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PREVENTION OF ROAD ACCIDENTS USING IMAGE PROCESSING ON VIDEO STREAMS: A REVIEW

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ABSTRACT

In this review paper we are simply going to review some research papers related to the prevention of road accidents using image processing. Generally road accidents happens due the fact that over speeding of vehicles or not wearing helmet or drunken drive. All these necessary safety parameters should be considered which can reduce the road accidents and may save a life. By studying all these papers we will come to know that the systems which are already implemented are using various techniques. Like for estimation of speed of vehicle Doppler effect is used. Also an analog to digital conversion is done which is used to determine the speed of vehicle and the license plate extraction which is used to extract the license plate and email it to Toll. For feature extraction of images some algorithms were used as descriptors i.e. SURF, HAAR, HOG and LBP. For image classification some Function Networks were used as classifiers i.e. Multilayer Perceptron, Support Vector Machines and Radial-Bases Function Networks. For fall detection background subtraction and optical character recognition methods is used whereas for helmet detection background subtraction and Hough transform descriptor is used.

Keywords: road accidents, MATLAB, video stream, speed detection, helmet detection.

I. INTRODUCTION

Safety and security is one of the most talked topics in almost every aspect. Road accidents have been rapidly growing throughout the years in many countries which encounter numerous cases leading to death. The impacts of these accidents are more dangerous when the driver involves in a high speed accident without wearing helmet or drunken drive by the driver can cause severe deaths. This paper makes a review of various research papers in which different accident prevention techniques have been discussed. This is implemented using image processing techniques in MATLAB software. Estimation of speed of a vehicles running on the road has been done. The result of this was to control traffic and checking if any vehicle is crossing their speed limit on the road by using image processing and vehicle recognition techniques. Also fall & helmet detection of a two wheeler driver run-time is done. This system would inform nearby hospitals, family members & law enforcement agencies in case of emergency. In this way it ensures safety of the drivers while driving. Automatic accident detection on public roads and reporting system was the motivation of this system. Also an automated method for detecting the over speeding of vehicles and charging them fine at the Toll has been done. An analog to digital conversion is done which is used to determine the speed of vehicle and the license plate extraction which is used to extract the license plate and email it to Toll. Here Doppler effect has been used to calculate the speed of vehicle. Implementation of some methods for automatic detection of motorcycles on public roads has been done. For this Traffic images were captured by using cameras. For feature extraction of images some algorithms were used as descriptors i.e. SURF, HAAR, HOG and LBP. For image classification some Function Networks were used as classifiers i.e. Multilayer Perceptron, Support Vector Machines and Radial-Bases Function Networks. A system for assisting driver which is very effective for preventing major accidents caused due to driver drowsiness and alcohol consumption. Various algorithms related to image processing have been used to identify the state of driver. A buzzer is used to alert the driver if driver is drowsy. With reference to the center of gravity the position of driver's head is determined and accordingly the

current state of driver is also identified. Also extraction and recognition of number plate from vehicles image has been done using Matlab. The images of the vehicle have been captured from Digital Camera. Alphanumeric Characters on plate has been extracted and recognized with the help of template images of alphanumeric characters. A new algorithm has been used to extract the number plate from the vehicle in various luminance conditions in MATLAB. Further this extracted image of the number plate can be seen in a text file for verification purpose. This paper will improve safety and reduce accidents, especially fatal to the motorcyclist.

II. LITERATURE SURVEY

A PROPOSED SYSTEM TO ESTIMATE THE VELOCITY OF VEHICLES FROM TRAFFIC VIDEO by Md. ShahriarRajib, Jabber Ahmed, MdMahfuzur Rahman, Wali Mohammad Abdullah and Naresh Singh Chauhan. Here they have proposed a system to estimate the speed of a vehicles running on the road. The result of this is to control traffic and checking if any vehicle is crossing their speed limit on the road by using image processing and vehicle recognition techniques. In this work they proposed an efficient image processing technique to estimate the velocity of a moving vehicle using simple background subtraction method. All concepts were implemented using computer vision toolbox on MATLAB. This system was implemented for both single and multiple vehicle tracking. It includes flow chart for the proposed system. Drawbacks of this system are at night the performance of system may vary. Also various weather condition, image quality and quality of the image capturing device may influence the performance. [1]

