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Driver Attention Alert

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Abstract:
Driver's lack of attention is one of the leading reasons for road accidents which lead to death. Hence, determining of driver's fatigue and its indication is an important research area. The existing methods are either vehicle based, or behavioral based or physiological based and some of these methods are intrusive and distract the driver, some require expensive sensors and data handling. In this paper we propose a cheaper alternative, where a webcam records the video and driver's face is detected in each frame employing image processing techniques. Facial landmarks on the detected face are pointed and subsequently the eye aspect ratio will be computed and depending on their values, driver's attention is analyzed.

***Index Terms*: Driver, Detect, Frame, Face Detection, Drowsiness, Driver Fatigue, Image processing, OpenCV, Haarcascade Files.**

1.Introduction:

Driver exhaustion is a significant factor in numerous accidents. Late measurements gauge that yearly 1,200 passing's and 76,000 wounds can be credited to fatigue-related crashes Driver drowsiness and fatigue is a major factor which results into many vehicle accidents. Developing and maintaining technologies that can efficiently detect or prevent drowsiness at the wheel and alert the driver before a mishap is a major challenge in accident prevention systems. Because of the danger that drowsiness can cause on the roads, some methods need to be developed for preventing counteracting its effects. With modern technology and real-time scanning systems using cameras, we can prevent major mishaps on the road by alerting car driver who is feeling drowsy through a drowsiness detection system The goal of this project is to create a prototype drowsiness detection system. The focus will be on developing a framework that can continuously detect whether the driver's eyes are open or closed... By monitoring the eyes, we believe we can detect the symptoms of driver fatigue early enough to avoid a car accident. The detection of fatigue entails observing eye movements and blink patterns in a series of images of a face.

2. Literary Survey:

In [1], Manu (2016) depicts a useful technique for recognizing tiredness through three distinct stages. The facial highlights detection using Viola Jones, the eye following, and yawning discovery are the three stages. Once the face is identified, the framework is light invariant by fragmenting the skin section only and analyzing only the chromatic parts to eliminate the majority of the non-facial picture foundations that are skin shade dependent. Relationship coefficient layout coordinating completes the following of eyes and yawning recognition. In [2], Belal et al. (2013) developed a module for Advanced Driver Assistance System (ADAS) to reduce the number of accidents caused by driver incapacity and, as a result, improve transportation safety. This system controls the detection of programmed driver tiredness using visual data and Artificial Intelligence. In [3], Jang et al. (2018) created a new fatigue detection algorithm that uses a camera mounted near the dashboard. The suggested calculation recognizes the driver's face in the image and calculates the face landmarks. The suggested calculation uses an AdaBoost classifier based on the Modified Census Transform highlights to recognize the face. In [4], Anirban et al. (2018) developed a cell phone-based strategy for drowsy driving in automobiles The suggested method recognizes drowsiness in three phases. The main stage employs a modified eye state order methodology to determine the level of eyelid conclusion (PERCLOS) obtained from images captured by the front camera. The framework utilizes close to infrared www.ijcrt.org © 2020 IJCRT | Volume 8, Issue 7 July 2020 | ISSN: 2320-2882 IJCRT2007200 International Journal of Creative Research Thoughts (IJCRT) www.ijcrt.org 2214 lighting for enlightening the essence of the driver during night-driving. The voiced to unvoiced proportion obtained from the mouthpiece's discourse data is used in the next step. A final check stage is used as a contact reaction within a specific time frame to declare the driver as weary and hence maintain a warning. In [5], Feng et al. (2019) derived a constant driving laziness recognition calculation that thinks about the individual contrasts of driver. To recognize the facial region, a deep felt convolutional neural system was constructed, which avoids the issue of helpless precision caused by fake element extraction. The milestones of frontal driver face in a casing are discovered using the Dlib toolkit. Another barrier, known as the Eyes Aspect Ratio, is used to determine the weariness of the driver, as suggested by the eye's milestones.

3. Existing System:

Accidents because of drowsiness can be controlled and prevented with the help of an eye blink sensor using IR rays. It comprises an IR transmitter and an IR receiver. The transmitter transmits IR rays into the eye. If they shut the eye, then the output is high. When the eye is open, the output is low. This output is linked to an alarm both inside and outside the vehicle. This module can be connected to the vehicle's braking system and used to reduce the vehicle's speed. The alarm inside the vehicle will go on for a while until the driver is back to his senses. If the driver is unable to regain control of the vehicle after the allotted time, the alarm outside the vehicle will sound and alert others to assist the driver.

4. Proposed System and architecture

4.1 Proposed system:

In this project, we detect drowsiness in a driver by monitoring his or her visual behavior with a webcam algorithm. This application will read images from a driver's inbuilt webcam and then extract facial features from the images using the OPENCV SVM algorithm. If the driver in the image blinks his eyes for 20 frames in a row or yawns, the application will notify him of his drowsiness. are constantly checking or predicting eyes distance closer to drowsiness; if the distance is closer to drowsiness, the application will notify the driver.
Drowsy driving is one of the primary causes of automobile accidents and fatalities. As a result, detecting driver fatigue and its symptoms is an active research area. The majority of traditional methods are vehicle-based, behavioral-based, or physiological-based. While some approaches are invasive and distract the driver, others require the deployment of pricey sensors and data processing. As a result, a low-cost, real-time driver sleepiness detection system with adequate accuracy is developed in this research. A webcam records the video in the developed system, and the driver's face is detected in each frame using image processing techniques. The eye aspect ratio, mouth opening ratio, and nose length ratio are computed from the observed face's facial landmarks, and drowsiness is recognized based on their values utilizing created adaptive thresholding.

