Piyush et al. International Journal of Recent Research Aspects ISSN: 2349-7688, Vol. 6, Issue 3, Sept 2019, pp. 11-14

Driver Distraction and Drowsiness Detection System

Piyush, Ravi Kumar, Dr. Neeraj Dahiya

Department of Computer Science and Engineering, SRM University, Delhi-NCR, India

***Abstract*— Driver's Fatigue is a standout among the most widely recognized purposes behind lethal street mishaps around the globe. This demonstrates in the transportation business particularly, where a driver of a substantial vehicle is regularly presented to long stretches of dull driving which causes weariness without continuous rest period. Because of the continuous frequency of driver weakness this has turned into a territory of extraordinary financial concern. Subsequently, a street mishaps anticipation framework by identifying driver's drowsiness, which measure the dimension of driver distractedness and give a notice when a potential risk exists, have gotten a lot of consideration as a measure to avert mishaps brought about by driver negligence. In this paper a proficient driver's laziness discovery framework is planned utilizing yawn identification by taking eye location and mouth recognition into thought at the same time with the goal that street mishaps can be kept away from effectively.**

***Keywords* —Drowsiness, face detection, mouth detection, eyes detection, yawn detection, alert.**

I. INTRODUCTION

National Highway Traffic Safety Administration (NHTSA) research information demonstrates that languor while driving is a contributing component for street mishaps and it results in 4-6 times higher accident hazard with respect to caution drivers [1]. A large portion of the lethal street mishaps happen at rates more noteworthy than 70 Kmph. The World Health Organization (WHO) has revealed that India has the most noticeably bad street conditions on the planet coming about roughly over two lakh passing in 2010 and 2011 [2].

Research demonstrates that driver weariness and drowsiness is one of the real purposes behind the expanding mishaps [3]. Driver exhaustion not just effects the readiness and reaction time of the driver yet it additionally improves the odds of being engaged with fender benders. The lethargic drivers neglect to take right activities before an impact. An essential incongruity in driver's weakness is that the driver might be too depleted to even consider comprehending his own dimension of laziness. This critical issue is regularly disregarded by the driver. Thus, the utilization of supporting frameworks that look at a driver's dimension of watchfulness is important to maintain a strategic distance from street mishaps.

These frameworks should then caution the driver on account of lethargy or obliviousness. Some notice signs that can be estimated as signs of driver weakness seem to be: wandering off in fantasy land while out and about, rolling over the inside line, yawning, feeling fretful, feeling hardened, overwhelming eyes and responding gradually.

There have been escalated explores to recognize drowsiness of drivers, in view of the previously mentioned motions of body (for example eye movement identification and yawning discovery). Here an effective driver's laziness discovery framework is structured utilizing yawn recognition by taking eye location and mouth identification into thought all the while with the goal that street mishaps can be maintained a strategic distance from effectively.

II. FACTORS CAUSING DRIVER'S DROWSINESS

Driver Fatigue is regularly brought about by four principle factors: rest, work, time of day, and physical. Regularly individuals endeavor to do much in multi day and they lose valuable rest because of this. Frequently by taking caffeine or different stimulants individuals keep on remaining conscious. The absence of rest develops over various days and the following thing that happens is the body at long last crumples and the individual nods off. Time of day components can frequently influence the body. The human mind is prepared to think there are times the body ought to be snoozing. These are regularly connected with seeing the dawn and dusk. Between the long stretches of 2 AM and 6 AM, the mind tells the body it ought to be sleeping.

Broadening the time conscious will in the long run lead to the body slamming. The last factor is an individual's physical condition. Individuals here and there are on meds that make languor or have physical infirmities that reason these issues. Being physically unfit, by being either under or overweight, will cause weakness. Furthermore, being candidly focused will make the body get exhausted snappier [3]

III. LITERATURE REVIEW

Driver Fatigue is among the most widely recognized explanation behind deadly street mishaps around the globe.

