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Real-Time Driver Drowsiness Detection System using Facial Features

Amaldev AC[1], Jomon M J[2], Sarath P K[3], Siddharth Chandra[4], Sidharth Sivankutty[5]
[1, 2, 3, 4, 5]*Department of Computer Science , College of Engineering Kidangoor*

Abstract: ***The project proposes an associate degree IOT (Internet of things) that monitors the important time behaviour of the driving force, to overcome the accident occurred because of asleep driving. The face, a very important part of the body, conveys a great deal of knowledge. Once a driver is in a state of fatigue, the facial expressions, e.g The frequency of blinking and yawning, are completely different from those within the traditional state. The device that detects the drivers' fatigue standing like yawning, blinking, and period of eye closure, mistreatment video pictures. We introduce Haar Cascade face tracking algorithmic programs to enhance the chase accuracy. Further, we have a design replacement detection technique for facial regions supporting sixty eight key points. Then we have a tendency to use these facial regions to gauge the drivers' state. By combining the options of the eyes and mouth, the device will alert the driver using an alarm.***
Keywords: Drowsiness detection, Face chase, Facial feature extraction.

I. INTRODUCTION

Vehicle accidents are happening within the world thanks to asleep driving. Within the past few years the globe has witnessed several accidents thanks to drowsy driving, many of us have died. In recent years, a rise within the demand for contemporary transportation necessitates a quicker car-parc growth. At present, an automobile is an essential mode of transportation for people. In 2017, a complete of ninety seven million vehicles were oversubscribed globally, that was 0.3 the world total estimation of the quantity of vehicles being employed was over one billion . Although the auto has modified people's lifestyle and improved the convenience of conducting daily activities, it's conjointly related to varied negative effects, like traffic accidents. A report by the National route route Safety Administration showed that a complete of seven, 277,000 traffic accidents occurred within the UnitedIdentify applicable funding agency here. If none, delete this. States in 2016, leading to thirty seven,461 deaths and three,144,000 injuries. In these accidents, fatigue driving caused roughly latent danger in traffic accidents. In recent years, the fatigue-driving-detection system has become a hot analysis topic. The detection strategies are categorised as subjective and objective detection. In the subjective detection methodology, a driver should participate within the analysis, that is related to the driver's subjective perceptions through steps like self-questioning, evaluation and filling in questionnaires.

Then, these information are used to estimate the vehicles being driven by tired drivers, assisting the drivers to arrange their schedules consequently. However, drivers' feedback isn't needed within the objective detection methodology because it monitors the driver's physiological condition and driving-behavior characteristics in real time .The collected information ar wont to assess the driver's level of fatigue. Moreover, objective detection is categorised into two: contact and non-contact. Compared with the contact methodology, non-contact is cheaper and a lot of convenient as a result of the system that not need pc Vision technology or sophisticate camera permit the employment of the device in additional cars. Owing to straightforward installation and low value, the non-contact methodology has been wide used for fatigue-driving detection. For instance, Attention Technologies and good Eye use the movement of the driver's eyes and position of the driver's head to see the amount of their fatigue. We have a tendency to propose a non-contact image-based framework for the detection and recognition of temporary states supported by a person's eyes and mouth . Such a framework is instrumental in an exceedingly multitude of eventualities, like driver temporary state detection, and therefore has the potential to avoid wasting lives. Among alternative things, the most common causes of driver temporary state are fatigue and excessive alcohol consumption. In such cases, it's very necessary to find the condition of the motive force and take acceptable steps to avoid wasting lives on the roads. Our planned framework may be a step towards an answer to the present public issue. To finish, our framework incessantly monitors a driver's condition in real time by employing a video camera put in before the person. From the video, we have a tendency to use associate image-based noninvasive techniques to find the eyes and mouth of the motive force and classify them as being open or not.

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II. OBJECTIVES AND SCOPES

A. A non-intrusive observation system that may not distract the motive force.
B. A period observation system to insure accuracy in detection sleepiness.
C. To alert the motive force if found drowsy.

Future work might concentrate on the use of outer factors like vehicle states, sleeping hours, climatic conditions, mechanical information, etc, for fatigue activity. observing the driver's state of sleepiness and vigilance and providing feedback on their condition so they'll take applicable action is one crucial step during a series of preventive measures necessary to handle this drawback. presently there's no adjustment in zoom or direction of the camera throughout operation. Future work could also be to mechanically pore on the eyes once they're localized. This project is often enforced within the kind of mobile application to scale back the price of hardware.

