Anti-Sleep Alarm System for Drowsy Driver

1.P. Archana, Assistant. Professor, Sreyas Institute of Engineering and Technology,

archana.pinnoji@sreyas.ac.in

2.M.Pavan kumar,Department of CSE ,Sreyas Institute of Engineering and Technology,
madhavarampavanrao976@gmail.com

3.K.Manikanta ,Department of CSE,Sreyas Institute of Engineering and Technology,

 manikantakandibanda@gmail.com

4.M.Nithin,Department of CSE,Sreyas Institute of Engineering and Technology,

 nithinreddymedapally2000@gmail.com

5.MD.Suleman,Department of CSE,Sreyas Institute of Engineering and Technology,

 mdsulemann9@gmail.com

Abstract

People's weariness ranges have expanded and their drowsing time has diminished in this fast-paced society. According to many research, weariness is a factor in 20% of all site visitors accidents. In trendy world,a developing variety of jobs need long-term attention. Drivers must preserve a careful eye on the avenue in order to react rapidly to surprising incidents.Many visitors accidents are immediately precipitated by using driver fatigue. As a result, structures that pick out and alert a driver the usage of OpenCV are needed, which may appreciably reduce the incidence of fatigue-related auto accidents. However, the development of such structures has several challenges, which includes the rapid and accurate evaluation of a driver's fatigue symptoms. The undertaking is a safety alerting system for drowsy drivers.

Introduction

The main goal of this lookup is to create a machine for detecting tiredness. The foremost focal point will be on growing a Machine Learning model that can precisely display the open or closed state of the driver's eyes in real time. It is hoped that by means of monitoring the eyes, the symptoms of driver drowsiness might be observed early enough to prevent an automobile collision. The examination of eye actions and blink patterns in a sequence of pictures of a face is used to observe weariness. Nowadays, one of the most preferred structures for averting accidents is driver safety in the car. As the world's populace grows, so does the quantity of people worried in automobile accidents. According to a recent survey, over half of a million accidents take place in India each year. Driver drowsiness is responsible for 60% of these accidents. In the following three domains, driver weariness has an have an effect on on riding abilities. It reasons slower response times, a) inhibits coordination, and b) impairs judgement.

The improvement of technological know-how in detecting a driver's drowsiness is a noteworthy project considering that it can assist decrease the probability of accidents occurring, resulting in fewer deaths and injuries precipitated by way of drowsy driving. Things have altered dramatically as a end result of technological advancements. Technology is designed to make man's life less difficult and more comfortable. We may additionally overcome the complexity of the current system with the proposed system through offering an efficient interface between the person and

the   system.   This   Computer   Vision model is beneficial for   a   driver   who   is drowsy whilst using his automobile because it affords an alarm sound.

Literature Survey

In   this   part, we've gone over several   tactics for   detecting   tiredness   and   blink   that   have   been proposed via researchers.   .
In 2016, Manu B.N brought a technique that makes use of Haar feature-based cascade classifiers to become aware   of   the   face.   To teach the   classifier   that   will observe the   object,   the method requires a giant quantity of fine pics (images of faces) and poor photographs (images besides faces). So, in addition to Haar feature-based classifiers, a cascaded Adaboost classifier is used to understand the face region, after which   the   compensated image is   segmented   into a wide   variety of   rectangle   sections   at any   scale and position inside the unique image. Haar-like characteristic is nice for real-time face detection because to the variant in   facial   features.   These   can   be decided the   usage   of the distinction in   sum   of   pixel values inside a rectangle area, and the Adaboost technique will be given all face samples whilst discarding non-facial   samples   of images throughout the   process.
In 2015, Aman Rahman suggested a approach for detecting   tiredness   that blended eye kingdom detection with   an   eye   blinking   strategy.   The image is   first converted to gray scale,   and   then   the   corners are found using the Harris nook detection technique, which detects the corner at each the aspect and down curve   of   the   eye   lid.   Following   the   tracing   of   the   points,   it draws a   straight   line   between the greater and lower points, calculates the   mid-point,   and hyperlinks the   mid-point   with   the   lower point. Now   it   will   repeat the approach for each image,   calculating   the   distance 'd' between   the   mid-point and the decrease factor to decide the   eye   state.   Finally,   the   eye nation decision is   made depending on   the calculated distance 'd'. The eye country is characterised as "closed" if the distance is zero or close to zero; otherwise,   the   eye state is labeled as   "open."   They   have additionally invoked   intervals   or   time to comprehend that   the person is   feeling   drowsy   or   not•   This   is carried out through the average blink duration of a character is 100-400 milliseconds (i.e. 0 I -0.4 of a second).

