Vision Based Drowsiness Detector for Real Driving Conditions

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Abstract— The objective of this project is to design an Accident Prevention System which supports in preventing or avoiding accidents. The driver is more disposed to accidents due to drowsiness and the disturbing intruders. Driver fatigue is one of the supreme common reasons for deadly road accidents around the world. This shows that in the transportation industry especially, where a driver of a heavy vehicle is often exposed to hours of monotonous driving which causes fatigue without frequent rest period. Driver inattention is one of the main causes of traffic accidents. Under this project we will develop a system using Python and Machine Learning that can monitor the alertness of drivers in order to prevent people from falling asleep at the wheel System creatively reduces accidents due to drivers' fatigue by focusing on treating the driver later than fatigue has been detect to achieve decline in accident.

Keywords: Image processing, machine learning, drowsiness, Pre-Processing

I. INTRODUCTION

Driver drowsiness detection is a car safety technology which prevents accidents when the driver is getting drowsy. Various studies have suggested that around 20% of all road accidents are fatigue-related, up to 50% on certain roads. Driver fatigue is a significant factor in a large number of vehicle accidents. Recent statistics estimate that annually 1,200 deaths and 76,000 injuries can be attributed to fatigue related crashes. The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems. Because of the hazard that developed for counteracting its affects. Driver inattention might be the result of a lack of alertness when driving due to driver drowsiness and distraction. Driver distraction occurs when an object or event draws a person's attention away from the driving task. Unlike driver distraction, driver drowsiness involves no triggering event but, instead, is characterized by a progressive withdrawal of attention from the road and traffic demands. Both driver drowsiness and distraction, however, might have the same effects, i.e., decreased driving performance, longer reaction time, and an increased risk of crash involvement. Based on Acquisition of video from the camera that is in front of driver perform real- time processing of an incoming video stream in order to infer the driver's level of fatigue if the drowsiness is Estimated then the output I send to the alarm system and alarm is activated.

II. LITERATURE SURVEY

This section of the literature survey eventually reveals some facts based on thoughtful analysis of many authors work as follows

The objective of paper [1] is to design an Accident Prevention System which supports in preventing or avoiding accidents. The driver is more disposed to accidents due to drowsiness and the disturbing intruders. Driver fatigue is one of the supreme common reasons for deadly road accidents around the world. This shows that in the transportation industry especially, where a driver of a heavy vehicle is often exposed to hours of monotonous driving which causes fatigue without frequent rest period. Driver inattention is one of the main causes of traffic accidents. There are lots of approaches and among them computer vision has the potential of monitoring the person behind the wheel without interfering with his driving. The computer vision system for driving monitoring uses face location and tracking as the first processing stage. In the next stage the different facial features are extracted and tracked for monitoring the driver's vigilance. Under this project we will develop a system that can monitor the alertness of drivers in order to prevent people from falling asleep at the wheel System creatively reduces accidents due to drivers' fatigue by focusing on treating the driver later than fatigue has been detect to achieve decline in accident.

Drowsiness Detection System has been developed, using a machine vision based concepts. The system [2] uses a small camera that points directly towards the driver's face and monitors the driver's eyes in order to detect fatigue or drowsiness. In a case if fatigue is detected, a warning signal or alarm signal is issued to alert the driver to wake up and come out of the drowsy state First of all, the system detects the face and then the eyes, and then determines whether the eyes are open or closed. The system deals with using information obtained for the binary version of the image to find the edges of the face, which narrows the area of where the eyes may exist. Once the eyes are located, measuring the distances between the intensity changes in the eye area determine whether the eyes are open or closed. If the eyes are found closed for 5 or more consecutive frames, then the system finds the inactiveness of the driver and concludes that the driver is falling asleep and issues a warning signal or generate and alarm signal to wake him up.

