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Drowsiness And Alcohol Detection Driver Status Using IOT

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ABSTRACT

We all know that most of the reason for the accident is that driver drowsiness, alcohol consumption, and bad road conditions are done during driving. The existing system in the literature, are showing remote less accurate due to variations camera visualization and inaccurate detecting gases from the air. To solve such a problem, In propose a system detecting driver drowsiness via eye blinking ratio and breath-based alcohol using the MQ3 sensor. The proposed integrated device not only analyzed the drowsy person and it detecting saturated water vapor in a human breath but also detecting pothole with comparing pothole characteristics. The proposed algorithm is implemented on the Open CV and Raspberry Pi controller with a camera. Alcohol concentration using an alcohol detecting method and MQ3 gas sensor. Detecting the potholes based on the pothole characteristics using ultrasonic. The result is notified to RTO,Owner and Police station. The result shows that the proposed system well performed detecting driver status.

Keywords: Computer Vision, Eyes Detection, Web Push notification, IOT, Pothole Characteristics.

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I. INTRODUCTION

Since the last few days with increasing ratio of traffic and research high speed motorized vehicles the accident due to drowsiness has increased periodically, some another reason that high-level consumption of alcohol and bad road condition with nearby 328000 crashes every user in the US[1].without including the property damage, fatigue-related Driving accidents cost the society 109 billion annually. High fatal due to drunk consumed person so a solution must be needed to find. Preventing the driver's unsafely driving focuses as safe driving methodology progresses[4]. Drowsy drivers are a major contributing factor to traffic accidents. It has been shown in the analysis, that there is a relationship between drivers who are sleepy with traffic accidents[2]. Preventing the driver from drowsiness will be able to reduce the occurrence of accidents. Such as a pothole, crack, a rut is factors of the asphalt pavement condition. Bad asphalt pavement conditions can cause various problems such as a car accident, a decrease of motorist concentration and the shock of car suspension [5]. However, high fatal accident rates caused by drunk drive and drowsiness as well as road conditions are still a serious problem[4]. When the driver does not have adequate rest, the driver will try to sleep while driving and this is the main sign of drowsiness.

In most cases, the driver does not give attention, and then the yawns come, the attempt to close the eyes every moment and the movement of the head from side to side. It has as a consequence a traffic accident which is an unfortunate event for the driver of the vehicle, as well as for the pedestrian [8]. All of these studies indicate serious human lapses and avoidable causes of death, which can be prevented by proper monitoring and alerting technology. Therefore, it is essential to develop a holistic, non-intrusive system to continuously monitor a person's physical and facial

movements and to alert them at critical moments to avoid road accidents, thereby significantly preventing serious injury and loss of lives. To address the above mentioned problems, a cost effective solution is needed that humps, collects the information about the severity of potholes and also helps drivers to drive safely and secure. To detect the pothole, we focus on three characteristics of the pothole. First, the pothole has the round shape second, the rugged region of the pothole. Third, the pothole outlines have darker than outer region. However, detecting the pothole with a laser sensor when the car does not go over the pothole and the system cannot be detected pothole. This paper reports on a prototype portable breath- based alcohol detection system and drowsiness detection, as well as pothole detection, evaluates the performance of our sensor device [1][4][5]. The system does not require a mouthpiece for sampling the breath and has a breath- recognition and eye detection as well as a road detection function to prevent abuse. The alert system consists of buzzer attached inside the vehicle and notifying to the driver via web push notification with the strategy of a web socket. The buzzer is connected to the GPIO pin of the Raspberry Pi controller triggered when drowsy is detected. Another alteration is that active shower and spread water on the driver's face. Raspberry Pi controller is performed drowsy state and eye state detected to the web socket server send web push notifications. Web socket clients receive the notification. The clients are RTO, Police station and owner of the vehicle. The respective client takes further action to prevent unsafely driving. such way ratio of the accident is the decrease.

II. LITERATURE SURVEY

[1] Real-time Drowsiness Detection Algorithm for Driver State Monitoring System

In this paper, we focused on more fast and accurate drowsiness detection algorithm using a camera sensor which senses the driver's face region. Also, we use an infrared camera which can obtain stable image frames at night as well as daytime. We evaluated the performance of the proposed algorithm in terms of processing time and ratio of detection. Drowsiness detection algorithm is used in which it has target board which has less space i.e 1 GHz I.MX6Quad. The accuracy depends on the subjects because some people have large eyes but other people have small eyes. Due to this PERCLOS it shows the result of accuracy is very different according to the subjects.

