American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)
ISSN (Print) 2313-4410, ISSN (Online) 2313-4402

http://asrjetsjournal.org/

Vision Based Vehicles Detection for Intelligence Transportation Systems.

Myat Su Oo, Dr. May The` Yu

[a]*Digital Image Processing, University of Computer Studies Mandalay, Myanmar*
[b]*Digital Image Processing, University of Computer Studies Mandalay, Myanmar*
[a]*myathsuoo90@gmail.com*
[b]*maytheyu@gmail.com*

Abstract

Research in advanced driver help machine (ADAS) is a vital step towards accomplishing the intention of the autonomous smart automobile. ADAS is the machine to help the driver inside the using technique due to the fact maximum road injuries took place due to human blunders. Vehicle detection and distance estimation is a crucial solution for ADAS. This paper aims to reduce traffic accidents on the road using computer vision technologies and to implement the driver assistance system. In this paper, firstly, this system inputs the video and segments the videos as the frames. After segmenting the images, vehicle detection results are represented. In the experiments, own datasets are created by capturing videos in Nay Pyi Taw, Myanmar and detection results are described.

Keywords: ADAS; ACC; CNN;

1. Introduction

To reduce the number the variety of annual accidents, a big amount of different systems has been researched and evolved. Autonomous driving is the very best stage of automation for a car, which means the automobile can pressure itself from a place to begin to a destination without a human intervention. Advanced driver assistance systems (ADAS) is also ordinary due to the fact the preliminary era of impartial using which requires massive scale gadget to paintings in coordination. ADAS are increasingly more used in a car in the remaining decade. The advanced sensor era and the growing computational power assist large of the ADAS. It calls for many subsystems to paintings in coordination.

---

* Corresponding author.

E-mail address: author@institute.xxx .

ADAS may also additionally recognize shared know-how of the usage of choices and actions for driving. Under ADAS, there are many sub-era like Adaptive Cruise Control (ACC), Collision Avoidance System, Lane Departure Warning Systems and so forth. ACC lets in growing the driving comfort and riding protection. ACC is a brand new machine format which could lessen pressure for the driving force by using controlling car velocity and maintaining distance to every different vehicle within the front. ACC structures particularly consist of manage and sensor subsystems. The sensor subsystem gives statistics about surroundings in vision range. Useful statistics for ACC is extracted from raw sensor facts on this subsystem. Although the preceding research used the sensor based totally approach, in this paper, car detection based totally on vision is proposed. The current paper contributes to create the own dataset by capturing the videos with cameras in vehicles and to accurately detect the size of the vehicles when the distance of the target vehicles is calculated.

This paper is prepared as follows: In phase 2, the reviewed previous researches are offered. Phase 3 represents the flow of the system. In phase 4, experimental outcomes are given. Phase 5 conclude the system.

2. Literature Review

In this paper, we offer a top level view of technologies to detect automobile for ADAS, that's a car protection system designed to reduce the opportunity of a twist of fate. We reviewed the research title, abstract, introduction, experiment, and future scale. We have identified the most appropriate document for review.

In [1] the authors present SegNet encoder-decoder architecture is used for pixel-wise semantic segmentation from the captured the videos in India. Convex hall is used to estimate road region. Bounding box algorithm is used to fit bounding rectangles over the car and people regions for people and car detection. Point polygon test is used to check overlapping edge pixels within convex hall of road region. The average accuracy of the vehicles and pedestrians' detection is 0.7613.

The authors [2] describe the pattern matching that is used to detect lane and vehicle that recorded videos in South Africa. Bounding box is used as the Region of Interest (ROI) for edge detection. Trigonometry is used distance estimation of lane width at the point where the vehicle meets the road. 87% accuracy is performed for detection.

Aysxegu¨l Ucxar, Yakup Demir and Cu¨neyt Gu¨zelisx [3] used to detect Caltech-101 and Caltech Pedestrian datasets. The 8 layers AlexNet and a novel 9 layers CNN is used to extract features. Principal Component Analysis (PCA) is used to select discriminative features and reduce the features dimension. Multiple Support Vector Machines (SVMs) are used by fusion for classification. The performance of classification and detection is 15/class 89.80±0.50 and 30/class 92.80±0.

The authors [4] used KITTI datasets and recorded videos during cloudy and raining. Hough Transform is used

to discover the dominant lines in the black and white image (lane detection). Masking operation is used to extract the ROI. New filter based on color intensity (new algorithm) by Gaussian filter to transform on dimension is used for vehicle detection. The detection accuracy is 90%.

