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A SURVEY ON ANALYSIS OF REAL TIME DRIVER FATIGUE DETECTION BASED ON FACE FEATURES AND PERCLOS

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ABSTRACT:

Driver weariness has risen to the top of the list of contributing factors in car accidents in recent years. Drowsiness, for example, can be an indication of driving weariness based on the driver's current health situation. A driver's safety on the road can be ensured by monitoring for indicators of tiredness. A framework that can be utilised in the real world to detect weariness is what we're focusing on in our research. First and foremost, we want to get a clear picture of the driver and collect ocular data from this method. A webcam and image processing are used to identify the driver in each frame of the recorded film. It is possible to tell if a person is fatigued based on their facial traits, such as the aspect ratio, mouth-opening ratio, and nose-longitation relationship.

A number of technical words, such OpenCV and Eye Aspect Ratio and Image Processing, are thrown around.

I.INRODUCTION:

100,000 cases of driver sleepiness or tiredness in the United States each year are estimated by the National Highway Traffic Safety Administration (NHTSA) (NHTSA). According to NHTSA statistics, fatigued driving was at blame for 72,000 accidents, 44,000 incidents, and 800 deaths in 2013. Everyone on the planet has access to an automobile at some point in their lives. It used to be seen as an extravagance, but now the majority of people consider it a need. Most people prioritise the security of their automobiles in the event of a break-in or an accident. People take you less seriously when you are drowsy. If this human instinct is neglected or not taken into consideration and acted upon, driving on the street can be dangerous and deadly.

Drowsiness is a feeling of tiredness or slumber. Adults need seven to eight hours of sleep per night to have a good night's rest. If this part is ignored and adequate sleep is not acquired, fatigue will ensue. Performing this while driving is extremely unsafe. Drowsy driving is the leading cause of car accidents, and many of them can be prevented.

As a result, accidents can be avoided if drivers are monitored for drowsiness at all times. Road conditions, weather conditions, and technical failures can all lead to accidents. A staggering 20 percent of car accidents are caused by drivers who

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are impaired by booze, drugs, or fatigue. Several factors influence a driver's ability to drive safely. A mishap could occur if these prerequisites are not met. One way to tell if a person is fatigued is to observe their head and eye movements, as well as their mouth opening and closing. A new algorithm based on computer vision has been created by our team. Instead, "Blink detection and frequency measurement is the key focus" (Eye aspect ratio). Throughout the video, there are a lot of eyes to be observed. An infrared camera is used to record video of the driver's eyes in all lighting conditions. Later, video recording and image processing systems will make advantage of the images captured in this manner. Drivers' eyes and sleep patterns are our primary concern. It is vital in the preceding system since image processing is one of the most effective methods for promptly diagnosing fatigue and saving time in order to avoid accidents. With this method, the images captured by the driver of the vehicle are enhanced and enhanced. Additional input identification features are included in our project module. If this could be adopted, the safety of automobiles would dramatically increase.

II.LITERATURE SURVEY

SYSTEM REVIEW - To gather data for this study, researchers looked to a variety of online resources and mobile applications. Through the use of this data and doing an audit, we were able to come up with new ideas and approaches for our project. The need for such an application has been demonstrated, and great progress has been made in this area, according to our findings.

Using technology was necessary in this scenario. Programming in Python uses an interpreter and is intended for use by programmers of all skill levels. Writing understandable Python code requires the use of whitespace. An object-oriented approach and a wide range of language features are meant to help programmers write clear, logical code for both small and large-scale projects. In addition to procedural, object-oriented, and functional programming, Python supports a large range of other paradigms as well.

Processing digital photos with computer tools is possible with digital image processing (b).

The term "learning" refers to computer systems that can do a specific task without relying on explicit instructions, but rather on patterns and inference. A subcategory of technology includes artificial intelligence. Algorithms for machine learning build a mathematical model from which they learn to generate their own predictions and judgments on the basis of "training data."

This technique makes face identification in colour photographs a breeze. The most common method for identifying eye candidates is to use a very sensitive skin detector. Filtering understudies for noise reduction and morphological filtering are both part of this procedure. Face-shaping rules are used to reduce the field to just two people. According to the findings of the study, 90% of the time, images featuring two well-lit faces were successful. In addition, this strategy is unsuccessful for the great majority of profile pictures taken today. Attempting to do the procedure with only one eye open will result in failure. The identification of border areas and the detection of light sources by the ear are two procedures that are necessary for future investigation.

