International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 05 | May - 2022 Impact Factor: 7.185 ISSN: 2582-3930

DRIVER ALERT AND MONITORING SYSTEM

PROF. K.B DUBEY,AKASH AWASTHI, AKHAND PRATAP SINGH, AKSHAY CHAUDHARY
Department of Computer Science and Engineering
ABES Institute of Technology, Ghaziabad, Uttar Pradesh, India

---

ABSTRACT

Here ,we have proposed a system which detects the driver's fatigue status by analysing the blinking and duration of eye closure and position of eye retina using video data without equipping their bodies with devices. When a driver is in a very state of ,the action of eye like frequency of blinking is different from those in normal condition. The aim of this proposed idea is to cut back the possibilities of accidents that will occur thanks to driver's fatigue condition . To spot lethargy various factors are utilized like eye retina identification and facial element acknowledgement has been utilized. Here right away, propose a method for identifying driver sluggishness utilizing eye retina location of the driving force. This framework is used for ongoing issue which catches picture consistently and measures the condition of the attention as indicated by the predetermined calculation and provides cautioning whenever required. For tiredness discovery of the drivers the per conclusion estimation of eye is believed of. So when the conclusion of eye surpasses a particular sum then we effectively distinguish driver to be tired. For actualizing this framework we utilize a pair of libraries of OpenCv . The framework can reach 40 edges for every second for eye following, and so the traditional right rate for eye area and following can accomplish 99.4% on five test recordings. the correct rate for weariness identification is 100%, yet the traditional exactness rate for weakness recognition is 90%.

Keywords- Driver fatigue,OpenCV,eye tracking,E.A.R,frames,lethargy,Threshold.

INTRODUCTION

Sluggishness is actually characterized as "a condition of close rest due to weariness". It is in fact unmistakable from Fatigue, which has been characterized as a "reluctance to stay playing out the work wanting to be done". The impacts of languor and weakness are especially the equivalent.

Drowsiness of the drivers is that the basic driver of mishaps on the planet at the same time as in India. due to lack of rest and more of considerable tiredness, sleepiness can happen while driving. the foremost ideal approach to remain aloof from mishappenings caused by drivers because of tiredness is to differentiate languor of the propulsion and caution the drivers before constitute rest.

Exhaustion of physical power influences mental sharpness, diminishing a person's capability to drive or handle a vehicle securely and scale up the danger of human mistake that could prompt fatalities and injuries. Lethargy eases back response time, diminishes mindfulness, focus and weakens judgment.

At the point when a driver drives more than typical duration of human then extreme exhaustion is caused and furthermore brings about tiredness which drives the driver to drowsy Condition or loss of awareness. Sluggishness is a perplexing marvel that expresses that there is an abatement in cautions and cognizant degrees of the driver. Despite the fact that there is no immediate measure to recognize the sleepiness a few circuitous techniques can be utilized for this reason. Favourable circumstances and impediments comparing to each framework is clarified. Contingent upon the points of interest and impediments the foremost appropriate technique is picked and proposed. At that point the methodology for whole framework advancement is clarified utilizing a stream outline which incorporates catching the picture progressively consistently, at that time isolating it into outlines.

RELATED WORK

Here in this segment we will summarise some of the literary work which are relevant and referenced in this paper.

With the assistance of non-intrusive machine vision based concepts, drowsiness of the driver detected system has been already established .There are a decent number of previous studies on drowsiness detection and fatigue monitoring has been already done. Many computer vision based schemes are developed for non-intrusive, real-time detection of sleepy driver with the assistance of assorted visual signs and and observed face expression .The observed patterns of changes in the eyes, head movements, and facial expressions are

known to reflect a somebody's level of fatigue and alertness .Eye closure, head movement, jaw drop, eyebrow shape and eyelid movement are samples of some features typical of high fatigue and drowsy state of someone. To make use of these visual cues, a distant camera is typically mounted on the dashboard of the vehicle which, with the assistance of various extracted face expression, analyses driver's physical conditions and classifies this state as drowsy/nondrowsy. It has been concluded that computer vision techniques are non-intrusive, practically acceptable and hence are most promising for determining driver's physical conditions and monitoring driver fatigue [4].

