A DRIVER FACE MONITORING SYSTEM FOR FATIGUE AND DISTRACTION DETECTION

Dr.D.Pramodhkrishna, Professor, Department of CSE, Narayana Engineering College (Autonomous) Gudur**,**.SPSR Nellore, AP, India**.**
A.Bhaveshkumar, K.Vishnuvardhan Reddy,B.Sujith, UG Students, Department of CSE, Narayana Engineering College (Autonomous) Gudur**,**.SPSR Nellore, AP, India

Abstract

Nowadays, the number of accidents areoccuring because of the Driving Drowsiness.It is one of major cause in the world. Detecting the driver eye tiredness is the way for measuring the drowsiness of a driver while driving a vehicle. The Existing system are to provide low accurate results and variations in the camera positions. In order to solve this problem,we proposed a project is 'A Driver Face Monitoring System For Fatigue and Distraction Detection '. Specially , we propose a framework it analyzes the eye movements of the driver this process is run continuously. Illustrate the system gives the better performance in terms of the accurate drowsiness detection results and it can reduces the Road Accidents.

Keywords:-web cam, face detection, alert system

Introduction

A Driver Face Monitoring System For Fatigue and Distraction Detection is a vehicle protection generation which enablesto save you from injuries caused by the driver getting drowsy. 20% of all road accidents are fatigue-associated, up to 50% on certain roads. The fatigue of the driver is one of the major problems for the accidents. The predominant purpose for those kinds of accidentsis "lack of sleep". person can't survive without sleepAnd it is a need for every human. The Stress is a second reason for these type of accidents. And also IT related people are going to the more stress. When they undergo stress, they'll drive in abnormal manner.So, as to wake them up we maintain an alert system to stop accidents. The third reason for these sorts of accidents are "travelling to long distance" by one driver. Think, what if one driver keeps on travelling to long distance, there definitely be an opportunity of accident. So, to prevent these type of accidents we need an system alert[1] When an alarm keeps on giving alert, we will decrease road accidents and save some lifes. However, there any kind of reasons for these types of accidents, but the innocent people who are passing opposite to them, they also losing some lifes[2].

The major vehicle production companies like Volvo and Mercedes-Benz they have their own alert system to react whenever the driver undergoes fatigue. However, accidents are occurring due to the fatigue many people are not using these type of alert system in their vehicles.

According to a survey, the Majority of the accidents (78.4%) are due to the driver fault .other (7.1%) of the accidents are due to fault of pedestrians or drivers of other vehicles, (2.8%) are due to civic bodies fault,(2.3%) are due to usage of unconditional vehicles and remaining (1.7%) of the accidents are due to weather conditions.

Now, in this paper we are focuses on the accidents which are related to the driver fault. We are going to detect the face of the driver through a webcam and identifies the driver is in conscious state or not. If the driving force isn't in conscious state then the detection system will find it out and provides an aware of driving force. Many things which are not possible manually are done by using the technology. Yes, by using the technology we will find whether a person is sleeping or not. To identify the state of person we are going to use Python along with some packages like OpenCV, Keras, Tensor Flow and PYGame[3][4].The requirements to implement this are webcam, through which we are going to take the input and alarm to gives an alert.

Literature survey

Driver fatigue is one of the main reasons for road accidents. In current survey it shows that out of 5 accidents one accident is due to driver sleepiness.and most of the road accidents are occur due to the

fatigue of a driver and it increasing gradually in every year. This survey mainly states that the accidents are occurred due to Fatigue. Driving a vehicle in more traffic road has become a bane because of the road and poor weather conditions, Fatigue of driver, the major road accidents are occurring due to drinking alcohol. Due to less conscious we can't take care of ours while driving. To provide security to driver, the vehicles are assisted with automated safety system that alerts driver by using alarm. All vehicles should be equipped with eye blink sensor and alcohol sensor sequentially to avoid these types of accidents. there are Four important factors of driver fatigue are sleep, work, time of day, and physical.