[2] Driver Drowsiness Detection System Based on Visual Features

The development of a driver monitoring system capable of producing warning to the driver upon detecting signs of drowsiness can prevent road accidents and thus save lives. Existing system are providing slightly less accuracy results due to low clarity image and videos, which results for variation in the camera position. In this paper[2],camera checks the eye blink count is not accurate for detecting the drowsiness. The limitation of this paper is the assumption of constant blink duration as it differs from person to person.

[3] Machine Learning and Gradient Statistics Based Real-Time Driver Drowsiness Detection

In this paper, the machine learning and gradient statistics based driver drowsiness detection is developed for the real-time application. Haar-Adaboost based face detection scheme is applied to the proposed system design which require more time to scan the system. The proposed design is evaluated by only PC using C/C++ language model.

[4] Portable Alcohol Detection System with Breath-Recognition Function

In this paper, reports on a prototype portable breath-based on alcohol detection system and evaluates the performance of sensor device. The system does not require a mouthpiece for sampling the breath and has a breath-recognition function to prevent abuse. The sensor could not detect natural gas and have small sensitivity to alcohol and smoke.

[5] Image Processing-based Pothole Detecting System for Driving Environment

The pothole is one of the significant factors for the motorist. Due to this pothole it cause a car accident, the decrease of car lifetime and a decrease of the motorist concentration. The system captures the GPS location of hole.

[6] Road Quality Management System using Mobile Sensors The main objective of this system is to design an application to know about the road quality. recently we all use Google maps and its application for navigation during travelling, but these applications is not able to tell you any road condition or its complexity. Analyze the road surface condition using sensor in mobile phone.

[7] A Survey on State-of-the-Art Drowsiness Detection Techniques:

The main concept of this paper is to prevent the road accident so to prevent the road accident we are using an alcohol detection sensor, an eye blink sensor, over-speed control sensor. The alcohol sensors are used to recognized the driver is drunk or not. The eye blink sensors are used to check the driver is sleepy or not with the help of the eyeball movement of the driver, if the driver is sleepy means it will trigger the alarm to conscious the driver. The over-speed controller sensors is used to check the car is over speed or not and if the car is over speed means it will reduce the speed of the car maintain the car speed into normal speed.

[8] Vision–based method for detecting driver drowsiness and distraction in driver monitoring system

The paper addresses the development of a system that is able to deal with a large set of different traffic situations. The input to the system comes from cameras, which are supplemented by active sensors (such as radar and laser scanners) and vehicle dynamic data, digital road maps, and precise vehicle-positioning data.

[9] Drowsiness Detection System based on Eye-closure using A Low-Cost

This paper, we have described a holistic, non intrusive approach to driving fitness detection, by checking for drowsiness and the loss of vehicle control under the potential influence of alcohol, based on driver visual monitoring, using computer vision techniques of facial landmark detection and motion detection using differential images. We have also demonstrated that real- time frame. The computational cost for the Eye Aspect Ratio of the eye blink and detection of lateral relative motion is found to be negligible, which allows the system to send out alerts in critical situations with rapid response times.

[10] A situation-adaptive lane keeping support system Overview of the SAFELANE approach:

The paper addresses the development of a system that is able to deal with a large set of different traffic situations. The input to the system comes from cameras, which are supplemented by active sensors (such as radar and laser scanners) and vehicle dynamic data, digital road maps, and precise vehicle-positioning data.

III. LITERATURE REVIEW

There are several different methodologies for eye tracking, and monitoring. Most of them in some way related to features of the eye reflections from within a video image of the driver. This project aimed to use the retinal reflection as a means of finding the eyes on the face and then using the absence of this reflection as a way of detecting when the eyes are closed. This algorithm on applying consecutive video frames may aid in the calculation of the eye closure period. Drowsy drivers are eye closure periods for longer than normal blinking. It is also a very small longer time that could result in a severe crash. So we will alert the driver as soon as the closed eye is detected.

In this module, we are performing some basic operations on the human face to get the proper image for processing. In this module, we perform certain operations like grey-scale conversion, smoothing, edging and image segmentation to get a proper and clean image. In this module, we are performing an algorithm on the human face like eyes detection algorithm to detect the eyes pattern for sleepiness detection.

