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DRIVER DROWSINESS MONITORING SYSTEM USING VISUAL BEHAVIOUR AND MACHINE LEARNING

[1]M. Aishwarya, [2]Shampuram Shalini, [3]P. Deepthi, [4]Dr. V. Anantha Krishna

[1]Student, [2]Student, [3]Student, [4]Professor

Department of Computer Science and Engineering

Sridevi Women's Engineering College, Vattinagulapally, Gandipet, R.R.DIST-500075, India

Abstract: Drowsy driving is one of the foremost reasons of deaths taking place in road accidents. The truck motorists who force for non- stop lengthy hours (in particular at night), machine motorists of lengthy distance course or in a single day, motorcars are lower prone to this problem. Motorist doziness is a heavy agony to passengers in each country. In the advanced system, a webcam information the videotape and motorist's face are detected in every body using image processing ways. Facial milestones at the detected face are pointed and in the end the eye aspect rate, mouth opening rate and nose length rate are reckoned and counting on their values, Doziness is detected primarily rested completely on advanced adaptive thresholding. A massive distance corresponds to eye closure. However, the machine attracts the consummation that the driving force is falling asleep and troubles a caution signal, If the eyes are observed unrestricted for five successive frames. The machine is likewise suitable of discover whilst the eyes cannot be observed, and works below affordable lighting institutions conditions.

Key Terms - Driver Drowsiness, Mouth Opening Ratio, Eye-Aspect Ratio, Nose-Length Ratio, Python, OpenCV.

I. INTRODUCTION

Every time, a large number of injuries and deaths do due to fatigue related road accidents. Hence, discovery of motorist's fatigue and its suggestion is an active area of exploration due to its immense practical connection. The introductory doziness discovery system has three phases; accession system, processing system and warning system. also, the videotape of the motorist's anterior face is captured in accession system and transferred to the processing block where it's reused online to descry drowsiness. However, a warning or alarm is transferred to the motorist from the warning system, If doziness is detected. The compass of the design includes to automatically fete the sleep and doziness of the motorist and its discovery, to assay the focus of motorist while driving, to determine attention of motorists while driving, to descry whether the camera is fastening duly and the motorist's face, to corroborate the doziness. to develop a low- cost, real time motorist's doziness discovery system with respectable delicacy. Hence, we've proposed a web- cam rested system to descry motorist's fatigue from the face image only using image processing and machine knowledge ways to make the system low- cost as well as movable.

II. OBJECTIVE

The primary ideal or purpose of the design is to develop a doziness discovery system. The focus will be placed on designing a system that will directly cover the open or unrestricted state of the motorist's eyes in real- time. By covering the eyes, it's believed that the symptoms of motorist fatigue can be detected beforehand enough to avoid a machine accident. Discovery of fatigue involves a sequence of images of a face, and the observation of eye movements and blink patterns.

III. PROBLEM STATEMENT

Motorist's inattention might be the result of a lack of alertness when driving due to motorist doziness and distraction. motorist distraction occurs when an object or event draws a person's attention down from the driving task. To perform a simulation, to descry the doziness of the motorist and shoot an alert to the motorist.

IV. PROPOSED SYSTEM

In this design, a low- cost, real time motorist doziness monitoring system has been proposed rested on visual behaviour and machine knowledge. also, visual behaviour features like Eye Aspect rate, Mouth Opening rate and Nose Length rate are reckoned from the streaming videotape, captured by a webcam. An adaptive Thresholding fashion has been developed to descry motorist Doziness in real time. The advanced system works directly with the generated synthetic data. In this OpenCV rested Machine Learning ways are used for automatic discovery of doziness.

