International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 05 | May 2019 www.irjet.net p-ISSN: 2395-0072

Vehicular Data Acquisition & Driver Behaviours Surveillance System

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Abstract - *Driver fatigue is one in every of the most causes of road accidents. it's essential to develop a reliable driver temporary state detection system which might alert drivers while not worrying them and is strong to environmental changes. This paper presents a fatigue detection techniques supported pc vision. Fatigue is detected from face and face expression of driver. Hybrid technique is employed for face and facial feature detection that not solely increase the accuracy of the system however additionally decreases the interval. Skin color pixels detection and viola Jones strategies is employed for face detection and data primarily based division technique is employed to extend the accuracy of facial feature detection. Microcontroller with GSM and GPS technology is used if the driver detect the drowsiness then the instant sms containing current position of a vehicle to take necessary steps.*

Key Words: Global Positioning system, Short message service, ARM-7

1. INTRODUCTION

Sleeping is one amongst the essential desires of the creature, sleep lack causes the body to react inefficiently, reducing each latency and wakefulness, additionally manufacture low alertness and lose of concentration which reduces the ability to perform activities based on care that is necessary in the case of driving a car.

According to several researches somnolence is said to thousands of traffic accidents every year, the accidents produces approximately 50% of death or serious injuries [1], as they tend to be impacts at high speed as a result of the driving force United Nations agency has fallen asleep cannot brake or deviate to avoid or scale back impact. To mitigate these accidents, manufacturers have developed drowsiness detection systems that recognize signs of possible drowsiness, alerting the driver to their condition [2].

In the research: "A smartphone-based driver safety watching system victimization information fusion. Sensors", Lee and Chung [3] propose a technique to watch driver safety levels employing a information fusion approach such as: eye characteristics, variation of biological signals, temperature inside the vehicle and vehicle speed. This system is developed as associate degree application for associate degree Android-based smartphone, where measuring security-related data that does not require additional costs or additional equipment. The system has associate degree potency of ninety six to notice that the driving force is awake and ninety seven to notice that he's asleep. This info permits knowing the signs that shows a sleepy-eyed driver.

In work "Detection of fatigue victimization Smartphone aims to use a smartphone (with humanoid OS or IOS) to notice fatigue within the driver" [4] Roberson et al uses the front camera of the smartphone to capture pictures of the driving force then uses advanced algorithms of laptop vision to notice his face and eyes. Rotation and tilting of the head and blinking of the eyes are detected as indicators of fatigue. The smartphones is employed to help driver victimization front and rear camera [5], for drowsy driving detection system [6], for the wavelet analysis of heart rate variability and a support vector machine classifier [7], and for identification of dangerous driving things [8].

The PERCLOS (Percent of the time Eyelids ar CLOSed) metrics is employed to live somnolence within the work "Eye pursuit based mostly driver fatigue watching and warning system" [9]. The system estimates with a non - constant ways for detection somnolence, the vehicle steering wheel variability is considered to determine the amount of drowsiness because drivers makes variability greater as driver become more drowsy. The PERCLOS metrics for alerting driver is employed in [10] to notice somnolence in serious vehicles, to monitor and alert the driver [11], for line departure warnings [12] and to detect drowsiness conditions in drivers [13].

The HCI systems permits to interrelate the creature with associate degree device (computer) that is capable of giving solutions to an excellent range of issues that may have an effect on him. The development and use of HCI has been very important, so it must be implemented with adequate usability criteria [14] and satisfy users' needs efficiently [15]. A relevant side is that not solely sought-after a straightforward interaction additionally sought-after to help humans with special skills to satisfy their desires even overcoming their limitations [16-19] and can be implemented using low cost systems [20-25]. The smart phones being mass-use are actually a low-cost

computer, if are used in an HCI would allow to massify its use and therefore offer greater solutions to improve the quality of lifetime of a person satisfying their desires though the person presents some limitation in one or additional of their senses.

The objective of this work was to implement a closed-circuit television to the transport driver supported artificial vision techniques and enforced in an exceedingly smartphone so as to notice and alert when the driver have drowsiness signs. To achieve this objective it absolutely was analyzed different works connected with detection somnolence in drivers, the drowsiness symptoms in vehicle drivers; we identify the technical parameters and algorithms that allow to method signals of the state of somnolence. In this work we tend to gift a developed somnolence detection formula, the interface during which the state of somnolence is displayed and also the necessary accommodates get the proper functioning of the implemented system.

