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Driver Drowsiness Detection and Accident Prevention System

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ABSTRACT: Driver drowsiness and fatigue are one of the leading causes of traffic accidents. Every year, the number of deaths and fatal injuries worldwide is increasing. This project presents a module of driver assistance systems cut down on incidents due to driver fatigue and increase transport safety. Powered by visuals and AI the system automatically detects driver drowsiness and prevents accidents. With this plan, we propose artificial intelligence-based driver weariness detection using an Arduino controller. This project combines machine vision-based techniques for monitoring drowsy drivers with accident prevention system analysis of driver/vehicle performance to develop a prototype of an integrated system that reliably assesses driver drowsiness. bottom. The goal of it is to be quantified reliably commercial vehicle operator sleepiness and provide the driver with real-time warnings and/or control outputs to the steering or other systems of the commercial vehicle as needed.

KEYWORDS: Artificial Intelligence, YOLO, Arduino controller, open cv.

I. INTRODUCTION

In addition to drowsiness and drunken driving, many traffic accidents are caused by the work environment, lack of sleep, and time factors. Sleepiness and tiredness of the driver due to drunk driving impairs the driver's decision-making ability and cognitive level. Both of these situations affect your capacity to sway your vehicle. There are several techniques used to detect driver drowsiness. By sensing the driver's actions and physiological characteristics of the driver, such as vehicle movement. Advanced driver assistance systems (ADAS) aim to assist drivers by simplifying observing, messaging, slowing, and control tasks through a variety of assistive technologies. The main purpose of these systems is to provide safety to drivers and prevent traffic accidents. ADAS systems are undoubtedly one of the quick growing areas in the automotive industry. Equipping safe human-machine interfaces improves vehicle and road safety by alerting drivers to potential problems and providing technology that helps them avoid collisions and accidents. Clash avoidance systems are automotive safety systems designed to reduce the severity of accidents. Also known as front money systems, frontal collision warning systems, or collision mitigation systems, cameras and sensors used to detect an impending impact. Once detection is complete, these systems alert drivers and send information using IOT. Today, it has established itself as a reliable network which uses for communication purposes on highways and in urban environments. We provide the best solution for the accident scene. The system can detect causal relationships in all directions and confirm whether an incident has occurred.

II. RELATED WORK

[1] Influence of viewing angle on the road in particular mobility probe the goods of face exposure while driving on a standing particular mobility device (PMD). Using PMD devices is 1a popular choice for recreational activities in developed countries like the United States and European countries. These devices are not entirely risk free and various accidents have been reported. Therefore, it is necessary to consider the risk factors that lead to accidents. Unfortunately,

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research on driving risk factors using PMD devices is not as mature as research on driving. Evaluate the effect of road viewing angle while driving on PMD. Trials have shown that aspect direction is an important factor in assessing the threat of trip with PMD. In addition, it was found that the trajectory deviation occurred in the direction opposite to the direction that the subject often sees. These results demonstrate how dangerous the risk of distracted driving and unintentional lane changes can be.

[2]. Drowsiness and distraction analysis of executive operators based on real-world alert data 2 Professional drivers are particularly susceptible to drowsiness and distraction due to their long daily drives. As similar, several studies took to probe motorist gesture that's corroborated by controlled trials (similar as natural studies and driving his simulator studies). However, new technologies allow the development of new research methods that complement existing research. This study investigated the effect of driving characteristics on the number of warnings due to distraction and fatigue using retrospective data 1 from a driver monitoring system (DMS) monitoring his 70 professional drivers from different companies bottom. Two separate negative binomial models were developed with explicatory variables representing nonstop driving time (partial driving time), driving time (series of partial driving), number of breaks, and rest duration.. It also contains dummy variables. and other interesting results were obtained. B. More uninterrupted driving time means more distraction and fatigue warnings.

[3] Smartphones as a unique platform for checking motorist gesture The part of Sensor Combo and Connection Today, further than partial global internet business comes from mobile phones, and by 2020 nearly 70 of the world's population will be using smartphones. The unknown request penetration of smartphones, combined with smartphone connectivity and bedded detector capabilities, is paving the way for large-scale deployment of intelligent transportation systems (ITS). Smartphones, on the other hand, have dependant boundaries such as relatively restricted power volume, computing capacity, and perfection. These shortcomings may limit its role as an unique driver behavior monitoring platform in the circumstance of ITS. In this study, we test this hypothesis by reviewing current scientific literature. A theoretical framework of cybernetics was used to allow systematic comparisons. First, few studies consider smartphones as integrated platforms. Second, inconsistencies have been noted between the approaches and metrics used in the literature.