AN APPROACH TOWARDS DETECTION OF INDIAN NO PLATE FROM VEHICLE by Sourav Roy, Amitava Choudhury, Joydeep Mukherjee. In this paper, an efficient less time consuming vehicle number plate detection method has proposed which has performed operations on complex images. There are two main steps which has been explained i.e. one is to locate the number plate and second is to segment all the number and letters to identify each number separately. By using, Sobel edge detection method it detects edges and fills the holes less than 8 pixels only. For extracting the license plate all the connected components less than 1000 pixels were removed. This proposed algorithm is mainly based on Indian automobile number plate system. The project was developed by using MATLAB7.4.0. Future work of this system is to extract the number plate for low ambient light image. [2]

AUTOMATED OVER SPEEDING DETECTION AND REPORTING by SarmadMajeed Malik, M. Asad Iqbal, Zohaib Hassan, TauseefTauqeer, Rehan Hafiz, and Usman Nasir. This paper has presented an automated method for detecting the over speeding of vehicles and charging them fine at the Toll. The project consists of three main modules; the RF-section where 2.6 GHz frequency signal is generated, transmitted and received. Also the analog to digital conversion is done which is used to determine the speed of vehicle and the license plate extraction which is used to extract the license plate and email it to Toll. Here Doppler effect has been used to calculate the speed of vehicle. The designed radar gun operates at 12V, generates a frequency of 2.6 GHz and covers a range of 10 m to 15m from the target. If the detected speed is greater than a set speed threshold, a camera automatically captures the snap of the vehicle and license plate number is extracted using Digital Image Processing techniques. MATLAB is used for image processing. This paper includes block diagram for the proposed system. [3]

AUTOMATIC HELMET DETECTION ON PUBLIC ROADS by Maharsh Desai , ShubhamKhandelwal , Lokneesh Singh , Prof. ShilpaGite. This paper mainly aims for avoidance of accidents on public roads and develop helmet detection system. So they have proposed an approach which would detect fall & helmet detection of a two wheeler driver run-time. For this they have used background subtraction and optical character recognition for fall detection and for helmet detection background subtraction and Hough transform descriptor. Also this system would inform nearby hospitals, family members & law enforcement agencies in case of emergency. Hence it ensures safety of the drivers while driving. Automatic accident detection on public roads and reporting system is the motivation of this paper. It includes the flowcharts for Fall Detection as well as Helmet Detection. The future scope of this system is to use more advanced safety measures like to check alcohol consumption, lane change detection, collision detection, traffic information, e-toll collection, license renewal etc. [4]

AUTOMATIC MOTORCYCLE DETECTION ON PUBLIC ROADS by Romuere Silva, Kelson Aires, Rodrigo Veras, Thiago Santos, Kalyf Lima and Andr eSoares. The goal of this paper is to study and implementation of some methods for automatic detection of motorcycles on public roads. Traffic images were captured by using cameras. For feature extraction of images following algorithms were used as descriptors i.e. SURF, HAAR, HOG and LBP. For image classification following Function Networks was used as classifiers i.e. Multilayer Perceptron, Support Vector Machines and Radial-Bases Function Networks. Finally, the results were presented and discussed. The main future work discussed in this paper is to design an automatic system to detect motorcyclists without helmets and also to locate and identify the license plate. [5]

DRIVER DROWSINESS DETECTION, ALCOHOL DETECTION AND ACCIDENT PREVENTION by TejaswiniJagdale, PradnyaJadhav, PrajaktaTotre, MayuraZadaneShrilekhaMankhair. This paper has discussed a system for assisting driver which is very effective for preventing major accidents caused due to driver drowsiness and alcohol consumption. Various algorithms related to image processing have been used to identify the state of driver. A buzzer is used to alert the driver if driver is drowsy. With reference to the center of gravity the position of driver's head is determined and accordingly the current state of driver is also identified. A camera of appropriate resolution has been used to sense the movement of eyes. Also this system gives extra feature of yawning detection. If a driver yawns more frequently then also an alarm is generated for safety purpose. For the detection of the driver is drunken or not a sensor has been used. The alarm generated is in the form of audio. The future scope discussed in this paper is to implement the model in two-wheelers. [6]

