

Drowsiness Detection of Driver in Real Time

¹Kallesh T J, ²Samarth Manjunth Hegde, ³Shrishail Sajjan, ⁴Avisake Saha, ⁵Mrs. Rajeswari P

^{1,2,3,4}Students, ⁵Associate Professor
Department of Electronics and Telecommunication
Dayananda Sagar College of Engineering
Bangalore, India

Abstract: In recent times driver drowsiness is one of the significant reasons for vehicle mishaps on the planet. An immediate approach to estimating driver exhaustion is estimating the condition of the driver. sluggishness.it's very important to identify driver condition in realtime to save his life. This task is pointed towards fostering a model of sleepiness discovery framework. This framework is an ongoing framework which catches picture constantly and measures the condition of the eye as indicated by the predefined calculation and gives cautioning whenever required. However there are a few techniques for estimating the Drowsiness yet this approach is totally indifferent which doesn't influence the driver in any capacity, thus identify the state of the driver. For detection of drowsiness as per value of eye closing is considered. So when the conclusion of eye surpasses the threshold value the driver is distinguished to be drowsy. For carrying out this framework a few OpenCv libraries are utilized including Haar-cascade. Likewise to work on the security and wellbeing of the driver and furthermore rigorously screen assuming that the driver is following "don't drive under the influence of liquor" rule. The liquor is been detected before the vehicle is started then the vehicle won't start. This avoids the driver to disregard the principles and furthermore to be protected simultaneously.

Keywords: Raspberrypi 3B+, OpenCV, USB camera, Python, Scripting GPS Module, Alcohol sensor, Dc Motor

INTRODUCTION

Driver tiredness discovery is an innovation in vehicles that is helpful in forestalling mishaps and saving the existences of drivers when they are getting drowsy. This project involves PC vision for the identification of drivers 'drowsiness. With the consistent improvement and advancement in innovation, there is a headway in transportation modes. Our dependency on it have begun expanding at a high rate.

It has enormously impacted our lives in numerous ways. Taking into account any economic wellbeing, there are a few standards which ought to be trailed by any vehicle driver. One is to remain ready and the other one is being dynamic while driving. The current innovations to distinguish driver tiredness are either expensive frameworks that apply to the top of the line vehicle models or frameworks that are reasonable however are not powerful. Sleep deprived driving is the activity of an debilitated because of an absence of rest.

Sleepless driving is a significant reason for vehicular mishaps. At the point when an individual doesn't get the expected measure of rest, their capacity to appropriately work is impacted. At the point when their capacity to work is impacted, they have longer response time and their memory and judgment is debilitated. Many examinations have found that rest lack can influence driving as much as liquor intoxication. Around 20% individuals have conceded to nodding off at the worst possible time with 40% individuals admitting that this has occurred no less than once in their driving vocations. Research shows, in India, 40% of expressway crashes or approach crashes happen because of sluggish driving while over half of all dangerous thruway crashes which include multiple vehicles are liquor related. Over 65% of all dangerous single vehicle crashes are connected with intoxication. Taking a gander at these insights, we should foster a driver security framework. To foster such a framework, we really want to gauge the state of the driver

Because of the dangers that weariness make on the roads, scientists have created different strategies to identify driver tiredness and every method has its own advantages and impediments. To lead an important survey of Drowsiness Detection Techniques (DDT) and fitting characterization strategies, we construct search strings to accumulate significant data. We keep our search focused on publications of well reputed journals and conferences.. We laid out a multi-stage choice models and evaluation method. In light of conceiving measures, 41 exploration papers are sifted through from a detail search of 1020 examination papers. We tracked down an extraordinary ascending in the patterns of sleepiness identification frameworks, yet there is space for additional improvement in present proportions of sluggishness recognition.

PROBLEM STATEMENT

This Proposed system is intended to stay away from innumerable mishaps because of sleepiness of drivers also by focusing on driver's eye developments. Its additionally expect to ceaseless following of driver area for making a crisis move. LITERATURE SURVEY

1) "PREDICTING PERFORMANCE AND SAFETY BASED ON DRIVER FATIGUE," ACCIDENT ANALYSIS PREVENTION

Drowsiness causes decrements in careful consideration and response time and is a significant wellbeing danger in the shipping business there is a need to assess the association between driver weariness and security regarding functionally important

measures. Hard-slowness occasions are a reasonable measure for this reason as they are somewhat effortlessly noticed and are connected with impacts and close crashes. We fostered a logical move toward that predicts driver weakness in view of a biomathematical model and afterward gauges hard-slowness down occasions as a component of anticipated weariness, controlling for season of day to represent precise varieties in openness.