This demonstrates in the transportation business particularly, where a driver of a substantial vehicle is regularly presented to long stretches of tedious driving which causes weariness without continuous rest period. Because of the successive event of driver weariness this has turned into a territory of incredible financial concern. Recognizing driver's sleepiness has been an exploration point for a long time, with numerous methodologies being considered along these lines far.

The work displayed in [4] exploits some mouth geometrical highlights to distinguish yawning. The work in [5] proposes the recognition of the face area utilizing the distinction picture between two pictures. Driver's yawn is then identified dependent on the separation between the midpoint of nostrils and the jaw. [6] Uses Gravity-focus layout to recognize the face. It at that point utilizes dark projection and Gabor wavelets to identify the mouth corners. At long last LDA is connected to characterize highlight vectors to identify yawning. [7] It displays a framework where the face is situated through Viola-Jones face recognition technique in a video outline. At that point, a mouth window is separated from the face area, in which lips are looked through spatial fluffy c implies (s-FCM) grouping. In [8] there

is leeway of two cameras: a low goals camera for the face and a high goals one for the mouth. It at that point utilizes haar-like highlights to distinguish driver's mouth and yawning is recognized by the proportion of mouth tallness and width. In [9] a strategy is embraced for yawning identification dependent on the adjustments in mouth geometric highlights. The work in [10] driver's sluggishness is resolved utilizing vehicle based measures, social measures and mental estimates which makes this a crossover laziness discovery framework. [11] Shows recognition of sleepiness dependent on head development and geometrical highlights of mouth is proposed. Analysis was directed on test size of 50 video clasps and saw that head development contributes about 8% and yawning contributes about 49%.

IV. JUSTIFICATION OF RESEARCH

This research is different from the related literature in three aspects. Right off the bat, in this research we are linking eye recognition and mouth identification by deciding the minute when there are shut eyes and open mouth all the while with the goal that a powerful discovery can be accomplished. Besides, so as to have a practical usage we utilize a real camera for continuous pictures to be handled. What's more, thirdly, in this research the framework will be structured utilizing open CV library.

V. OBJECTIVES

The main objective is to first design a system to detect driver's drowsiness based on yawning measurement by eye and mouth detection ensuring the robust detection of yawning expression in the presence of variable lighting conditions and facial occlusions so that road accidents can be avoided successfully. Secondly, to alert the driver on detection of drowsiness by using beep or buzzer and to ensure a simple and efficient design, that can be implemented using simulation and hardware as well without false detections.

III. PROPOSED APPROACH

The driver's face is continuously recorded using a video camera that is installed under the front mirror. In order to detect the yawn, the first step is to detect and track the face using the series of frame shots taken by the camera. Then the location of the eyes is detected and the mouth in the detected face. **The closed eye gesture is detected along with closed eyes for yawning detection.** This makes segmentation procedure more robust to false detections. The mouth and eye geometrical features are then used to detect the yawn.

The system will alert the driver of his fatigue by use of beep or buzzer and the improper driving situation in case of yawning detection. This is to be done in various phases given following:

Phase 1: Face Detection
Phase 2: Eyes Detection
Phase 3: Mouth Detection
Phase 4: Yawn Detection
Phase 5: Alert System

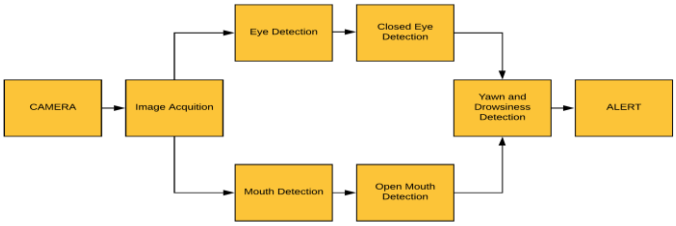

Fig. 1: Block Diagram for working of detection system

VI. APPLICATIONS

- Transportation business where almost daily accidents occur due to driver fatigue.
- Security guard cabins.
- Operators at nuclear power plants where continuous monitoring is necessary.
- Military applications where high intensity monitoring of soldier is needed.
- In classrooms where students feel drowsy and inattentive during the class.
- In Offices to detect lazy and sleepy employees.