Gray intensity was employed in this study to establish an accurate method of recognising eyes. It is our hope that we can combine the advantages of two existing methods: one based on functions and one based on templates. A feature-based technique is used to identify two raw locations on the body for each eye once the face has been placed. A model-dependent technique is then used to determine the iris centres in these two rough areas. In a number of studies, this method has proven to be successful and reliable.

III. PROPOSED METHOD

The driver's eye highlights (often seen as reflections in the eye) in a video are the most common source of these anomalies. It was determined by a method known as retinal reflection that the eyes were on the face and that they were closed. This approach can be used to calculate the time it takes for the eyes to close. During a sluggish

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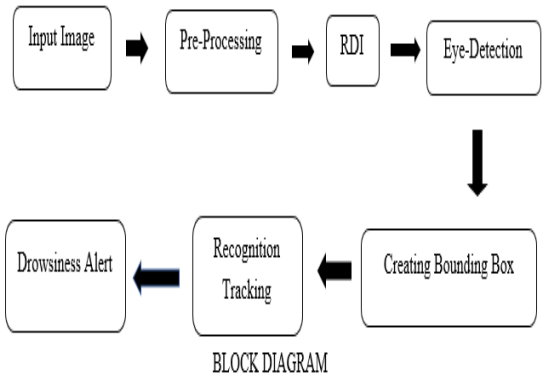
driving state, the blinking time is extended. Moreover, it's really little, and if it's left ignored for long enough, it could fail catastrophically. As soon as we spot a closed eye, we'll issue a warning to the driver.



BLOCK DIAGRAM

STEPS

• A webcam can be used as an input for the camera to take pictures if you want to. This led us to create an unlimited loop that would record every frame from the webcam. In order to access the camera and set the capture object, we utilise the OpenCV method cv2.VideoCapture(0), which allows us to do so (cap). Using Cap.Read(), you can save a snapshot of each frame in the frame variable.

•In order to use OpenCV for protest location computation, we must first transform a photo to grayscale in order to recognise a person's face. Color data is not required to identify the products. When it comes to recognising people's faces, the Haar cascade classifier will be employed. Face-to-face = cv2. Our classifier is established using CascadeClassifier('path to our haar cascade xml file'). Faces = face is then used to determine the location. detectMultiScale(gray). This collection of findings includes the protest's x,y coordinates and the protest's boundary box width. I'm now at a position where I can draw borders around the faces and emphasise their individual features.

• A technique known as ROI may be used to recognise eyes in the same manner that faces can be recognised. Before using shape[lStart:lEnd] to identify individual eyes, a cascade classifier for eyes is created in l-eye (gray). Only the eyeballs can be extracted from this image now. You can use a piece of code to remove the eye's boundary box, and then utilise it to extract the eye image. Data from the eye's images are stored there. An eye-tracking classifier called OPENCV will incorporate this feature. The result is we'll be removing the right component of your eye.

• The OPENCV classifier is used to determine if the eyes are open or closed. Consequently, we had to go through a series of steps to ensure that the model was built with accurate measurements. In order to turn a colour image into a grayscale image, use cv2.cvtColor(frame, cv2.COLOR BGR2GRAY). Since our show relies on photos with a resolution of 24*24 pixels, we resize the image at this point to 24*24 pixels. Using the standard of r eye = r eye/255, we have normalised our data. Every single value must be between 0 and 1.) Boost the accuracy of our classifier. Building our model was a breeze thanks to exhibit = load model('models/cnnCat2.h5.h5'). We currently use the lpred = model.predictclasses(l eye) formula to make predictions for each individual pupil. According to the lpred[0] evaluation, the eyes are open if the esteem is 1, and closed if it is less than 1.

• This score can be used to estimate how long the subject has been dozing off and on for. We'll keep adding points if both eyes are closed; we'll take points away if both eyes are open. It's being displayed on the screen using cv2. Current status information can be displayed in real time using the putText() function. This signifies that the person's eyes are shut off for a long period of time if the score surpasses 15. When we utilise sound to beep a warning, it occurs. play().

A simple and user-friendly approach that leads to a safe road journey is the primary purpose of this post.

