Drowsiness Detection Using Image Processing

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Abstract- *In this paper, we have proposed to reduce the number of accidents caused by driver fatigue and thus improve road safety. In this proposed system automatic detection of driver drowsiness is based on visual knowledge and performance intelligence. We detect, track and analyze both the driver's face and eyes to measure PERCLOS (percentage of blindfolds) with Softmax sensory transmission function. Alcohol pulse detection will also be used to assess whether a person is normal or abnormal. Driver fatigue is one of the major causes of road accidents, especially for drivers of large vehicles (such as buses and heavy trucks) due to prolonged driving and boredom in busy traffic.*

Keywords- Machine Learning, Deep Learning, Convolutional Neural Network Classification.

I. INTRODUCTION

The driver is tired when the driver's ability to drive safely is reduced due to physical or mental fatigue or sleepiness. Driver fatigue is a major safety hazard in the road transport industry. The main causes of 'drowsy driving' are very sleep deprivation, driving at times when you would normally be asleep and working or not sleeping for very long hours. Driver drowsiness can be divided into three categories:

1. vehicle-based routes
2. behavioral-based approaches
3. methods based on physical symptoms.

In physical activity, physical signals from the body, such as the electroencephalogram (EEG) of brain activity, the Electrooculogram (EOG) of the eye movement, and the Electrocardiogram (ECG) of the heart, are monitored to detect the driver's drowsiness. Recent research shows that methods that use live signals (especially the EEG signal) can achieve better reliable accuracy and accuracy of the driver's drowsiness compared to other methods. Fatigue, drowsiness and drowsiness are often used in the same way in describing driving conditions. Including many human characteristics, it is a diverse nature that researchers find difficult to define decades ago. Despite the uncertainties associated with fatigue, it is an important factor in driving safety. Studies have shown that fatigue is one of the leading causes of road accidents worldwide. It also uses alcohol pulse discovery to determine if a person is normal or abnormal. It is especially important for drivers on the job, such as bus drivers and trucks, because they may have to work longer hours at driving hours, at higher hours.

II. LITERATURE SURVEY

Liu Dan [1] suggests that in order to prevent accidents caused by fatigue, drunk driving, and driver disturbances, it is designed and used to monitor the driver's condition and early warning system based on a combination of multiple sensors. The system used the wearable terminal to collect the driver's heartbeat, alcohol overload and speed up to three axes in real time and transfer them to the server. By monitoring the driver's condition, including heart rate, alcohol, etc., if the received data is not in normal range, an alarm message is generated immediately to prevent road accidents, and an instant message will be sent to the family indicating the driver's condition. In addition, the heartbeat sensors are also used for the proper diagnosis of the driver if in any case the driver loses strength due to any major medical problems. The results show that this program can effectively prevent tired driving, increase driving safety and provide references to other smart driving technologies.

Kulkarni, Harale, Thakur [2], in the paper suggests a real-time way to get the driver to sleep due to fatigue or drunkenness. According to a government study, 22% of accidents are caused by drowsiness and 33% of accidents are caused by alcohol. Actually developing such an approach to a car that can detect drowsiness is a daunting task. Completing this process of image processing can be very helpful. The camera is supported by an embedded system when using the Raspbian OS. The embedded system is automatically connected to another small RS232 protocol controller via a serial connection, which will be able to detect the driver's real-time status and turn on the alarm when drowsy, the system turns off the car's power source with a microcontroller-based signal. . The GSM module is introduced into the system that sends sms to the contact person stored in the system.

Peijiang Chen, [3], proposes a paper to reduce road accidents caused by fatigue driving, on the basis of analyzing current methods of detecting tired driving, fatigue detection technology based on the human condition is studied. Based on skin color features, YCbCr color space conversion is used to gain surface area to improve image processing efficiency. A

dual image of the face region is processed, and a double-dimensional guessing method is adopted to determine the position of the eyes. Eye pupil opening is assessed and open eye measurements are measured to determine if the driver is in a state of fatigue or not. Test results show that this method can improve the face and eye area, and can determine the driver's fatigue status.

Tong Chen, Wang Shuqun [4], suggests that with the increasing popularity of private vehicles, the number of road accidents are increasing every year. Among them, driving under the influence and fatigue driving is a big part of the reason. Aimed at this point, a safe driving system provides an effective and efficient solution. The program contains of 3 modules: anti-collision, anti-drunk driving and anti-fatigue driving: STM32 is used as the root of external expansion. The HC-SR04 ultrasonic distance receiver is used to obtain the distance from the front barrier. The side-heated semiconductor alcohol gas sensor MQ-3 is used to detect saturation of air in the air. Collect and process facial information with the Raspberry Pi, then issue a command when driving time reaches the maximum limit for continuous driving. As a result, the program accomplishes three major functions: anti-collision, anti-drunk driving and fatigue driving. The Safe Driving System puts the prevention first, which can reduce the number of road accidents effectively.