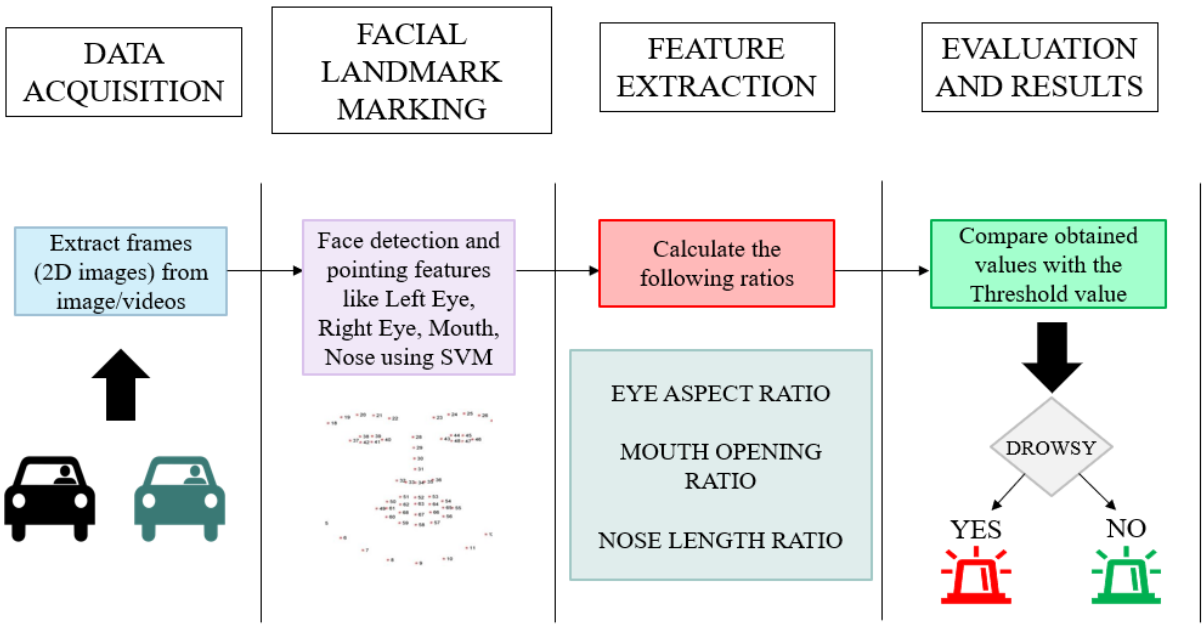

Fig. 1: System Architecture

V. MODULES

To apply this generality, we're using following modules-

- **Video Recording:** Using this module we will connect operation to webcam using OPENCV erected- in function called VideoCapture.
- **Frame Extraction:** Using this module we will snare frames from webcam and also prize each picture frame by frame and convert image into 2- dimensional array.
- **Face Detection & Facial Landmark Detection:** Using SVM algorithm we will descry faces from images and also extract facial expression from the frames.
- **Detection:** Using this module we will descry eyes and mouth from the face.
- **Calculate**: Using this module we will calculate distance with Euclidean Distance formula to check whether given face distance closer to eye blinks or yawning, if eyes blink for 20 frames continuously and mouth open as yawning also it'll advise motorist.

VI. ALGORITHM

FACE DETECTION USING OPENCV-

This seems complex at first but it's truly easy.

Step 1- Considering our prerequisites, we will bear an image, to begin with. latterly we need to produce a waterfall classifier which will ultimately give us the features of the face.

Step 2- This step involves making use of OpenCV which will read the image and the features train. So at this point, there are NumPy arrays at the primary data points. All we need to do is to search for the row and column values of the face NumPy N dimensional array. This is the array with the face cell equals.

Step 3- This final step involves displaying the image with the blocky face box.

SVM DESCRIPTION-

The distance between the hyperplane and the nearest data point from either set is known as the borderline. The thing is to choose a hyperplane with the topmost possible borderline between the hyperplane and any point within the training set, giving a lower. Machine knowledge involves prognosticating and classifying data.

VII. RESULTS AND DISCUSSION

To run this project, double click on 'run.bat' file to get below screen.

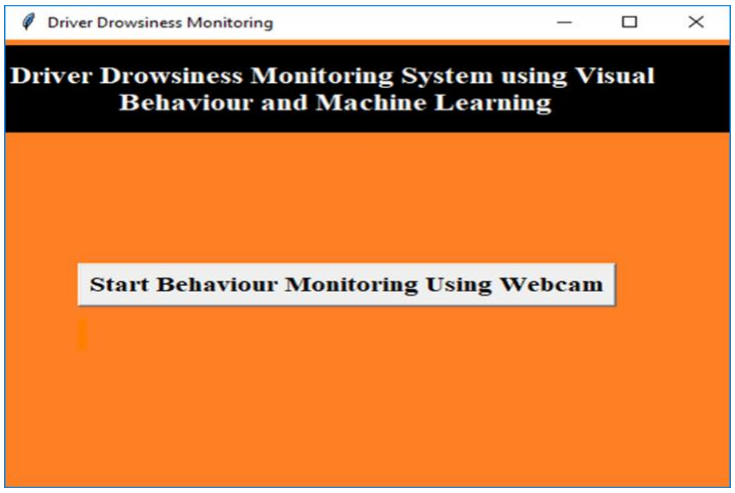

Fig.2: Interface of Driver Drowsiness Monitoring System

In above screen click on 'Start Behaviour Monitoring Using Webcam' button to connect application with webcam, after clicking button will get below screen with webcam streaming

