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Rash Driving and Drowsiness Detection

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ABSTRACT- Nowadays, driving support systems, such as car navigation systems, are getting common, and they support drivers in several aspects. It is important for driving support systems to detect status of driver's consciousness. Particularly, detecting driver's drowsiness could prevent drivers from collisions caused by drowsy driving. This paper does the detailed survey of the various methods to detect driver's fatigue, which can help to increase vigilance of the driver and make him alert from fatigue state. The entire solution requires only a raspberry pi placed in vehicle and with accelerometer. Software installed on the raspberry pi computes accelerations based on sensor readings, and compares them with typical drowsy driving patterns extracted from real driving tests. Once any evidence of drowsy driving is present; the raspberry pi will automatically Capture the face and detect the face. If the Face expression is similar to the drowsy pattern then it will automatically generate warning.

KEYWORDS- Driver Drowsiness, Machine Learning, Image Processing, rash driving

I. INTRODUCTION

Abnormal driving, on the other hand, is usually caused by fatigue, recklessness, and/or drunkenness, etc. With the rapid popularization of mobile phones, phone use while driving becomes a new yet leading cause for motor vehicle crashes [5]. Normal driving can be characterized by well controlling the vehicle speed [6]. Abnormal driving generally demonstrates unusual operations of the vehicle, which provides useful cues for identifying abnormal driving in the real-world traffic conditions Firstly, a drunk driver is intoxicated by alcohol and usually issues sudden accelerating or decelerating with a delayed response [7], which results in poor speed control. Secondly, fatigued driving is characterized as manifesting the same characteristics as drunk driving but without alcohol intoxication [8]-[10]. In other words, a fatigue driver and a drunk driver usually issue similar operations on the vehicle, such as smashing the accelerator and the brake pedals.

Quite a few methods have been proposed to detect the abnormal driving by using vehicle-mounted sensors. Some are known as driver's vigilance monitoring systems based on physiological reactions such as the facial expression, head waving, etc. Some focus on the drivers' operations on the vehicle, such as the accelerating, braking, steering, etc. The blood pressure and the blood alcohol level are also useful physiological signals for indicating abnormal behavior . Most of the signals are collected by sensors embedded in the body, which may make the driver uncomfortable and cause negative interference to the driving. It is thus desirable to use non-contact sensors, and the vehicle data routinely collected the on-board computer would be the first choice.

II. LITERATURE SURVEY

Literature survey is the most important step in any kind of research. Before start developing we need to study the previous papers of our domain which we are working and on the basis of study we can predict or generate the drawback and start working with the reference of previous papers.

In this section, we briefly review the related work on drunk and driving detection using driving patterns and facial recognition

This paper shows that irregular driving alludes generally to alcoholic driving, exhaustion driving, and forceful driving practices. This places of business alcoholic driving identification, which really can be stretched out to apply to discovery of the other anomalous driving practices. The methodology finds out about the related on-board vehicle sensors for recognizing alcoholic driving practices dependent on picking up utilizing certain alcoholic driving signs. In a past work, we built up a Hidden Markov Model (HMM) technique and applied it to each time arrangement of the chose sensors estimations. The expectation exactness was most elevated for the longitudinal quickening, with a limit of 79%. Here, we expand our initial work that depended on HMMs and utilize Recurrent Neural Networks that spend significant time in time arrangement, where our testing results show exactness rates that go into the upper nineties. [1]

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This paper proposed With India detailing as numerous as 1.34 lakhs fatalities in street mishaps consistently, a huge 70% of them being because of smashed driving, questions are currently being raised on whether the mushrooming development of alcohol distributes along the roadways is dependable for costing valuable lives in an unfavorable way. The framework executed by us targets diminishing the street mishaps later on because of tanked driving. The motivation behind this undertaking is to create vehicle mishap avoidance by strategy for liquor identifier in exertion to lessen car crash cases dependent on driving impaired liquor. In this proposed project another strategy is utilized by use of picture preparing framework and liquor in perspiration palm for alcoholic and driving identification. [2]