Husam, Khalaf, Salih, Juboori ,, Lalit Kulkarni [5], suggests that fatigue and sleepiness of drivers while driving are one of the main causes of road accidents. Watching drivers experience fatigue and tiredness is a complex task that combines behavioral and physical aspects. A variety of methods are being developed, including computer-assisted detection and the ability to track drivers without interfering with driving. The proposed system can detect the alertness or fatigue of drivers to prevent them from falling asleep while driving. In this exercise, a frame is developed to detect fatigue following the cornea of the eyes by focusing on the driver's face. It uses image shape changes such as dilution, erosion, image splitting as a background cut and Circular Hough Transform (CHT) to detect eye cornea in photographs taken from drivers. Whenever fatigue appears to sound an alarm in the system and the necessary steps can be taken. It also reduces negative effects by discarding low-quality faces that occur in video sequences due to logical light problems, head movements, and posture variability.

Diogo Raimundo, Andre Lourenco, Arnaldo Abrantes, [6] proposes a driving monitoring system based on a driving simulation, specially designed for this project, using inexpensive game technology without a shelf (software and hardware). This paper proposes research on the effects of drowsiness (caused by fatigue, alcoholism, etc.) on driving performance and how it can be detected early to reduce accidents. To achieve this, the system constantly monitors the driver's life signals (e.g., heartbeat) and his or her driving behavior. Electrocardiography (ECG) signal plays an important role in this project, as the element taken from it - HRV (Heart Rate), which is very clear in its spectral energy distribution - is used to continuously measure the driver's level of awareness and thus generate alarms. The initial testing of the proposed system is discussed with the presentation of specific test results.

Ratna Kaavya M, Ramya V, Ramya G Franklen [7] proposed that accidents occur around the world and the cause of the inability to concentrate on the road while driving. The concentration is skipped due to driving without rest which makes the person drowsy and this drowsiness is the cause of serious accidents. This problem is solved by building different systems for getting sleep. The system proposed here uses the Raspberry Pi and various sensors such as Gas Sensor, Vibration Sensor to determine the type of sleep. The driver is monitored by placing a camera that captures an important signal. If the eye is closed for a long time then a picture of the person is sent. Danger is detected using a vibrating sensor and the server is notified by sending latitude and length. The car location is sent to the IoT modem embedded in the car. When the driver is drunk he senses a gas sensor and the server is notified by message. The car's running motor can be stopped or disconnected if the server side is notified by the driver that the person is not in a driving position. With this, the risk level decreases and the risk to the lives of customers is reduced.

Pranay Sharma, Naveksha Sood [8] suggests that increasing the number of vehicles on Indian roads and enforcing lower traffic laws leads to more accidents caused by people and deaths. In this paper, we propose a driver-assisted monitoring device that uses IoT sensors, such as an alcohol sensor and an air pressure sensor to test intelligence and machine learning algorithms for low sleep and normal yawning to detect drowsiness. The machine opens and asks the driver to blow in the mouth. After a clean and proper beating, the driver was allowed to turn on the ignition. After that, the device constantly monitors the driver using a camera to detect signs of fatigue, and uses a car sound system or buzzer to alert the drowsy driver. The goal of our mission is to build and use a device that will prevent drunk driving and make drowsy and instill good driving behavior in drivers.

III. PROBLEM STATEMENT

When it comes to sleep risk information, drivers are faced with a number of statements related to sleep drivers'

characteristics (age, gender, physical condition, sleep problems) in addition to the statement that sleep can happen to anyone. Based on the pilot reviews of these statements, it seems to be a common consensus between them, both private and professional, that sleep can happen to anyone. In addition, they seem to be well aware of the real danger of falling asleep while driving. Independent drivers and professional drivers respectively estimate that an average of 40 and 36 out of 100 drivers have fallen asleep driving. Calculated as a percentage these numbers form stocks close to the actual values found in this study. There will also be the use of alcohol to see the driver to see if the person is normal or abnormal. Therefore, knowledge of the real danger of falling asleep among drivers seems very good.

IV. MOTIVATION AND NEED

The ability to anticipate and hazards depends on the driver's motivation to choose to do so and this will be linked to their knowledge of potential hazards if you look ahead. The impetus for driver decisions will be based on their awareness (knowledge) and their ability to respond to various road conditions. This includes naming the driving process and having the right driving decisions. This is the opposite of a simple example of motivation whenthe driver slows down when a police officer is nearby. Little is happening inside. It will also use heart rate detection to determine if a person is normal or abnormal.

In the case of a person who is driving for employment, he or she may be encouraged to ignore the need for safe conduct in order to meet the demands of the job, especially if there is an incentive to do so. The story of those who are going to be trained to drive is about their motivation to change the way they drive. This needs to be done internally and not through features such as coercion.