III.PROPOSED METHOD

The task of the planned system is to scale back road accidents that occurred because of sleepyheaded driving. Once the motive force is within the state of fatigue, the device can find that the motive force is during a sleepyheaded state, sharp alarm can enlarge, so the motive force can wake and the device can monitor eye and mouth of the motive force in real time. Within the planned system the planned step is image enhancement so the detection of countenance and also the last step is evaluating the countenance. The evaluated options can reveal the motive force is in a sleepyheaded or traditional state. If the state of the motive force is sleepyheaded the alarm turns out the sound and it'll awaken the motive force.

IV.SYSTEM DESCRIPTION

A. Architecture

The system mainly consists of prepossessing module ,facial feature extraction module, drowsiness detection module .Once the face of the thrust is detected the information is passed to image processing module for the detection of eye and mouth and then to the drowsiness detection module.

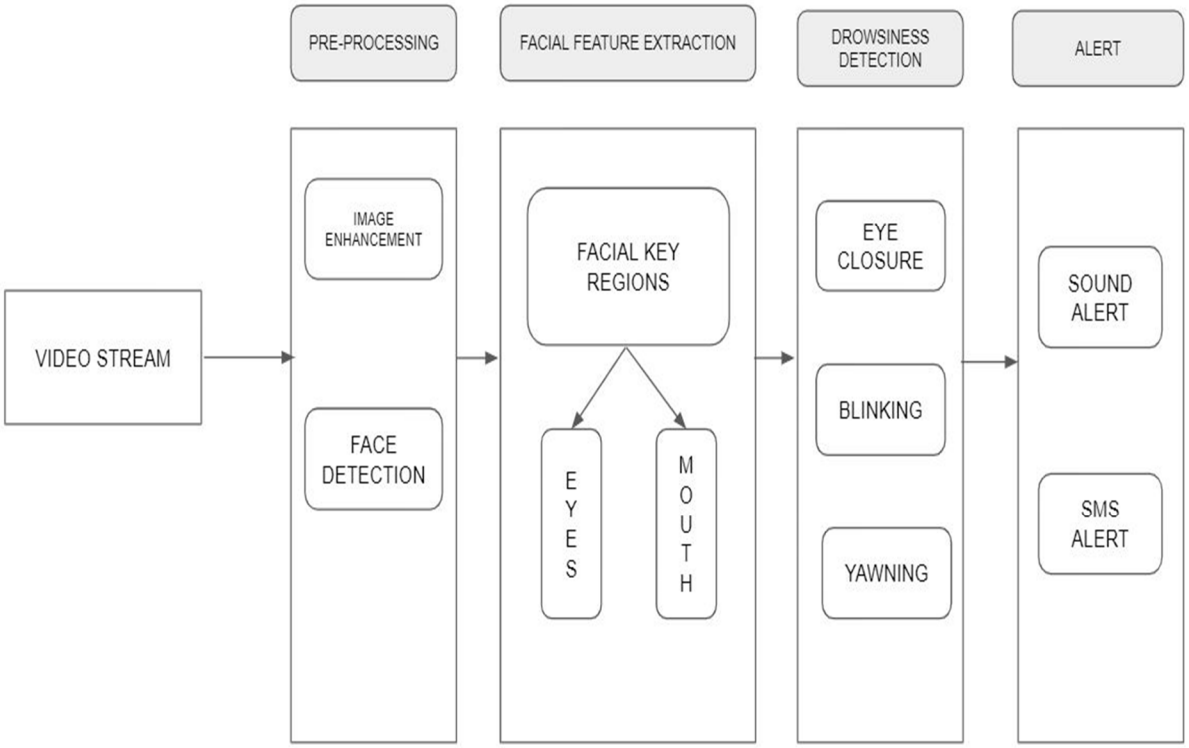

Fig 1. Architecture of proposed system'

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B. Modules of the System

1) *Implementation of Pre-Processing Module:* During the detection process, the quality of images is affected and features of the external piece become unclear if the illumination intensity within the cab is modified during driving. This usually occurs just in case of overcast skylight, rain, and within the dead of night. For detection accuracy, we use the illumination enhancement method to pre-process images before tracking the driver's face.

