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Drowsiness Detection System

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Abstract: *This document is a survey report on the exploration led and the task made in the field of computer engineering to design and foster a system for driver drowsiness detection to keep mishaps from happening in light of driver fatigue and drowsiness. The report proposed the outcomes and arrangements on the restricted execution of the different methods that are presented in the venture. However, the implementation of this project gives the real-world idea of how the system works and what changes must be done in order to improve the efficiency of the overall system. Besides, the paper expresses the outline of the perceptions made by the creators to assist with encouraging streamlining in the referenced field to accomplish the utility at an improved proficiency for a more secure street.*

Keywords: Driver Drowsiness; Eye Detection; Landmark Detection; Blink Pattern; Fatigue

I. INTRODUCTION

Recent surveys and statistics indicate a rise in accidents caused due to driver fatigue and drowsiness. Current statistics revealed that in 2015 in India alone, 148,707 people died due to car related accidents. Out of these accidents, at least 21 percent were caused due to the drowsiness of driver. Hence, to overcome the current situation, we have come up with an idea to detect drowsiness and fatigue of the driver in real time. To screen and keep away a disastrous result from such carelessness, numerous scientists have composed research papers on driver sleepiness identification systems. However, now and again, a portion of the places and perceptions made by the system are not sufficiently exact. Consequently, to give information and one more point of view on the central issue, to work on their executions and to additionally advance the arrangement, this undertaking has been carried out.

II. PROJECT SCOPE

There are numerous items in the market that give the proportion of exhaustion level in the drivers which are executed in numerous vehicles. The driver tiredness detection system provides the comparative usefulness however with improved results and extra advantages. Likewise, it cautions the user on arriving at a specific immersion point of the drowsiness measure.

III. LITERATURE REVIEW

Sr. No	Paper Title	Authors & Published on	Methodology
1	Real Time Driver Drowsiness Detection Based on Driver's Face Image Behavior Using a System of Human Computer Interaction Implemented in a Smartphone	Franklin Silva, Eddie Galarza, January 2018	The used algorithm processes the color information present in the image, converting it to grayscale. To determine the face in the image, the image will be divided in sub regions determining whether the subregion is a face or not. The use of this algorithm means a time saving and only the subregions that contains a face are processed. The gesture detection is done from the residual error that is modeled considering a linear combination of facial movement models. A similar model is considered to detect the position and inclination of the face. It includes a system that allows detecting facial gestures in the presence of head movement.

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2	Driver Drowsiness Detection	V B Navya Kiran, Raksha R, Anisoor Rahman, 2020	The paper used PERCLOS, in order to perform the process. The following steps as per: Perception of face and face pursuit. Position of eye and eye pursuit. Identification of the state of the eyes. Calculation of percentage of eyelid closure. Identification of the drowsy state.
3	Drowsiness Detection System using Machine Learning	S. Jansi Rani, Anand Rajasekharan, Chandrasek har A R, June 2020	This paper used an algorithm that uses a facial landmark detector. A single scalar quantity called eye aspect ratio (E.A.R)is calculated that reflects whether the eye is closed or not. For every video frame, the landmarks of the eye regions are found, and the Euclidean distance using the height and width of the eye is calculated, which is the eye aspect ratio (E.A.R). EAR = ‖p2 − p6‖ + ‖p3 − p5‖ 2‖p1 − p4‖
4	Real-Time Driver Drowsiness Detection System Using Eye Aspect Ratio and Eye Closure Ratio	Sukrit Mehta, Sharad Dadhich, Sahil Gumber, Arpita Jadhav Bhatt, January 2019	This library uses a pre-defined face detector, which is based on improvisation to the histogram of oriented gradients and uses linear SVM (support vector machine) method for object detection. Actual facial landmark predictor was then initialized, facial landmarks captured by the application were used to calculate the distance between the points. These distances were used to compute EAR value (K. C. Patel, S. A. Khan, and V. N. Patil,2018). EAR is defined as the ratio of the height and width of the eye.
5	DRIVER DROWSINESS DETECTION SYSTEM	Belal ALSHAQAQI; Abdullah Salem BAQUHAIZEL; Mohamed El Amine OUIS;	Our framework begins with the initialization phase, which is face and eyes detection to extract both face and eyes regions and take them as templates to track them back in the following frames. For each tracking we check if that tracking is good or bad? If the tracking is bad, we return to initialization step, else we pass to the following steps which are: eyes states identification and driver state.

IV. ALGORITHM

The sequence of our algorithm goes as follows:

1. Initializing video stream: A live video stream is initialised.
2. Face detection: Frames are extracted from the live video stream and the face is detected using Haar-Cascade classifier in OpenCV.
3. Landmark detection: After the face is detected, facial landmarks are plotted over the eyes and lips using shape predictor module from Dlib library.
4. EAR(Eye-Aspect-Ratio) Calculation: Next, the 12 landmarks plotted over the eyes obtained from landmark detection and using those, Eye-Aspect-ratio (EAR) is calculated using the formula.
5. Counter: If EAR is less than a given threshold level, the counter is incremented.
6. Alarm Generator: If counter exceeds the count of 20, the alarm is triggered and an alarm is sounded to alert the driver.

V. CONCLUSION

It totally meets the goals and necessities of the system. The structure has accomplished an unflinching state where every one of the bugs have been discarded. The system conscious clients who know about the structure and appreciate its central focuses and the way that it deals with the issue of worrying for people having weakness related issues to illuminate them about the tiredness level while driving.

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VI. FUTURE SCOPE

- The model can be improved steadily by utilizing different boundaries like blink rate, yawning, condition of the vehicle, and so forth. On the off chance that this large number of boundaries are utilized it can work on the exactness by a great deal.
- We intend to additional work on the task by adding a sensor to follow the pulse to forestall mishaps caused because of unexpected respiratory failures to drivers.
- Same model and strategies can be utilized for different purposes like Netflix and other web-based features can recognize when the client is snoozing and stop the video appropriately. It can likewise be utilized in application that keeps client from resting

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