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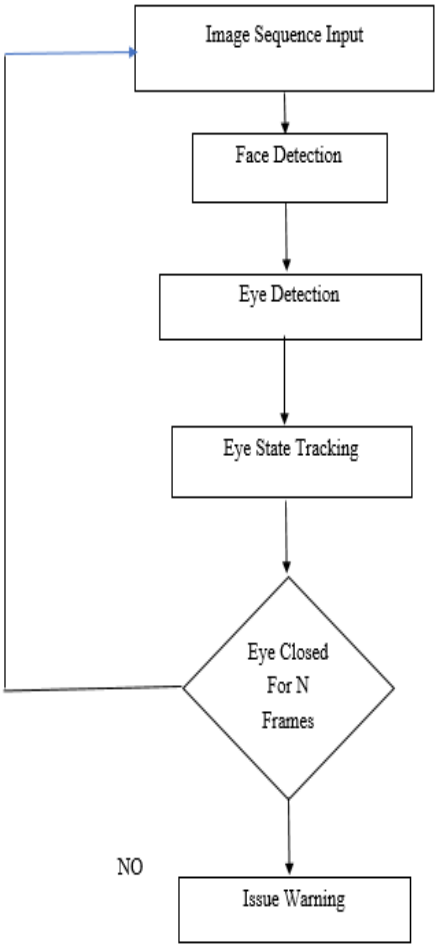


Figure 1 depicts a successful approach to the system's design. Identification of a person's face in an image is made possible by the usage of sub-regions and the processing method used to feed code into the image. Using this strategy, only domains with faces are processed.

Fig 2.

Fig 2 shows how the system would work and look in real world

Fig 3

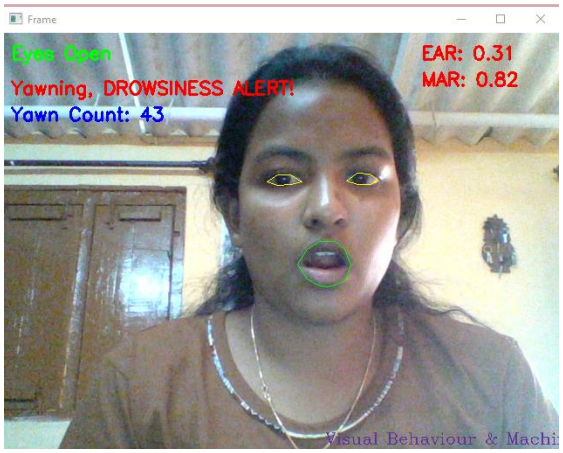


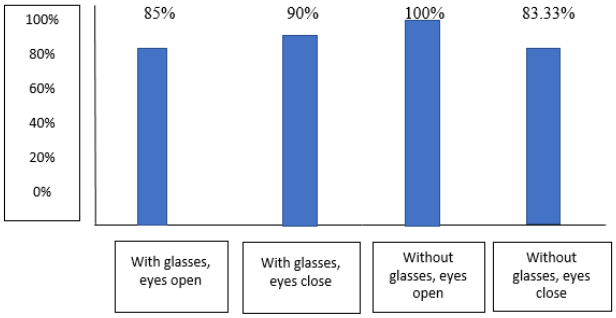
Fig 3,4,5,6In this real-time test example, an alert sounds if the eyelids are closed for an extended period of time.

V Results:

While working on this sleepy driver project, below is a list of four test scenarios.

Test Cases	Eyes Detected	Eye Closure	Result
Case 1	NO	NO	No Result
Case 2	NO	YES	No Result
Case 3	YES	NO	No Result
Case 4	YES	YES	Alarm Beep

Anecdotes from the Field When a driver's eyes are closed past a particular number of edges, we know they are fatigued. Future warnings will be issued in regards to these kinds of situations. An attempt was made to discover whether or not the blink of an eye and exhaustion were related. We used a computer with a 5-megapixel webcam as our primary tool. A built-in white LED made it easy to tell if the camera was operational. Infrared LEDs, not white LEDs, should be used for real-time framing. If the driver appears to be falling asleep, an audible alarm is played through the car's speaker system to wake him or her up. A wide range of persons and lighting circumstances can be accommodated by the frame's design (day and night). When the backdrop light is on, the webcam can discriminate between blinking and weariness more than 95% of the time.



Driver Drowsiness Detection System Eye Fatigue Algorithm

VI.CONCLUSION

This post suggests the creation of a low-cost, real-time system for detecting weariness based on ocular activity and machine learning. Some of the visual appearance metrics that a camera gets from a streaming video are the eye-to-mouth ratio, mouth opening ratio, and nose width reference. A camera module put on the car takes photographs of the drivers' faces while they are driving to check their health. Data from the vehicle's sensors reveals that a passenger is asleep, and when this occurs, the driver is notified and given the choice to pause the vehicle. An analysis of feature values is done using machine learning-based methods.

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