The paper aims unusual driving conduct may make genuine risk both the driver and the general population. In this work, we propose to recognize unusual driving by breaking down standardized driving conduct. Filling in as the virtual driver, a customized driver model is set up for the speed control reason by utilizing the privately planned neural organization and this present reality Vehicle Test Data. The driving conduct is standardized by utilizing the virtual driver to lead the speed following assignment as characterized by the standard driving cycle test, e.g., the FTP-72. Three common unusual driving practices are portrayed and recreated, to be specific, the weariness/inebriated, the wild and the telephone use while driving. An irregularity record is proposed dependent on the examination of standardized driving practices and is applied to quantitatively assess the abnormity. Mathematical examinations are directed to check the viability of the proposed plot. [3]

This paper proposed that smashed driving, or formally Driving Under the Influence (DUI) of liquor, is a significant reason for auto collisions all through the world. In this system, propose an exceptionally effective framework focused on early recognition and caution of risky vehicle moves ordinarily identified with alcoholic driving. The whole arrangement requires just a cell phone set in vehicle and with accelerometer and direction sensor. A program introduced on the cell phone processes increasing speeds dependent on sensor readings, and contrasts them and ordinary alcoholic driving examples separated from genuine driving tests. When any proof of alcoholic driving is available, the cell phone will consequently alarm the driver or call the police for help a long time before mishap really occurs. We actualize the recognition framework on Android G1 telephone and have it tried with various types of driving practices. The outcomes show that the framework accomplishes high exactness and energy proficiency. [4]
In this paper, wellbeing and security in vehicle voyaging are a pre-prominent worry for all. With the quick urbanization and stunning development of transport networks like bike vehicles, wellbeing on the streets and security on the bicycle has arisen as a certain need for us. It has extended the pace of mishaps, which prompts a few harms with loss of lives. Much of the time, we can't ready to identify the mishap's area. A cap is a type of ensuring gear worn to be careful the head from wounds. All the more explicitly, the cap helps the skull in securing the mind. A brilliant protective cap can identify the mishap's areas likewise save lives and makes bike driving more secure from already. This system propounds a savvy protective cap framework to dodge the mishap. The framework separates into three sections cap circuit, auto circuit, and portable application. From the start, the head protector circuit has IR and liquor discovery sensor. The vehicle circuit has a 3-pivot accelerometer, Bluetooth module, hand-off, and load sensor. The cap circuit imparts a sign to the car circuit to begin if the protective cap is wearied and no liquor recognizes. At that point the vehicle circuit checks the status of the heap to begin. 3-pivot accelerometer detects crash or hit. In the wake of identifying a mishap versatile application sends the mishap area naturally to police and crisis contact number through the information base. [5]

In the modern day, with the increase in the number of vehicles plying on the roads, traffic accidents have grown significantly in number. One of the primary causes of traffic accidents is drunk driving or driving under influence (DUI). This is particularly an important issue for developing countries, such as India, where 53.4% of unnatural deaths in the year 2014 were due to traffic accidents, with drunk driving being the primary cause. Currently, police inspecting roads sample cars for breath tests to detect alcohol levels. However, this approach is manual and unlikely to detect most cases of driving under influence of alcohol. Alternate and more effective approaches to detect drunk driving may include automatic detection using sensors. Prevention may include reducing. [6]
This system propose a fine-grained abnormal Driving behavior Detection and identification system, D3, to perform real-time high-accurate abnormal driving behaviors monitoring using smartphone sensors. By extracting unique features from readings of smartphones' accelerometer and orientation sensor, we first identify sixteen representative features to capture the patterns of driving behaviors. Then, a machine learning method, Support Vector Machine (SVM), is employed to train the features and output a classifier model which conducts fine-grained identification. From results of extensive experiments with 20 volunteers driving for another 4 months in real driving environments, we show that D3 achieves an average total accuracy of 95:36%. [7]

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The proposed approach aims to take advantage of advanced specifications of smartphones to design and develop a low-cost solution for enhanced transportation systems that is deployable in legacy vehicles. In this context, a customized Android application is developed to gather information regarding speed, gravitational force, pressure, sound, and location. The speed is a factor that is used to help improve the identification of accidents. It arises because of clear differences in environmental conditions (e.g., noise, deceleration rate) that arise in low speed collisions, versus higher speed collisions). The information acquired is further processed to detect road incidents. Furthermore, a navigation system is also developed to report the incident to the nearest hospital. The proposed approach is validated through simulations and comparison with a real data set of road accidents acquired from Road Safety Open Repository, and shows promising results in terms of accuracy. [8]