Shailesh et al.[5] used a camera fixed on the dashboard to capture and send images to Raspberry Pi server installed within the vehicle, to detect faces using Haar classifier and facial points using the Dlib Library. Vibin Varghese et al. [7] detected landmarks for each image taken, facial cues are utilized to calculate the EAR (between eye height level and eye width) using the landmark points of face. After computing the EAR, they determined the driver as drowsy if the EAR was less than the limit for 2 or 3 seconds (because the eye blink lasts approximately 100-400ms). Rateb et al.[12] detected real-time driver drowsiness using deep neural networks. They developed an Android application.

Ashish Kumar et al.[19] detected yawning of driver by determining the mouth aspect ratio. Vural et al. [23] proposes a system that applies automated measurement of the face during actual drowsiness to get and discover new signals of drowsiness in facial expression and head motion . Horng et al. [10] Use edge information to identify and locate eyes and use dynamic pattern matching for eye tracking to detect driver's fatigue

There are several other research works that have been conducted to determine vision based drowsiness detection .So, with reference to the literature work we have proposed a system that detects driver's drowsiness using EAR which is described in this paper.

PROPOSED SYSTEM

In these papers, various styles of techniques for estimating the laziness of the propulsion are referenced which contains Vehicle - based measures , Physiological measures , Behavioural measures. Utilizing those strategies an insight framework are often created which could alarm the drive within the event that sluggish condition and forestall mishaps. At that time each casing is investigated to find face first. On the off chance that a face is distinguished, at that time the subsequent undertaking is to seek out the eyes. After the positive after effect of recognizing eye, the measure of conclusion of the eye is resolved and contrasted and therefore the reference esteems for the Drowsy state eye. On the off chance that the lazy condition is discovered, at that point the actuation is frightened else over and again the circle of discovering face and recognizing tired condition is

completed. In spite of the actual fact that there is no immediate measure to differentiate the sluggishness some peculiar/aberrant techniques may be utilized for this reason. In part 1, in beginning segments, various varieties of techniques for estimating the laziness of the driving force are referenced which includes Vehicle-based measures, Physiological measures, Behavioural measures.

Utilizing these strategies a knowledge framework is created which might alarm the propulsion on the off chance that sluggish condition and forestall mishaps. Points of interest and detriments regarding every framework are clarified. Depending upon the points of interest and hindrances the foremost reasonable technique is picked and proposed. At that point the methodology for whole framework advancement is clarified utilizing a stream outline which has catching the image progressively ceaselessly, at that time isolating it into outlines. At that point each casing is broke right all the way down to discover face first. On the off chance that a face is recognized, at that point the next undertaking is to hunt out the eyes. After the positive consequence of distinguishing eye the measure of conclusion of the attention is resolved and contrasted and therefore the reference esteems for the Drowsy State Eye. On the off chance that the lazy condition is discovered, at that time the driving force is frightened else over once the cycle of discovering face and recognizing tired condition is completed. the attention squint is quick shutting and reviving of a natural eye. Every individual has somewhat unique example of squints. the instance varies within the speed of shutting and opening, tier of pressing the eye and in flicker term. the attention squint keeps going around 100-400 ms. we infer the attention perspective proportion (EAR) that's utilized as a gauge of the enlightening state. Since the per- outline EAR may not really perceive the eye flickers accurately, a classifier that considers a way bigger transient window of a casing is ready.

MODULES OF PROPOSED APPROACH

1. VIDEO PROCUREMENT

The idea behind this stage is to acquire video pictures of driver's face in order that straight forwardly noticeable viewable prompt could be determined for weariness assurance. The image receiving framework or device consists of a small charge coupled device (CCD) ,this is a small scale miniature camera to achieve the IR as much possible.

The obtained pictures need to be generally invariant to light conditions and need to encourage eye identification and following:-.
This incorporates:

- Lighting Variations
- Changing Background
- Vibration_Problem

the framework should be robust enough to able to capture video accurately irrespective to the issues mentioned above. The lighting conditions may shift due to various climate conditions (radiant,rainy, stormy, gloomy, shady,) and day timings (morning,evening,noon time). Likewise ,the inspiration of the driving force is additionally exposed to changes on the grounds that the vehicle is continually proceeding onward the road with various scenes side-by.