The somnolence detection victimisation patterns analysis ar generated supported measurable variables that ar obtained by experimentation. These variables will be speed, acceleration, braking, gear shifting, hand pressure on the hand wheel and therefore the car's path within the road lane. This technique has the disadvantage that its modeling depends on the characteristics of every automobile and therefore the method of driving that's specific to every driver.

By the utilization of the image process, driver states will be determined. From the image of the face it will be detected if the motive force is awake or asleep. The somnolence of the motive force will be determined as a result of the motive force is making an attempt to shut his eyes [29]. This technique has the advantage of not being intrusive and might be used techniques just like the templet pairing technique wherever a driver templates is outlined. The technique of the behavior of the eyes, calculates the blinking frequency and therefore the measure of eyes closing so as to see the speed of somnolence.

One of the foremost used indexes to calculate the amount of temporary state is PERCLOS (Percent of the time Eyelids ar CLOSed), that measures the proportion of your time somebody's eyes are closed at eightieth to 100% in a very amount. According to a study by Bruno Walter Wierwille and colleagues [30], PERCLOS is among the foremost necessary time period alert measures for vehicle somnolence detection systems.

2. METHODOLOGY

In this paper drowsiness of driver behaviour detection detect by using two part:

1)Hardware part
2)Software part

1) Hardware Part:

In hardware part ARM-7 is used as a microcontroller, where we are using GPS/GSM module which is interface to the laptop by using serial to USB connector. The information related to latitude and longitude is given by GPS module and message is sent to GSM module, this message is sent whenever the alert information is sent by computer.

2) Software Part:

In software we are designing algorithm which can be detect face and eyes. The algorithm design where the eyes blinks are detected face inclination is calculated in terms of degree. If the eye blink or face is detected then alert message is shown on the screen with beep. At the same time alert message is sent to ARM processor.

On receiver end consult person will get the messagesnor sms with latitude and longitude tag with the system, which will be helpful for them and take necessary action if the accident occur.

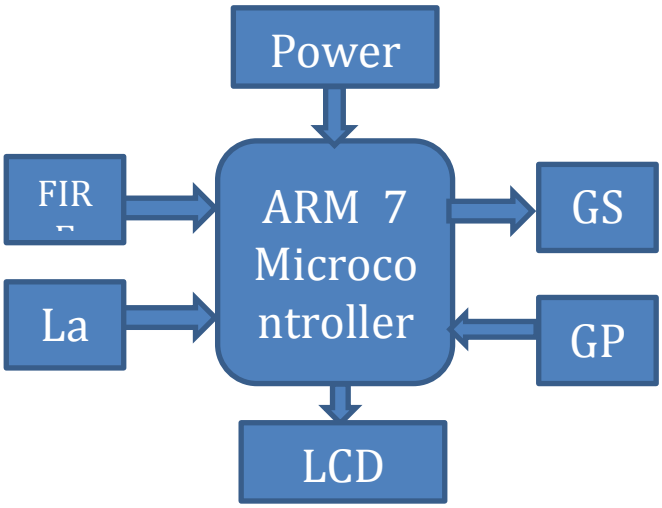

Figure:1 Hardware Module

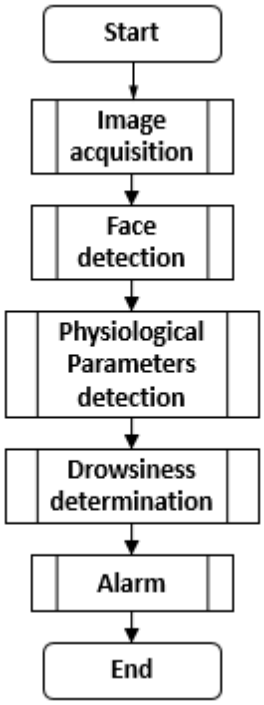

Figure. 2. Drowsiness detection Flow chart

Table -1: Comparative study of algorithm:

No	Parameters	Haar features	Haar cascade	Viola-jones	Ada-boost
1.	Calculation	Easy	Complex	Easy compared to all	Complex rather than viola-jones
2.	Detection time	High	Less	Less	High
3.	Working area	Whole image	Particular image	Intregal image	Classifier
4.	Resized area	Cannot resized	Resized	Resized	Cannot resized
5.	Accuracy	Low	Better than Haar	High compared to Haar and cascade	High compared to all

3. RESULTS

Drowsiness Detection and segmented as shown below.