Fig. 2: Alert in case of Yawn Detection

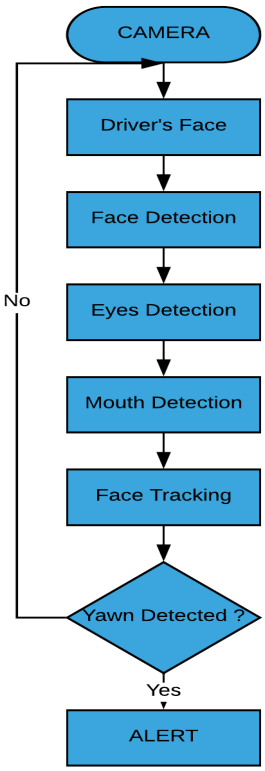

Fig. 3: Flow Diagram for working of detection system

IV. DETECTION TECHNIQUES

A. *Eye Blinking Based Technique*

In this eye squinting rate and eye conclusion term is estimated to distinguish driver's sluggishness. Since when driver felt sluggish around then his/her eye flickering and look between eyelids are not quite the same as would be expected circumstances so they effectively distinguish drowsiness."Fig.6", demonstrates the eye squinting based drowsiness location.

In this framework the situation of irises and eye states are checked through time to assess eye flickering recurrence and eye close term. [18]. What's more, in this kind of framework utilizes a remotely set camera to gain video and PC vision strategies are then connected to successively limit face, eyes and eyelids positions to gauge proportion of closure.[19] Using these eyes nearer and flickering apportion one can identify sleepiness of driver. Such a framework, mounted in a circumspect corner of the vehicle, could screen for any indications of the head tilting, the eyes hanging, or the mouth yawning at the same time. The accompanying figure demonstrates the eye flicker identification.

B.*Yawning Based Technique*

Identification of drives' languor dependent on yawning estimation.

This includes a few stages including the ongoing identification and following of driver's face, recognition and following of the mouth shape and the discovery "Fig.7", shows of yawning dependent on estimating both the rate and the measure of changes in the mouth form region. APEX™ car brilliant camera stage created by Connive Corp. In our methodology, the driver's face is persistently caught utilizing a camcorder that is introduced under the front mirror inside the vehicle, as appeared in "Fig.8", next, recognizing languor includes two fundamental strides to appropriately quantify changes in facial motions that infer drowsiness.

First, the driver's face is detected and tracked in the series of frame shots taken by the camera. After locating the driver's face, the next step is to detect and track the location of the mouth. We have chosen to detect and track the face prior to tracking the mouth as this makes the mouth tracking procedure more robust against false detections.

After detection of the mouth, the yawning state is detected based on measuring the rate of changes in the area of the mouth contour and the aspect ratio of mouth area [22].

V. FUTURE SCOPE

a) Rather using alarm we can use Automatic Braking System which will reduce the speed of the vehicle.
b) The vehicle can be automatically parked by first using Automatic braking system, which will reduce the speed and concurrently will turn on the parking lights of the vehicle
c) Using Pressure sensor on the steering alarm or Automatic braking System can be set in case of drowsiness. By using wireless Technology if the driver gets drowsy an alert message can be sent to a selected person's mobile by using GSM module along with the alarm in vehicle.

VI. REFERENCES

[1] Ralph Oyini Mbouna, Seong G. Kong, Senior Member, IEEE,(2013),Visual Analysis of Eye State and Head Pose for Driver Alertnes Monitoring, (IEEE),pp.1462-469,vol.14,USA

[2] S. Vitabile, A. De Paola, F. Sorbello, J Ambient Intell Human Comput, "A real-time non-intrusive FPGA-based Drowsiness system" Springer, pp.251-262, University of Palermo, Italy 2011

[3] Road safety information, rospa, "driver fatigue and road accidents" ,www.rospa.com, 2011

[4] Arun Sahayadhas,Kenneth Sundaraj,"Detecting Driver Drowsiness Based on Sensors A Review",pp.16937-16953, ISSN 1424-8220, Malaysia 2012 http://djhurij4nde4r.cloudfront.net/images/images/000/005/917/fullsi ze/eskandarian.png?1386903510

