs. People die in these road accidents which is a great loss for the family. It provides maximum efficiency and is user friendly.

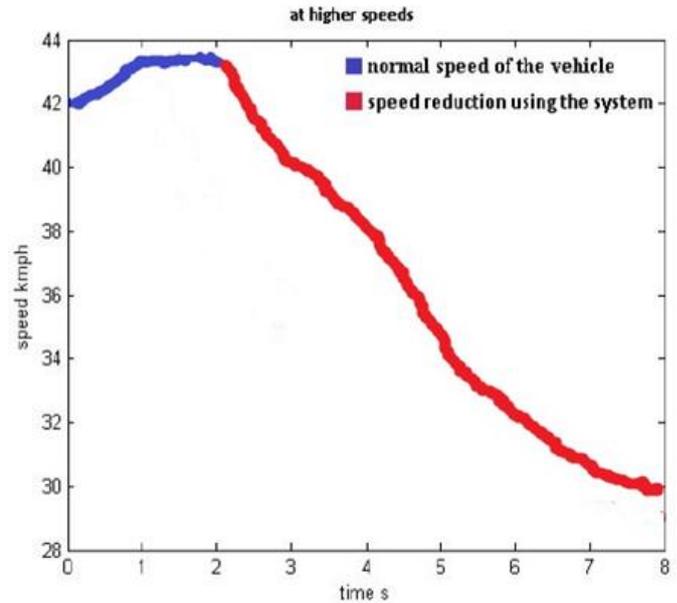


Chart 1: Speed V/S Time analysis at High Speed

The speed of the vehicle is reducing gradually by this way we reduce the accident. If the vehicle is reducing the speed suddenly there is chance for accident by collision of vehicle that are coming back. We also think for this situation too. Sometimes while travelling at night time the driver may not able to see the hump in front, so by this system we can reduce the speed of the vehicle if the driver is not aware of the hump also.

5. CONCLUSION

This system is used to save the valuable life by preventing accidents due to the negligence of traffic signs boards. The project is mainly focus on majority of the society who used to travel especially the night travelers and it also helps traffic police to reduce the traffic issues. The main idea for this project is from the road accidents that take place due to driver's ignorance of traffic signs. People die in these road accidents which is a great loss for the family. It provides maximum efficiency and is user friendly. At present 40% percentage of death that taking place in a day is mainly due to the road accidents. By our project we expected that we can able to reduce it up to 20%.

REFERENCES

[1] Sanchita Bilgaiyan, Sherin James, Sneha. S Bhonsle, Shruti Shahdeo, Keshavamurthy "Android Based Signboard Detection using Image and Voice Alert System" IEEE International Conference On Recent Trends In Electronics Information Communication Technology, May 20-21, 2016, India.

[2] S. Escalera et al., "Traffic-Sign Recognition Systems", Springer Briefs in Computer Science, 2011.

- [3] Jack Greenhalgh and Majid Mirmehdi, "Real-Time Detection and Recognition of Road Traffic Signs" IEEE Transactions On Intelligent Transportation Systems, Vol. 13, No. 4, December 2012.
- [4] Frank Lindner, Ulrich Kressel, and Stephan Kaelberer "Real-time Vision For Intelligent Vehicles" IEEE Instrumentation & Measurement Magazine June 2001.
- [5] Ian Fletcher ,Bill J.B. Arden, Chris s. cox "Automatic Braking System Control" IEEE International Symposium on Intelligent Control Houston, Texas October 5.8 2003
- [6] Chia-Hsiung Chen, Marcus Chen, and Tianshi Gao "Detection and Recognition of Alert Traffic Signs"
- [7] Rubel Biswas, Hasan Fleyeh, Moin Mostakim "Detection And Classification Of Speed Limit Traffic Signs" IEEE 2014
- [8] B. Hoferlin and K. Zimmermann, "Towards reliable traffic sign recognition," in 2009 IV symposium, 2009, pp. 324-329
- [9] Aparna A. Dalve, Sankirti S. Shiravale, " Real Time Traffic Signboard Detection and Recognition from Street Level Imagery for Smart Vehicle" International Journal of Computer Applications (0975 - 8887) Volume 135 - No.1, February 2016.
- [10] Jack Green Halgh and Majid Mirmehdi, senior member, IEEE, "Real-time detection and recognition of road traffic signs" transactions on intelligent transportation systems, vol. 13
- [11] Jack Green Halgh and Majid Mirmehdi, senior member, IEEE, "Real-time detection and recognition of road traffic signs" transactions on intelligent transportation systems, vol. 13
- [12] Kassem, N. Microsoft Corp., Redmond, WA, USA Kosba, A.E.; Youssef, M.; VRF-Based Vehicle Detection and Speed Estimation vehicular Technology Conference (VTC Spring), IEEE (2012)
- [13] Edouard Oyallon, Julien Rabin, IPOL, "An Analysis of the SURF Method" 5 (2015), pp. 176-218. <http://dx.doi.org/10.5201/ipol.2015.69>



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