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Drowsiness Detection Application

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Abstract: *Every year, hundreds of people die in car accidents around the world, with the primary cause being driver inattention. A sleepiness detection system will aid in the reduction of this accident and the saving of countless lives all around the world. To defend this problem, we propose a methodology based on Machine learning (ML) that illustrates drowsiness detection as a task to detect an object. It will detect and localize whether the eyes are open or close based on the real time video stream of drivers. Through the live video streaming, a frame is extracted for image processing. Images are captured typically at a fix frame rate of 20fps based on brightness and camera quality. The OpenCV and Dlib support the android platform to detect the faces from the live frame and predict the driver drowsiness. The suggested method aims to improve precision and computational efficiency. It's also cost-effective because it can handle video feeds in real-time and doesn't require any expensive hardware. It is also affordable as it can process incoming video streams in real-time and does not need any expensive hardware support. There only needs a inbuilt camera of android and provide a alert sound when the system predict the driver is drowsy. After that, it send SMS to the police station with these predicted information.*

Keywords: Android Application, Haar Cascade, Firebase database, Eye Closure, Web Application.

I. INTRODUCTION

The suggested method aims to improve precision and computational efficiency. It's also cost-effective because it can handle video feeds in real time and doesn't require any expensive hardware. Automobile manufacturers such as Tesla, Mercedes-Benz, and others have various features for driver assistance features such as lane departure warnings, emergency braking systems, variable cruise control, and steering assist. These advancements have made it easier for drivers to avoid collisions. Samsung has investigated the attention level of a driver by reading facial characteristics and patterns. The project will detect the drowsiness of the driver through horizontal projection on the image and tracking the face components via template matching technique which comprised of eyebrows and eyes along with mouth. The proposed method has been implemented in simulation environment of MATLAB (Simu link). The addition of infrared lights as a source of light improved the system's face detection. Changes in intensity due to lighting circumstances, the existence of spectacles, and the appearance of a beard on the person's face are all crucial considerations. Drowsiness detecting technologies are fraught with difficulties.

II. LITERATURE REVIEW

[1] AD3S Machine Learning-based Advanced Driver Drowsiness Detection System, Parul Agarwal, Sukrit Mehta, Parimal Mishra, Arpita Jadhav Bhatt, Sukrit Mehta, Sukrit Mehta, Sukrit Mehta, Sukrit Mehta, Sukrit Mehta, Sukrit
The empirical results show that using the Bagging classifier, the proposed AD3S (Advanced Driver Drowsiness Detection System) is capable of identifying driver drowsiness with an accuracy of around 98 percent. In this project, an advanced system called AD3S (Advanced Driver Drowsiness Detection System) was created utilising an Android application. The device can capture the drivers' facial landmarks in real time. The facial landmarks are also used to compute many metrics based on adaptive threshold, such as the Eye Aspect Ratio (EAR), Nose Length Ratio (NLR), and Mouth Opening Ratio (MOR), which are capable of detecting driver fatigue. The technology can capture the user's facial landmarks in real time.The facial landmarks are also used to compute many metrics based on adaptive threshold, such as the Eye Aspect Ratio (EAR), Nose Length Ratio (NLR), and Mouth Opening Ratio (MOR), which can detect tiredness in drivers. The non-intrusive and cost-effective nature of AD3S makes it stand out.

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[2] Drowsiness Detection in Drivers Using Face Expression Recognition, Rahmati (2011)
The project will detect the driver's tiredness by projecting horizontally on the image and tracking the face components using a template matching technique that includes the brows, eyes, and lips. The proposed method has been tested in the MATLAB simulation environment (Simulink). The addition of infrared lights as a source of light improved the system's face detection. Changes in intensity due to lighting circumstances, the existence of spectacles, and the appearance of a beard on the person's face are all crucial considerations. Drowsiness detecting technologies are fraught with difficulties. Changes in intensity owing to lighting circumstances, the existence of spectacles, and the presence of a beard are all crucial considerations.

[3] Deep learning for real-time driver sleepiness Md. Tanvir Ahammed Dipu, Syeda Sumbul Hossain, Fatama Binta Rafiq, Md. Tanvir Ahammed Dipu, Md. Tanvir Ahammed Dipu, Md. Tanvir Ahammed Dipu, Md. Tanvir A (2021)
Drowsiness detection is depicted as a task to recognise an object using Convolutional Neural Networks (CNN), which will detect and localise whether the eyes are open or closed based on the real-time video stream of drivers. For this object detection challenge, the MobileNet CNN Architecture with Single Shot Multibox Detector was used. Based on the result of the SSD MobileNet v1 architecture, a distinct algorithm is employed. To train the SSD MobileNet v1 Network, a dataset of roughly 4500 photos was tagged with the object's face yawn, no-yawn, open eye, and closed eye. Approximately 600 photos are chosen at random.