The vibration of the vehicle can likewise represent a block within the visual information assortment process.

2. CONVERT INTO THE FRAMES

Here We are managing the ongoing state where video is recorded and must be prepared.
However, Calculations can only be applied or done on just a single image.
Therefore, the captured video should be divided into contours or outlines before it undergoes inspection.

3. EYES RECOGNITION

In our technique , eye is the selected parameter that will be used for locating the condition of the driver. Although the identification of the eye can be easily done, but actually it might be very confusing. Now the system tries to identify the eyes within the certain necessary specific region with the use of recognition of some highlighted features. For the foremost part, the Eigen approach is utilized for this procedure. This procedure takes time to complete. After achieving the aim i.e; when eye recognition is completed then the result is coordinated with the reference or limit an incentive for choosing the condition of the actuation (driver). Now the system identifies the real status of the eyes that whether eyes are open or close or semi-open. The ID of eyes status is the most important and essentially required condition. Information on how the ID of the eye position is calculated is given further in this paper. Now the system displays a warning message in case it

found eyes in any semi-free state or closed state up to a specifically selected limit of frames. Here the framework continuous to rehash until it finds the closed eye .

4. DROWSINESS DETECTION AND ANALYSIS

Detection of Languor condition is reasonably associated with the eye flicker identification part. The planning of eye shut occasions is contrasted and the limits are also evaluated. For recognition of tiredness we set some edge an incentive for the discovery of sleepiness within the driver edge esteem is relies upon the squinting of the attention of the driving force . On the off chance that limit esteem become not exactly a caution is ringing and an alarm message came to the driving force ,

for an example, “Laziness alert”.

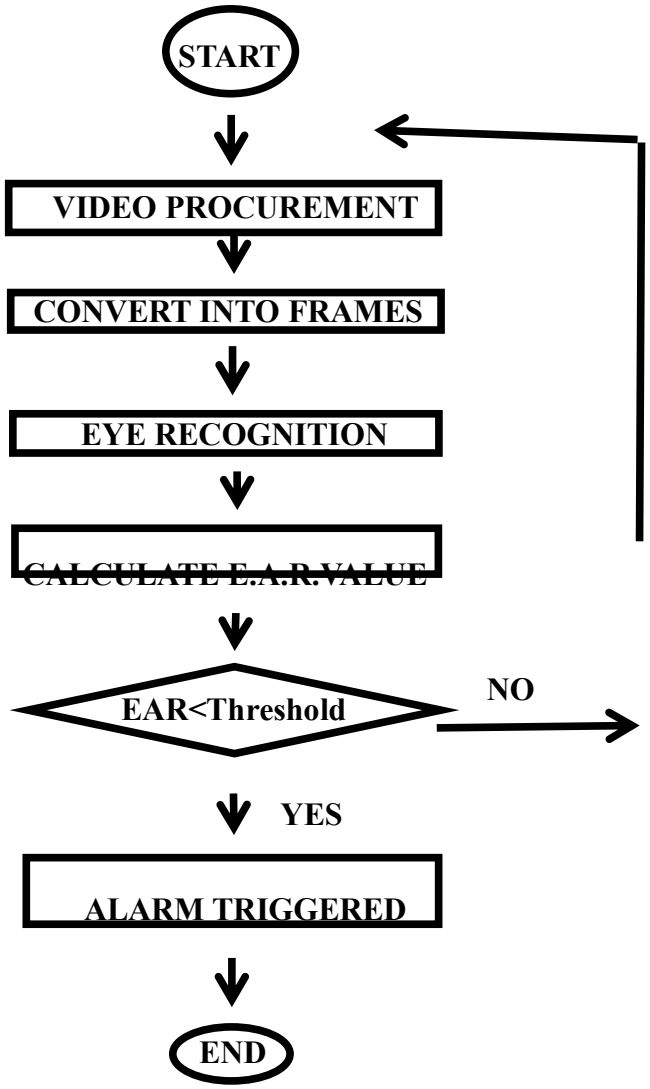

fig1.flow chart of algorithm used

METHODOLOGY

The various angles and highlights gave by the framework to acknowledge laziness even as different highlights to offer interruption location are clarified in detail.

