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Real Time Driver Drowsiness Detection System

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ABSTRACT
Driver fatigue has become one of the key reasons for road accidents in modern days. Various surveys prove that if a driver is correctly identified as fatigued, and he, or she is timely alarmed regarding the same, the cases of accidents can be remarkably bring down. There have been various techniques adopted to identify a drowsy driver. Through this project, an in-depth study of various existing techniques of fatigue in a driver is studied, followed by developing a deep learning based model to accurately identify a driver's state using a novel technique of using spatiotemporal features of the face. It can be determined that the accuracy will remarkably increase when this technique isused.
Keywords:driverfatigue,deeplearning,spatiotemporalfeatures.

I. INTRODUCTION

Driver fatigue is a significant variable in an expansive number of vehicle accidents. Late insights, assess that every year 1,200 deaths and 76,000 injuries can be credited to weariness related accidents. Road Accidents in Sri Lanka cause a lot of financial losses worth around Rs.9 billion yearly. It shows us there are minimum around 2,400 road accidents consistently take place that means one death per every four hours. 20% of car crashes with drivers are caused due to driver's drowsiness or tiredness.

Accidents caused due to drowsiness are more serious, because of the higher speeds involved distraction and the driver cannot take any avoiding activity to stop vehicle, or even brake, before collateral damage. The improvement for recognizing or preventing fatigue of the driver is a significant test in the field of accident avoiding systems. Because of the danger drowsiness presents on the road, strategies need to be created for checking its influences. Loss of the awareness because of the tiredness causes a few changes in the human's body andactivities.

These side effects and parameter empowers us to effectively measure the drowsiness level. Different strategies for drowsiness identification can be divided into two general classifications. The techniques used in the first gathering recognize the level of the tiredness focused around the physiological changes in the body.

A new approach towards automobile safety and security with autonomous region primarily based automatic automotive system is projected during this conception. A Drowsy Driver Detection system and a traffic detection system with external vehicle intrusion dodging primarily based conception. In recent time's automobile fatigue connected crashes have very enlarged. so as to attenuate these problems, we've incorporated driver alert system by watching each the driver's eyes still as sensing still because the driver state of affairs based primarily based native setting recognition based on AI system

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Table:
Total accidents, number of accidents involving death and personal injury, number of persons killed and injured between 2003 and 2012 in Turkey.

Years	Total Accidents	Accidentsinvolvingdeath and personalinjury	Number of perkilled	Number of persons injured
2003	455 637	67031	3946	118214
2004	537 352	77008	4427	136437
2005	620 789	87273	4505	154086
2006	728 755	96128	4633	169080
2007	825 561	106994	5007	189057
2008	950 120	104212	4236	184468
2009	1 053 346	111121	4323	201380
2010	1 106 201	116804	4045	211496
2011	1 228 928	131845	3835	238074
2012	1 296 634	153552	3750	268079

The development of technologies for detecting drowsiness at the wheel is a major challenge in the field of accident avoidance. Because of the danger that drowsiness presents on the road, therefore methods need to be developed. Aim of the project is to develop a drowsiness detection system. The focus will place on designing a system that will monitor the open or closed state of the driver's eyes in real-time. By monitoring the eyes, we can detect the driver fatigue can be early enough to avoid a caraccident.

II. LITERATURE SURVEY

Driver drowsiness in commercial truck drivers is a major concern and is responsible for thousands of accidents and fatalities every year. In the Office of Crash Avoidance Research (OCAR) of the National Highway Traffic Safety Administration (NHTSA) identified driver drowsiness as one of the leading cause accidents. Driver's drowsiness can be measured by two classes of phenomena: Physical and physiological and Vehicle state variables. Physical and physiological measurements include the measurement of brain wave or Electroencephalogram (EEG), eye activity. PERCLOS (PERcent eyelid CLOSure) is one of the most widely accepted measures in scientific literature for measurement and detection of drowsiness.

Drowsiness detection systems have been developed which work based on measurement of Physical and physiological features, and can provide very good detection accuracy. The problem with an EEG is that it requires the use of electrodes to be attached to the scalp and that makes it very impractical to use. Eye closure activity can also provide good detection accuracy, but capturing eye image unobtrusively can be expensive and challenging under certainconditions.

With respect to Vehicle State Variables Measurement, other approaches for detecting driver drowsiness are based on monitoring driver inputs or vehicle output variables. These methods have the advantage of being non-intrusive to the drivers. Discussed the performance measures as indicator of driver drowsiness in detail and has discussed that in the previous year's many algorithms for eye pupil/iris detection have been developed.

