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DRIVER DROWSINESS DETECTION SYSTEM BY USING WEBCAM

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ABSTRACT

Driver sleepiness and fatigue is one of the main causes of car accidents. Every years, they increase the number of deaths and injuries worldwide. The Advanced Driver Assistance System (ADAS) module has been proposed to reduce the number of accidents caused by driver fatigue, thereby increasing transportation safety; The system is based on visual information and cognitive function automatic driver drowsiness detection. We propose to detect, track and identify the driver's face and eyes to measure PERCLOS, a scientific measure of fatigue associated with delayed eye closure. This project demonstrates the development of a solution that detects drowsy driver in real time and alerts to avoid traffic accidents. In particular, one method for detecting fatigue in computer vision focuses on the use of facial expressions. Anxiety, fatigue, exhaustion, speeding and exhaustion are causes of accidents and Advanced Driver Assistance Systems (ADAS) clearly help reduce human error.

Keywords: ADAS(Advanced Dirver Assistance Systems), PERCLOS(Percentage Of Eye Closure), Drowsiness.

I. INTRODUCTION

Car crashes are one of the leading causes of death, killing about 1.3 million people each year. Most of these accidents are caused by distracted or drowsy drivers. Drowsiness reduces the driver's focus, work, alertness, and alertness, resulting in slow and sometimes incomplete judgments. Seizures affect mental health, reduce the driver's ability to operate safely, and increase the risk of human error, which can lead to death and injury. Driver error is reduced. Countless people are fleeing the streets day and night. Insomnia or distractions like talking on the phone or talking to passengers can cause accidents. To avoid these situations, we recommend a system that alerts drivers when they are distracted or drowsy.

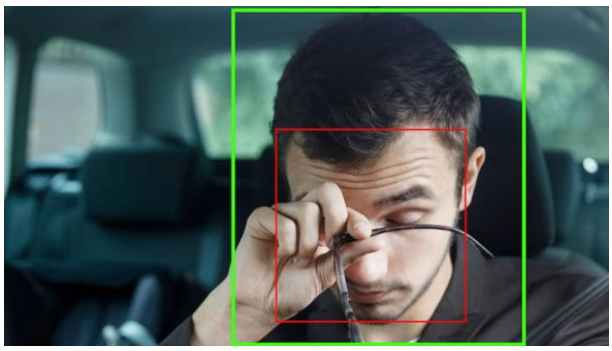

Fig 1: Drowsy Driver

Face and type recognition is used to detect distraction or sleepiness by processing facial images captured by cameras. To solve this problem, we propose a solution in image processing. Edit photos. , OpenCV and Dlib open source libraries. Use Python as a language to implement the concept. Associate's infrared cameras are used to continuously monitor the driver's facial features and eye movements. This project focuses on the driver's eye signal. driver. Eye characteristics are monitored regularly to detect fatigue. Images are captured by the camera sent to image processing, which allows the face to recognize the impact and fatigue on the driver. This project includes the following applications. If the driver's eyes are closed for a limited time, the driver is considered asleep and an alarm is used to alert the driver.

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II. METHODOLOGY

Tools and Image Methods

Open CV: OpenCV (Open Source Computer Image) is the Swiss Army Knife of computer vision, the computer has many modules that can help us solve many problems in, but perhaps the most important is the OpenCV architecture and memory management. Using OpenCV algorithms or your own, gives you a frame in to process images and videos in any way you want without worrying about allocating memory to your photo. After optimization, can be used for video and image processing OpenCV's high-throughput image processing is used by the author to process images in the runtime processing of real-time video streams from the camera.

DLib: Dlib is a modern C tool with machine learning algorithms and tools for developing complex C++ software to solve real world problems. It is widely used in many fields in industry and academia, including robots, embedded devices, mobile phones, and high-performance computing environments. Lib's open source license allows to use it in any free application. The author uses the open Dlib library for CNN (Neural Network) implementation. The authors use optimized prediction functions and pre-learned face recognition to identify faces.

EAR (Eye Aspect Ratio)

The number of this equation calculates the distance from the vertical center of the eye from when it points to. Calculate the distance between the horizontal eyes using the points, weight the denominator of accordingly, because has only one. With the eye open, the ratio of the eye is about, but when you blink, quickly drops to zero. When a person blinks, the aspect ratio of the eye drops significantly and drops to zero. As shown in Figure 2, the eye aspect ratio is constant, then suddenly drops to zero and then increases, indicating that only one blink occurred.