The Fig.1 is eyes open detection, Fig 2 is detection & Fig 4 is face tilt dectection.

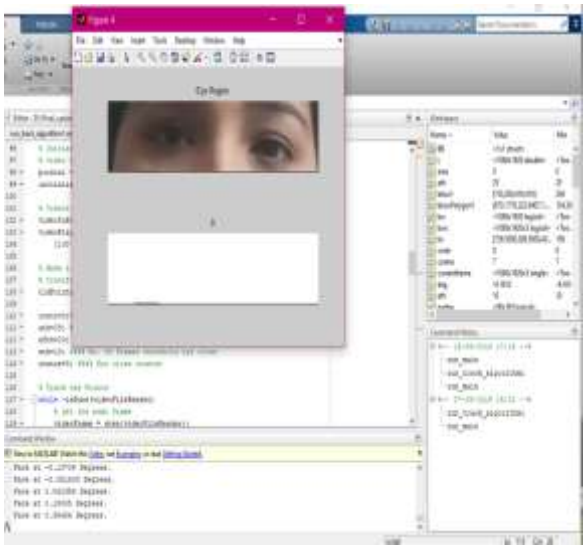

Figure 1: Eyes Open Detection

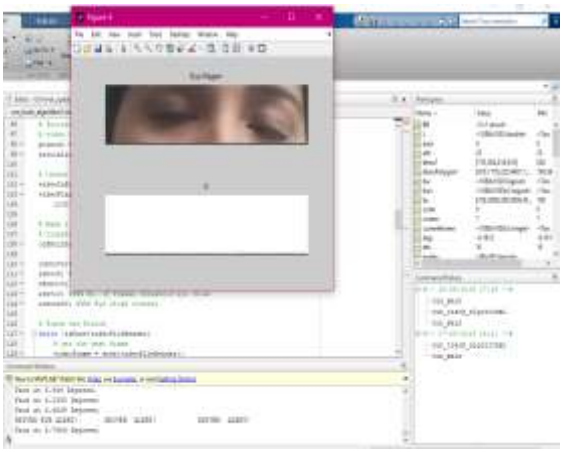

Figure 2 : Eyes Closed Detection & Eye alert to driver

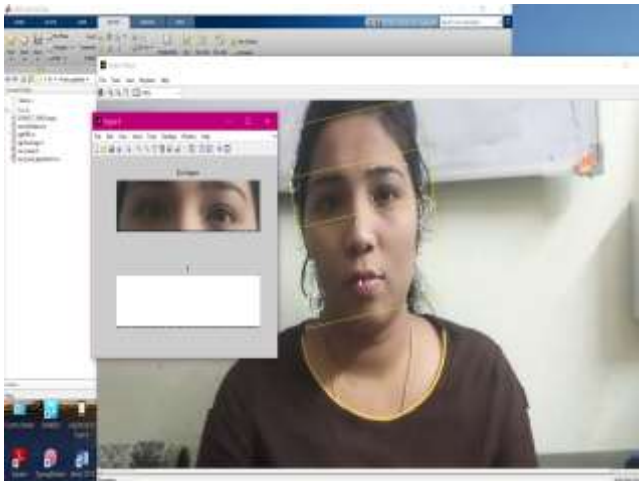

Figure 3 : Face Detection

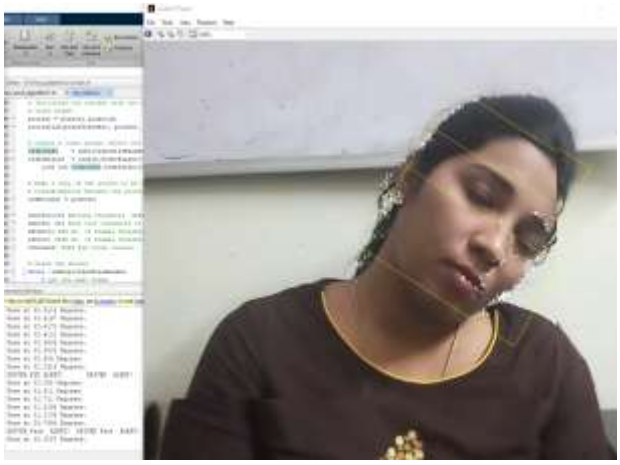

Figure 4 : Face Tilt Detection

4. CONCLUSION

Drowsiness detection algorithm is design and implemented. It will work according to the face inclination and Eye bilk detection. Moreover the result are achieved.

If system is applicable number of accident will reduced.

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