Automatic Detection of Road Traffic Signs Bassed On Text Extraction

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Abstract – Detection and recognition of traffic signs is an essential task of regulating the traffic, guiding and warning driver's pedestrians. In traffic sign detection research are categorized into three groups. The first group of researchers believes that traffic sign detection colors are important information by which traffic signs can be detected and classified. The second group believes that detection of traffic signs can be achieved by traffic sign shape only, and the third believes that color together with shape make the backbone for any road sign detection. Although traffic signs are apparent and have several obvious characteristics, some conditions may prevent driver perceiving them. For instance, at night or in bad lighting conditions drivers are less likely to notice the traffic signs. Some distracting events on road may result in a skip of signs. Moreover, sometimes only the driver himself is not able to notice the signs due to lack of concentration. Driving needs continuous processing of visual information from the road. To avoid accident, driver needs to monitor a lot of traffic signs. For this purpose traffic signs play an important role to provide information about traffic and road conditions which is necessary for a driver to ac accomplish a collision free driving environment.

Index Terms – Traffic, Signs, Detection.

1. INTRODUCTION

The automatic detection and recognition of traffic signs is a challenging problem, with a number of important application areas, including advanced driver assistance systems[5], road surveying, and autonomous vehicles. While much research exists on both the automatic detection and recognition of symbol-based traffic signs[4], This could be partly due to the difficulty of the task caused by problems, such as illumination and shadows, blurring, occlusion, and sign deterioration. Without the use of additional temporal or contextual information, there is few information to determine traffic signs from non traffic signs on the fly, while driving, other than basic features, such as shape or color. On this basis, the number of false positives (FPs) likely to occur in a cluttered image, such as a road scene, is high. This is demonstrated in the example , where although the traffic sign present in both images is successfully detected, more FPs are detected by the system (in the top scene) when additional structural and temporal information is not deployed. We approach this problem by detecting large numbers of text-based traffic sign candidates using basic shape and color information[7]. This over detection is important to ensure that no true positives (TPs) are missed. We then reduce the large number of detected candidate regions by making use of the structure of the scene, as well as its temporal information, to eliminate unlikely candidates.

Fig.1.1 TRAFFIC SIGNS

The proposed system comprises two main stages: detection and recognition. The detection stage exploits knowledge of the structure of the scene, i.e., the size and location of the road in the frame, to determine the regions in the scene that it should search for traffic text signs[7]. These regions are defined once the vanishing point (VP) of the scene and, hence, the ground plane are determined.

Fig.1.2 TRAFFIC SIGNS RECOGNITION

Potential candidate regions for traffic signs are then located only within these scene search regions, using a combination of MSERs[3] and hue, saturation, and value (HSV) color thresholding. By matching these regions through consecutive frames, temporal information is used to further eliminate FP detected regions, based on the motion of regions with respect to the camera [15]and the structure of the scene.

2. RELATED WORK

2.1. Road-Sign Detection and Recognition Based on Support Vector Machines :

In this paper, presents an automatic road-sign detection and recognition system based on support vector machines (SVMs). In automatic traffic-sign maintenance and in a visual driver assistance system, road-sign detection and recognition are two of the most important functions. Our system is able to detect and recognize circular, rectangular, triangular, and octagonal signs and, hence, covers all existing Spanish traffic-sign shapes. Road signs provide drivers important information and help them to drive more safely and more easily by guiding and warning them and thus regulating their actions. The proposed recognition system is based on the generalization properties of SVMs. The system consists of three stages:1) segmentation according to the color of the pixel; 2) traffic-sign detection by shape classification using linear SVMs; 3) content recognition based on Gaussian-kernel SVMs.

2.2 Real-Time Traffic-Sign Recognition Using Tree Classifiers:

Traffic-sign recognition (TSR) is an essential component of a driver assistance system (DAS), providing drivers with safety and precaution information.The performance of k-d trees, random forests, and support vector machines (SVMs) for traffic-sign classification using different-sized histogram-of-oriented-gradient (HOG) descriptors and distance transforms (DTs). use of Fisher's criterion and random forests for the feature selection to reduce the memory requirements and enhance the performance.

2.3. Real-Time Detection and Recognition of Road Traffic Signs:

The system detects candidate regions as maximally stable extremal regions (MSERs), which offers robustness to variations in lighting conditions. Recognition is based on a cascade of support vector machine (SVM) classifiers that were trained using histogram of oriented gradient (HOG) features. The training data are generated from synthetic template images that are freely available from an online database; thus, real footage road signs are not required as training data.

