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Detection of Drunk Drivers by Using Image Processing for Pupil Size Abnormality and Intoxicate Bottle Detection with Alcohol Sweat Level Detection

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Abstract:
With India reporting as many as 1.34 lakhs fatalities in road accidents every year, a vast 70 per cent of them being due to drunken driving, questions are now being raised on whether the mushrooming growth of liquor vends along the highways is responsible for costing precious lives in an untimely manner. The system implemented by us aims at reducing the road accidents in the future due to drunken driving. The purpose of this project is to develop vehicle accident prevention by method of alcohol detector in effort to reduce traffic accident cases based on driving under the influence alcohol. In this proposed project a new methodology is used by usage of image processing system and alcohol in sweat palm for drunk and driving detection.

Keywords: pupils size, alcohol, Drunk and Drive recognition, Bottle Recognition, GPS messaging

I. INTRODUCTION

[2]In 2013, 28.7 million people admitted to driving under the influence of alcohol - that's more than the population of Texas. Drink and driving is a global issue to dealt with. Today various technology to determine if you have been drinking, the police look for specific symptoms including slurred speech, red watery eyes, and the odor of alcohol on your breath and clothes. If the police detect any of these they will likely ask you to exit your vehicle and conduct a field sobriety test. The field sobriety test is usually conducted at the scene where you were stopped by the police. The field sobriety test usually includes a series of simple physical and mental tests such as:

- **One-Leg Stand Test:** The suspect is instructed to stand with one foot approximately six inches off the ground and count aloud by thousands (one thousand-one, one thousand-two, etc.) Until told to put the foot down. The officer times the subject for 30 seconds. The officer looks for four indicators of impairment, including swaying while balancing, using arms to balance, hopping to maintain balance, and putting the foot down.
- The officer takes **Nystagmus test**, Horizontal Gaze Nystagmus is an involuntary jerking of the eyeball which occurs naturally as the eyes gaze to the side. Under normal circumstances, nystagmus occurs when the eyes are rotated at high peripheral angles. However, when a person is impaired by alcohol, nystagmus is exaggerated and may occur at lesser angles. An alcohol-impaired person will also often have difficulty smoothly tracking a moving object.
- The officer gave some alphabets to render verbally forward and backwards.
- **Divided Attention Tests**- require a suspect to listen to and follow instructions while performing simple physical movements. Impaired persons have difficulty with tasks requiring their attention to be divided between simple mental and physical exercises that are easily performed by most sober people. And there is another checking procedure such as breathing test an analysis of breath gas, using a "breath-analyzer" (which the police can do immediately, on the road) gives only an indirectly determined value for blood alcohol level (BAC). It's based on how much alcohol is in some portion of exhaled air, not how much alcohol is in the blood. As it impossible for policemen to detect every driver in the road to respond for that we are proposed to develop embedded system in the car to detect the driver is drunk or not by using image processing technique and sweat alcohol sensor.

II. PROPOSED SYSTEM

The proposed system involves using various physical effects on drunk driver by alcohol. The amounts of alcohol that consume affect a person peripheral vision. Slow pupil reactions: Alcohol tends to affect the speed of iris and pupil constricts and dilates. A drunk man cannot adapt quickly to oncoming lights. Drinking alcohol has led to decrease the sensitivity of peripheral vision which may led to perception of having tunnel vision. As the pupil reaction is slow against the light intensity. By using image processing technique we can detect the pupil reaction is working properly or not. The drunk person sweat easily has a quite high amount of alcohol in the sweat, so we can detect alcoholic person by using this property. Detecting an alcohol related bottle in car cabin by image processing can help to recognize a driver consuming alcohol in car cabin. After recognizing sending the GPS location of driver vehicle and vehicle data to the local authority

III. METHODOLOGY

By using pupil size vs intensity of light at a time of alcoholic driving a car. The size of pupil data has been initializein the system. [6]To detect and track eye images with complex background, distinctive features of user eye are used.

