DRIVER DROWSINESS AND ACCIDENT DETECTION SYSTEM

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ABSTRACT

Drowsiness detection has many indications including reducing roads traffic accidents importance. Using image processing approach is amongst the new and reliable methods in sleepy face. Drowsiness of the drivers is the main bring of accidents in the world as. Due to need of sleep and tiredness, drowsiness can occur while driving. The best way to escape accidents caused by drivers' drowsiness is to detect drowsiness of the driver and warn him before fall into sleep. To detect drowsiness many method like eye retina detection, facial feature recognition has been used. Here in this paper, we propose a method of detecting driver drowsiness using eye retina detection and accident exposure of the driver. In this report, we propose a more precise drowsiness detection method which is a hybrid approach of eye retina detection and accident detection.a

Keyword: - *Drowsiness, Image Processing*

1. INTRODUCTION

Improvement of public safety and the depletion of accidents are of the important goals of the Intelligent Transportation Systems (ITS). One of the most important factors in accidents, especially on rural roads, is the driver fatigue and tedium. Fatigue reduces driver insight and decision making capability to control the vehicle. Researches show that usually the driver is collapse after 1 hour of driving. In the afternoon early hours, after gulp lunch and at midnight, driver fatigue and drowsiness is much more than other times. In addition, drinking alcohol, drug habit, and using hypnotic medicines can lead to loss of consciousness. In different countries, different demography were reported about accidents that happened due to driver fatigue and distraction. Generally, the main cause of about 20% of the crashes and 30% of fatal crashes is the driver drowsiness and lack of concentration. In single-vehicle crashes (accidents in which only one vehicle is damaged) or crashes involving heavy vehicles, up to 50% of accidents are related to driver hypo vigilance. According to the current studies, it is expected that the quantity of crashes will be reduced by 10%–20% using driver face monitoring systems. The driver face observing system is a real-time system that investigates the driver physical and mental condition based on the processing of driver face images. The driver state can be evaluate from the eye closure, eyelid distance, blinking, gaze direction, yawning, and head rotation. This system will alarm in the hyper alert states including fatigue and distraction. The vital parts of the driver face monitoring system are imaging, hardware platform, and the intelligent software. In the driver face track systems,

two main challenges can be examined: "how to measure the fatigue?" and "how to measure the concentration? These problems are the main dares of a driver face monitoring system.

The first challenge is how to define drowsiness exactly and how to measure it. Even supposing the progress of science in physiology and psychology, there is still no precise definition for fatigue. Certainly, due to the lack of exact definition of fatigue, there is not any measurable criterion or tool. However, a precise definition for fatigue is not defined still, but there is a relationship between fatigue and some symptoms including body temperature, electrical resistance of skin, eye movement, breathing rate, heart rate, and brain activity. One of the first and most important signs of fatigue appears in the eye. There is a very close connection between Psychomotor Vigilance Task (PVT) and the percentage of eyelid closure over time (PERCLOS). PVT shows the response speed of a person to a visual affect. Therefore, almost in all driver face monitoring systems, eye closure detection is the first symptom used to count fatigue. The second challenge is counting the driver attention to the road. The driver attention can be partly estimated from the driver head and stare direction. The main problem is that if the head is ahead and looking toward the road, the driver does not necessarily pay attention to the road. In other words, looking regards the road is not paying attention to it. In this paper, a new driver face monitoring system is proposed which bring out the hypo vigilance symptoms from driver face and eye adaptively. Then, the symptoms are examine by a woolly expert system to determine the driver state. The hint of paper is arranged as follow. In Section 2, some old researches are reviewed. The proposed system is report with details in Section. The exploratory results and discussions are presented. Section 5 is associated to the conclusions.

Figure 1: Drowsiness situation while driving car

2. LITERATURE REVIEW

A. Driver Drowsiness Detection System and Techniques According to the specialist it has been observed that when the drivers do not take break they tend to run a high risk of becoming drowsy. Study shows that accidents occur due to sleepy drivers in need of a rest, which means that road accidents happens more due to drowsiness rather than drink-driving. Attention attend can warn of inattentiveness and drowsiness in an extended speed range and notify drivers of their current state of fatigue and the driving time since the last break, offers adaptable sensitivity and, if a warning is emitted, indicates nearby service areas in the COMAND navigation system..