The Possible detection technique supported the vehicle might be deviation from the lane or the pressure on the acceleration portal.We mainly focus on the factors which are related to the eyes of the driver and detecting the state of drowsiness. The use of image processing in the following system is very important and necessary as it provides one of the best solutions to detect the drowsiness at earliest and spares time to work on avoiding the accidents. Image processing is used in this system to process the images that are collected from the vehicle of the person driving the vehicle. We are also including one more feature in our project module that is Intrusion detection. This is an important feature for ensuring safety of the cars from the burglars. Accidents due to Fatigue are increasing .This problem will increase day by day. So, we need to have an automatic system that can detect the face and give alarm[5[6]].

Methodology There are various ways to detect whether a person is in Active state or not.

A. Techniques:

The various techniques that are used are :

1. Image processing techniques
2. Eye analysis and facial expressions

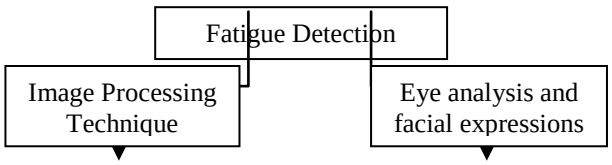

Fig 1.various techniques

a.**Image Processing Technique**:

In the image processing technique, the drivers images is captured before while sleeping and in normal state as well[5]. These images are given input and then it will match with the driver sleeping image and driver normal image. In this way we can detect that the driver is sleeping or not.

b.**Eye Analysis and Facial Expressions***:*

In the eye analysis and facial expressions, we will use webcam to capture the driver face and process the image continuously. It is a continuous monitoring system. The image is taken as input and it will detect the face of the driver in the image. After detecting the face it will detect the eyes of the driver and find out the status (open or close) of the eye. If the driver is sleeping it gives an alert by ringing alarm. It is accurate and not cost effective.

B. Comparing and Choosing Best Technique:

Let's compare and choose the best technique.

NO:	Technique	Limitations
1	Image processing technique	Not more suggestible (because , when background or driver changes it may not work effectively)
2	Eye analysis and facial expressions	It is accurate and not cost effective.

Figure 2.comparing various techniques

So, eye analysis and facial expressions is chosen by considering the cost effective case and accuracy.

c. Implementation:

Implementation mainly involves schema design, use case diagram and Algorithm

a.**Schema design*:***

Schema design involves that, the webcam is placed in front of the driver and it will capture the image. After capturingimage it will process and identifies whether the driver is sleeping. If he/she is sleeping then produces alarm.

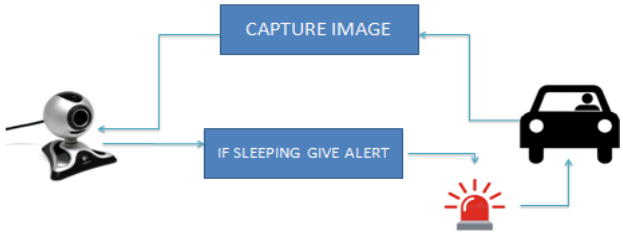

Fig 3.schema design

b.**use case diagram:**

In this use case diagram, the flow of process is represented as shown in the Figure. The fatigue levelare in continuous frame.

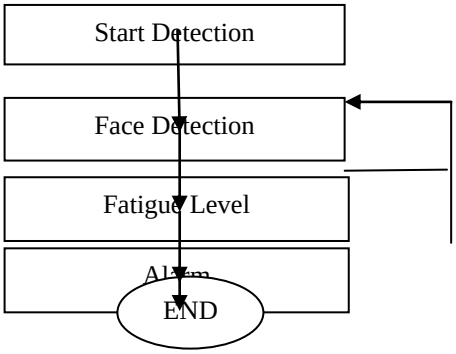

Fig 4.use case diagram

3. ***Algorithm:***

The Algorithm is for analysis of eye and facial expressions is as follows:

START

STEP 1: Camera will monitor the person and it captures the image.

STEP 2: Face will be detected and it will create a Region of Interest (ROI).

STEP 3: Eyeswillbe detected from ROI and Feed it in to the Classifier.