By D. Mollicone, K. Kan, C. Mott et al, 2020. By D. Mollicone, K. Kan, C. Mott et al, 2020

2) "PORTABLE PREVENTION AND MONITORING OF DRIVER'S DROWSINESS FOCUSES TO EYELID MOVEMENT USING INTERNET OF THINGS,"

This paper incorporates a sleepiness prevention device since as of late vehicular include of mishaps incremented yearly in the Philippines. Ebb and flow security measures are followed to increment the driver's mindfulness which incorporates the utilization of standard thunder strips on streets reference, establishment of GPS, speed limiters, sensors and different examinations utilizes signal handling installed of a costly vehicle. The innovation utilizes web of things so the vehicle proprietor can screen the driver's sluggishness wherever during work hours. The review centers at the eyelid development that isn't yet referenced to the past review. This proposed framework constantly filters the eyelid developments of the driver and whenever sleepiness is distinguished the gadget naturally cautions him utilizing an irregular composed alert. It naturally advances the report to the vehicle proprietor from the web application through web access.

By M. Miranda, A. Villanueva, M. J. Buo, R. Merabite, S. P. Perez, and J. M. Rodriguez, 2020

3) "REAL-TIME SYSTEM FOR DRIVER FATIGUE DETECTION BASED ON A RECURRENT NEURONAL NETWORK,"

This paper presents a method for dissecting and expects driver sluggishness by applying a Recurrent Neural Network over a grouping outline driver's face. We utilized an informational index to shape and endorse our model and executed dreary brain network engineering multi-facet model-based 3D Convolutional Networks to recognize driver sluggishness. After an instructional meeting, we got a promising exactness that moves toward a 92% acknowledgment rate, which made it conceivable to foster a constant driver observing framework to lessen street mishaps.

By Y. Ed-Doughmi, N. Idrissi, and Y. Hbali, 2020

4) "DRIVING FATIGUE DETECTION FROM EEG USING A MODIFIED PCANET METHOD,"

In this review, we introduced an original element extraction technique in view of a profound learning model to accomplish high grouping precision and effectiveness in involving EEG for driving exhaustion discovery. EEG signals were kept from six sound workers in a mimicked driving trial. highlight extraction technique was created by incorporating the important part investigation and a profound learning model called PCA organization. Specifically, the central part examination was utilized to preprocess EEG information to lessen its aspect to conquer the impediment of aspect blast brought about by PCANet, making this approach possible for EEG-based driving exhaustion discovery.

By Y. Ma, B. Chen, R. Li et al, 2019.

COMPONENTS DESCRIPTION

4.1. Pi Camera Module: This Raspberry Pi Camera module v2 can be utilized rather than the first camera module, to catch superior quality video with still picture with the assistance of usb camera 5 megapixel sensor. It works with 1080p30, 720p60, and VGA90 video modes which interface with a CSI port through a 15 cm lace link on the Raspberry Pi module that is portrayed

4.2. Raspberry Pi3 Model B+ Module: It is a Mastercard measured PC which is installed with Quad Core 1.2 GHz Broadcom BCM2837 64-bit CPU, 1 GB RAM, and different parts. Raspbian OS is coordinated in it, and its chip is intended for Windows working framework

4.3. GPS Module: This module is utilized to follow the vehicle's area, on the off chance that any serious crash happens with a tired driver. It is the primary part to recognize the scope and longitude of any region on the Earth with date and time from satellite. In this framework, the setback area is handily followed and the area is sent utilizing GPS.

4.4 Speaker: It is a sound or voice-creating gadget which can change over electromagnetic waves into sound. If the driver's sleepiness is recognized, then, at that point, a voltage is provided as a caution to produce standard customized voice sound.

4.5 A DC motor: is any of a class of rotating electrical engines that converts direct flow electrical energy into mechanical energy. Working Voltage: 4.5V to 9V The most well-known types depend on the powers delivered by electromagnetic fields. Practically a wide range of DC engines have some inner system, either electromechanical or electronic, to steer current in piece of the engine occasionally.

4.6 Relays: are switches that open and close circuits electromechanically or electronically. Transfers control one electrical circuit by opening and shutting contacts in another circuit. As transfer graphs show, when a hand-off contact is regularly open (NO), there is an open contact when the hand-off isn't empowered.

4.7 Buzzer: Utilize electronic parts and top notch wear-safe shaft. Smooth activity, high effectiveness, great execution, long help life. Can be quite a while persistently work, low clamor, wellbeing and ecological protection. Widely utilized in industry, logical examination, aeronautic trade.