As referenced, the procedure starts with social actions surges of data by gathering picture outlines from the video which is obtained by means of the camera module.

The collected data or pictures are now utilized for handling, and the laziness and drowziness is analysed and detected. When sluggishness is identified, the individual who is driving the vehicle is cautioned within the vehicle by the help of speakers within the vehicle and alarms the driver.

The Eye Aspect Ratio(E.A.R)

"EAR is defined as the ratio of height to the width of an eye"

- **Determining the E.A.R**

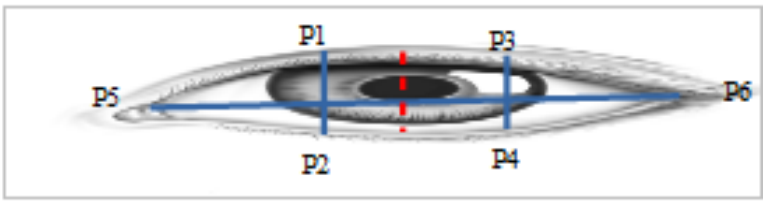

Fig 2: landmark for eye tracing

$$E.A.R = \frac{H1 + H2}{2*W}$$

where;

H1 = euclidean distance between P1&P2

H2 = euclidean distance between P3&P4

W = euclidean distance between P5&P6

Here, H and W denotes height and Width of an aye respectively.

The average eye aspect ratio is 0.340 and 0.140 when the eyes opened and closed, respectively .[1]

E.A.R={ X>open threshold value ;open

X<closure threshold value; close } where x is the real value of E.A.R

There are some fluctuations occurs in the perspective proportion of open eyes Completely immutable among people and due to the uniform scaling of the image and the orientation of the face.

Since eye flicker occurs in both eyes synchronously, the calculated E.A.R for both eyes is an average value.