Existing system

These days, range of accidents due to the drowsiness of the driver are increasing day by day.So,to alert the driver when he feels drowsy there are two types of models that are present in the existing world. They are

1.Physiological approch: This approach is   an   intrusive approach whereby electrodes   are   used to acquire pulse rate, coronary heart charge and intelligence pastime information. ECG is used to calculate the editions in coronary   heart rate and realize exceptional conditions for   drowsiness.   The   correlation between different signals such as   ECG (Electrocardiogram),   EEG (electroencephalogram),   and   EMG (electromyogram) are made and then the output is generated whether or not the man or woman is drowsy or not.

Disadvantages

- The main disadvantage of this existing system is that it is not an easy task to install the whole equipment that requires a lot of space inside the vehicle and it also consists of many electric wires that every person cannot easily connect them.
- This traditional approach also requires high maintenance cost.
- More over these devices must always be connected to the driver to constantly observe his heart rate which is an inconvenient for a driver.

2.Behavioral approch:

In this approach eye blinking frequency, head pose of a man or woman is monitored through a digicam and the person is alerted if any of these drowsiness symptoms are detected. A machine known as as Viola-Jones Detector that follows this behavioral approach.This model used to be proposed through Paul Viola and Michael Jones. For the face Detection it uses Haar feature-based cascade classifiers which is an object detection method. It is a desktop gaining knowledge of primarilybased method where a cascade characteristic is trained from a lot of superb and negative images. It is then used to detect objects in other images. Here they worked with face detection. Initially, the algorithm desires a lot of fine pictures (images of faces) and negative photos (images barring faces) to educate the classifier.

Disadvantages

- The precision of the night vision detection has some spaces to improve due to the algorithm and hardware ability limitation.
- The accuracy of the algorithm needs further optimization for the night condition.
- The detection model does not able to detect the eyes of the driver if the driver is wearing the spectacles.
- Yet another major drawback of this model is that they usually implicitly impose too strong requirements on the setup such as image resolution, illumination, motion dynamics etc .
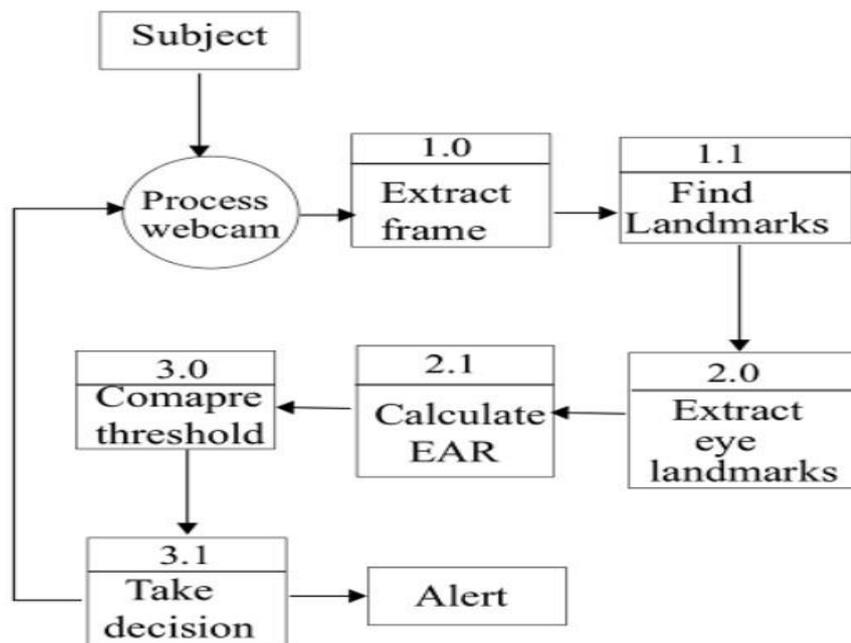
Proposed system

Due to the drawbacks of building the mannequin by using the use of the traditional method we are proposing a gadget the place it uses driver's face movements and eye locations to decide the kingdom of drowsiness. The gadget performs a processing of input photograph move to compute the stage of fatigue of the driver. The analysis is based on calculating a quantity of frames of the Data stream the place the driver eyes are closed. The end result of the processing is despatched to the next section where we activates an alarm sign when the drowsiness index exceeds a pre-specified parameter. In this venture we are making an attempt to implement the detection machine via using the Python libraries known as as OpenCV and DLib.OpenCV is a library that is used to system the snap shots and the movies to discover objects, faces etc. In this assignment we use OpenCV to extract the picture of the driver face and then it is given to DLib.DLib is every other library that acts as a facial landmark detector that is used to estimate the area of sixty eight coordinates which are constant for every person. From these coordinates we extract the coordinates of both eyes of driver and we calculate the Eye Aspect Ratio via which we can become aware of whether or not the driver is drowsy or not.