The current existing solutions that provide assistance to passengers in case of vehicle accident occurrence are mainly concerned with user interaction after the incident happened. Those mobile solutions require that the injured must launch the app and request help manually and that would not be possible if he/she is under critical or serious non-vital situation. The situation becomes even worse if passengers went under unconscious state. Accident detection device installed in a vehicles when meets with an accident will send SMS/ messages to the pre-install numbers of the drivers family members, police station, ambulance and nearest hospital. This automated tracking system can be useful for tracking and detecting the exact position of any automobile, which has met with a collision by using Global Positioning System (GPS) and sensors. [9]

In this paper, a major share of accidents happening today is categorized under drunk and drive accidents. Attempts to curb these accidents are limited to manual checking of drivers and awareness programs, which is evidently not enough or stringent. We propose a system where the driver's face is captured in thermal image spectrum and is first recognized using facial recognition, then classified as drunk or sober. The former is done using a deep learning tool that is Convolution Neural Network and the latter is done using Gaussian Mixture Model along with Fischer Linear Discriminant for dimensionality reduction. Post the facial recognition, we will be using capillary junction points on faces to determine difference in blood temperature thus allowing us to classify them as drunk or not. [10]

III. PROPOSED SYSTEM APPROACH

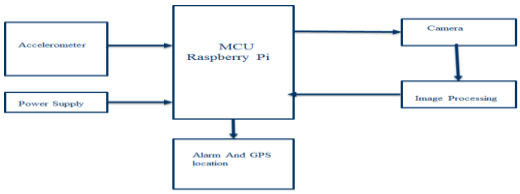

Fig.2 Block Diagram of Proposed System

The accelerometer is able to detect the rash driving. An accelerometer measures speed variations of anything that it's mounted on by extracting cues from the vehicle's lateral and longitudinal accelerations. If the driving is reckless the designed system will detect the vibrations from the vehicle and then automatically invoke the camera. There are several different algorithms and methods for eye tracking, and monitoring. The vast majority of them somehow or another identify with highlights of the eye (regularly reflections from the eye) inside a video picture of the driver. The unique point of this undertaking was to utilize the retinal reflection as a way to finding the eyes on the face, and afterward utilizing the nonattendance of this reflection as a method of distinguishing when the eyes are shut. Applying this calculation on continuous video edges may help in the computation of eye conclusion period. Eye closure period for Drunk drivers are longer than normal blinking. So we will warn the driver as soon as abnormality in eye movements is detected.

IV. OBJECTIVES

- Our objective is to develop the highly efficient system aimed at early detection and alert of dangerous vehicle movements typically related to rash driving under the influence of alcohol or drowsy state of driver.

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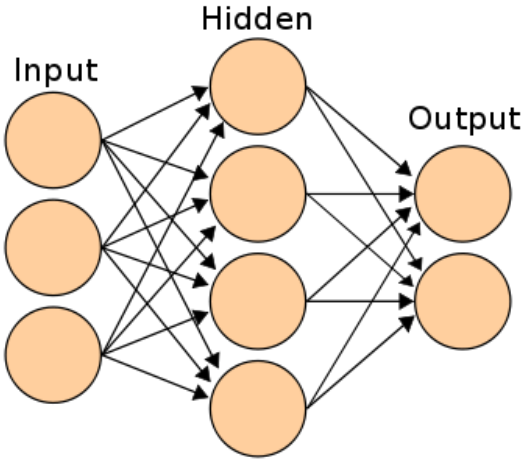
- The approach for the entire system is such that first we analyze the driving behaviors and extract its fundamental cues based on lateral and longitudinal accelerations of vehicle, which is determined by accelerometer sensor.
- If a rash driving behavior is detected then the system will prompt the camera module to take real time images. The images are divided into frames and analyzed for drowsy or sleepy state via image processing. If drowsy condition is found, then the buzzer is triggered and the location info of the driver will send to the authorized department.
- Heart diseases when aggravated spiral way beyond control. Heart diseases are complicated and take away lots of lives eve

V.METHODOLOGY USED IN PROPOSED SYSTEM:

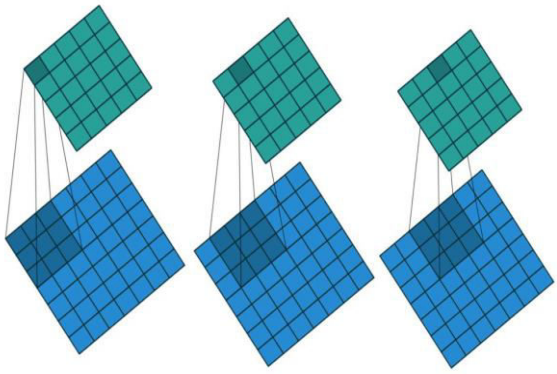
1 Convolutional Neural Network

CNN takes in processed images as input. Extract different features about the images regardless of their position using a series of mathematical operations to identify the pattern. Every layer in CNN has API which transforms input to output with differentiable functions.