STEP 4: Classifier will categorize whether eyes are open or closed state.

STEP 5: Now,calculate score to check wheather the person is fatigue state.

STEP 6: If the level of fatigue is more then give an alert to the driver by ringing the alarm.

STEP 7:the alarm sounds until the driver wakes up.

END:

Here we are using Opencv, Keras, Tensor Flow,PYGame. OpenCV is used for the eye detection and face detection, background as Tensorflow.Keras for classifying the state. PYGame is used for ringing the alarm[7].

Results and Discussions

This discuss about the results and analysis of the eye analysis and facial expressions. Let's explore. Here are the sample outputs

a.Case 1

When the driver is in open state that means the driver is not sleeping. It indicates that the driver is in open state and fatigue level will be on "zero"

b.Case 2

When the driver is in Initial close state that means the driver is about to sleep. It indicates that the driver is in initial close state and fatigue level will depend on how much fatigue he/she has. Give an alert.

c.Case 3

When the driver is in closed state that means the driver is sleeping. It indicates that the driver is in closed state and fatigue will be detected and gives alarm indicating "DROWSINESS ALERT".

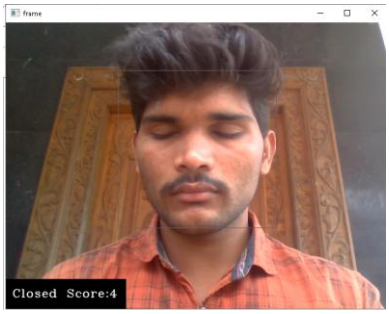

Fig 6(a): Open State Figure 6(b): Initial close state Figure 6(c): Alarm State-DROWSINESS ALERT

NO:	Type	N0: of observations made	Accuracy
1.	Driver without spectacles	20	92.54%
2.	Driver with spectacles	30	83.95%
3.	Driver with Sunglasses	30	81.2%
4.	Driver with wearing Cap	20	88.32%
Total		100	86.3276%

Fig5.Results and analysis

Conclusion

There are number of accidents are happening ordinary and number of individuals are losing their lives. By utilizing this methodology we can save a group of lives. As our methodology is not most cost effective we can adopt this method in our vehicles. This can save some of important life.

Future scope

When the driver is continuously sleeping and our system has given alert but the driver is not in a position to wake up then in this case we need to extend our detection. When the alarm is ringing but the driver has not taken any action then the computer in the vehicle has to take an action against it that means, the vehicle should be controlled by computer. The computer should connect to GPS Maps and by using indicator the vehicle has park to its left side. So, we'd like to possess an automatic system which will detect the face and provides alarm.

References

[1]Real time driver drowsiness detection based on driver's face image behavior using a system of human computer interaction implemented in a smartphone by Eddie E. Galarza1,1, Fabricio D. Egas1, Franklin M. Silva1, Paola M. Velasco1, Eddie D. Galarza1,

[2]Real-time driver drowsiness detection for android application using deep neural networks techniques by ratebjabbara, Khalifa Al-Khalifaa, Mohamed Kharbechea, Wael Alhajyaseena, Mohsen Jafarib, Shan Jianby Prakash Choudhary, Rahul Sharma.

[3] Human drowsiness detection system by Rukhsar Khan, Shruti Menon, Shivraj Patil, Suraj Anchan, Saritha L. R.

[4] Driver drowsiness detection system for vehicle safety by A. Subbarao, K.Sahithya

[5] Venkateswara Rao, P., Ramamohan Reddy, A., Sucharita, V.An approach of detecting white spot syndrome of peaneid SHRIMP using improved FCM with hybrid back propagation neural network, International Journal of Pharmacy and Technology, 2016, 8(4), pp. 22351–22363

[6]Sucharita, V., Venkateswara Rao, P., Bhattacharyya, D., Kim, T.-H. Classification of penaeid prawn species using radial basis probabilistic neural networks and support vector machines International Journal of Bio-Science and Bio-Technology, 2016, 8(1), pp. 255–262

[7] A review: driver drowsiness detection system by Chisty, Jasmeen Gill