B. Implementation of the Driver Drowsiness Detection System .This paper is about making cars more brilliant and interactive which may notify or resist user under unacceptable conditions, they may provide critical information of real time situations to save or police or owner himself [2]. Driver fatigue resulting from sleep disorganization is an important factor in the increasing number of accidents on today's roads. In this paper, we state a real-time safety prototype that controls the vehicle speed under driver fatigue [2]. To advance a system to find out fatigue symptoms in drivers and control the speed of vehicle to avoid accidents is the purpose of such a mode. In this paper, we propose a driver drowsiness detection system in which sensor like eye blink detector are used for detecting drowsiness of driver .If the driver is found to have sleep, alarm will start buzzing and then turns the vehicle ignition off[2] .

C. Detecting Driver Drowsiness Based on detectors Researchers have attempted to determine driver drowsiness using the following measures: (1) vehicle-based measures; (2) interactive measures and (3)

physiological measures [3]. A detailed review on these computes will provide insight on the present systems, issues associated with them and the enhancements that need to be done to make a robust system [3]. This paper reviews the three measures as to the detectors used and discuss the advantages and limitations of each. The various ways through which drowsiness has been provisionally manipulated is also discussed [3]. It is concluded that by designing a blend drowsiness detection system that combines non-intrusive physiological measures with other measures one would accurately determine the drowsiness level of a driver. A number of road accidents might then be avoided if an alert is sent to a driver that is considered drowsy [3].

3. SYSTEM ARCHITECTURE

Our driver drowsiness detection system consists of four main stages (Fig 2):

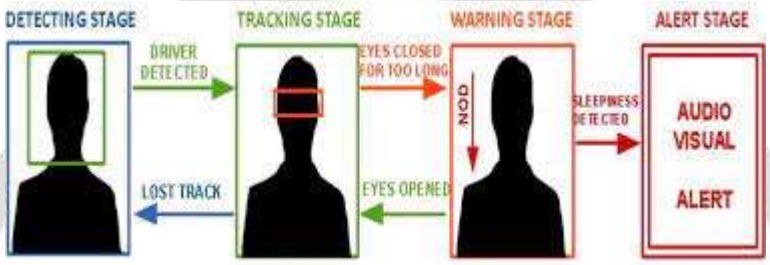

Figure 2: Four stages of Driver Drowsiness Detection System

1) Detection Stage: This is the DE allocates stage of the system. Every time the system is started it needs to be set up and increased for current user and conditions. The main step in this stage is successful head detection (Fig. 2). If the driver's head is correctly discovered we can proceed to extract the features necessary for setting up the system. Setup steps include: (i) bring out driver's skin color and using that information to create custom skin color model and (ii) gathering a set of open/closed eyes samples, along with driver's normal head position. To help achieve these goals, user interchange might be required. The driver might be asked to sit restfully in its normal driving position so that system can determine upper and lower thresholds needed for detecting potential nodding. The driver might also be asked to grip their eyes closed and then open for a matter of few seconds each time. This is sufficient to get the system started. Over time, the system will swell the dataset of obtained images and will become more error resistant and overall more robust.

2) Tracking Stage: Once the driver's head and eyes are correctly located and all the necessary features are extracted, the system enters the regular tracking (monitoring) stage. A important step in this stage is the continuous monitoring of the driver's eyes within a dynamically allocated tracking area. More specifically, in order to save few processing time, the system will state the size of the tracking area based on the previous history of eye movements. For example, if the eyes were moving horizontally to the left for a number of frames it is to be expected that that drift with continue in the following frame also. So it is logical to swell the tracking area towards the expected direction of the eyes and shrink the area in other three directions. During this stage, the system must also state the state of the eyes. All these tasks must be carried out in real-time; depending on the processor's capacity and current load, it might be necessary to occasionally skip a few frames, without sacrificing algorithmic accuracy.