V. PROPOSED SYSTEM

The proposed system is a driver's face monitoring system that can detect driver monitoring (both fatigue and disturbances) by analyzing eye and facial circuits. After image detection, face detection is the first stage of processing. After that, the symptoms of hypo vigilance are removed from the facial image. However, the clear eye detection phase is not used to determine the eye on the face, but some of the key features related to the eye area (upper and lower part of the face) are eliminated by refining the face recognition algorithm of all the complex computer systems. It will also use heart rate detection to determine if a person is normal or abnormal. Therefore, after face detection in the first frame, face tracking algorithms are used to track the driver's face in subsequent frames unless the face is lost.

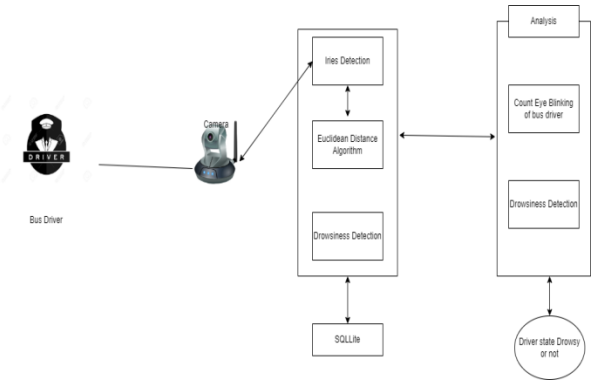

Fig.1.System Architecture

Modules

• Person Detection:
First the person’s image can be detected
• Eye Detection:
After detecting, the person’s eyes capturing is done.
• Iris Detection:
After eyes detection the iris will be detected

VI. METHODOLOGY

Python is a highly adaptable translation language. Its design philosophy emphasizes the legitimacy of the code and its use of critical retreats. Its language structure and its object-oriented approach aims to help programmers write clear, logical code for small and large projects. Python is a computer programming language commonly used to build websites and software, perform tasks automatically, and perform data analysis. Python is a common target language, which means it can be used to create different programs and is not special for any specific problems. Another reason Python is so well-known is that it is an easy-to-learn programming language. Because of its easy human understanding, it is easy to make machine learning models. In addition, many codes say that Python is more accurate than other programming languages.

VII. EXISTING SYSTEM

The driver falls asleep, and the driver loses control of the vehicle, an action that often results in the collision of another vehicle or object. To prevent these catastrophic accidents, an earlier method was developed. In this program the driver's sleep condition was monitored closely. The following steps have been widely used to monitor drowsiness:

1. Car-based detection: The number of actions / metrics, including deviations from the line of motion, steering motion, acceleration pedal speed, etc., are constantly monitored and any change in this cross-border indicator indicates a significant increase in the driver's chances of drowsiness.

2. Behavioral measures: Driver behavior, including yawning, blindfold, blink of an eye, head position, etc., was monitored by the camera and the driver was warned if any of these symptoms were detected.

3. Physical measures: The relationship between body signals (electrocardiogram (ECG), electromyogram (EMG), electrooculogram (EOG) and electroencephalogram (EEG) and driver drowsiness was studied.

VIII. CONCLUSION

An increasing number of road accidents due to declining driver alert levels have become a major problem for the community. Statistics show that 20 percent of all road accidents are caused by reckless drivers. In addition, the risks associated with monitoring drivers are far worse than other types of accidents, as drowsy drivers often do not take appropriate precautionary measures before collisions. For this reason, the development of driver-level monitoring systems and alert systems, when drowsy and insufficient on the road, are essential to prevent accidents. It will also use alcohol pulse discovery to determine if a person is normal or abnormal. Prevention of such accidents is a major goal of focusing on the field of effective safety research. Tired people exhibit visual behaviors that are easily seen as a result of changes in their facial features such as eyes, head, mouth and face. Computerized monitoring can be a natural and non-disruptive way to monitor driver alertness. Face as a key component of human communication has been the subject of research in computer vision for a long time. Driver fatigue detection is considered one of the possible commercial applications for automatic facial recognition. Automatic recognition (or analysis) of facial expressions includes three levels of activity: facial recognition, extraction of facial information, and speech classification. In these operations, extracting information is a key feature of the feature based on detecting facial shape from image sequence. It involves detecting, identifying and tracking facial features under different light, facial expressions and facial expressions. In this research project the SVM Classifier is used to diagnose fatigue and get different results. Here the accuracy of the work is 70.

IX. FUTURE SCOPE

The driver fatigue is the major problem in today's world, because due to the downiness problem day by day accidents are increased. In the future work it further implemented with the help of Neural Network and other real time sensor devices so that more accuracy is achieved. The system will be very useful for school bus driver. It will also use alcohol pulse detection to check out the person is normal or abnormal increasing the safety on the roads.

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