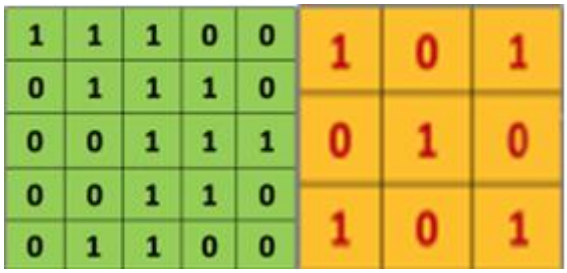
In this module, we are using the IoT sensor to detect alcohol. If alcohol detected then the system will in the form to the police station, owner and RTO for an alert. This system easily detects alcohol from breath via the MQ3 sensor. the sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. Sensor MQ-3 is useful for detecting Alcohol, Benzine, CH4, Hexane, LPG, CO, etc. MQ-3 gas sensor is SnO2 sensitive material, which with lower conductivity in clean air. Detect alcohol MQ-3 sensor can be easily attached to Micro controllers, Arduino Boards, Raspberry Pi, etc. This alcohol sensor is useful for detecting alcohol concentration on human breath and your common breathalyzer. It has a fast response time and high sensitivity. MQ-3 Sensor provides an analog restive output based on alcohol concentration. It is very simple the driver circuit, all it needs is one resistor. A simple interface could be a 0-3.3V ADC.

Web push notifications are transformed on a web socket server or mobile screen anytime they have their platform open— regardless of whether or not the user is on the website. Push notications are one of the most valuable capabilities of native apps, and the action of a service worker or web page script showing information to a user. Our proposed framework can also be easily applied to detect eyes from face Our web-based system report to high authority person via web push notication. In this module, we are using the IoT sensor to detect the road condition. We are using the ultrasonic sensor to detect the road condition. If the road condition is bad then our system will send notication to a centralized system.

IV. METHODOLOGY (CNN)

Convolutional neural network (CNN, or ConvNet) is a deep learning algorithm which can take in an input image,assign importance to various aspects and most commonly applied to analyzing visual imagery. CNNs uses a variation of multilayer perceptrons The pre-processing required in a ConvNet is much lower as compared to other Classification algorithm. They are also known as space invariant artificial neural networks, based on their shared weights architecture and translation invariance characteristics and analogus to that of connectivity. Individual cortical neurons respond to stimuli only in a restrict region of the visual field known as the receptive field. The receptive fields of different neurons partially overlap such that they cover the entire visual field. This means that the network learns the filters that in traditional algorithms were hand engineered. This independence from prior knowledge and human effort in feature design is a advantage. They have applications in image and video recognition, image classification, medical image analysis,

and natural language processing. A CNN consists of an input and an output layer, as well as multilayer hidden network. The hidden layers of a CNN typically consist of convolutional layers, pooling layers, fully connected layers and normalization layers. ConvNets derive their name from the "convolution" opera-tor. The primary purpose of Convolution in case of a ConvNet is to extract features from the input image. Convolution preserves the spatial relationship between pixels by learning image features using small squares of input data. We will not go into the mathematical details of Convolution here, but will try to understand how it works over images As we discussed above, every image can be considered as a matrix of pixel values. Consider a 5 x 5 x 1 image whose pixel values are only 0 and 1. An image from a standard digital camera will have three channels (RGB)red, green and blue you can imagine those as three 2d-matrices stacked over each other (one for each color), each having pixel values in the range 0 to 255.



Also, consider another 3 x 3 matrix as shown. Then, the Convolution of the 5 x 5 x 1 image and the 3 x 3 matrix can be computed as shown in the animation.

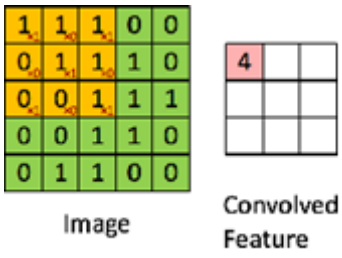


Fig2.The Convolution operation

The Pooling Steps:

Spatial pooling decreases the computational power required to process the data through dimensionality reduction. There are two types of spatial pooling Max pooling and, Average pooling.

In case of Max Pooling, we define a spatial neighborhood a 2×2 window and take the high level element from the rectified feature map within that window. Instead of taking the largest element we could also take the average pooling returns the average of the values from the portion of the image covered by the kernel. In practice, Maximum Pooling performs a lot better than average pooling. Max Pooling operation image covered by the on a Rectified the number of such layer may be increased for capturing low levels details even further, but at the cost of more computational power and take the maximum value in each region.

V. CONCLUSION

Hence we successfully develop an integrated system under the control of the Raspberry Pi controller. Computer vision- based drowsiness detection system for a vehicle with the use of web push notification developed. Web push notification alerts the clients like Police, RTO, OWNER. A prototype movable alcohol device sensor detects within a 3 sec Once a driver's breaths into the device. The alcohol level measured by the de- tector and controls the sensor. The accuracy of +-10 ppm was got by introducing exhaled breath from within 20mm. pothole detecting system based on an ultrasonic sensor to overcome bad road conditions. We can anticipate the improvement of the asphalt pavement condition and increase the efficiency of driving and car life, spare human life.

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