Advantages

- This system has overcome few of the limitations of the existing systems. Our System will not only alert the driver but also the co-passengers with a loud alarm.
- As the proposed system makes use of OpenCV libraries, there is no necessary minimum resolution requirement on the camera.
- Better differentiation between colors, as it uses multichannel
- colors.Consumes very less memory.
- Capable of achieving blink detection, even when the automobile driver is wearing spectacle.

Architecture

Implementation

Implementation consists of all those things to do that take area to convert from historic system to new system. The ancient device consists of manual operations, which is operated in a very hard manner from the proposed system. A desirable implementation is critical to provide a reliable system to meet the requirements of the organization.
The modules of the utility are as follows:
The first and the essential step that has to be done by way of the driver is to flip on the camera as it is the very necessary requirement for our detection system. Without driver we can't turn on digicam and except digital camera there is no detection system.
At first the eye fame detector takes the video captured by the camera as the enter and then it extracts the frames from it. Then it performs preprocessing of the photos and then it performs face awareness and eye recognition. After the eyes are identified then it finds the coordinates of the eyes and sends the reputation of the eyes to the system.

Results

Determining status of Eye in bright light

Alerting the drowsy driver with alarm

Determining status of eye in dark light

Alerting the drowsy driver with alarm

Test cases

Request Id	Ticket id	Request description	Expected Output	Actual Output	Request Ticket Status
101	201	Driver is feeling sleepy	Alert	Alert	Pass
101	202	Driver is not feeling sleepy	No Alert	No Alert	Pass
101	203	Face is not recognized	Face not found	Face is not found	Pass
101	204	Driver is there but unable to recognize the face coordinates	Alert	Face not found	Fail

Conclusion and future scope

Drowsy riding is serious hazard to drivers and visitors participants. The present's machine lacks one essential function that presents non-reliable results. Our proposed system will overcome these drawbacks and correct reliable results. The commonplace of our drowsiness detection algorithm pretty straightforward. A camera setup to reveal flow of faces. After which, we observe facial landmark detection extract eye regions. will compute the eye issue ratio determine if the eyes are closed. Video segments whose common eye nation factor exceeds the threshold value drowsy and the driver alerted. The system can also be used successfully in locomotives and acro planes. It has broad scope the future and can multiplied to meet excellence. By doing many reduced and gives secure lifestyles the driver and automobile safety. A device for driver safety and car introduced solely the luxurious costly cars. Using drowsiness detection system, driver security can be carried out in normal automobiles also. In the actual time security alerting gadget for drowsy driver, it is required to slow down a car robotically when fatigue stage crosses a positive limit. It monitors degree drowsiness continually and when this stage exceeds a sure fee a signal is generated which controls the hydraulic braking device of the vehicle. Since it brings the vehicle controllable limit, the probabilities of accident occurrence is considerably reduced which is quite beneficial for warding off crashes precipitated via drowsiness related cases.

References

[1] A. Amodio, M. Ermidoro, D. Maggi, S. Formentin, and S. M. Savaresi, "automatic detection of driver impairment based on pupillary light reflex," IEEE transactions on intelligent transportation systems, 2019.

[2] F. Chen and S. Chen, "Injury severities of truck drivers in single- and multi-vehicle accidents on rural highways," Accident Analysis & Prevention, 2011.

[3] G. Niu and C. Wang, "Driver fatigue features extraction," Mathematical Problems inEngineering, 2014.

 (4) R. Zhang. F. You, X. N. Chu, L. Guo, Z.-C. He, and R.-B. Wang, "Lane change merging control method for unmanned vehicle under V2V cooperative environment," China Journal of

Highway and Transport, 2018.

[5] S. Luo, C. Xu, and H. Li, "An application of object detection based on YOLOv3 in traffic," in Proceedings of the 2019 International Conference on Image, Video and Signal Processing-IVSP 2019, Association for Computing Machinery, Shanghai, China, 2019.

[6] Y. Wang, X. Liu, Y. Zhang, Z. Zhu, D. Liu, and J. Sun, "Driving fatigue detection based on EEG signal," in Proceedings of the 5th International Conference on Instrumentation and Measurement, Computer, Communication, and Control, Qinhuangdao, China, September 2015.