Drowsy Driver Detection Using Image Processing

[1]Dr.A.Bamini, [2]Miss.B.Sivakalai

[1]M.Phil, Ph.D., [2]MCA
[1]Head, [2]Student
Department of Computer Applications
The Standard Fireworks Rajaratnam College for Women, Sivakasi, India.

***Abstract*: The paper entitled "Drowsy Driver Detection Using Image Processing" is developed using Android Studio & Python as front end and PHP & MySQL as back end. The main aim of the paper is to make human driving safer and to overcome accidents. Around 60% of these accidents are caused due to driver fatigue. Through this paper a real time monitoring system using image processing, face/eye detection techniques.To ensure real-time computation, Face detection technique is used for drowsy/fatigue detection. The Android API's to interact and get the output of local camera. It maybe a webcam or any other attached camera. The API's are used to get the camera video input for the smart phones to manipulate and recognize faces in real time.**

***Keywords*: Local camera, Webcam, Video data, Image processing, Fatigue detection.**

I. Introduction

Driver fatigue is one of the major causes of accidents in the world. Detecting the drowsiness of the driver is one of the surest ways of measuring driver fatigue. To overcome these issues the paper titled **"Drowsy Driver Detection Using Image Processing"** has been introduced**.** In this paper a prototype drowsiness detection subsystem is developed. This system works by monitoring the eyes of the driver and sounding an alarm when the driver becomes drowsy. The system designed is a non-intrusive real-time monitoring system. The priority is on improving the safety of the driver without being obtrusive. In this paper the eye blink of the driver is detected. If the drivers eyes remain closed for more than a certain period of time, the driver is said to be drowsy and an alarm is sounded. The Mobile Camera for Eye-Blink Monitoring System and provide buzzer that alerts the driver during the drowsy condition. Driver's location can be tracked using GPS. The proposed web application design admin will be controlling the parameters of the system and send the messages to the appropriate persons

II. Literature Review

In June, 2015, **Eyosiyaset. al**. described 'Driver Drowsiness Detection through \HMM based Dynamic Modeling'. They proposed a new method of analyzing the facial expression of the driver through Hidden Markov Model (HMM) based dynamic modeling to detect drowsiness. They have implemented the algorithm using a simulated driving setup. Experimental results verified the effectiveness of the proposed method.**In August 2019**, Detecting Driver Drowsiness Based on Sensors Researchers have attempted to determine driver drowsiness using the following measures: vehicle-based measures; behavioural measures and physiological measures. A detailed review on these measures will provide insight on the present systems, issues associated with them and the enhancements that need to be done to make a robust system. This paper reviews the three measures as to the sensors used and discuss the advantages and limitations of each. The various ways through which drowsiness has been experimentally manipulated is also discussed. It is concluded that by designing a hybrid drowsiness detection system that combines non-intrusive physiological measures with other measures one would accurately determine the drowsiness level of a driver. A number of road accidents might then be avoided if an alert is sent to a driver that is deemed drowsy

III. Proposed Work

In this approach need electrode contacts on the automobile drivers' head, face, or chest making it non-implementable in real world scenarios. It monitor the road and driver behavior characteristics to detect the drowsiness of the automobile driver. This approach is inherently flawed as monitoring the road to detect drowsiness is more of an indirect approach and also lacks accuracy. In this paper a direct approach that makes use of Face detection techniques to detect drowsiness. This application is used to track drivers and bus details using GPS.

IV. Methodology

❖ Video Acquisition

OpenCV provides extensive support for acquiring and processing live videos. It is possible to choose whether the video has to be captured from the in-built webcam or an external camera by setting the right parameters. The OpenCV does not specify any minimum requirement on the camera, however OpenCV by default expects a particular resolution of the video that is being recorded, if the resolutions do not match, then an error is thrown. This error can be countered, by over riding the default value, which can be achieved, by manually specifying the resolution of the video being recorded.

❖ **Dividing into Frames**

Once the video has been acquired, the next step is to divide it into a series of frames/images. This was initially done as a 2 step process. The first step is to grab a frame from the camera or a video file, in our case since the video is not stored, the frame is grabbed from the camera and once this is achieved, the next step is to retrieve the grabbed frame. While retrieving, the image/frame is first decompressed and then retrieved. However, the two step process took a lot of processing time as the grabbed frame had to be stored temporarily. To overcome this problem, a single function grabs a frame and returns it by decompressing

❖ **Face Detection**

Once the frames are successfully extracted the next step is to detect the face in each of these frames. This contains a number of features of the face, such as height, width and thresholds of face colors, it is constructed by using a number of positive and negative samples. Cascade file detects all the possible objects of different sizes in the frame. To reduce the amount of processing, instead of detecting objects of all possible sizes, since the face of the automobile driver occupies a large part of the image, the output of the detector is stored in an array. Now, the output of the edge detector is then compared with the cascade file to identify the face in the frame. Since the cascade consists of both positive and negative samples, it is required to specify the number of failures on which an object detected should be classified as a negative sample. The output of this module is a frame with face detected in it.