[4] Real-Time Driver Drowsiness Detection Using Eye Closure and Facial Landmarks for Yawn Detection, Dr. N. Sivakumar, Ananya Bhavana D S A real-time eye-blink and yawn detection method
It detects weariness before a hazardous scenario arises, demonstrating that facial landmarks are accurately identified to reflect the level of eye and mouth openness. The initial stage is to use computer vision techniques to detect the facial region and capture video sequences. The facial landmark detectors are then utilised to locate the driver's eyes and mouth region, which are investigated using the eye aspect ratio (EAR), which is a single scalar number that is used to detect the eye and mouth opening in each frame.

[5] Drowsiness Detection in the Driver Based on ResNet-based Behavioural Changes, Vivek Jeyasekar, A. Jeyasekar Iyengar, Ravi (2019)
Drowsiness detection using ResNet is proposed since this method operates on the premise of passing the output and considers eye movement and yawning as two behavioural changes of the driver. Three ways are used to detect the driver's behaviour while drowsy. One method involves placing sensors in the vehicle's steering wheel and accelerator and analysing the signal sent by the sensors to identify tiredness. To forecast drowsiness, the second approach relies on assessing heart rate, pulse rate, and brain signals, among other things. The third method makes advantage of the driver's facial expressions, such as blinking rate, eye closure, and yawning.

III. SYSTEM ARCHITECTURE

UML is a language for describing, visualising, producing, and documenting software system artefacts. The Object Management Group (OMG) and UML collaborated to establish UML. UML is a general-purpose visual modelling language that may be used to envision, design, and document software systems. Although UML is commonly used to represent software systems, and it is not restricted to this .It can also be used to represent non-software systems, such as process flow in a manufacturing facility. Although UML is not a programming language, it can be used to generate code in a variety of languages using tools based on UML diagrams. UML is intrinsically tied to object-oriented analysis and design. After considerable standardisation, UML became an Object Management Group standard..

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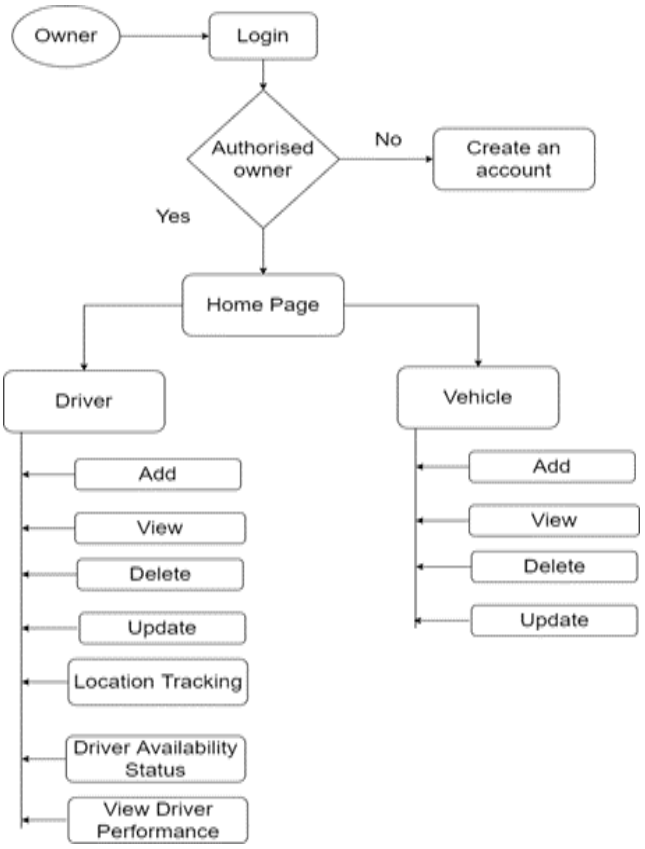

IV. SYSTEM IMPLEMENTATION

This paper shows the implementation of

MOBILE APP:

MODULE 1: Login

MODULE 2: Registration

MODULE 3: Driver Drowsiness Detection

WEB APPLICATION:

MODULE 1: Login

MODULE 2: Registration

MODULE 3: Add/view/update/delete car

MODULE 4: View Driver performance/location/driving status

Login

Initially, the user has to create an account with basic information before logging into the app. Unauthorized users will be prompted to create an account if they log in. The app is only accessible by authorized users. The owner, Driver has to create an unique account for login in web app and mobile app. The owner can also create an account for driver and provide to them.