4.2 Proposed Architecture:

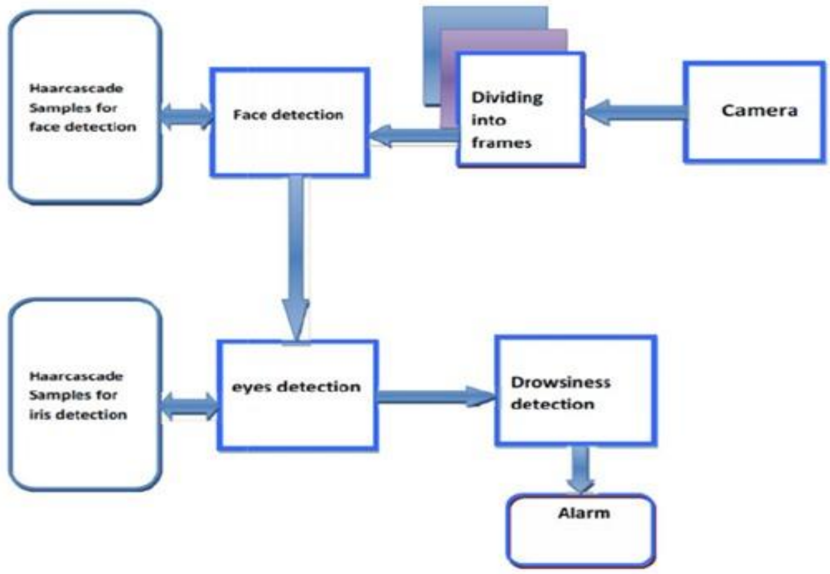

Fig 1. Proposed System Architecture

A) Gathering the Video:

By specifying the appropriate parameters, you can also specify whether the video should be collected via the built-in webcam or from an external camera. As previously stated, OpenCV does not specify any minimum camera requirements; however, by default, OpenCV requires a specific video resolution, if this requirement is not met then OpenCV will run into an error. In order to not encounter such an error, we must not rely on the default resolution

B) Breaking up into frames:

After obtaining the video, it must be divided it into a sequence of frames/images. This was originally carried out in two steps. The very first action is to take a frame out from camera or a video file; in our scenario, because the video is not preserved, the frame is directly obtained from the camera; after that, the image/frame is retrieved during the retrieval process. Instead of the above steps, we used a function that obtains the frame and gives back a decompressed frame.

C) Face detection:

When the frames are effectively separated the following stage is to recognize the face in every one of these edges. This is accomplished by utilizing the Haarcascade files for face recognition. The Haarcascade file contains various highlights of the face, like stature, width and limits of face tones., it is built by utilizing various positive and negative examples. First, we load the cascade file for face detection. The captured frame is then passed to an edge detection programme, which analyzes all conceivable objects of various sizes in the frames. Because the face of the automobile driver takes up a large portion of the image, we can specify the edge detector to detect only objects of a specific size, which is determined by the Haarcascade file, where each Haarcascade file is designed for a specific size. The edge detector's result is now saved as an array. To identify the face in the frame, the edge detector's output is compared to the cascade file. The number of failures on which an object identified should be classed as a negative sample because the cascade contains both positive and negative samples. We've set this value in our system. In our system, we set this value to 6, which helped in achieving both accuracy as well as less processing time. This module's output is a frame with a face recognized in it.

D) Eye Detection

Following the detection of the face, the next stage is to detect the eyes, which can be done using the same methodology as the face detection. However, before attempting to detect eyeballs, we mark the region of interest to limit the amount of processing.

E) Attention Detection:

After detecting the eyeballs, the next stage is to establish if they are closed or open. The pixel values from the ocular region are extracted to achieve this. After extracting, we check to see if these pixel values are white; if they are, it means the eyes are open; if they aren't, it means the eyes are closed. This is carried out for each and every frame that is extracted. The automobile driver is considered fatigued if his or her eyes are closed for two seconds or a specified number of consecutive frames, according on the frame rate. We consider it as a blink if the eyes are closed in non-consecutive frames. A text message is shown along with an audible alarm if drowsiness is detected. However, the system was found to be unable to run for a lengthy period of time since the conversion of the captured video from RGB to grayscale used up too much memory. Instead of transforming the video to grayscale, the RGB video was just used for processing to solve this problem.

5. Results:

Case 1: The driver's eyes remain open and the system allows blinking provided the eyes do not close for longer than 10 seconds as set by limitation.

Case 2: The driver shuts his eyes for longer than 10 seconds, triggering the alert system. This alert will set off until the driver opens his eyes and the drowsiness goes below 10. Eventually setting the driver in an alert state.

6. Conclusion:

This project's main purpose is to create a real-time sleepiness monitoring system for autos. We created a simple system with five modules: video acquisition, frame division, face detection, eye detection, and drowsiness detection. Each of these components can be done separately, giving you a way to organize them based on your preferences. Each of these components can be executed independently, giving you the option of structuring them according to your needs. Our system differs from others in four ways: (a) Pay attention to the driver, which is a simple approach to detect tiredness. (b) A system that is fully non-intrusive. (c) A system that detects face, iris, blink, and driver fatigue in real time. (d) Utilize cost effectively.

7. References:

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