Generally, an eye-tracking and detection system can be divided into four steps:

A. Components of System

a. Video Capture

In this component, the system continuously captures the image frame from the webcam and passes it to the next component. The video camera is initialized and the frames are captured.

b. Pre-Processing

This part deals with the pre-processing of the frame which is captured before the application of the algorithms. First, the image is resized to a particular size. Then the image is transformed to gray-scale format as the processing of image is a little simpler in this format. After conversion, the image follows Histogram Equalization which helps to adjust the overall contrast of the image. It is normally useful when the driver is driving in low-light conditions so that the intensities can be better spread on the histogram. As a result, areas which are of lower contrast gain a higher contrast.

c. Face Detection

A classifier is trained for detecting the facial region within the frame. A set of positive and negative samples are used for training. Positive samples are the ones which includes faces while negative samples are the random images without the facial region. Thus, the face is detected.

d. Eyes Detection

Like face, a classifier is used for training of eyes too. A set of positive and negative samples are taken for training. Positive samples contain images includes eyes while negative samples are the random images without the eye region. In the entire frame eyes, being a small feature is difficult to detect. As a result, the facial part obtained in the last stage is cropped and eyes are detected in the cropped image.

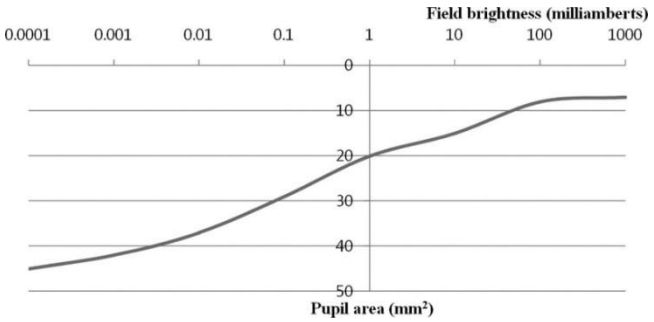
If the face is detected and eye is not detected than a driver is sleeping. If both are detected than system processed:

e. Pupil detection and

f. Eye tracking. Image processing technique is incorporated for detection of these. Figure 1 illustrates the scheme. Camera is incorporated in the dashboard of vehicle which takes the images of the driver regularly at certain interval. From a image first the face portion is recognized from the complex background. It is followed by eye region detection and thereafter the pupil or eyelid detection. The detection algorithm finally detects the eyelid movement or closeness and openness of eyes. In the proposed method, eye detection and tracking are applied on testing sets, gathered from different images of face data with complex backgrounds. This method combines the location and detection algorithm with the grey prediction for eye tracking.

g. Pupil size detection

According to this research,[2]The research was tested on 250 volunteers with means age of the participants is 29.2 years. All volunteer doesn't have any health problem and they are free from any visual, impaired or/and neurological problems. The pupil measurements of volunteers were taken place under these three light levels condition: room light, near-total darkness and direct light. Pupil size according to research [2]: [2]For each pupil measured (N = 500), the mean (SD) for each of the three test conditions were: room light 3.86 (0.93) mm: near-total darkness 6.41(1.55) mm; and direct light 3.35 (0.72) mm.



Intensity of light vs Pupil Size

By checking up the data in the system we can analyze the driver is drunk or normal by checking up the pupil size of the driver co-relation to the intensity of light into the face of the driver. If the pupil size is normal according to data than it's a normal but if the pupil size abnormal co-relation to intensity of light than high chances that driver is drunk.

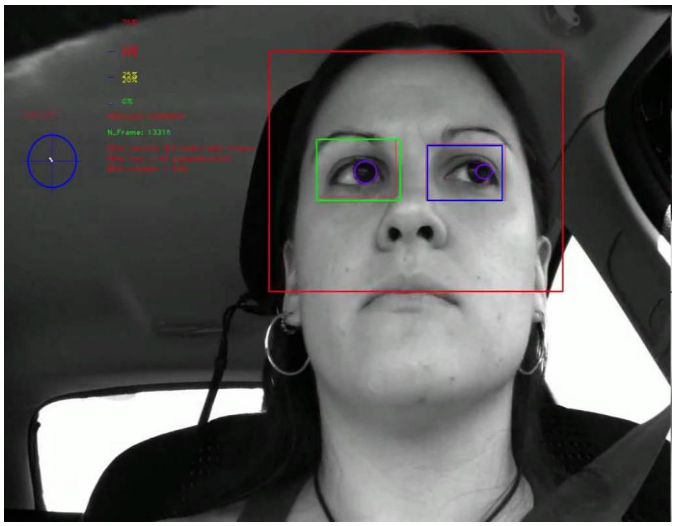


Figure.1.

2. By using alcohol proportion in the sweats of drivers by installing alcohol measurement sensors in steering wheels We evaluated the sweat-patch test for its ability to detect alcohol consumption. According to this research,[1], an 8-day study taken place during these days volunteers drank whisky while wearing sweat patches that collected continuously at a quite steady rate.