In [5], Hirshik et al. presented R-CNN, a CNN network offering regional proposals. In their article, the authors would like to show that CNN can get better results than methods using low-level functions, such as HOG. Their object detection pipeline consists of in three parts. First, R-CNN uses a selective search to create offers for a region, that is, different regions that may include an object. Then, 4096-dimensional feature vectors are extracted from each detected area using AlexNet. The only change in architecture is the number of units in the classification layer. Each feature vector is then classified using SVM, and each SVM is trained for a particular class. In the ILSVRC2013 detection data set, R-CNN scored more than over feat.

The authors [6] suggested method efficiency in camera calibration methods that detect depending on camera position. The shadow created by the vehicle was used to determine the availability of the vehicle for this purpose the camera is composed in a little location, for example on the side of the road, sidewalk. The main difficulty of this system is too costly to fit and costly camera is cool stealing. After completing the vehicle discovery mission, the next important issue is tracking frame sequence of the moving vehicles, which forms a basis visual monitoring system requirement.

In [7], the authors recommended according to the region he tracking method uses spot blobs. Blob is composed of continuous areas move the group of pixels in the image. These areas are separate fixed pixels in a sequence of images In order to follow these moving pixel areas. The drawback of this method is that the size of the drop is not static. Size changes can make a difference in tracking treatment.

3. Design of the Proposed System

An overview process of the proposed system is shown in Fig.1.

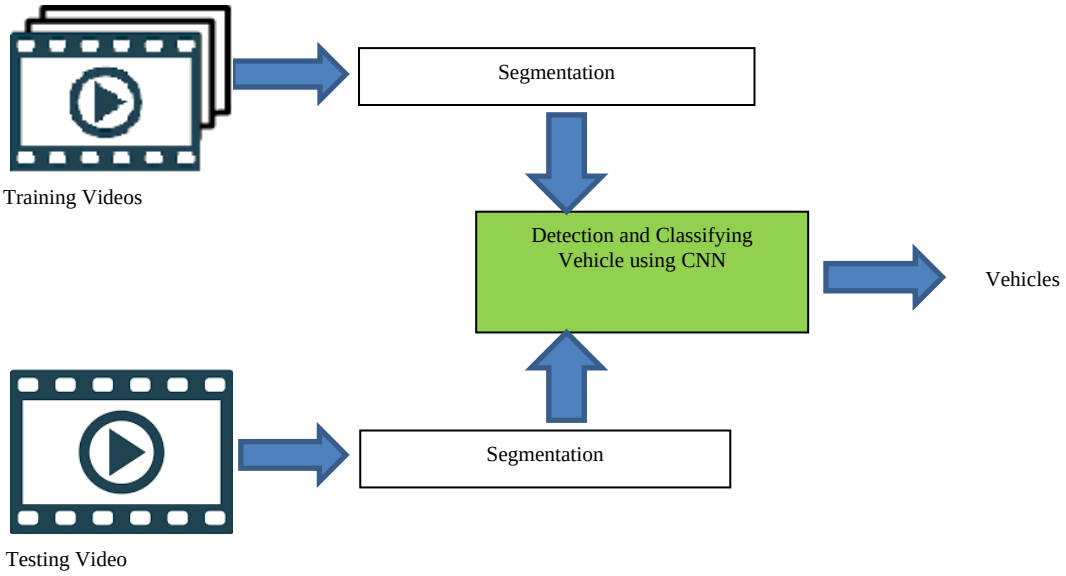

Figure 1: Architecture of the Proposed System

The proposed system firstly takes the videos captured in Nay Pyi Taw as the input and covert videos to image frames. The system use Convolutional Neural Network (CNN) to detect and recognize the vehicles. To determine where the target vehicles are along the driving path, the parameters (e.g size, distance, angle) of the target vehicles measured. In this paper, detection of the vehicles size is described by color threshold method.

4. Experimental Results

This section explains about the results that detect the size of the vehicles.

