



“Traffic Sign Detection and Recognition Using Deep Learning”

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Abstract

Traffic sign recognition and detection is a crucial task in autonomous driving and intelligent transportation systems. Deep learning techniques, such as convolutional neural networks (CNNs), have shown remarkable success in detecting and recognizing traffic signs from images. In this paper, we present an overview of recent advances in deep learning-based traffic sign recognition and detection. We discuss the challenges associated with this task and the various techniques used to overcome them. We also analyze the different datasets used for training and evaluation of traffic sign recognition models. Furthermore, we compare and contrast the performance of different deep learning architectures for traffic sign recognition and detection. Finally, we discuss future research directions in this field and the potential applications of traffic sign recognition and detection in real-world scenarios.

I. INTRODUCTION

Traffic signs play a crucial role in ensuring road safety by conveying important information to drivers and pedestrians. With the advent of automotive intelligent technology, leading car manufacturers like Mercedes-Benz and BMW have invested heavily in Advanced Driver Assistance Systems (ADAS) research, which includes Traffic Sign Recognition (TSR) systems. The implementation of TSR systems helps in reminding drivers to pay attention to speed limits, which can prevent accidents on the roads. However, with the increasing demand for vehicle intelligence, it is imperative to detect and recognize traffic signs automatically using computer technology. In this paper, we present a robust CNN-based system that can accurately predict traffic signs, making it easier for drivers to recognize them while driving. We leverage the distinctive shape, color, and symbols used in traffic sign design to create an efficient and effective recognition system.

LITERATURE REVIEW

Paper Name: A Traffic Sign Detection Algorithm Based on Deep Convolutional Neural Network

Author name : Xiong Changzhen, Wang Cong, Ma Weixin, Shan Yanmei

Abstract :- Traffic sign detection is an essential task for driving assistance systems and ensuring traffic safety. However, existing methods are often limited to pre-defined sets of traffic signs. In this paper, we propose a traffic sign detection algorithm that utilizes deep Convolutional Neural Network (CNN) and Region Proposal Network (RPN) to detect all Chinese traffic signs. We first collected a Chinese traffic sign dataset by gathering seven main categories of traffic signs and their subclasses. Then, we trained and evaluated a traffic sign detection CNN model using the collected dataset through fine-tuning technology. Finally, we tested the model on 33 video sequences with a size of 640×480. The experimental results demonstrate that the proposed algorithm achieves high detection accuracy, with above 99% precision, and real-time detection speed. The proposed method's effectiveness and robustness can improve traffic safety and assist drivers in navigating the roads.

Paper Name :- A Traffic signs' Detection Method of Contour Approximation based on Concave Removal

Author name: Xu Zhe1 , Ren Jingyi1 , Bao Chaoqian.

Abstract:- Detecting triangular and circular traffic signs in complex natural scenes remains a challenging problem due to deformation and occlusion. In this paper, we propose a simple and efficient algorithm for detecting such traffic signs. The proposed algorithm involves segmenting and binarizing the image, calculating the convex hull of each contour extracted from the binarized image, and removing concave parts of the contour. The concave parts are replaced by the corresponding convex edges of the convex hull, and the contour is approximated to a polygon. Traffic signs are detected by approximating contours to triangles or ellipses using random least squares fitting. The experimental results demonstrate that our algorithm outperforms the Hough method, achieving a detection rate of 86.79%. Moreover, the proposed method is more robust to deformation and occlusion of traffic signs. The proposed algorithm can potentially improve the accuracy and efficiency of traffic sign detection, making it more reliable for driving assistance systems and traffic safety.

