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Machine Learning Based Driver Distraction Detection

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Abstract: Distraction is nothing more than a lack of consideration for healthy driving practices. Intended or accidental deviation of the focus from the driver side may be attention. The diversion by drivers can be identified as anything required to detect data for safe and secure control of the car by incidents, people inside or outside the vehicle that may be forced or appear to force the drivers to move their focus from a fundamental driving activity into another spot. The main cause of distraction for drivers is their competitiveness for events which reduce driving performance in road crashes. The solution to the above issue defined in this paper will help minimize the accident by road that is one of the major reasons for the driver's distraction. The driver also assesses whether or not the driver deliberately detects yawning, facial recognition, eye detection and finds whether or not the driver drank an alcoholic. The sensor can be used for alcohol detection. It is planned to ensure the safety of car passengers. For real-time object tracking, the hair cascade algorithm may be used.

Keywords: Raspberry pi, Open CV, Safety, Haar cascade algorithm, Machine learning

Introduction

It can be shown that only the drivers conduct and blame account for 90 percent of road injuries [1]. Vehicle collisions cause not only deaths and wounds, but also financial costs and poor productivity. The driver's reckless behavior will also raise the risk of distractions from other drivers as the head motions are driven [2]. Highly skilled drivers also use safe and sound control applications for drivers to reduce the cost of gasoline. Durability and distraction in driving incidents have become significant [3]. The sluggish conditions that detect driving efficiency will lead to unnecessary yawning. The frequency of road crashes can be minimized by a vehicle tracking device. If the driver is drowsy, tired and dangerous, the device would immediately warn the driver to drive safely [4].

In order to track driver actions in real time, deaths and traffic injuries may be minimized. The device also reads the directional wheel motion and side location divergence while assessing driver sleepiness activity and detecting vehicle functionality [5]. In dropping road collisions, the device can be tracked and very helpful. The driver's performance and safety are improved. The driving distracts the driver from the actions which are crucial for healthy drive into a competitive operation [6]. If drivers are unspoken, their attention at the moment is split between the primary task of driving and secondary duties that are not related to driving [7]. For starters, the cognitive tools of cell phone drivers are given to evaluate the driving situation as well as the conversation [8].

Distractions may arise because of different causes, such as a driving conversation or cell email, etc. Texting: Texting is one of the key sources of driving distraction. The study reveals that drivers are also involved in text messages in such a truck or a truck that raises collisions as drivers that are not disturbed [9]. Calling a mobile telephone along with driving just raises the danger, when drivers take the eyes off the road on the telephone for one moment. The map reading and events such as playing car songs enhance the driver's distraction [10]. Touch screens may be to some degree creative, but without a momentary glance away from the road they are very difficult to use [11]. In food and drink during commuting, the rate of injuries increases twice as much.

Related Work

This section includes an overview of some essential literature work for distracted drivers. Reference [12] offers a solution made up of a set of convolutionary neural networks weighted genetically. They trained the CNN on raw photos, cutaneous face, face photographs, hand pictures and face pictures. They educated the Alex Net, the Inception V3 network, a 50-layer ResNet network and a VGG-16 network on all five picture source sources. For these networks they have mastered a retrained Net picture model. The weighted average of the network outcomes is then assessed using a genetic algorithm for the final class distribution. They achieved 76% accuracy via the VGG-16 network and 81% accuracy on the ResNet and 90% on the Inception V3 network. The new State Farm-like dataset was developed for distracted driver identification by Abouelnaga[13]. By using the skin, face and hand segmentation, the writers preprocessed the photos and suggested the solution using five separate Convolutional New Networks weighting ensemble. The system has achieved a reasonable rating consistency but is too compute-complex to be the most important autonomous driving system in real time [14].