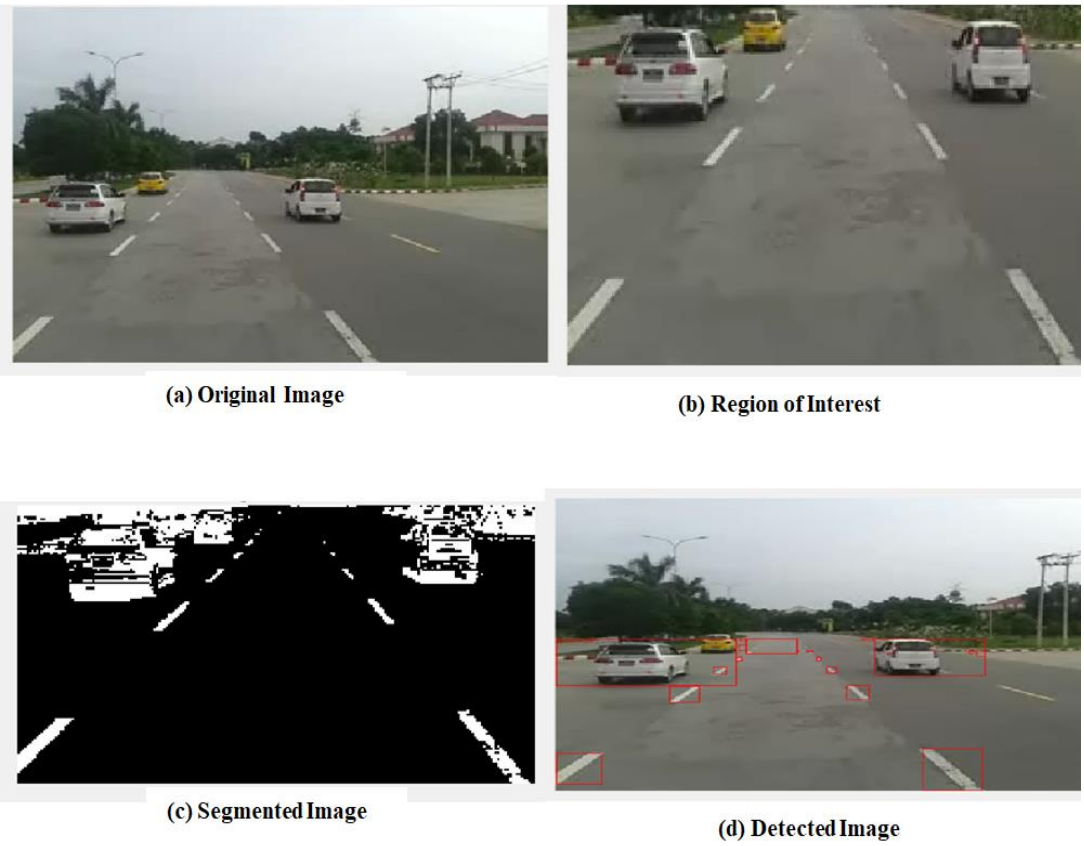

Figure 2: Steps for Vehicles Detection

In Figure 2, the proposed system firstly takes input videos and (a) describe the original images. In (b) the images are removed the unwanted region such as sky, building, trees and so on. After extracting the region of interest, in (c) the images are segmented to detect correctly the vehicles size using the color threshold methods. In (d), the detected obstacles are described by using bounding boxes to train in CNN as the input.

5. Conclusion and Recommendations

The detection and classification of vehicles has a great influence on the achievements in the field of intelligent transport systems. Computer vision task helps to develop improve road systems by analyzing traffic and helping to prevent or detect traffic accidents. Although useful in many ways, the detection and classification of vehicles

is not easy task. This paper examines accurately vehicle detection in segmentation process for classifying by using CNN that can produce high results on large data sets without the need for additional feature extraction and advanced pretreatment in most cases. Further, this system will classify the vehicles to give the decision for the driver. As the limitation, CNN is not suitability for real time. Therefore, other method should be used.

References

[1] Deepika N, Sajith Variyar V V. "Obstacle Classification and Detection for Vision Based Navigation for Autonomous Driving" 2017 International Conference on Advances in Computing, Communications and Informatics (ICACCI).

[2] Ritesh Kanjee ; Asheer K. Bachoo ; Johnson Carroll "Vision-Based Adaptive Cruise Control Using Pattern Matching" IEEE Xplore 2013 6th Robotics and Mechatronics Conference (RobMech).

[3] Aysxegu¨l Ucxar, Yakup Demir and Cu¨neyt Gu¨zelisx. "Object recognition and detection with deep learning for autonomous driving applications". Simulation: Transactions of the Society for Modeling and Simulation International 2017, Vol. 93(9) 759–769.

[4] Manne Sai Sravana, Sudha Natarajanb,*, Eswar Sai Krishnac, Binsu J Kailathc. "Fast and accurate on-road vehicle detection based on color intensity segregation" ELSEVIER Procedia Computer Science 133 (2018) 594–603.

[5] H. Huttunen, F. S. Yancheshmeh, and K. Chen, "Car type recognition with deep neural networks," in Intelligent Vehicles Symposium (IV), 2016 IEEE, pp. 1115– 1120, IEEE, 2016.

[6] Y. Iwasaki and H. Itoyama, "Real-time vehicle detection using information of shadows underneath vehicles," Advances in Computer, Information, and Systems Sciences, and Engineering, pp. 94–98, Springer, 2006.

[7] S. Gupte, O. Masoud, R. F. Martin, and N. P. Papanikolopoulos, "Detection and classification of vehicles," IEEE Transactions on Intelligent Transportation Systems, vol. 3, no. 1, pp. 37-47, 2002