- They offered **1.0**, **2.0**, or **5.0** g ethanol/kg/day to **6** continuous drinkers, and
- **5.0** g ethanol/kg/day for **2** days to **8** episodic drinkers.
- The sweat patches were removes after 2,4,6 and 8 days.
- The concentration of ethanol in the collected sweat (Cs) rose progressively with the amount of alcohol consumed and linearly with the mean concentration of ethanol in the blood (Cb) during the sweat collection period.

Cs-concentration of ethanol in the collected sweat

Cb-mean concentration of ethanol in the blood

Table.1. the data evaluate from the research are:

Amount of Ethanol consumed (g ethanol/kg/day)	Drinker intake classified:	Cs (G/L)	Cb (G/L)
5.0g	Heavily Drunk	0.80	1.40
0g	Non-Drinker	<0.0022	<0.01
0.5g	Light Drink	0.0067	0.013

Thus, this test data clearly distinguished drinkers from non-drinker. By using sweat sensors attached in the steering wheel we can differentiate between alcoholics and non-alcoholic driver.

3. Alcohol bottle recognition in car cabin by using image processing.

Figure.1. Alcohol bottle detection by Image Processing.

By using these three techniques we can recognise Alcoholic driver consuming alcohol and other intoxicant Substance after recognizing sending the GPS location of driver vehicle and vehicle data to the local authority

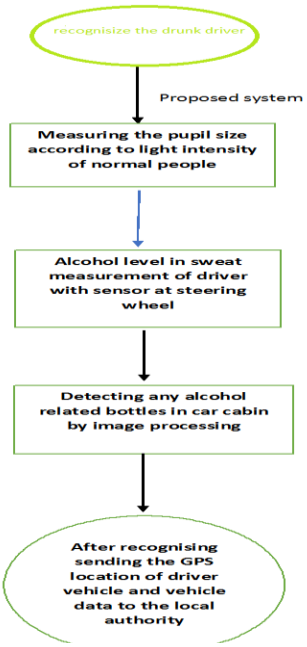


Figure.2. Steps involved in the whole methodology

IV. CONCLUSION

In this paper, we recognize drunk and drive Driver in these proposal by using image processing by method of pupil size with light intensity variation with drivers, by using alcohol proportion in the sweats of drivers by installing alcohol measurement sensors in steering wheels. By recognize bottle in car cabin is the bottle contains any alcohol related stuffs or not. By recognizing all these send these data to the local police authority with GPS location and culprit car data.

Biography

Mohammed Madne Girnariis recently pass out engineering student. He received **Bachelor of Computer Science** (BE) degree in 2017 from **Rizvi college of Engineering**, **Mumbai**, **India**. His research interests are Image processing, Artificial intelligence, Algorithms, etc.

V. REFERENCE

[1]. a sweat-patch test for alcohol consumption: evaluation in continuous and episodic drinkers Phillips M, McAloon MH., 1980 Oct; 4(4):391-5.

[2]. an evaluation of pupil size standards used by police officers for detecting drug impairment Jack E. Richman. Author links open the author workspace. O.D.Opens the author workspace opens the author work space[a.] Kathleen Golden McAndrew,. M.S.N., ARNP[b.] Donald Decker.[c.] Stephen C. Mullaney.B.S., M.S.[d], Optometry. 2004 Mar; 75(3): 175-82., NCBI.

[3]. PUPIL SIZE AFTER USE O F MARIJUANA AND ALCOHO L BRLAJST BROWN, PH.D, ANTHON Y J. ADAMS, PH.D. , GUNILL A HAEGERSTROM-PORTNOY, O.D., REES E T. JONES, M.D., A ND MERTO N C. PLUM, PH.D. San Francisco, California.

[4]. Interaction of aberrations, diffraction, and quantal fluctuations determine the impact of pupil size on visual quality RENFENG XU, HUACHUN WANG,LARRY N. THIBOS, AND ARTHUR BRADLEY.

[5]. Drunk and drive. (2013, May). Retrieved from http:// www.madd.org/drunk-driving/about/drunk-driving-statistics .html.

[6]. Vehicle Accident Prevention System Embedded with Alcohol Detector, M.H Mohamad, Mohd Amin Bin Hasanu ddin, Mohd Hafizzie Bin Ramli, MALAYSIA, International Journal of Review in Electronics & Communication Engineering (IJRECE) Volume 1 - Issue 4 October 2013