4.8 An alcohol sensor: A liquor sensor identifies the mindfulness of liquor gas in the air and a simple voltage is a result perusing. The sensor can initiate at temperatures going from - 10 to 50° C with a power supply is under 150 Ma to 5V. The detecting range is from 0.04 mg/L to 4 mg/L, which is appropriate for breathalyzers.

4.9 LED: A light-producing diode (LED) is a semiconductor light source that transmits light when current moves through it. Electrons in the semiconductor recombine with electron openings, delivering energy as photons. Ongoing advancements have created high-yield white light LEDs appropriate for room and open air region lighting.

SYSTEM ARCHITECTURE

In this method, a model of eye is planned first and afterward eye position is gotten by recursive strategy. In any case, this strategy unequivocally relies upon starting place of the eye which ought to be close to the genuine place of eye. In the layout matching angle, the proposed calculation depends on Eigen highlights and brain networks for the extraction of eyes utilizing rectangular fitting from dim level face captures.

Liquor is identified by the liquor sensor, the qualities from the sensor is perused by raspberry pi and provided that the liquor level is not as much as limit then it switches on the relay which in turns on the system.

The driver sluggishness can be estimated utilizing Eye Aspect Ratio (EAR). The proportion of the eye can change for every single individual. Fig. the accompanying case is tried for ten different arrangement of individuals with two circumstances. One is determined for educational condition and another for eye shutting condition. Eye shutting rate is estimated after each 0.5 seconds and on the off chance that the worth passes previously existed boundary esteem, the raspberry pi 3 gets the alarm signal from caution associated with the GPIO pins of Pi 3 board. Fig 5. When the individual shutting his eyes for more than fixed edge range then the alarm signal is produced to awaken the driver from tired state and furthermore through the cloud administration the alarm message is shipped off the proprietor of the vehicle alongside the vehicle plate numbers.

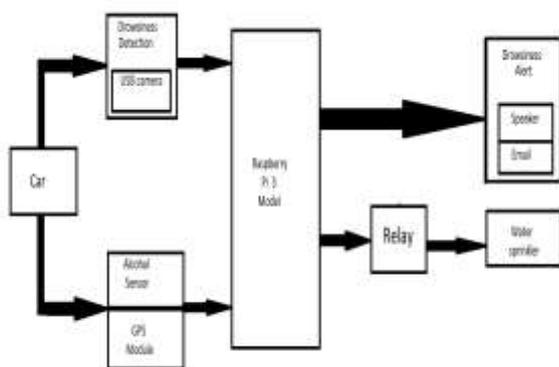


Fig 1. Proposed Block Diagram

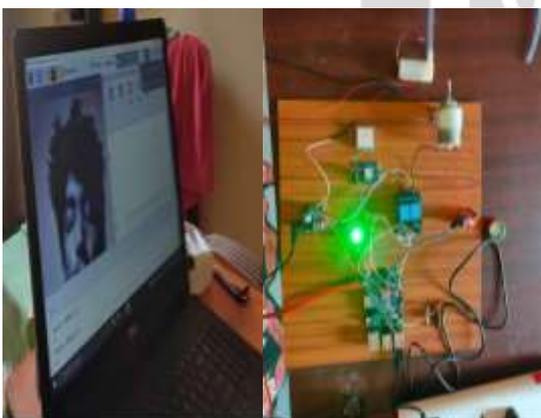


Fig 2. Proposed System

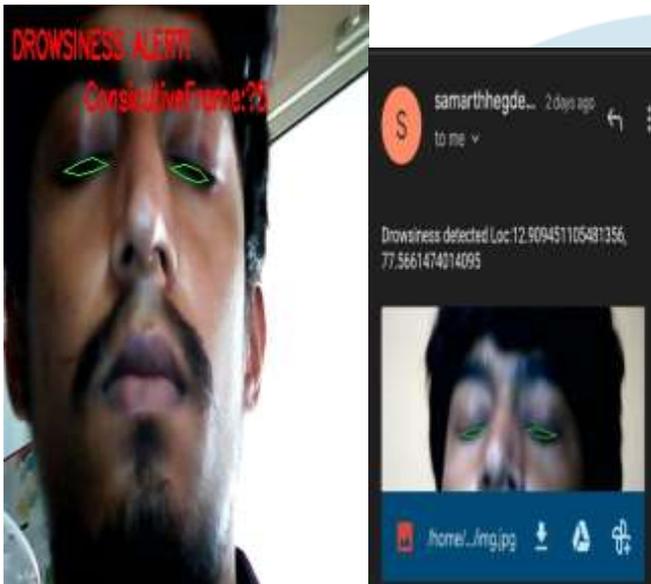
CONCLUSION

Execution of sleepiness location with Raspberry Pi was done which incorporates the accompanying advances: Successful runtime catching of video with camera and Successful discovery of liquor level. Captured video was separated into outlines and each casings were investigated. Effective recognition of face followed by location of eye. If closing of eye for successive frames are detected then it is classified as drowsy condition or else it is kept as normal blink and the loop of capturing image and analysing the state of

