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A Survey on Lane Departure System for Traffic Control on Highways

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ABSTRACT: The traffic conditions of some of the developed and developing countries are very vast and complicated now a days. Due to this complications and difficulties that occur in the traffic control, there are possibilities of traffic collision and accidental cases, such conditions causes' economical loss, loss of time as well as minor and major accidents. Hence to avoid such accidental or economical loss there is need of system that will capable of monitor all the traffic such that proper control on the traffic can be established. This system is proposed for controlling and monitoring the traffic by observing the lanes which are mainly for two wheelers and four wheelers or multi axels. This paper presents a lane tracking algorithm for the lane departure and monitoring of individual lanes. This paper represents the system work related to automatic observation of traffic system in which there are multiple lanes present. With the multiple lanes such that one particular lane is allocated for two wheeler and another lane is especially for four wheeler or multi axel vehicles. If there is any case, that two wheeler crosses its lane, breaks the rule and illegally enters into the lane which is for multi axels then the system will capture the image of that two wheeler and send that image to the traffic control office or traffic police. Same process will be followed by the system if four wheeler enters into the lane of two wheeler. With the help of that captured image, it's easy for the traffic police obtain the image of that particular vehicle. The system will be installed at some suitable places such as national highways, state highways or express highways where the traffic is more and chances of traffic problems and accidents are more

KEYWORDS: Vehicle image capturing, Background subtraction, Area calculation, Differentiate the Vehicle.

I.INTRODUCTION

Each year the number of road accidents has increased thus causing severe injuries to humans and can also result in the death of the individual. The main priority is that the driver remains in his lane and does not cross over to the other lane. There are a number of safety measures which have been proposed by the researchers in the field of intelligent transport service like the Advanced Driver Assistance System (ADAS) including the Lane Departure Warning System (LDWS). These systems help the driver to take precautions thus intercepting the danger and preventing any accidents or mishaps. The proposed system will take a note of any vehicle that intends to cross over to the other lane and notify the user with the image of the vehicle. Action can be taken on the vehicle driven by implementing a fine or issuing the driver a court notice.

The system consists of a camera which will capture the image. A high resolution camera can be used to obtain better image quality thus providing better processing. A night vision camera can be used for further up-gradation or real time implementation. Once the image is captured we perform background subtraction to obtain the image on which the processing needs to be done. We then perform a number of morphological operations on the image. The image obtained is first converted to grey scale and later the morphological operations are performed. Once the region of maximum area is found we can later obtain the centroid. The classification based on maximum area will help determine if the vehicle a two wheeler or a four wheeler.The surrounding objects around the vehicle is eliminated to obtain the vehicle that has

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broken the traffic norms.This system can have a high accuracy but needs to consider the environmental or whether challenging conditions that may obstruct the process. The width will be calculated to determine of it is a two wheeler or a four wheeler to make the image accuracy better we can increase the number of frames thus providing better implementation later leading to desired output. In this paper, a new lane departure warning system, namely LDDW, based on the tracking score mechanism is introduced. Field test results indicate that the proposed tracking algorithm provides an accurate estimation of lane boundaries and a powerful capability to extract the correct lane from detected lines in video frames. The lateral shift of lines position is calculated to enhance predicting lane boundaries in future frames assuming that the system fails to detect a line in the current frame. Hysteresis loop has proved its efficiency in stabilizing the estimation and the detection processes of lane boundaries. Also, its fast response in eliminating road drawings and undesired noise under a variety of road structures and conditions is experimentally validated.

II.LITERATURE REVIEW

The system consist of camera which is mounted on highway lanes or expressway lanes. If the vehicle crosses the particular line that vehicle will get captured by the camera Features like shape and overall area covered by that vehicle is extracted and calculated. If a vehicle covers certain area that is set for four wheeler then obviously that vehicle is four wheeler otherwise it is considered as two wheeler.

A. A. Assidiq and O.O. Khalifa [1].Developed a system of automatic detection, recognition and tracking of vehicles in traffic management system that will automatically Line tracking is implemented to extract lane boundaries and Differentiate it from false lines; which have been detected because of the edges of moving vehicles, road drawing, and Vehicles' shadow. It is also able to predict the boundaries if the system fails to detect the line for a certain number of frames. This algorithm mainly consists of two lists: the detected list representing the position of lines in the current frame; and the tracked list representing analysis and status of the detected lines in prior frames.

J. C. McCall[2].This system was developed to monitor activities in Updating Line positions in the tracked list whose state is decreasing is essential in order to predict its position in next frames. The lateral shift of the vehicle is obtained by calculating average shifts of lines in the tracked list whose state is increasing. The last step is inserting the input lines from the detected list which failed to find best match lines in tracked list. The tracked list is updated in each frame as every detected line that is inserted into the list could be a potential lane boundary.

U Franke and I Kutzbach[3].This system operates on the second part of the LDDW system is lane departure which determines the vehicle's position relative to the current lane boundaries and produces an alarm to warn driver whether the vehicle is located in a safe area or about to depart. The remaining of this paper is organized as follows. In Section II, lane detection procedures are described. The lane departure algorithm is advanced in Section III. In Section IV, experimental results of the proposed tracking algorithm are demonstrated.

R. Hartey and A. Zesseman [4] Multiple View Geometry in Computer Vision, Cambridge University Press, 2 edition, LDW is a vision-based system which relies on image processing and computer vision algorithms. Many LDWsystems employ lane detection algorithms to extract road lane marking from the taken images. In this work, the Lane Detection and Departure System (*LDDS*) system is advanced in that system. The IPM block constructs a bird's eye view of the road in front of the vehicle and extracts the edge of objects using edge detection techniques. Irrelevant edges must be eliminated by converting grayscale to a binary image. Sub-regions are defined in the image. Those regions are the candidates to contain boundaries of the lane using simplified Hough transform. Lineddetection mechanism detects the best fit vertical lines. The algorithm is used to find points which belong to the line and thenline fitting is applied to approximately fit these points into lines.

N. Srinivasa and C. Daniell[5];.This is the system for real-time forwardcollision warning in automobiles," in Proceedings of the 2003 IEEE International Conference on Intelligent Transportation Systems, 2003, vol. 1, pp. 457–462. [11] M. Al, "Real time detection of lane markers in urban streets, "Our lane marking detection algorithm is based on low-level image features. In general, we rarely use the original size of the captured image directly. On the other

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hand, we usually use only about the half size of the original image after removing the unnecessary regions such as the sky, buildings or traffic signs located in the upper part of the image

Suzuki A, N. Yasui, N. Nakano and M. Kaneko[6] The Lane Recognition System for Guiding of Autonomous Vehicle," Intelligent Vehicles'92this causes each vehicle to represent the same portion of the road and makes the image similar to reality. The width of the road markings is invariant with their position within the whole image. Parallel lines in the real world are restore again, which make the detection of lane easier.

G. Taubel and J. S. Yang; [7] "A lane departure warning system based on the integration of the optical flow and though transform methods," IEEE International Conference on Control and Automation (ICCA),this system is capable of detecting the individual lane activities and tracking the lane conditions on highways. This system will assist the traffic control administrative for handling traffic effectively.

III.CONCLUSION

The proposed system will use for tracking the vehicles for controlling the traffic conditions and to accidental cases in highways and expressways.It is very useful for traffic controlling applications where it is needed to detect and track the vehiclein the area of particular lanes. A simple system is implemented which automatically captures and tracks the vehicle which will cross its specified lane and enters into another lane. Unauthorized entry of vehicle is captured by the camera and that image will be send to the traffic controlling unit or traffic police to track the vehicle.

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