III. EXISTING METHOD

The rate of eye blinking and the duration of eye closure are measured in this test to detect driver drowsiness. Because the driver's eye blinking and gaze between eyelids differ from normal situations when he or she is sleepy, they can easily detect drowsiness. The position of the irises and eye states are tracked over time in this system to estimate eye blinking frequency and eye close duration. And in this type of system, a remotely placed camera is used to acquire video, and computer vision methods are then used to sequentially localise the positions of the face, eyes, and eyelids in order to measure the ratio of closure. Drowsiness of the driver can be detected by bringing the eyes closer together and increasing the blinking rate. A system like this, installed in a hidden corner of the vehicle, could keep an eye out for any suspicious activity.

IV. PROPOSED SYSTEM

The ATMEGA328P controller is used to detect driver drowsiness using artificial intelligence. We will use AI to find people in real time in this proposed system. OPENCV Following image acquisition, it must be pre-processed and compressed. The model is trained using images. It is trained by extracting the required pattern from the image using feature extraction. The image is then compressed using feature fusion and dimension reduction for dependable and real-time performance. This system consists of a web camera that captures the driver's drowsy behaviour and an ultrasonic sensor that detects an obstacle in front of the vehicle; it sends alerts to the driver via vibration motor and also sends mail to the owner via IOT. If the steering and wheel do not move, the alarm sounds (most accidents occur due to a loss of control in vehicle speed). The driver is driving at cruising speed and is unable to control the vehicle in a sudden curve, resulting in an accident.). The proposed system is used to detect real-time drowsiness behaviour as well as accident prevention with driver intake care. All sensed details are displayed on the LCD display and are updated on the IOT.

V. METHODOLOGY

Image processors perform the functions of image access, storage, preprocessing, segmentation, presentation, recognition, and interpretation, and display or record the final rendered image. The following block diagram represents the Abecedar sequence contained in the image processing system. In the preprocessing section, the input images can be of different sizes, contain noise, and have different color combinations. These parameters should be changed according to the needs of the process. Image noise is most noticeable in areas of the image with low signal locations resembling shadow areas and underexposed images. There are numerous types of noise, similar as wipe and pepper noise, film grain, and more.. All these noises are removed using a filtering algorithm. Among various contaminants, wiener mud is used. The pre-processing module reuses the captured images for appropriate cases. Preprocessing was performed using an algorithm. Preprocessing should be performed on all images for better results.

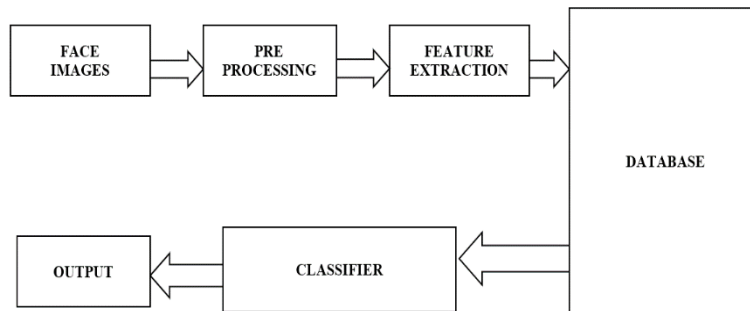


Fig 1. Block Diagram

The study of data collection, organisation, analysis, and interpretation is known as statistics. It addresses all aspects of this, including data collection planning in terms of survey and experiment design. This is the significance of statistics. • Mean • Variance • Skewness • Standard deviation are image statistical features. Texture Examination Making Use of the Gray-Level Co-Occurrence Matrix (GLCM). The Gray-level co-occurrence matrix (GLCM), also known as the Gray-level spatial dependence matrix, is a statistical method for examining texture that takes into account the spatial relationship of pixels.

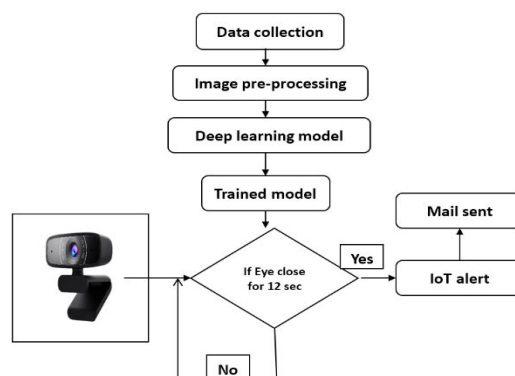


Fig 2. Flow chart

The relationship between the data and the classes into which they are classified must be well understood in order to classify a set of data into different classes or categories. To accomplish this by computer, the computer must first be trained. Training is critical to the success of classification techniques that were developed originally. Features are data element attributes that determine which classes the elements belong to.

