**Driver Drowsiness Detection System**

**ABSTRACT**

Ever increasing number of accidents while driving can be significantly reduced if modern technology is introduced within the automobile to monitor the physical condition of the driver at every instance during the movement of the vehicle and precautionary measures are taken for the safety of the driver. According to the survey made by government, 22% accidents are due to drowsiness. To manage the system image processing technique can be more useful. Based on the computer vision techniques, the drivers face is located from a colour video capture in a car. Then, face detection is employed to locate the region of drivers eyes, which are used as the templates for eye tracking in subsequent frames. Finally, the tracked eye images are used for drowsiness detection in order to generate warning alarms. It has three phases: Face, Eye detection and drowsiness detection. The role of image processing is to recognize the face of the driver and then extracts the image of the eyes of the driver for detection of drowsiness. The Haar face detection algorithm takes captured frames of image as input and the detected face as output. Next, CHT is used to tracking eyes from the detected face. If the eyes are closed for a predefined period of time the eyes of the driver will be considered closed and hence a buzzer will be started to alert the driver. A GSM module is introduced in the system which sends SMS to the person whose contact is saved in the system. This system focuses on the development in the most economical way so that it can be implemented in the lower end vehicles too which form larger crown on roads.

**INTRODUCTION**

Drowsy driving is one of the major causes behind fatal road accidents. One of the recent study shows that one out of five road accidents are caused by drowsy driving which is roughly around 21% of road accidents, and this percentage is increasing every year as per Global Status Report on road safety 2015, based on the data from 180 different countries. This certainly highlights the fact that across the world the total numbers of road traffic deaths are very high due to driver’s drowsiness. Driver fatigue, drink-and-drive and carelessness are coming forward as major reasons behind such road accidents. Many lives and families are getting affected due to this across various countries. All this led to the development Intelligent Driver Assistance Systems. Such driver drowsiness detection can be measured using physiological measures, ocular measure and performance measure. Among these physiological measures and ocular measure can give more accurate results. Physiological measures includes brain waves, heart rate, pulse rate measurements and these requires some sort of physical connection with the driver body but this leads to discomfartable driving conditions. But ocular measure can be done without physical connection. Ocular measure to detect driver eye condition and possible vision based on eye closure is well suited for real world driving conditions.

**BACKGROUND**

Passenger safety has been a major concern to all societies in any country in the world. Thousands lose their lives daily and many more lose their livelihood because of paralysis cause by accidents. On average traffic, road accidents in the world claim 13 million lives and cause 20 to 50 million disabilities annually. It is approximated that road accidents account for more than 23% of all injury deaths worldwide. This statistics are projected to rise to be third killer by 2020. Ahead of HIV/AIDS, respiratory infections and wars.

Developing countries shoulder the largest share of road accidents despite having the smallest share of all registered vehicles. With only 52% of the words registered vehicles, they account for over 80% of all world traffic accidents. Currently the annual road traffic fatality rate stands at 20.1 per 1 lakh compared to 8.7 per one lakh in the high income countries.

In order to counter drowsiness several measures have been put in place for tracks, public service vehicle (PSV) and private vehicle drivers. The most common being presence of rest places and driver relaxing at petrol stations in order to prevent drowsiness from building up. Drivers driving under immense pressure, stress, sleep deprivation and those who drive longer for economic reasons contribute greatly to this statistics. Drowsiness can be physical or mental impairment brought about by having inadequate rest over a period it can result from lack of sleep, long period of work and time of the day when work is being done. Drowsiness leads to loss of alertness, which is accompanied by poor judgement, slower reaction to events and decreased skills leading to accidents. This affects the efficiency, effectiveness and safety of a driver carrying out the driving task resulting to accidents. However, providing cheaper solutions to serve in the low income regions will help reduce the associated losses.

**BLOCK DIAGRAM**

GSM module

moo

Raspberry pi

Eye detection

Camera

Buzzer

Fig: Basic Block Diagram of Drowsiness Management System.

1. Camera:

A digital camera of 5MP was used to capture real time image periodically to detect the drowsiness of person. Then capturing images are then given to the Raspberry pi for further processing for eye n pupil detection.

1. Raspberry pi:

In Raspberry pi, board image processing based eye n pupil detection algorithm has been implemented. Speed of Raspberry pi board was very high in real time system as compared to other.

1. Buzzer:

It was used for indication. As soon as system detects the drowsiness or alcoholic state, alarm starts ringing and ignition of vehicle was kept in off state by keeping relays OFF.

1. Power Supply:

DC power supply for system depends on selection of micro controller. We have used micro controller which runs on 5v supply this supply can be derived from Raspberry pi board.

1. GSM module:

A GSM module was implemented to send the positive drowsiness condition SMS to the relative or person close to the driver so that the person knows the condition and can call to the driver and can suggest to stop the vehicle immediately.

**OBJECTIVES**

To develop an embedded system that detects driver drowsiness level and warns him or her of his or her state.

1. To be able to accurately detect a face from an image.

2. To be able to detect the region of interest in this case the eyes.

3. To accurately classify the state of the eye either closed or open.

4. To provide a warning to the driver if drowsiness is detected.

**PROBLEM DEFINITION**

In the 21st century, driver drowsiness has continued to be a major challenge contributing to a large number of accidents on our roads. In India, driver drowsiness especially among long distance truck drivers, public service vehicles drivers and private vehicle drivers is a major concern. This continues despite the government putting in place several measures to address the problem; measures including regulation of the public vehicle travel time, increasing the number of drivers for buses that travel at night, use of alcohol blows to detect drunk drivers among many others.

Providing drowsiness management system among drivers has not been achieved making it difficult to enforce relevant legislations. A few systems are available in the market however; they are expensive making them a reserve for a few who can afford the cost of current vehicles fitted with search technologies. There is hence great need to provide drowsiness management system that are affordable to the many who are low income earners and also public service vehicles to help address the many accidents associated with drowsiness.

**EXPECTED OUTCOME**

The datasets with positive and negative samples will be used as training samples in this system. Haar like features will be used to locate eyes on the face and extracts of these parts will be done. The features of these parts will be extracted using adaptive boost technique by means of which matching samples will be identified.

When driver is feeling drowsy, opening and closing of eyes becomes frequent or longer closing periods can be seen than normal or fresh mood.

Along with opening and closing of the eye it will be possible to detect drowsiness by detecting the size of the pupil which is greater as compared to the normal conditions.

After detection area of eye region, opening and closing rate of eye are to be calculated and compared with threshold value in system database to declare drowsiness and according signalling with alarm and SMS will be sent to the registered mobile number.

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