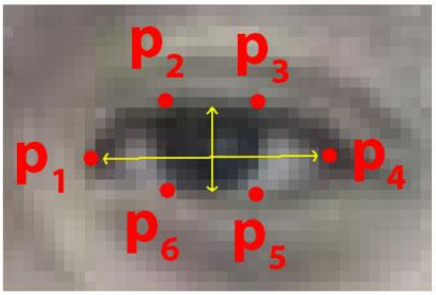

Fig 2: Eyes Points

Face Recognition

The facial recognition methods Eigenface, Fisherface, and Histogram of Local Binary Pattern are discussed in detail in the following sections, along with how they are implemented in OpenCV:

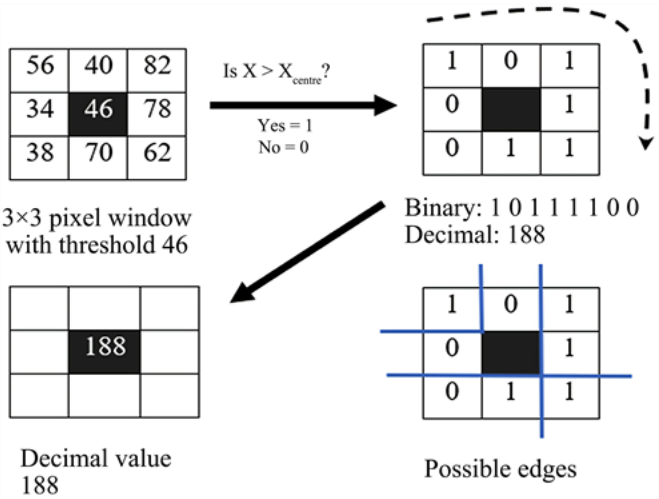

Fig 3: LBPH

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Local Binary Pattern Histogram (LBPH) Li suggested Wang's use of local binary patterns as classifiers in Computer Vision and 1990. [4] In 2009, LBP and histogram-oriented gradients were combined, which enhanced the performance in some data sets [5]. The image is partitioned into cells (4 × 4 pixels) for feature coding by rotating a neighbouring pixel either clockwise or anticlockwise. The figures are contrasted with the central ones in Figure 6 for comparison. Each neighbor's intensity or brightness value is compared to the primary pixel. The location is given a value based on whether the difference is higher or less than 0.

In the picture, the result will be the same as before. Determining the frequency of values in large cells speeds up the process. By analyzing the results in cell, margins can be identified based on changes in value. The eigenvectors can be obtained by calculating the values for each cell and combining the histograms. The input image is classified as according to the same method and compared with the dataset to determine the distance.

Algorithm Steps

Step 1 – Take image as input from a camera.

Step 2 – Recognize the face in the image and create a region of interest (ROI).

Step 3 – Recognize the eyes from the ROI and send them to the classifier

Step 4 – The classifier classifies whether the eyes are open or closed

Step 5 – Calculate the score to be verified. when the person is sleepy.

Flowchart

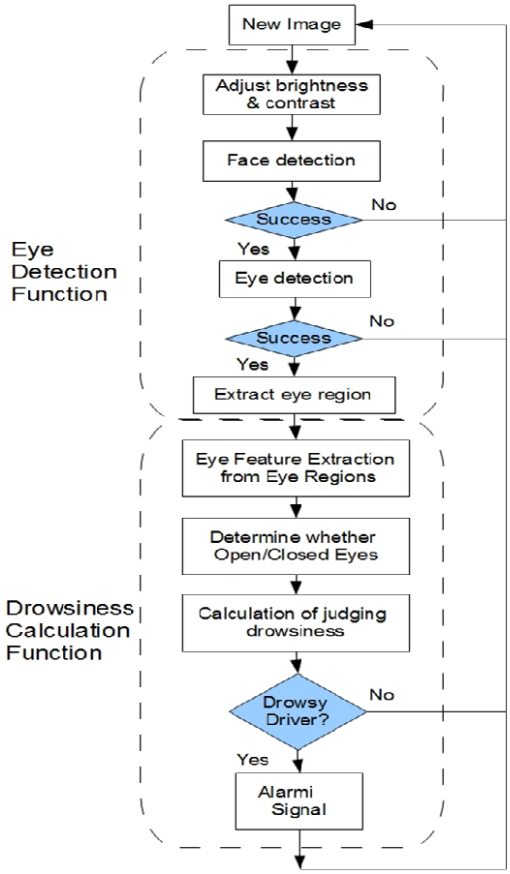

Fig 4: Drowsiness Detection

We take a photo as input using the webcam. To access the webcam, we create an endless loop capturing every frame. We will use the method provided by OpenCV to access the camera and set the capture, read each frame and save the image in different frames. To recognize faces in an image, we must first convert the image to grayscale because the OpenCV algorithm for object recognition uses grayscale images as input. We don't need color information to describe objects. We use the hair cascading classifier to recognize the face. Then we make faces to accept. Returns an array of detections containing the x,y coordinates and height and width of the object's bounding box. Now we can iterate of the face. and draw contour boxes for each face.

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III. RESULTS AND DISCUSSION

1. Eye Extraction Module

In this model, the detects the eye and face region from the webcam feed and uses algorithms for the image to check whether the driver is asleep or not.

