Drowsiness Detection System
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Abstract:
The major reason for road accidents is a fatigue of a driver often called as Drowsiness. Therefore, to reduce these accidents, an automotive system which monitors alertness level of drivers is necessary. This system represents a new way towards safety as well as security of automobiles. By using the concept of Iris recognition system, Drowsiness detection is achieved. Now a day’s driver fatigue related crashes has increased. To develop nonintrusive system which will detect the fatigue or drowsiness of driver and will issue a warning with the help of alarm is the main aim of our project. This project will help to lower the number of crashes or accidents as most of the accidents are caused due to drowsiness. In this project we will detect the eye blinking with the help of webcam. If the eyes of the person are closed for more interval of specified time then this will result into the warning in the form of sound project or alarm.

Keywords: Drowsiness, Fatigue, non-intrusive.

I. INTRODUCTION

Automotive population is increasing exponentially in our country. The most important problem regarding the increased use of vehicles is that the rising number of road accidents. Road accidents are undoubtedly a world menace in our country. The frequency of road accidents in India is among the very best within the world.

Per the reports of the National Crime Records Bureau (NCRB) about 135,000 road accidents-related deaths occur each year in India. The world Status Report on Road Safety published by the globe Health Organization (WHO) identified the most important causes of road accidents are due errors and carelessness of the driving force.

Driver sleepiness, alcoholism and carelessness are the key contributions within the accident scenario. The fatalities, associated expenses and related dangers are recognized as serious threat to the country, of these factors led to the event of Real Time Drowsiness Detection Systems (DDS). Driver errors and carelessness contribute most of the road accidents occurring nowadays. The most important driver errors are caused by drowsiness, drunken and reckless behavior of the driving force.

This errors and mistakes contribute much loss to the human beings and animals. So as to reduce the results of driver drowsiness, a system for drowsiness monitoring must be built with the vehicle. The important time detection of those behaviors could be a serious issue regarding the look of advanced safety systems in automobiles. This project focuses on a driver drowsiness detection system on automotive domain.

Detection of fatigue involves a observation of a face, detection of eye position and therefore the observation of eye status. The analysis of face images could be a popular research area with applications like face recognition, virtual tools, and human identification security systems. During this, the project will concentrate on the locating the eyes, which involves staring at the complete image of the face, and determining the position of the eyes, by a self-developed image processing algorithm.

Once the position of the eyes is located, the system is intended to see whether the eyes are opened or closed and detect whether the driver is drowsy or not. Developed system works efficiently even within the presence of various illumination sources within the background, unlike the previous research which needs that there should be dark background behind the user.

II. PROBLEM DEFINITION

Drowsiness and Fatigue of drivers are amongst the numerous causes of road accidents. They increase the amounts of deaths and fatalities injures globally, every year. During this project, a module for Driver Drowsiness Detection System (DDS) is presented to reduce the number of accidents due to drivers fatigue and hence increase the transportation safety; this method deals with automatic driver drowsiness detection supported visual information and detection.

Now a days, more and more professions require long-term concentration. Drivers must keep an in depth eye on the road, in order that they can react to sudden events immediately. Driver drowsiness often becomes an instantaneous explanation for many traffic accidents.

Therefore, it is very important to develop the system that will detect a bad psychophysical condition of a driver and notify him/her, which could significantly reduce the number of fatigue-related car accidents.

However, the event of such systems encounters many difficulties associated with fast and proper recognition of a driver’s fatigue symptoms, one amongst the technical possibilities to implement driver drowsiness detection systems is to use the vision-based approach.

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III. BLOCK DIAGRAM

![Block Diagram Image]

**Working step of proposed system**
Process Webcam -> Extract Frames -> Find landmarks
Extract Eye Landmark -> Calculate Eye ratio
Compare Threshold -> Take decision -> Alert

3.1 Process Webcam
The webcam captures input video and supply it to the drowsiness detection system.

3.2 Extract Frames
Extraction is that the process during which frames are created from input video which are then used for eye detection (eye position and eye detection).

3.3 Find Landmarks
In this step, Shape predictors, also called landmark predictors, are accustomed predict key (x,y) coordinates of given “shapes”. the foremost common, well-known shape predictor is dlib’s facial landmark predictor accustomed localize individual facial structures, including the:
- Eyes
- Eyebrows
- Nose
- Lips/mouth

3.4 Extract Eye Landmarks
In this step, as we've got to handle specially eyes, eye landmarks are extracted from the landmarks found by landmark predictor.

3.5 Calculate Eye ratio
In this step calculation of Eye ratio is performed.

3.6 Compare threshold
Compare the computed Eye ratio with the predefined threshold value. If the computed EAR value is larger than predefined threshold value in predefined number of frames (20) them system will raise the alarm.

IV. EYE ASPECT RATIO

For every video frame, the attention landmarks are detected. the attention ratio (EAR) between height and width of the attention is computed.

![Facial Landmarks Image]

Figure.2. Facial Landmarks

Facial landmarks are used for face alignment (a method to spice up face recognition accuracy), building a “drowsiness detector” to detect tired, sleepy drivers behind the wheel, face swapping, virtual makeover applications, and far more.

![Eye Aspect Ratio Image]

Figure.3. Eye aspect ratio

The EAR is generally constant when a watch is open and is getting near zero while closing a watch. it's partially person and head pose insensitive. ratio of the open eye incorporates a small variance among individuals and it's fully invariant to a regular scaling of the image and in-plane rotation of the face. The EAR of both eyes is averaged from when the eye blinking is performed by both eyes synchronously.
V. USE CASE DIAGRAM

VI. FLOWCHART

During this project, the algorithm which we are using is fast as compared to the PERCLOS which was used by others, therefore the time taken by our system is a smaller amount. Hence this technique is fast and can issue a warning within the variety of sound.

VII. ADVANTAGES

1. Detects drowsiness
2. Decreasing road accidents
3. System implemented without using database storage
4. No wires, cameras, monitor or other devices are to be attached or geared toward the motive force
5. because of the non obtrusive nature of those methods they're more practically applicable

VIII. CONCLUSION

In Drowsiness Detection System the driver’s eyes are detected and supported eye landmarks Eye ratio is calculated using EAR algorithm. If the motive force is found drowsy then alert is given to the motive force through alarm. This system reduces the quantity accidents while driving a vehicle and helps to stay ourselves safe.

IX. REFERENCES

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