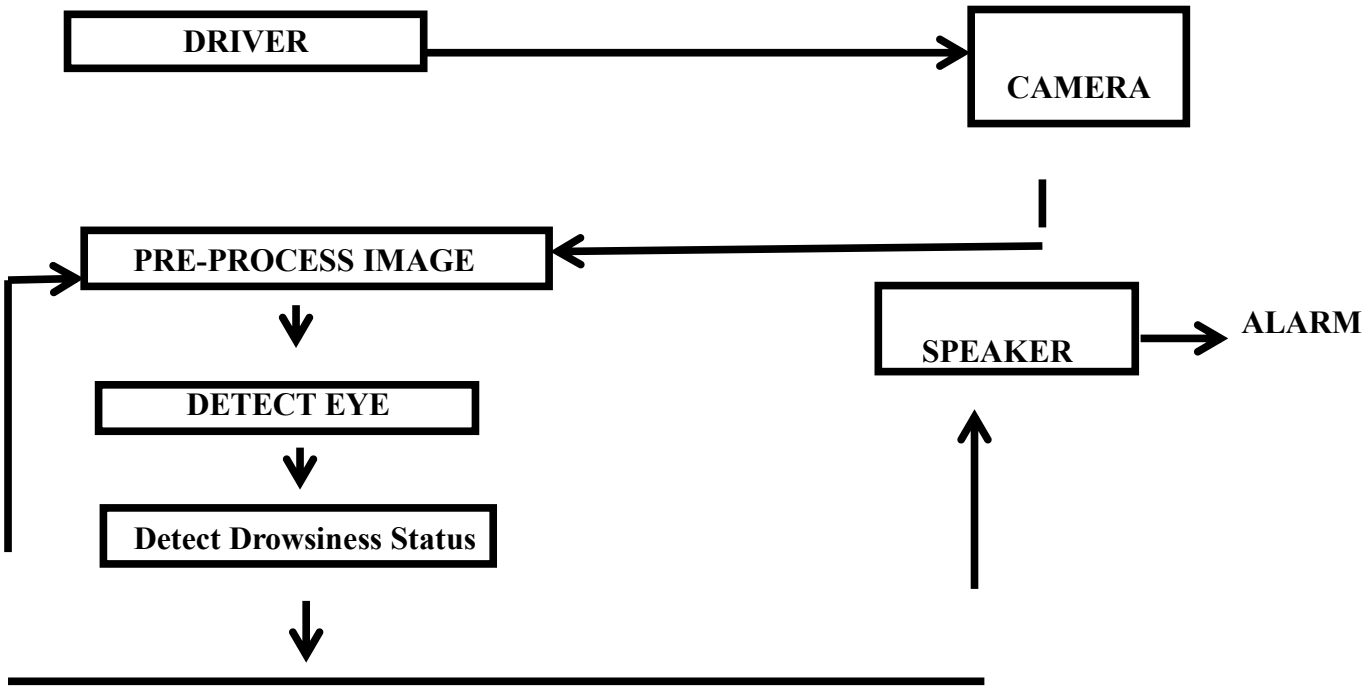

Fig3. Block diagram of proposed system

ADVANTAGES

- no interference and annoyance
- detection of lethargy
- practically applicable
- easy to implement
- reduces road accidents with huge probability

RESULT AND ANALYSIS

The framework can reach 40 edges for every second for eye following, and so the traditional right rate for eye area and following can accomplish 99.4% on five test recordings. the correct rate for weariness identification is 100%, yet the traditional exactness rate for weakness recognition is 90%.

CONCLUSION

We have proposed a driver fatigue monitoring and warning system using a non-intrusive approach. It is successfully able to detect whether the eyes are open or not and warns the driver under lethargical or drowzy state(eyes are closed or yawning) by the help of an alarm.

It is also successful with the spectacles on .

Here we preferred non-intrusive method over intrusive methods because in intrusive method sensors attached on the body of driver may distract him/her in any possible way.

As mechanism to alert the driver the alarm (buzzer) immediately rang in less than 1 second after detecting the eyes closed.

FUTURE SCOPE

The proposed system can be integrated in different vehicles either small or huge.

This approach only warns the a particular vehicle's driver in which it has been integrated .

So, to overcome this some kind of signal (in the form of emergency light or sound) or indication can be used to alert the neighbouring vehicles and make them conscious about dozy driver and can protect their vehicles too.

REFERENCES

1. Real-Time Driver Drowsiness Detection System Using Eye Aspect Ratio and Eye Closure Ratio Sukrit Mehta, Sharad Dadhich, Sahil Gumber, Arpita Jadhav Bhatt Jaypee Institute Of Information Technology, A10, Block A, Industrial Area, Sector 62, Noida Article history: Received 15 January 19 Received in revised form 23 January 19 Accepted 24 February 19
2. Real Time Driver Fatigue Detection System Based on Multi-Task ConNN BURCU KIR SAVAŞ AND YAŞAR BECERİKLİ Computer Engineering Department, Kocaeli University, 41380 Izmit, Turkey. Article history: Received December 4, 2019, accepted December 19, 2019, date of publication January 3, 2020, date of current version January 21, 2020.
3. Driver Drowsiness Detection using Machine Learning Approach- Surekha Reddy,Manjunath Kothari. All content following this page was uploaded by Manjunath Kotari on 26 January 2021.
4. Zuopeng Zhao,1 Nana Zhou , 2 Lan Zhang,2 Hualin Yan,2 Yi Xu,2 and Zhongxin Zhang 2 1 School of Computer Science and Technology & Mine Digitization Engineering Research Center of Ministry of Education of the People's Republic of China, China University of Mining and Technology, Xu-zhou 221116, China 2 School of Computer Science and Technology, China University of Mining and Technology, Xuzhou 221116, China Correspondence should be addressed to Nana Zhou; ts18170082p21@cumt.edu.cn Received 2 December 2019; Revised 20 October 2020; Accepted 28 October 2020; Published 18 November 2020
5. BURCU KIR SAVAŞ AND YAŞAR BECERİKLİ Computer Engineering Department, Kocaeli University, 41380 Izmit, Turkey Corresponding author: Burcu Kır Savas (burcu.kir@kocaeli.edu.tr) This work was supported by the Scientific Research Project Department, Kocaeli University, through the A-2-2 Doctoral Thesis Support Project 2017/087. received December 4, 2019, accepted December 19, 2019, date of publication January 3, 2020, date of current version January 21, 2020.