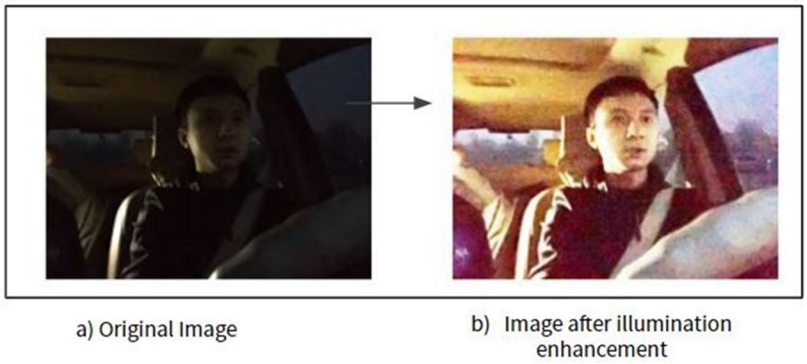

Fig 2. Image before and after image enhancement

2) *Implementation of Facial Feature Extraction:* In this module the countenance like eye, mouth of the driver is detected. Then, we use Dlib to locate 68 facial key points on the driver's face.

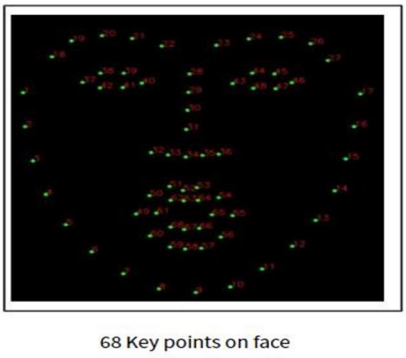

Fig 3. 68 Key points on face

3) *Drowsiness Detection*

a) *Eye status Recognition based on Euclidean Distance:* The Euclidean distance of horizontal and vertical distance of eyes are considered. To detect if the eye is closed we wish to compute the ratio of the gap between the horizontal eye landmark and so the space between the vertical eye landmarks.

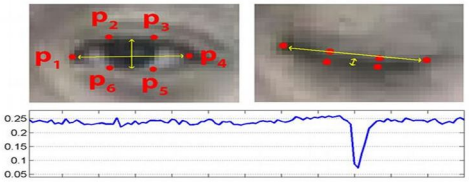

Fig 4 . Measurement of Euclidean distance around the eyes.

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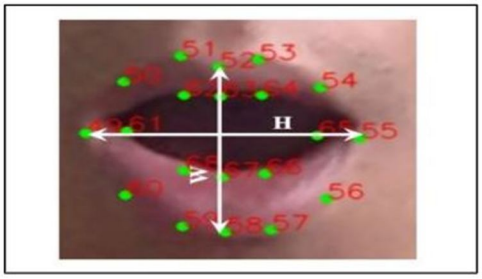
b) Mouth Status Recognition Based On Width And Height: For detection of yawning, the gap between upper lip and lower lip is taken under consideration. So there are 20 key points around the mouth, but only 6 key points around the upper and 6 key points around the lower lip are taken into consideration. Thus a mean point will be taken around the upper lip and lower lip for yawn detection. Broadly speaking if the space between the mean points is greater than given threshold for a specific period of some time, we are going to come to a conclusion that the individual is yawning and is drowsy



20 Key Points on mouth

Fig 5 . 20 key points around mouth

4) Implementation of Alert Module: After drowsiness is detected,the system will alert the driving force by a sound inside the vehicle. Simultaneously an alert message is visiting be sent as a SMS to a predefined mobile number. along with the message, these coordinates of the actuation, i.e. latitude and longitude are going to be sent along.

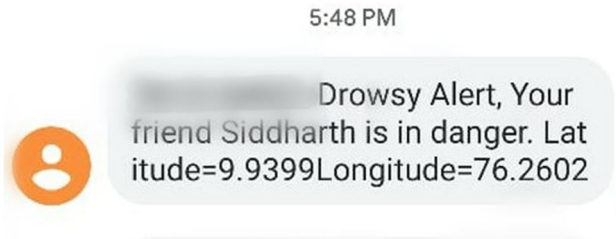


Fig 6 . SMS alert along with coordinates.

C. System Requirements

1) Hardware Requirements

a) Raspberry Pi - The Raspberry Pi is a low cost, credit- card sized computer that plugs into a monitor or TV, and uses a standard keyboard and mouse.

b) Buzzer - Buzzer is a mechanical, electro mechanical, magnetic, electromagnetic, electro-acoustic or piezoelectric audio signalling device. A piezoelectric buzzer can be driven by an oscillating electronic circuit or other audio signal source. A click, beep or ring can indicate that a button has been pressed.

c) GSM Module - GSM is a mobile communication modem; it stands for global system for mobile communication. It is a widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at 850MHz, 900MHz, 1800MHz and 1900Mhz frequency.

d) Web Camera - Device for recording visual images in the form of photographs, film, or video signals.

2) Software Requirements

a) Raspbian Software - Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make Raspberry Pi run. However, Raspbian provides more than a pure OS.

b) Pycharm - An integrated development environment facilitates computer programmers by integrating fundamental tools (e.g., code editor, compiler, and debugger) into a single software package.