Paper Name: Using Mobile Lidar Point Clouds For Traffic Sign Detection And Sign Visibility Estimation

Author name: Shuang Wu1 , Chenglu Wen1*, Huan Luo

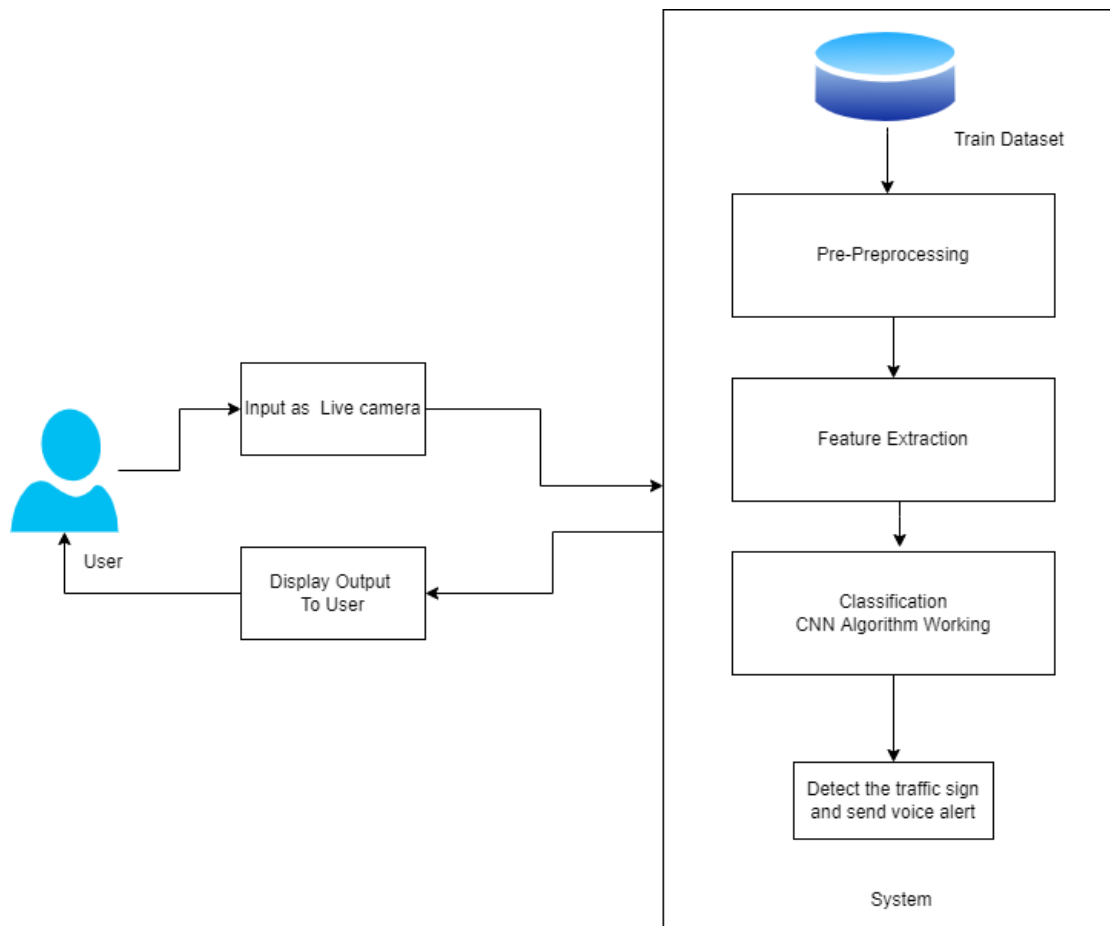
Abstract :- In this paper, we propose a novel method for detecting traffic signs and evaluating their visibility using mobile LiDAR point clouds and corresponding images. Our algorithm consists of two main steps. Firstly, we design a detection algorithm based on the high retro-reflectivity of traffic signs from mobile LiDAR point clouds. This algorithm is capable of detecting traffic signs in complicated road scenes. To address the spatial features of traffic signs, we also establish geo-referenced relations between traffic signs and roads based on the normal of the ground. Secondly, we estimate the visibility of the detected traffic signs using image processing techniques. The proposed method provides an efficient and accurate approach to detecting traffic signs and evaluating their visibility, which is critical for driving assistance systems and traffic safety. The experimental results demonstrate the effectiveness of our proposed method for traffic sign detection and visibility evaluation.