2. Convolutional Layer

We extract different features pixel wise by using feature detectors/kernels. Perform numerous convolutions on input, where each operation uses a different filter. This results in different feature maps. In the end, we take all of these feature maps and put them together as the final output of the convolution layer.



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3. Flattening

Basically here we arrange the pooled feature into a single vector/column as a input for next layer(convert our 3D data to 1D)

4. Fully Connected Layer

Neurons in a fully connected layer have full connections to all the activations in the previous layer. Combining more neurons to predict more accurately.

5. Why we use CNN?

1. CNNs have repetitive blocks of neurons that are applied across space (for images) or time (for audio signals etc).
2. For images, these blocks of neurons can be interpreted as 2D convolutional kernels, repeatedly applied over each patch of the image.
3. For speech, they can be seen as the 1D convolutional kernels applied across time-windows.
4. At training time, the weights for these repeated blocks are 'shared', i.e. the weight gradients learned over various image patches are averaged.
5. The reason for choosing this special structure is to exploit spatial or temporal invariance in recognition.
6. Minimize computations, simplifies, handling.

VI. RESULT AND DISCUSSION

As per the survey mentioned, we've devolved the system of Rash Driving Detection using machine learning. Result of the same are below:

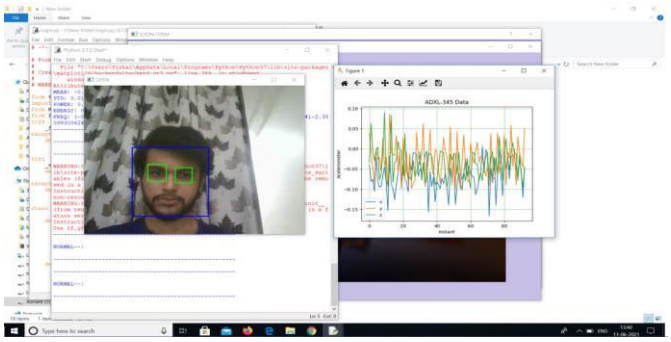

Figure: Face Detection

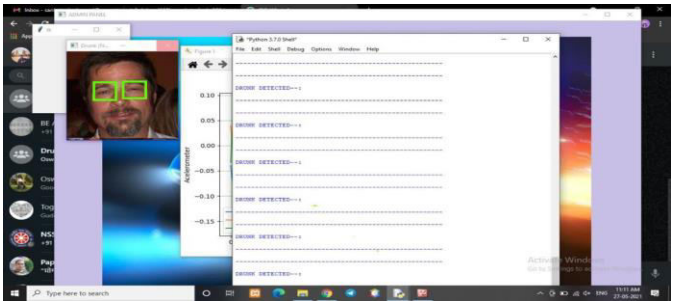

Figure: Rash Driving Detection

VII. CONCLUTION

There are several different algorithms and methods for eye tracking, and monitoring. Most of them in some way relate to features of the eye (typically reflections from the eye) within a video Nowadays accidents are frequently increasing at a high rate due to careless driving which results in damage to one's life or worse, cause death image of the driver. As per the survey, many accidents are caused due to rash driving under the influence of alcohol. A Rash Driving System is

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a system which can reduce these accidents to some extent caused due to rash driving and unconsciousness induced by alcohol or drowsiness. Raspberry Pi will be set up properly for implementation. Several subjects will be taken to record the response and working of the system. The opening of eyes was indicated by circular shapes. If drowsy state is detected, then circle does not appear indicating the closure of eye or drowsy state of a driver. Results were shown with several photos with both eye opening and closing condition.

VIII. FUTURE WORK

We suggest that with the technological advancement if new and improved technique for image processing is developed it can be used for making the drowsiness detection system more accurate. Moreover, we also suggest that with vehicle automation the present system can be extended further to make the decision to stop the vehicle if drunken state is detected.

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