Fig 5: Eye Extraction

2. Drowsiness Detector Module

In this module will capture eyes from a live webcam feed and will use an algorithm on the image to detect if the driver is asleep.

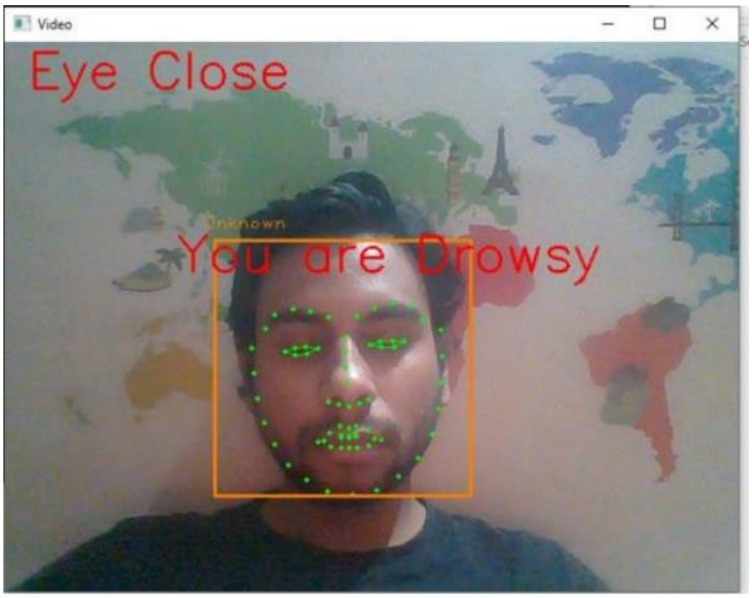

Fig 6: Drowsiness Detection

3. Face Identification Module

In this module will capture the identity of the driver using with the help of face recognition method, from this authentication, fetch driver family details from database and send a warning message.

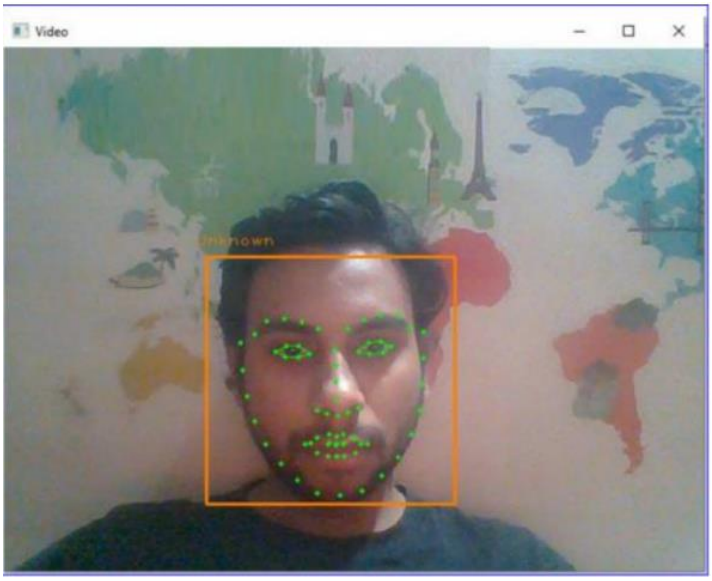

Fig 7: Face Identification

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4. Alert Module

If the driver does not wake up for the 50 warning music, the will send texts and emails to the users of the family to let them know that you are asleep and that their current picture and location are live.

Requirement

Software Requirement:

1. Front End : Tkinter (Page)
2. Back End : Python
3. Domain : Machine Learning
4. Algorithm : LPBH, DLib, HaarCascade

Hardware Requirement:

1. Processor : i5 or Greater
2. RAM : 4GB or Greater
3. Hard Disk : 50GB or Greater
4. Connectivity : LAN or WiFi, Camera

IV. CONCLUSION

The equipment recommended in this review provides the accuracy of types of driving fatigue. Guidance on the evaluation and design of test equipment for driving fatigue. The recommended device is and it is used to prevent many road accidents due to drowsy driving and it can also help driver sleep when used by, thus giving a warning when driver's car sleeps. Drowsiness Detection Device Concept Behavior detects and informs vehicle and body inertia as a whole of. It seems that the driver yawns less often than before the fell asleep, and now the yawns more often, not as much.

To detect a drowsy driver, the face, eyes and mouth are identified in driverless video. uses a convolutional neural network to classify eyes as open or closed. Drowsiness was determined by closed eyes. Yawn frequency was analyzed using OpenCV and Dlib in Python. The alarm is set to sound to alert the driver after detecting. Darkness, lighting conditions, driver's hands covered, wearing sunglasses, etc. Detection of the driver's status and facial expression will be prohibited due to factors. The convolutional neural provides better performance for, and the facelift method follows the competition, because the detection process is to increase sleep, is often used in conjunction with other facelift methods.

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