[5] Anirban dasgupta,anjith george,"A Vision Based System For Monitoring The Loss Of Attention in Automotive Drivers",(IEEE Transaction),vol.14,no.4 2013

[6] AntoinePicot,SylvieCharbonnier,"On-Line Detection of Drowsiness Using Brain and Visual Information",IEEE Transaction on systems, man and cybernetics part a: systems and humans, VOL. 42, NO. 3,2012

[7] Boon-Giin Lee and Wan-Young Chung, "Driver Alertness Monitoring Using Fusion of Facial Features and Bio-Signals", (IEEE) Sensors journal, vol. 12, no. 7,2012

[8] Ralph Oyini Mbouna, Seong G. Kong, Senior Member, "Visual Analysis of Eye State and Head Pose for Driver AlertnessMonitoring",IEEE transactions on intelligent transportation systems, VOL. 14, NO. 3 2013

[9] Rami N. Khushaba, Sarath Kodagoda, Sara Lal, and Gamini Dissanayake,"Driver Drowsiness Classification Using Fuzzy Wavelet-Packet-Based Feature-Extraction Algorithm", (IEEE) Transactions vol. 58, no. 1, 2011.

[10] Raoul Lopes , D.J Sanghvi, Aditya Shah,"Drowsiness Detection based on Eye Movement, Yawn Detection and Head Rotation", Vol. 2, No.6,2012

[11] Wei Zhang, Bo Cheng, Yingzi Lin," Driver Drowsiness Recognition Based on Computer Vision Technology",(IEEE) Vol.17, No.3, 2012.

[12] Karamjeet Singh,Rupinder Kaur,"Physical and Physiological Drowsiness Detection Methods", IJIEASR, pp.35-43,vol.2,2013.

[13] Dr. Xiong (Bill) Yu, P.E.,"Non-Contact Driver Drowsiness Detection System",(safety IDEA),2012

[14] Di Huang, Student Member, IEEE, Caifeng Shan, Member, IEEE,"Local Binary Patterns and Its Application to Facial Image Analysis A Survey", (IEEE), pp.765-781, vol.41, 2011. http://www.scholarpedia.org/article/Local_Binary_P atterns

[15] Chahar, P., Dalal, S.: Deadlock resolution techniques: an overview. Int. J. Sci. Res. Publ. **3**(7), 1–5 (2013)

[16] Jarek Krajewski,David Sommer,"Steering Wheel Behavior Based Estimation Of Fatigue", Fifth International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design, Germany.

[17] L. Bergasa, J. Nuevo, M. Sotelo, R. Barea, and M. Lopez ,"Real-Time System for Monitoring Driver Vigilance", (IEEE) Transactions on Intelligent Transportation Systems, Vol. 7, no. 1, March 2006

[18] Artem A. Lenskiy and Jong-Soo Lee, "Driver's Eye Blinking Detection Using Novel Color and Texture Segmentation Algorithms", International Journal of Control, Automation, and Systems,pp.317-327, 2012

[19] Amol M. Malla, Paul R. Davidson, Philip J. Bones, Richard Green and Richard D. Jones,"Automated Video-based Measurement of Eye Closure for Detecting Behavioral Microsleep", presented at 32nd Annual International Conference of the IEEE EMBS Buenos Aires, Argentina 2010

[20] Pooja Chahar, Surjeet Dalal, "Deadlock Resolution Techniques: An Overview", International Journal of Scientific and Research Publications, Volume 3, Issue 7, July 2013.

[21] Shivangi R.Mishra, Prof. S. B. Somani, Pranjali Deshmukh, Daman Soni, "EEG Signal Processing and Classification of Sensorimoter rhythm-based BCI",(IJERT),International Journal of Engineering Research & Technology Vol. 1 Issue 4, 2012

[22] Behnoosh Hariri, Shabnam Abtahi,Shervin Shirmohammadi , Luc Martel," A Yawning Measurement Method to Detect Driver Drowsiness ".