driver is carried out again after again .In this execution during the sleepy express the eye isn't encircled by circle or it isn't recognized and it is displayed to relate message. On the off chance that the driver isn't sleepy and the liquor level is less then on the vehicle start is begun.

RESULTS

The driver drowsiness can be estimated utilizing Eye Aspect Ratio (EAR). The proportion of the eye can shift for every single individual. Eye shutting rate is estimated after each 0.5 seconds and in the event that the value passes previously existed esteemed value, the raspberry pi 3 gets the alarm signal from caution associated with the GPIO pins of Pi 3 board. At the point when the individual shutting his eyes for more than fixed limit range then the alarm signal is produced to awaken the driver from drowsiness state and furthermore through the cloud administration the alarm message is transmitted off to the proprietor of the automobile.



REFERENCES

- [1] D. Mollicone, K. Kan, C. Mott et al., "Predicting performance and safety based on driver fatigue," *Accident Analysis Preven_x0002_tion*, vol. 126, pp. 142–145, 2020.
- [2] Miranda, A. Villanueva, M. J. Buo, R. Merabite, S. P. Perez, and J. M. Rodriguez, "Portable prevention and monitoring of driver's drowsiness focuses to eyelid movement using internet of things," in *2018 IEEE 10th International Conference on Humanoid, Nanotechnology, Information Technology, Com_x0002_munication and Control, Environment and Management (HNICEM)*, IEEE, 2020.
- [3] S. Gupta and E. Garima, "Road accident prevention system using driver's drowsiness detection by combining eye closure and yawning," *International Journal of Research*, pp. 839–842, 2019.
- [4] S. W. Jang, B. Ahn, "Implementation of detection system for drowsy driving prevention using image recognition and iot," *Sustainability*, vol. 12, no. 7, p. 3037, 2019.
- [5] D. Dogan, S. Bogosyan, and T. Acarman, "Evaluation of driver stress level with survey, galvanic skin response sensor data, and force-sensing resistor data," *Advances in Mechanical Engineering*, Article ID 168781401989155, 2019.
- [6] Y. Ma, B. Chen, R. Li et al., "Driving fatigue detection from EEG using a modified PCANet method," *Computational Intelligence and Neuro-science* vol. 2019, pp. 1–9, 2019.
- [7] S. M. Gowri, P. Anitha, D. Srivaishnavi, and M. Nithya, "Internet of things based accident detection system," in *2019 Third International conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC)*, IEEE, 2019.
- [8] V. Kinage and P. Patil, "Iot based intelligent system for vehicle accident prevention and detection at real time," in *2019, Palladam, India*, 2019.
- [9] R. V. Siva Reddy and P. A. Kumari, "Internet of things (IoT) based multilevel drunken driving detection and prevention system using Raspberry Pi 3," *International Journal of Computer Science and Information Security (IJCSIS)*, pp. 131–137, 2019.
- [10] K. Mutya, J. Shah, A. D. McDonald, and J. Jefferson, "What are steering pictures are worth? using image-based steering features to detect drowsiness on rural roads," *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, vol. 63, no. 1, pp. 2041–2045, 2019.
- [11] U. Budak, V. Bajaj, Y. Akbulut, O. Atila, and A. Sengur, "An effective hybrid model for EEG-based drowsiness detection," *IEEE Sensors Journal*, vol. 19, no. 17, pp. 7624–7631, 2019.
- [12] A. A. Hayawi and J. Waleed, "Driver's drowsiness monitoring and alarming auto-system based on EOG signals," in *2019 2nd International Conference on Engineering Technology and its Applications (IICETA)*, pp. 214–218, IEEE, 2019.
- [13] M. S. Song, S. G. Kang, K. T. Lee, and J. Kim, "Wireless, skin mountable EMG sensor for human-machine interface application," *Micromachines*, vol. 10, no. 12, p. 879, 2019.

[14] R. V. Siva Reddy and P. A. Kumari, "Internet of things (IoT) based multilevel drunken driving detection and prevention system using Raspberry Pi 3," International Journal of Computer Science and Information Security (IJCSIS), pp. 131–137,2020.