3) Warning Stage: If the driver retains his eyes closed for prolonged period of time or starts to nod, alertness has to be raised. The main step within this stage is close monitoring of drivers eyes. The system must state whether the eyes are still closed, and what is the eyes' position relative to previously established thresholds. We cannot purvey to skip frames in this stage. In practice, trace of eyes is performed much in the same way as in the tracking stage with the addition of the following processes: calculation of velocity and trajectory of the eyes and sill monitoring. These additional computations are required to increase the system's ability to determine whether the driver is drowsy or not.

4) Alert Stage: Once it has been state that the driver appears to be in an abnormal driving state, the system has to be proactive and alert the driver of potential dangers that can arise. Combination of audio/visual alerts are used to attract the driver's attention and raise their alertness level. Notify has to be implemented in such a way as not to cause the opposite effect of intended and startle the driver into causing an accident.

3.1 Algorithm

In this paper, we will be using OpenCV for gathering the images from webcam and feed them into a Deep Learning model which will classify whether the person's eyes are 'Open' or 'Closed'. The approach we will be using for this project as follows:

STEP 1: Capture a picture from a camera as input.

STEP 2: Create a ROI around the face in the image.

STEP 3: Discern and input the eyeballs from the ROI to the classifier.

STEP 4: The Classifier will determine either or not the eyes are open.

STEP 5: State if the subject is sleepy by calculating a score.

3.2 Flowchart

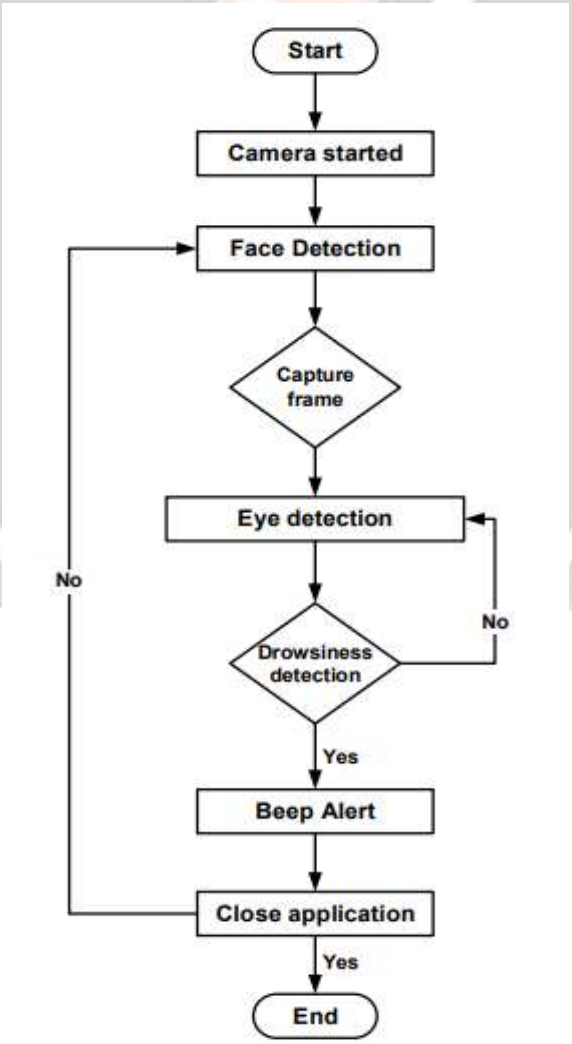

Figure 3: Flowchart of System

4. CONCLUSIONS

Motive of our project is to help solving real life problem in very cost effect way. It alerts the truck driver as well as the owner of the company. Whenever the driver feels sleepy and closes his eyes for more than a second, the buzzer is blown. As a result, it alerts the driver. It also alert the owner of the truck driver by sending him text messages. As a result the accident ratio decreases. Hence, our project if mercantile developed will help in saving the precious life of truck driver & money of the owner.

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