Studies show that around one quarter of all serious motorway accidents is attributable to sleepy drivers in need of a rest, meaning that drowsiness causes more road accidents than drink-driving. Driver fatigue is a significant factor in a large number of vehicle accidents. The development of technologies for detecting drowsiness at the wheel is a major challenge in the field of accident avoidance systems. Because of the hazard that drowsiness presents on the road, methods need to be developed for counteracting its affects. The aim of this is to develop a drowsiness detection system by monitoring the eyes and mouth; it is believed that the symptoms of driver fatigue can be detected early enough to avoid a car accident. Detection of fatigue involves the observation of eye movements, blink patterns and mouth opening for yawning. The analysis of face images is a popular research area with applications such as face recognition, and human identification security systems. Paper [3] is focused on the localization of the eyes, which involves looking at the entire image of the eye, and determining the position of the

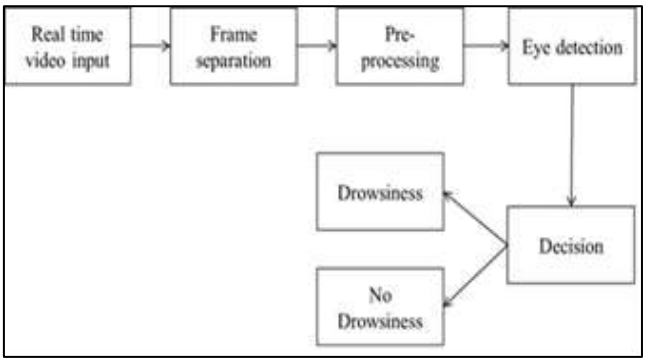
eyes, by a self-developed image-processing algorithm. Index Terms— Drowsy, Accident, Algorithm, Image Processing.

Paper [4] presents a non-intrusive approach for drowsiness detection, based on computer vision. It is installed in a car and it is able to work under real operation conditions. An IR camera is placed in front of the driver, in the dashboard, in order to detect his face and obtain drowsiness clues from their eyes closure. It works in a robust and automatic way, without prior calibration. The presented system is composed of 3 stages. The first one is pre-processing, which includes face and eye detection and normalization. The second stage performs pupil position detection and characterization, combining it with an adaptive lighting filtering to make the system capable of dealing with outdoor illumination conditions. The final stage computes PERCLOS from eyes closure information. In order to evaluate this system, an outdoor database was generated, consisting of several experiments carried out during more than 25 driving hours. A study about the performance of this proposal, showing results from this test bench, is presented.

Paper [5] represents a way of developing an interface to detect driver drowsiness based on continuously monitoring eyes and DIP algorithms. Micro sleeps that are short period of sleeps lasting 2 to 3 seconds are good indicator of fatigue state. Thus by continuously monitoring the eyes of the driver by using camera one can detect the sleepy state of driver and timely warning is issued. Aim of the project is to develop the hardware which is very advanced product related to driver safety on the roads using controller and image processing. This product detects driver drowsiness and gives warning in form of alarm and as well as decreases the speed of vehicle. Along with the drowsiness detection process there is continuous monitoring of the distance done by the Ultrasonic sensor. The ultrasonic sensor detects the obstacle and accordingly warns the driver as well as decreases speed of vehicle.

Paper [6] describes the steps involved in designing and implementing a driver drowsiness detection system based on visual input (driver's face and head). It combines off the-shelf software components for face detection, human skin color detection, and eye state (open vs. closed) classification in a novel way. Preliminary results show that the system is reliable and tolerant to many real-world constraints.

III. PROPOSED SYSTEM



1) Video Processing Module to analyze frame by frame status of the image captured. It always tracks face part only. Region of Interest (ROI) is only human face which is checked always by this module
2) Image Acquisition Module Action of retrieving an image
3) Frame Separation Aim is to detect changes in image sequences.

IV. CONCLUSION

The proposed system in this analysis provides accurate detection of driver fatigue. This paper tries to look at the developing technologies and determine the best methods in trying to prevent the number one cause of fatal vehicle crashes. Driver drowsiness detection systems have been precise advantageous in reducing day by day road accidents. This paper gives a review of driver drowsiness detection technique. The structure is able to recover and properly localize the eyes. Image processing achieves highly accurate and reliable detection of drowsiness. Image processing offers a noninvasive approach to detecting drowsiness.

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