2.4. Vision-Based Traffic Sign Detection and Analysis for Intelligent Driver Assistance Systems Perspectives and Survey :

The contributions of recent works to the various stages inherent in traffic sign detection: segmentation, feature extraction, and final sign detection. While Traffic sign recognition is a well-established research area, we highlight open research issues in the literature, including a dearth of use of publicly available image databases and the over representation of European traffic signs.

2.5. Text String Detection From Natural Scenes by Structure-Based Partition and Grouping :

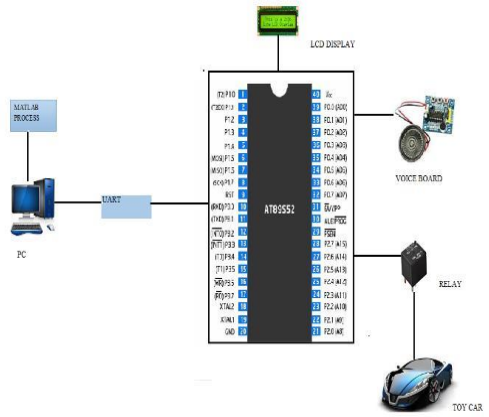
Text string detection consists of 1) image partition to find text character candidates based on local gradient features and color uniformity of character components 2) character candidate grouping to detect text strings based on joint structural features of text characters in each text string such as character size differences, distances between neighboring characters, and character alignment By assuming that a text string has at least three characters, Use two algorithms of 1)

adjacent character grouping method 2) text line grouping method.

3. PROPOSED SYSTEM

The main techniques used are color segmentation and information extraction.For the color segmentation, at first the images are taken by digital camera and the RGB images are then converted into gray scale.The rest of the parts i.e. information extraction depended on how precisely the segmentation was done.Edge detector is an image descriptor based on the image's gradient orientation. The phases of the proposed system are feature descriptor formation, and training and classification. The training requires the use of SVM classifier which is used extensively in data mining, machine learning etc. Here the input image will get compare in mat lab process and lcd will display the output and through voice board the message will be intimated to the user.

SYSTEM ARCHITECTURE:



ALGORITHM:

Edge detection is an image processing technique for finding the boundaries of objects within images. It works by detecting discontinuities in brightness. Edge detection is used for image segmentation and data extraction in areas such as image processing, computer vision, and machine vision.

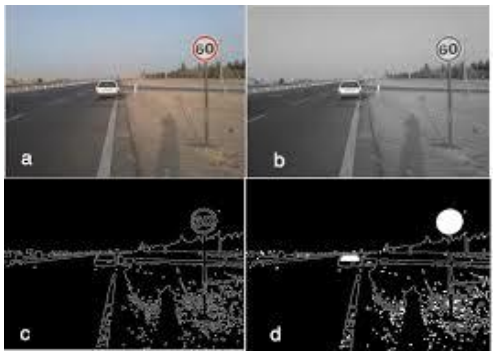


Fig.3.1 Edge Detection

4. EXPRIMENTAL

4.1 AT89s52 Microcontroller

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory.The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the Indus-try-standard 80C51 instruction set and pin out.

4.2 LCD

To display LCD number of commands have to be provided . Before inputting the required data. LCD doesn't know about the content (data or commands) supplied to its data bus. It is the user who has to specify whether the content at its data pins are data or commands. For this, if a command is inputted then a particular combination of 0s and 1s has to be applied to the Control lines so as to specify it is a Command on the other hand if a data is inputted at the data lines then an another combination of 0s and 1s has to be applied to the control lines to specify it is Data.

4.3 VOICE BOARD:

The APR9600 experimental board is an assembled PCB board consisting of an APR9600 IC, an electret microphone, support components and necessary switches to allow users to explore all functions of the APR9600 chip. The oscillation resistor is chosen so that the total recording period is 60 seconds with a sampling rate of 4.2 kHz.

4.4 RELAY:

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

5. CONCLUSION

The automatic detection and recognition of text in traffic signs has been proposed. The search area for traffic signs was reduced using structural information.Perpective rectification and temporal fusion of candidate regions of text were used to improve OCR results.Both the detection and recognition stages of the system were validated through comparative analysis.

6. FUTURE WORKS

It make driving safer and easier and its useful for driver to recognizing and detect text based traffic signs by automatically. It is very useful in Driver Assistance System . It works efficiently for images in a variety of weather conditions.To get better results in color detection and recognition .It reduces memory consumption and increases utilization of background information.

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