ENHANCEMENT OF VEHICLE SPEED DETECTION SYSTEM FOR AVOIDANCE OF ACCIDENT by AbhirajitChattopadhyay, GundaRavichandra, Vivek, Sudhansh Solanki, P Suganya. This paper presents an arrangement to detect reckless driving or over speeding on highways and by design send tickets to violators over email. In this paper the hardware as well as the software modules is involved in the speed detection system. The system requires a microprocessor, a camera for input, and network capabilities to send data. This paper includes system architecture diagram for better understanding. Advantages of this system is that it is highly configurable, robust and works like a clockwork throughout the day. Also the electricity and network cost is very low. If manufactured properly, the lifetime of the system can be very high and the rate of maintenance can be low. The future work discussed in this paper is that the current system can be enhanced to limit the amount of input being consumed. Presently all the data, when a vehicle is inside the reference line is stored. But if the predicted speed of a vehicle is already lesser than the limit, it need not be processed any further. [7]

MULTIPLE MOVING OBJECT DETECTION AND TRACKING IN A VIDEO SEQUENCE by Amit S. Kakad, Dr C. M. Jadhao, Prof. S. S. Mhaske, Prof. N. B. Bhawarkar. Main aim of this paper was of Object Detection and then to track its location. Two different approaches were made for this, one was to detect and track using specific features like color and other was to detect using background subtraction and then track it using an Adaptive recursive filter. An algorithm was designed which takes the video sequences as an input and starts extracting the frames from these sequences. After extraction, equalization of each and every frame is done to have a well-defined input for further processing. Through detection tracking algorithm moving objects were detected and tracked until the vision of the camera. Further these detected objects were classified according to shape based criterion. It includes flow graph for background subtraction and logical flow for kalman filter. [8]

SPEED DETECTION CAMERA SYSTEM USING IMAGE PROCESSING TECHNIQUES ON VIDEO STREAMS by Osman Ibrahim, HazemElGendy, and Ahmed M. ElShafee. In this paper a new Speed Detection Camera System (SDCS) is developed which is could be used as a radar alternative. Several image processing techniques on video stream were captured from single camera which made the system capable of calculating the speed of moving objects avoiding the traditional radars' problems. SDCS processes were divided into four successive phases; first phase was of Objects detection phase. A hybrid algorithm has been used which is based on combining an adaptive background subtraction technique with a three-frame differencing algorithm which ratifies the major drawback of using only adaptive background subtraction. The second phase was of Objects tracking, which consists of three successive operations, object segmentation, Object labelling, and Object center extraction. Objects tracking operation takes into consideration with different possible scenarios of moving object like; Simple

tracking, object has left the scene, object has entered the scene, object cross by different object, and object leaves and another one enters the scene. Third phase was of speed calculation phase, which were calculated from the number of frames consumed by the object to pass-by the scene. The final phase was of Capturing Object's Picture phase, which captures the image of objects that violate the speed limits. Also various advantages were discussed in this paper. [9]

TRACKING NO PLATE FROM VEHICLE USING MATLAB by ManishaRathore and SarojKumari. In this paper extraction and recognition of number plate from vehicles image has been done using Matlab. The images of the vehicle have been captured from Digital Camera. Alphanumeric Characters on plate has been extracted and recognized with the help of template images of alphanumeric characters. A new algorithm has been used to extract the number plate from the vehicle in various luminance conditions in MATLAB. Further this extracted image of the number plate can be seen in a text file for verification purpose. It includes flowchart for the proposed system. [10]

III. CONCLUSION

By referring all these different research papers we came to know that preventing road accidents can be very important and very effective for the safety purpose for every human being by using various image processing techniques or tools which are available in MATLAB software. We are working towards an idea which can contribute some part towards a developing India to become secure & safe. Where the society has to take just one step ahead i.e. by wearing helmet, by limiting the over speeding of vehicles & avoiding the drunken drive.

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