Starburst algorithm is a robust eye-tracking

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algorithm that combines feature-based and model-based approaches to achieve a good trade-off between run-time performance and accuracy for dark-pupil infrared imagery. Geometric feature learning methods extract distinctive geometric features from images. Geometric features are objects constructed by a set of geometric elements like points, lines, curves or surfaces. These features can be corner features, edge features, Blobs, Ridges, salient point image texture and so on, which can be detected by feature detectionmethods.

METHODOLGY

Convolutional neural network technique is used to predict driver drowsiness and helps detecting it. CNN takes image as input and differentiate between two images and gives an alarm if the driver is sleeping or closing is eye for more than few seconds. Preprocessing required in a CoNvnet.

OBJECTIVES

- Driver drowsiness detection is a technology for car safety which helps to save the life of people by avoidingaccidents.
- The main object is to design software that detects the drowsiness of the driver by taking eyes as the dataset.
- The software that installed in the car can work even if the driver is wearing specticals or any various lightingconditions.
- By using a buzzer or an alarm we can alert thedriver.
- By reducing the accidents we can maintain the trafficmanagement.

SCOPE

To implement a tool which can alert a driver or the passengers who are inside the vehicle when ever the driver is Drowsy which can reduce the accidents. By taking their eyes as dataset.

PROBLEM STATEMENT

Driver drowsiness driving is one of the main reasons for road accidents. In present look over it shows that out of 5 accidents one accident is caused due to drowsiness of the driver which is approximately 20% of road accidents and it increasing gradually.

PROTOCOL OF TESTING

For initiating the test, the driver starts the simulator. As the process begins, the images of driver can be recorded by using camera. Meanwhile, observer interprets images to recognize the levels drowsiness. When simulator shows the road, crossing test finishes. (Four wheels should exit the road according to the researcher's assessment). For controlling, the light from the vehicles ahead that caused bright light shock leading to reduced subjective drowsiness, the oncoming vehicles made use of low beam. In order to control the circadian rhythm, the tests were performed between 9 A.M to 12A.M

III. IMPLEMENTATION

The implementation of the drowsiness detection system with its features and its installation and setup procedure are also described. Mid portion of the chapter described how the entire process of drowsiness detection occurs in low level. For conducting these libraries of OpenCv is used. Different .xml files of OpenCv is operated on the input and provide the required result. The .xml files written for drowsiness detection includes face and eye detection which basically done by algorithm developed by Viola-Jones. Those algorithm includes Haar features, Formation of integral Image, Adaboost and Cascading. Theoretical part of all those features are described briefly.

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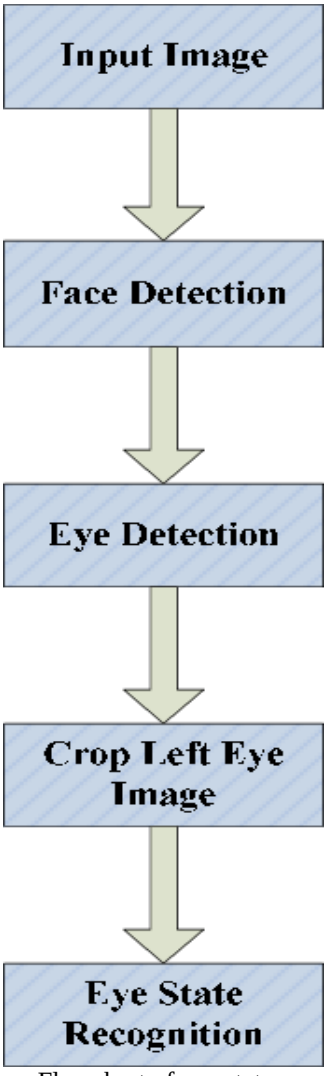

Flowchart of eye state recognition.

IV. CONCLUSION

The driver abnormality monitoring of system developed which is capable of detecting drowsiness, drunken and any other reckless behaviour of the driver in a short period. The Drowsiness Detection System which is developed based on eye closure of the driver can differentiate between normal eye blink and drowsiness and detect the fatigue of the driver. The proposed system can prevent the accidents caused due to the tiredness while driving. The system can work well even in if the drivers wear spectacles and even under dim light conditions if the camera delivers better output. While keeping track, the system is able to decide if the driver eyes are opened or closed. When the eyes are closed for too long, a warning signal is issued and alerts the driver.

V. FUTURE ENHANCEMENT

This drowsiness detection can save a lot of lives from stopping accidents we built this software by using convolutional neural network which takes images as dataset. For future development of this it can also consider the outer factors such as state of the vehicle, sleeping hours, weather conditions, data etc, for fatigue measurement.

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