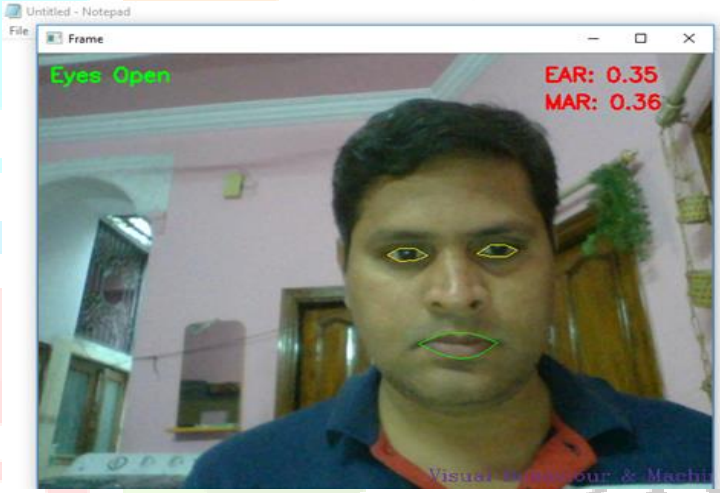

Fig.3: Image of Web Cam Streaming Video

We can see web cam stream, then application monitors all frames to see person eyes are open or not, if closed then will get below message. Similarly if mouth starts yawn then also will get alert message.

Eyes are closed and head is bent, therefore a drowsiness alert!

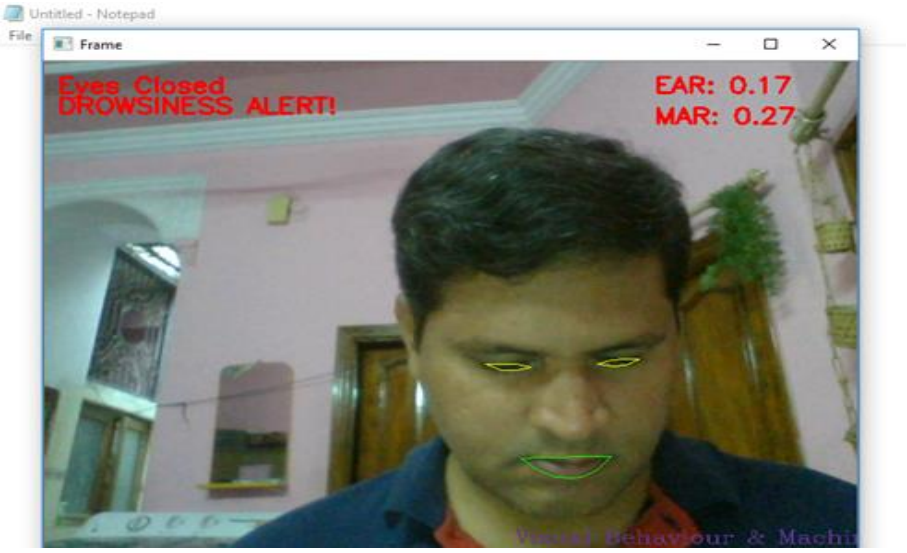

Fig.4: Image of Drowsiness Alert

VIII. FUTURE ENHANCEMENT

The Future Scope of this project includes the following:

- If the user doesn't respond for a longer time, emergency call or message will be sent automatically.
- The alcoholic sensor can be integrated for drunk drivers.
- This project, if integrated with car, automatic speed control should be imparted if the driver is found sleeping.

IX. CONCLUSION

Our design is concentrated on administering a doziness discovery system that tries to bridge the gap between them by balancing affordability and vacuity with functionality. The end of our approach is to overcome the challenges – responsibility, delicacy and speed, by erecting a real- time, adaptive system that leverages, whenever possible, readily available computer vision tools. In this design, a low- cost, real time motorist's doziness discovery system is developed with respectable delicacy of 95.6. An alert is transferred to the motorist, if he's detected with the doziness symptoms.

X. REFERENCES

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