A solution for the diagnosis of drowsiness is given in reference [15]. Three criteria for diagnosis of drowsiness have been taken and each parameter subdivided. The three parameters are behavioral, social, and vehicular. In actions, they aim to diagnose driver fatigue with different criteria such as the relationship between the eye closing, blinking of the eye, the head posture, facial movements and yawning. They use the eye closure proportion and are called open

or closed depending on the outcome of the ratio. Yawning-based detectors examine geometrical mouth variations of the drowsy driver such as wide mouth opening, lip location, etc. Lane identification, blink age, steering angle, steering wheel actions is used as the various methods used by the car. Under the direction of the car used to track driver steering behaviours, there was a single angle sensor. Driver drowsiness based on physical factors like heart rate, heartbeat, breath speed, breathing speed and bodily temperature etc has been observed in physiology-based techniques. These biological criteria are more effective and precise in the diagnosis of drowsiness when it comes to what physically happens to the pilot. The researcher used 3 different classification methods, including vector support machines (SVM) with 98.4 percent accuracy. Secret Markov was another tool and the last method was used the Convolutional neural network (CNN) with 98 percent accuracy.

Proposed System

This segment illustrates the operation of the machine by using a pi and opening a CV. The project's main concept is to consider driving alertness. In case of a yawning, inactive, disturbed or drunk driver, he is becoming conscious of the continuous sound. And if a car driver's drunk, this device literally makes buzzer sound. The photo of driver is continually taken and saved on the SD card by Raspberry Pi. Raspberry Pi has a Special Camera Module built on it the main part (microprocessor). By using Raspberry Pi, the execution time is shortened. The camera for night vision is supposed to watch the driver distract or not. Image capturing is completed with the Java module and OpenCV. The open CV is for the user-defined classification of objects. The Haar cascade senses the image taken from the eye and face. If you find a closed eye, the driver is warned. Yawing is detected by the eye, nose and mouth order from the face image. Haar Cascade Classification method is an approach to master learning, in which the cascade function is practicing from separate positive and negative images. In fact, if a driver is drunk this machine will give a buzzer signal. The driver is informed and the admin is notified. Driver drinking is often measured by a sensor of alcohol. If a person's breathing, the alcohol sensor senses alcohol level. This alcohol sensor is much like the common breathalyzer, for the detection of alcohol levels on breath. It is extremely adaptive and easily receptive. The Sensor provides an alcohol dependent analog resistive output. The 0 specifies that the usual state and 1 notify the user. It is 0 and 1 output value. Both driver-related data remain inside the database. The advanced capabilities of Raspberry-Pi are included in the MySQL database framework. Raspberry is linked to the modules lead and buzzer. Assume the driver will be switched off then the sound will be played and the signal will be given. Statistics of the user driver are synced to the server.