Register

In Register Module, the user has to create an account with their username and password.

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Driver Drowsiness Detection:

Once the Driver login to the mobile app, it display the profile page where the driver's current photo, name, email is displayed. The GPS location of the driver is automatically predicted by the app. After tracking the latitude and longitude of driver it allow him/her to drive. While driving the video frames are analysed and detect the faces for each frame. The facial feature is evaluated to get the eyes location and movement. If the eye lids are closed then automatically it trigger the alarm sound to driver as waking up signal.

Add/view/update/delete car

The owner can add car once he logged in to the website. He/she can add, view, delete and update the car information.

Add/view/update/delete:

Driver Similar to car, the owner can add driver to database.They can also delete and update the driver contact number details.

ALGORTIHM USED

Cascade of Haar Here is an example of calculating the Haar value from a rectangular image slice. Pixels with a value of 1 are darker in the haar feature, while pixels with a value of 0 are lighter. Each of these is in charge of identifying a specific feature in the image. Any structure in the image with a quick shift in intensities, such as an edge, a line, or any other structure. The haar feature, for example, can detect a vertical boundary with darker pixels on the right and brighter pixels on the left in the image above. The goal is to calculate the sum of all image pixels in the haar feature's darker area, as well as the sum of all image pixels in the lighter area.

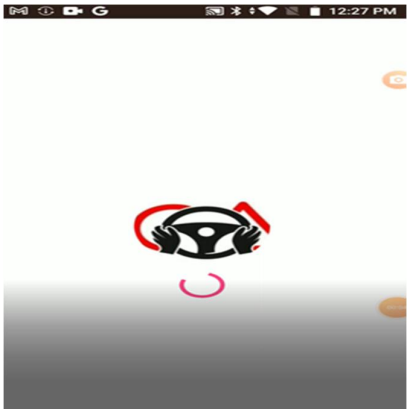
This is only a visual illustration of the haar feature traversal concept. The haar feature would traverse the image pixel by pixel in its actual work. The haar characteristics will also be applied in all feasible sizes. These are divided into three groups based on the attribute that each person is seeking for. The first pair of two rectangular features is in charge of determining whether the edges are horizontal or vertical (as shown above). The second set of three rectangle features is in charge of determining whether a lighter zone is flanked on either side by darker sections or vice versa. The final set of four rectangular characteristics is in charge of determining how pixel intensities fluctuate across diagonals.

V. SYSTEM EVALUATION

The goal of testing is to find mistakes. Testing is the practise of attempting to find all possible flaws or weaknesses in a work product. It allows you to test the functionality of individual components, sub-assemblies, assemblies, and/or a whole product. It is the process of testing software to ensure that it meets its requirements and meets user expectations, and that it does not fail in an unacceptable way. There are many different types of tests. Each test type is designed to fulfil a distinct testing need.

VI. RESULTS

MOBILE



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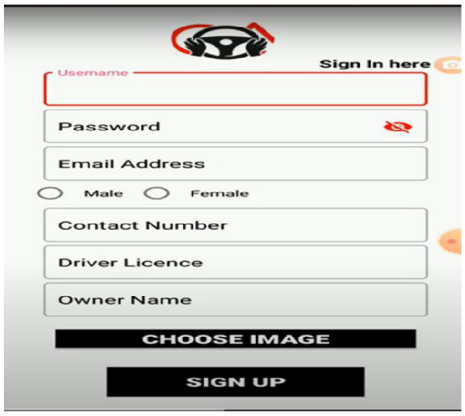
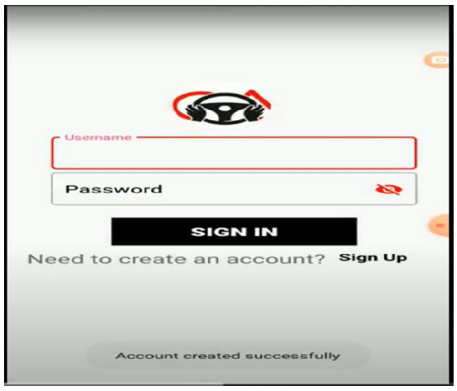
REGISTER PAGE



LOG IN PAGE



PROFILE PAGE WITH PREDICTED LOCATION:

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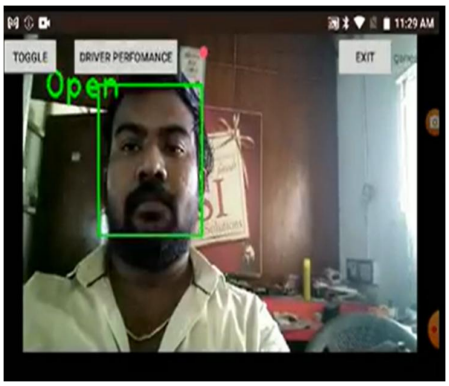
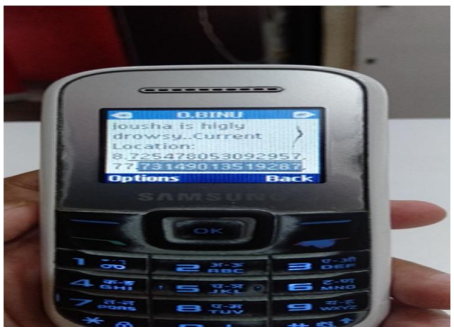
DRIVER EYELID PREDICTION:



SMS SENT TO THE POLICE STATION



VII. CONCLUSION

A non-invasive system to localize the eyes and monitor driver drowsiness was developed. Information about the eyes position is obtained through OpenCv and Dlib algorithm. The technology can determine if the eyes are open or closed during the monitoring. When the eyes have been closed, a warning alarm is triggered. Those drowsiness statuses is lively updated to the owner in the website. The identification of tiredness is highly accurate and dependable thanks to image processing.

REFERENCES

[1]. International Organization of Motor Vehicle Manufacturers, “Provisional registrations or sales of new vehicles,” http://www.oica.net/wpcontent/uploads/, 2018.

[2]. Wards Intelligence, “World vehicles in operation by country, 2013-2017,” http://subscribers.wardsintelligence.com/data-browse-world, 2018.

[3]. National Highway Traffic Safety Administration, “Traffic safety facts 2016,” https://crashstats.nhtsa.dot.gov., 2018.

[4]. Borghini Gianluca and Astolfi Laura et.al, “Measuring neurophysiological signals in aircraft pilots and car drivers for the assessment of mental workload, fatigue and drowsiness,” NEUROSCIENCE AND BIOBEHAVIORAL REVIEWS, 2014.

[5]. Attention Technologies, www.zzzzalert.com, 1999, "S.a.m.g-3-steering attention monitor."

[6]. Smart Eye, “Smarteye,” https://smarteye.se/, 2018.

[7]. "High-speed tracking with kernelized correlation filters," Henriques J F, Caseiro R, and Martins P et al. IEEE

[8]. P. F. Felzenszwalb, R. B. Girshick, D. McAllester, and D. Ramanan, “Object detection with discriminatively trained part-based models,” IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 32, no. 9, pp. 1627–1645, Sept. 2010.

[9]. Y. Sun, X. Wang, and X. Tang, "Facial point detection using a deep convolutional network cascade," in Proc. IEEE Conf. Computer Vision and Pattern Recognition, June 2013, pp. 3476–3483.

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[10]. S. Ren, X. Cao, Y. Wei, and J. Sun, "Face alignment at 3000 Fps via regressing local binary features," in Proc. IEEE Conf. Computer Vision and Pattern Recognition, June 2014, pp. 1685–1692.

[11]. E. Zhou, H. Fan, Z. Cao, Y. Jiang, and Q. Yin, "Extensive facial landmark localization with coarse-to-fine convolutional network cascade," in Proc. IEEE Int. Conf. Computer Vision Workshops, Dec. 2013, pp. 386–391.

[12]. Wierwille Walter, "Overview of research on driver drowsiness definition and driver drowsiness detection," Proceedings: International Technical Conference on the Enhanced Safety of Vehicles, vol. 1995, pp. 462–468, 1995.

[13]. R. Grace, V. E. Byrne, D. M. Bierman, J.-. Legrand, D. Gricourt, B. K. Davis, J. J. Staszewski, and B. Carnahan, "For big vehicles, a drowsy driver detecting system," in Proc. (Cat. No.98CH36267) 17th DASC AIAA/IEEE/SAE. Digital Avionics Systems Conf, Oct. 1998, vol. 2, pp. I36/1–I36/8 vol.2.

[14]. L. Li, Y. Chen, and Z. Li, "Two cameras are used to detect yawning for the purpose of monitoring driver weariness.," in Proc. 12th Int. IEEE Conf. Intelligent Transportation Systems, Oct. 2009, pp. 1–6.