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V. RELEVANCE

A. It's not safe and moral to form a drowsy driver drive on the road.It is an automotive safety technology that helps forestall accidents caused by the motive force getting drowsy.

B. These methods can form the basis of a system potentially scaling back the amount of crashes associated with drowsy driving.

C. Traffic management is often maintained by reducing accidents. We are able to implement somnolence detection systems in craft so as to alert pilots.

VI.CONCLUSION

We tend to introduce a brand new analysis technique for somnolence that supports the states of the eyes and mouth. Therefore, it's nearly a time period system because it encompasses a high operation speed. it's applicable to completely different circumstances and might supply stable performance.

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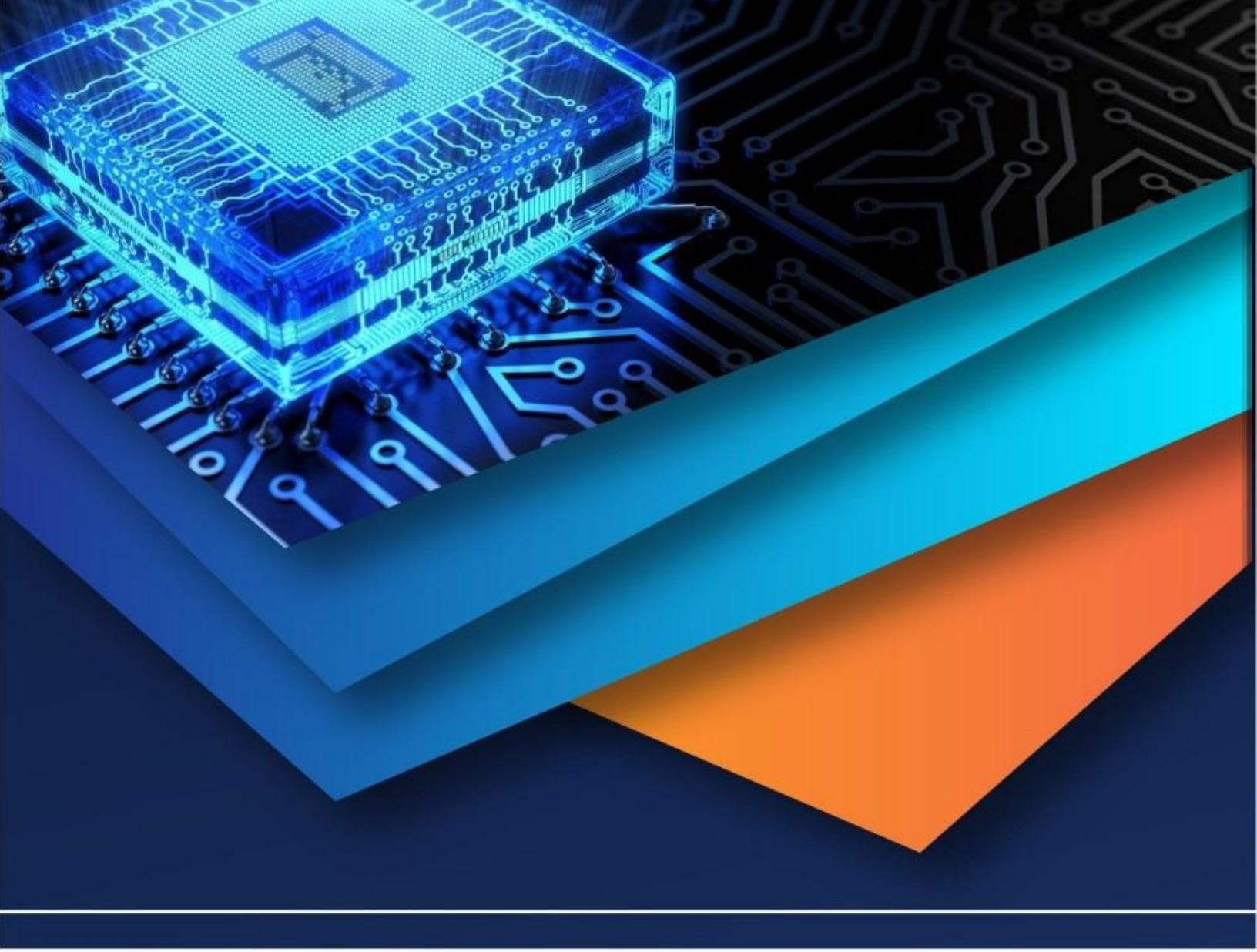

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