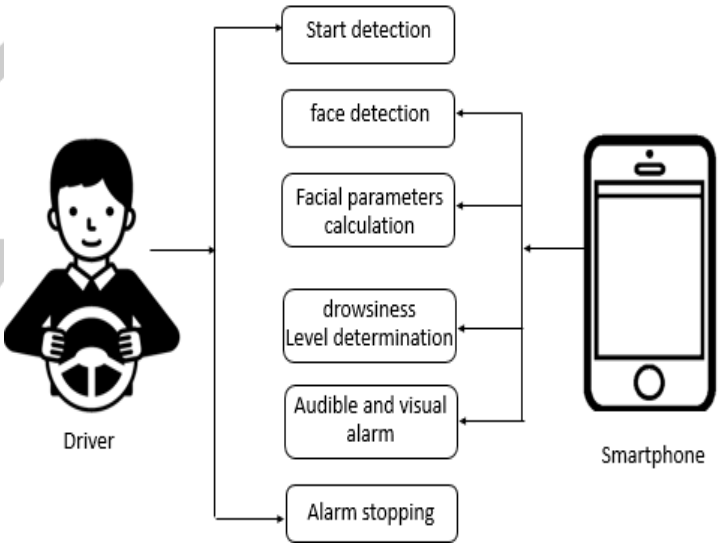
❖ **Drowsiness Detection**

Once the faces are successfully detected from the frame, the coordinates of the face will be shot by using Rect class. If the coordinates cross the boundaries or the face suddenly disappear from the camera. It will identifies that the driver is in Drowsiness state.

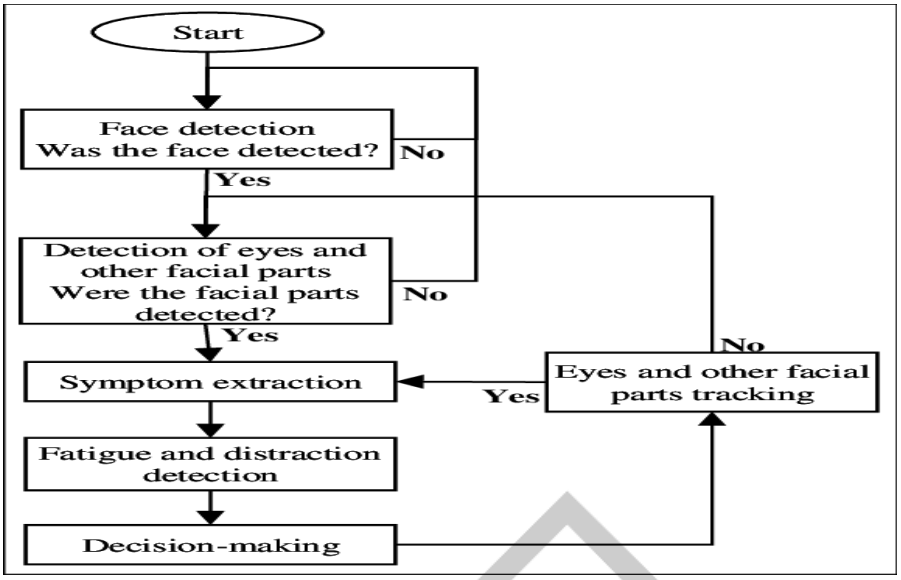
❖ **Alert**

If the application detects the driver is in Drowsiness it will alert the driver via play a sound in a loop. It will stops by pressing the ok button in the dialog box.

V. Process Flow



VI. Work Flow



Conclusion

The primary goal of this paper is to develop a real time drowsiness monitoring system in automobiles via Smartphone. Different features that make our system different from existing ones are, Focus on the driver, which is a direct way of detecting the drowsiness and Real-time system that detects face and driver drowsiness. This paper uses some Android API's to interact and get the output of local camera. It maybe a webcam or any other attached camera. These API's to get the camera video input to our smart phones.Then use the video data to manipulate and recognize faces in real time

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