Paper Name: Automatic Detection and Recognition Of Traffic Signs**Author : Carlos Filipe Paulo, Paulo Lobato Correia.**

Abstract : This paper proposes algorithms for the automatic detection and classification of traffic signs from photo or video images to provide a driver alert system. The effectiveness of the proposed system is demonstrated using several examples taken from Portuguese roads. The detection of traffic signs is achieved by analyzing color information, particularly red and blue, contained in the images. The detected signs are then classified based on their shape characteristics, such as triangular, square, and circular shapes. By combining color and shape information, traffic signs are classified into one of the following categories: danger, information, obligation, or prohibition. The detection and classification algorithms include innovative components that improve the overall system performance. The proposed system provides an efficient approach for the automatic detection and recognition of traffic signs, which is crucial for driving assistance systems and traffic safety.

Paper Name: Fast Traffic Sign Detection under Challenging Conditions**Author: Bao Trung Nguyen , JaeRyong, Shim.**

Abstract:- The paper "Fast Traffic Sign Detection under Challenging Conditions" proposes a fast and robust traffic sign detection system that includes two main stages: segmentation and detection. The authors note that most existing research in this area has been tested under restricted conditions, and their proposed system is designed to be flexible and able to handle more challenging environments. To achieve this, they use a double segmentation approach, with one segmentation using higher criteria and the other using lower criteria, in order to reliably reduce computation time and improve the system's reliability. The proposed system is evaluated using real-world driving data, and the results demonstrate its effectiveness under various challenging conditions.



Admin

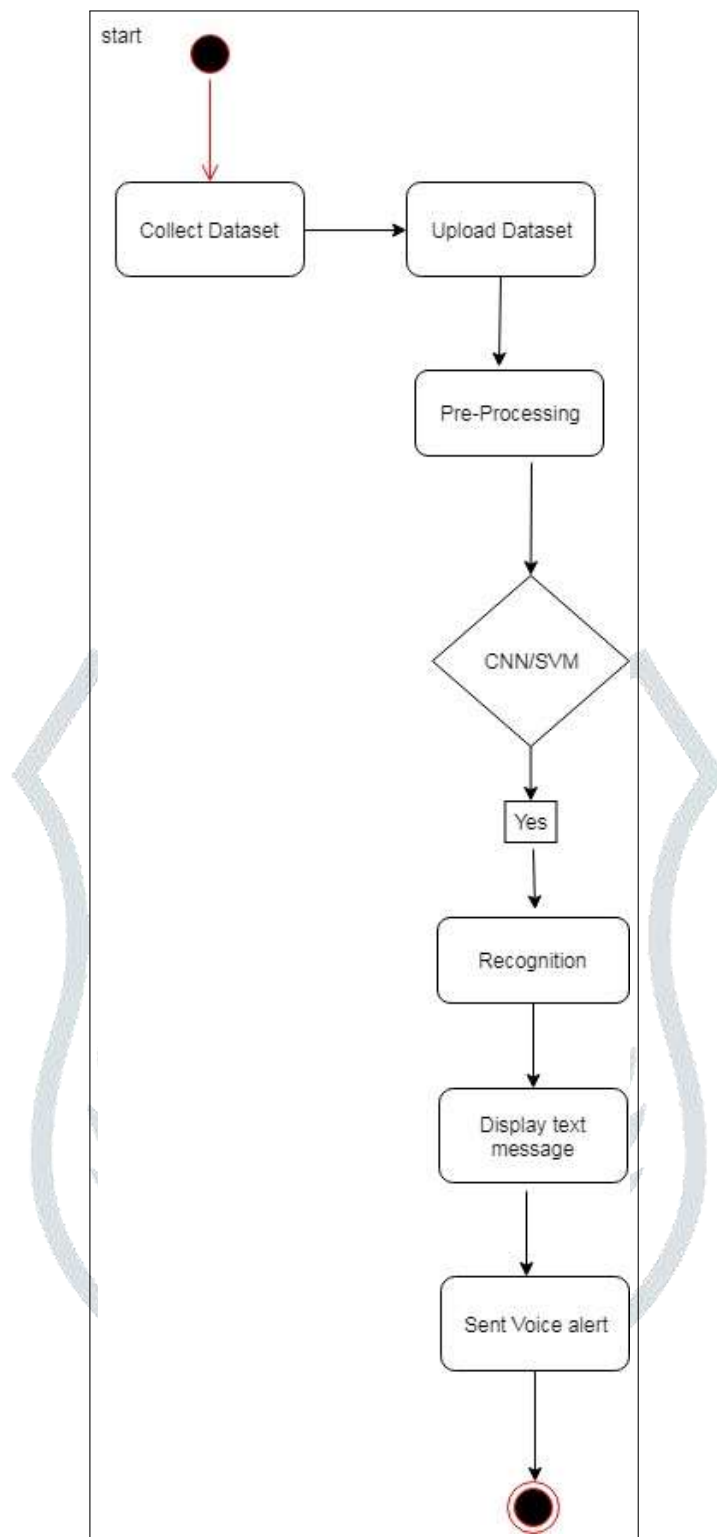
In this module, the admin has to log in by using valid user name and password. After login successful he can do some operations such as View All Users and Authorize.