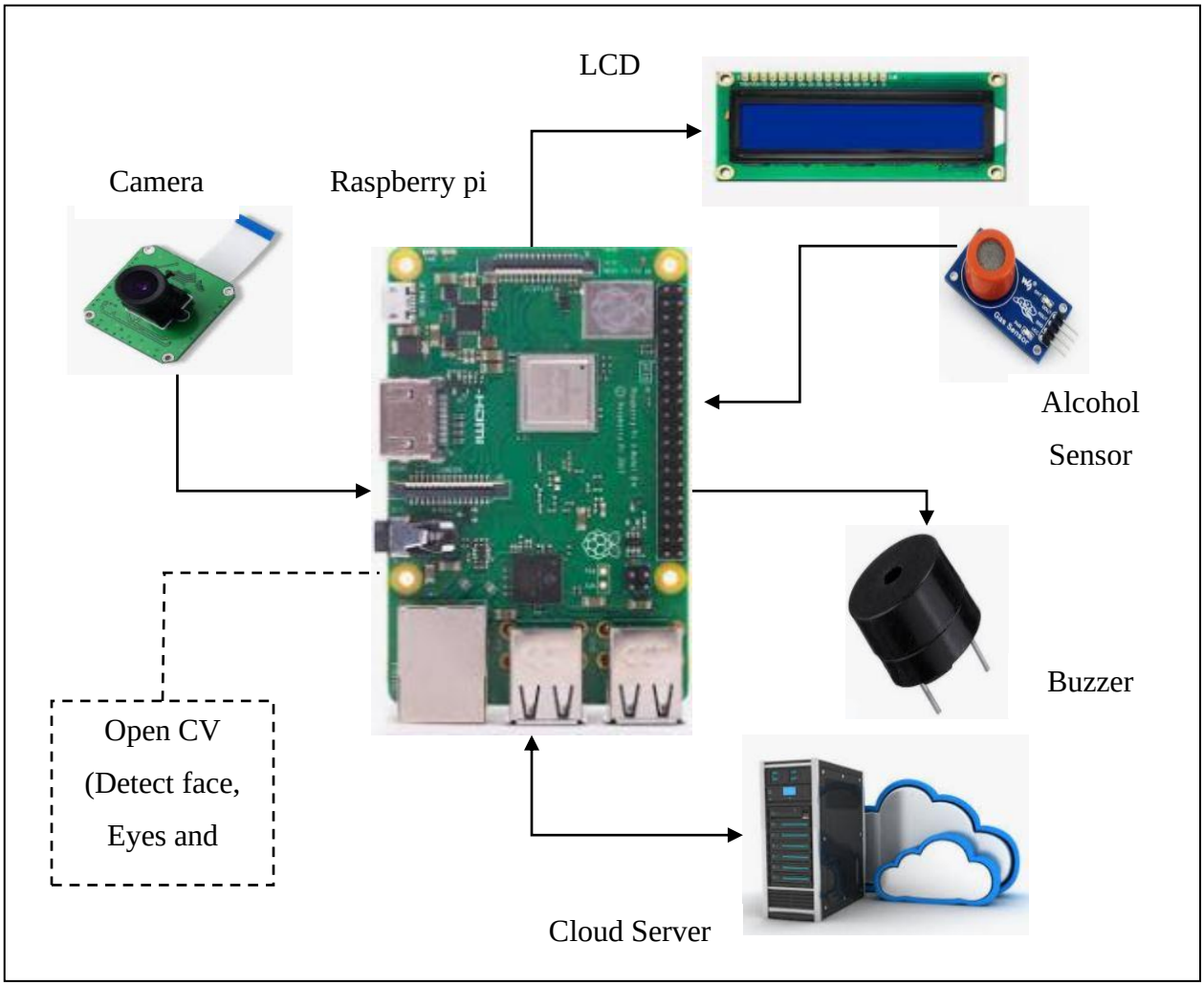

Figure 1: Block diagram

Cascade feature from different positive and negative pictures is educated in this grouping. Subsequently, the objects in other images were identified. It may be used OpenCV to create one if one has to train an own Classifier for an entity like vehicle, aircraft, etc. It offers a series of steps, each of which comprises a list of poor students. The scheme senses the related objects. Each classifier phase specified the exact area as either positive or negative, based upon the current location of the window. True in that an object is identified or bad, as the object was not observed in the picture.

Result

In reality, if a car driver is drunk or driven away, this machine will send buzzer sounds. The driver is alerted and the alert is sent to the supervisor. The driver can be at risk if the driver is drunk, but both the traveler and pedestrians who have also been on the roads. The algorithm was found on images which indicate that the detection is accurate. In order to obtain precision, the images are collected and analyzed under varying contrast values.

Figure 2: Experimental setup

Figure 3: Driver distracted

More checks on pictures and even provide time to recognize a particular method of facial, eye and mouth. Compared with other approaches, the Haar cascade has the highest precision. The detector accuracy is to adjust contrast values. If the contrast value of the image is decreased, the detection precision by hair cascade is higher. Experimental configuration, distracted driver outcome images, is shown in Figure 2 and Figure 3.

Conclusion

Drowsiness detection plays an important role in safe driving, and this article proposes a new system to prevent drowsiness-related accidents. So, in the first phase of the system, the system captures the frame stream and the checkpoints used to access the ROI in the preprocessing block are: Then the eye region is selected and the preprocessor selects the eye in front of the camera. To minimize road accidents it is important to recognize the main causes of it. One of the big causes is a diversion as mentioned above. This system enables to select an optimal approach to eliminate road injuries due to driver's tiredness. It is created that a framework, which Helps drivers in driving car effectively. Often improves passenger safety and offer the details about the driver's actions when driving and identify whether the driver is drunk or not. Compared to the Viola-Jones algorithm, the Haar cascade algorithm senses face, eye, and yawning. Haar cascade works quite well relative to the output of viola Jones. Haar Cascade has a superior solution because Adaboost is a suboptimal solution relative to other solutions. The hair

case algorithm is cost-effective and cost-effective in contrast to a linear discrimination analysis algorithm.

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