- 1).The image classifier acts as a discriminant, distinguishing one class from others.
- 2)Discriminant value is highest for one class and lowest for others (multiclass)
- 3).Positive discriminant value for one class, negative for another (two class).

You Only Look Once (YOLO) is a network that detects objects using Deep Learning (DL) algorithms. YOLO detects objects by classifying them within the image and determining where they are in relation to it. For example, if you feed a YOLO network an image of a herd of sheep, it will generate a vector of bounding boxes for each individual sheep and classify it as such.

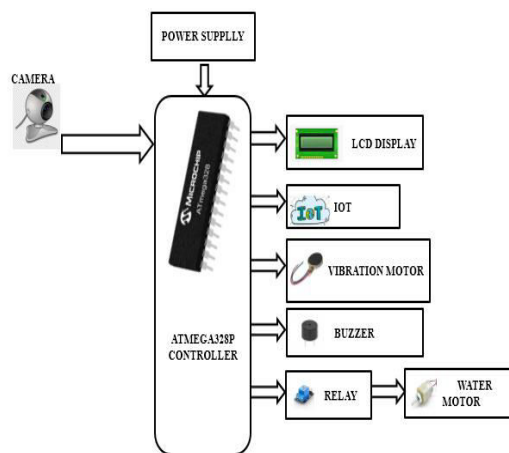


Fig 3. Hardware blockdiagram

VI. EXPERIMENTAL RESULTS

The dataset used for this model was created by us. To produce the dataset, We wrote a script that records the eyes from the camera and saves them in the original scrap. We have categorized them into separate flags open or unrestricted. Use your webcam to capture an image as input. So I created a circle with no horizon capturing every frame to penetrate the webcam. I use the OpenCV,cv2.VideoCapture(0) system to penetrate the camera, set the captive object (cap).cap.read() to read every frame and save the image in a frame variable. To descry faces in an image, we first need to convert the image to grayscale.. This is because the OpenCV object detection algorithm uses images of Argentina as input. No color information is required to recognize objects. Detect faces using hair waterfall classifier.

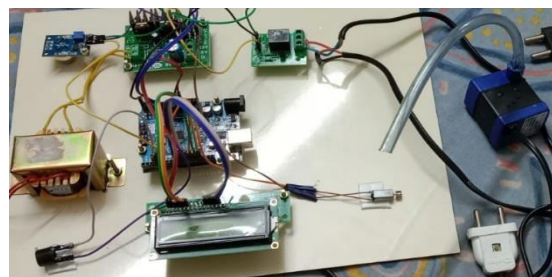


Fig 4. Hardware kit

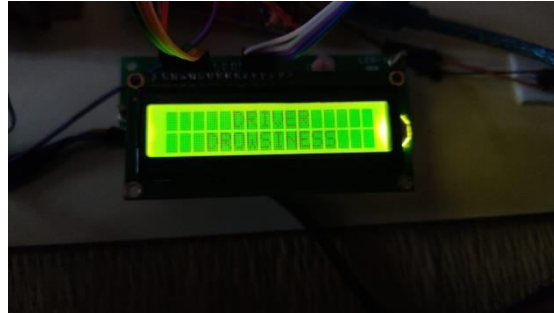


Fig 5. Drowsiness detected displayed

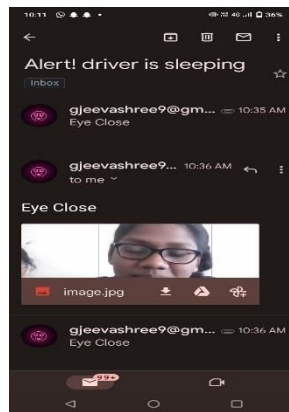


Fig 6. IOT Mail

The same procedure to detect faces is used to detect eyes. First, we set the cascade classifier for eyes in leye and reye respectively then detect the eyes using `left_eye = leye.detectMultiScale(gray)`. We predict each eye with our model. If the value of `lpred[0] = 1`, it states that eyes are open, if value of `lpred[0] = 0` then, it states that eyes are closed.

VII. FUTURE SCOPE

In future, speed detector can be connected as potentiometer and steering detector as gyro sensor. This notifies and control the speed of the vehicle if drowsiness is detected.

VIII. CONCLUSION

Based on India's traffic accidents, a 2020 report released by the Ministry of Roads and Highways shows that 4,044 accidents occurred in both the Allied and domestic sectors. The proposed system predicts drowsiness based on machine knowledge and detection of waterfall explanations. This proposed deep literacy model trains different characteristics of drivers from a dataset containing images of drivers from different countries to detect drowsiness and lack of fatigue. The proposed system achieves a high degree of refinement with low uptime.

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