View and Authorize Users

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as user name and admin authorizes the users.

End User

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored in the database. After registration successful he has to login by using authorized user name and password. Once Login is successful user will be able to use the traffic sign detection and recognition system.





Output 1



Output 2



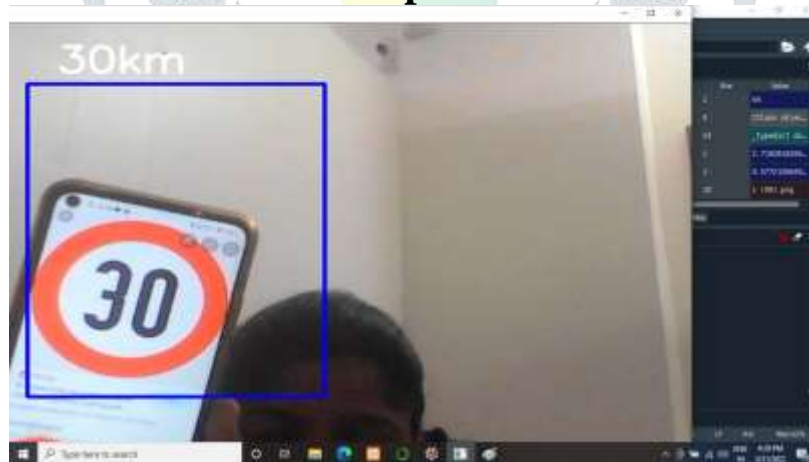
Output 3



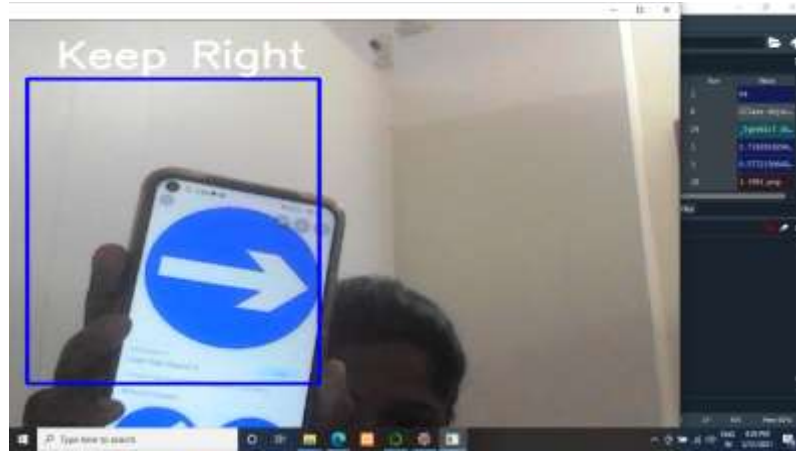
Output 4



Output 5



Output 6



Output CONCLUSION

The proposed smart driver alert system based on traffic sign detection and recognition is a promising solution to improve road safety and traffic regulation. The system can detect and classify a wide range of traffic signs in different environments using a neural network-based approach. However, the performance of the system can still be improved by testing different neural network structures and implementing real-time detection and recognition. Overall, this technology has the potential to reduce road accidents and make driving safer for everyone.

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