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Safety of Hazard Driving using Artificial Intelligent and IOT

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ABSTRACT: Now a day most of car accidents caused by drunk & drive and crash driving. We studied in a research paper that most of researcher state that most of accident cause of the 'drunk & drivers' cases. In various techniques such as, Breath Based Detection (MQ-3), Touch Based Detection, face recognition. In this paper, we propose to develop a technology to detect the drunken state of the driver using facial gesture to identify whether the driver is tired or not. . In this paper the main purpose is, detect the alcohol level of driver where the alcohol level of driver is exceed than current fix limit(legal limits for BAC are between 0.01% and 0.08%.) then car driving system must lock by itself send appropriate massage to driver. The tiredness of driver detect by Eye Aspect Ratio & alert to driver with buzzer & displaying massage.

Keywords: alcohol detection, accident avoid, alert, drowsiness, MQ-3 sensor, Eye Aspect Ratio(EAR)

1. INTRODUCTION

In our country, more than 1.5 lakh people lost their lives in road crashes in 2018, registering an increase of 2.4% as compared to the year before, when there were 1.47 lakh fatalities. One serious road accident in the country occurs every 1 minute, 16 peoples lost their life in road accident in a hour and 1214 road accidents occur every day in India. The 66% of accident cause by over speeding and over 5% were caused by drunk driving. The alcohol consumption, even at low doses, significantly affected driving-related skills such as vision, breaking behavior, and vigilance. Therefore, many countries have been working on solutions to drunk driving for a long period of time, including publicity and education and tough drunk-driving laws. It's been proven that driving under the influence of alcohol & over speeding increases the risk of accidents. So the accident cause by drunk drive & drowsy driver will over come by the system which we propose in this paper. The main objective of this system is to detect the drowsy state of the driver, alcohol level of driver and alert the drive, also send appropriate massage. On the action of detection, the alert system activated & the GPS of the vehicle will activate for provide appropriate massage to the driver's relative for alert with latitudes and longitudes location of vehicle.

2. OBJECTIVES OF THE STUDY

- The drunk and drive causes the accident so we prevent the accident we need to detect the driver done drink or not.
- Sometimes measure reasons for accidents are sleepiness of driver, that drowsy driver needs to detect for avoid / prevent accidents.
- The Breath Based Detection, Touch Based Detection are the method getting output true that means a driver is drunk, because Breath Based Detection, Touch Based Detection methods represents the driver's alcohol level.
- The system using the imaging with face reorganization, Eye blinking rate & Eye Aspect Ratio (EAR) that detect drive is in drowsy state, so a system will send alert massage with buzzer because system detect changes in the Eye Aspect Ratio (EAR) or difference between top & bottom edges of eyes.

3. LITERATURE REVIEW

There has been a rich literature dealing with the Safety of Hazard Driving. In particular, the authors in [1], From the regarding paper get the information that different technologies for detecting the driver alcohol leveled, 'MIROID' which developed & used mobile software, breath-based detection & touch-based detection calculated the blood alcohol concentration(BAC). The study represented draw backs of MIROID & It can over come by Breath Based Detection & Touched Based Detection technique combine together. The author in[2], studied paper represents approximate blood alcohol concentration per unit drink chart & the relation between the concentration of alcohol and time after the drink chart. We discuss the simple detector project which only detects the alcohol leveled & display an appropriate message on led but the system couldn't control the car speed or unhallowed to the driver who drunk above than the sufficient leveled. In this paper [3] the author proposes some methods for

detection that were i. using the MQ-3 sensor detect the alcohol leveled by the breath, ii. Using android software for speed of car, iii. Facial recognition to identify the tired face of the driver. They provide a GPS module to detect the location of vehicle & using LCD to display specific massaged. In[7] M.K.A. et al. The author proposed a system, which detects the drowsy driving detection and drunk and drives detection & also avoided accidents. The drowsiness detects by the eyed using a camera & drunk detect by a gas sensor which detects driver whether drunk or smoking. The further paper proposed the technique which warn the driver using buzzers & vibrate if driver in drowsy state. In image detection use the Haar Cascade which is a Machine learning Object detection algorithm used to identify specific objects. In[9], the author discuss in this paper, proposed system that detect drunk drive & rush driving. The detection done by eye blink sensor, alcohol sensor detecting sensor & also over speed controller all this connected to mobile. The paper conclude that the system connected to the mobile app which send the SMS to the register mobile number with GPS address of vehicle & also send to the relatives.

4. PURPOSE SYSTEM

For accident avoid, we will use the certain precaution methods which will help to reduce the accident. The most probably accident cause by drunk drive and drowsy driver, so we will overcome the accident by detecting the alcohol level, drowsiness of driver. Detecting the alcohol level using two sensors which are Breath base (MQ-3) sensor and Touch Base sensor.

MQ-3 SENSOR : MQ-3 module is suitable for detecting Alcohol, Benzene, CH_4, Hexane, LPG, CO. Sensitive material of MQ-3 gas sensor is SnO_2, which with lower conductivity in clean air. When the target alcohol gas exist, the sensor's conductivity is more higher along with the gas concentration rising. MQ-3 gas sensor has high sensitity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapor.

This sensor provides an analog resistive output based on alcohol concentration. When the alcohol gas exist, the sensor's conductivity gets higher along with the gas concentration rising.

Fig. 1 Breath base (MQ-3) sensor

TOUCH BASE SENSOR : The touch-based system analyzes alcohol found beneath the driver's skin's surface (or more specifically, the blood alcohol content detected in the capillaries). Measurement begins by shining an infrared light on the driver's skin, similar to a low power flashlight, which moves into the tissue. A portion of the light is reflected back to the skin's surface, where it is collected by the touch pad. This light contains information on the skin's unique chemical properties, including the concentration of alcohol.

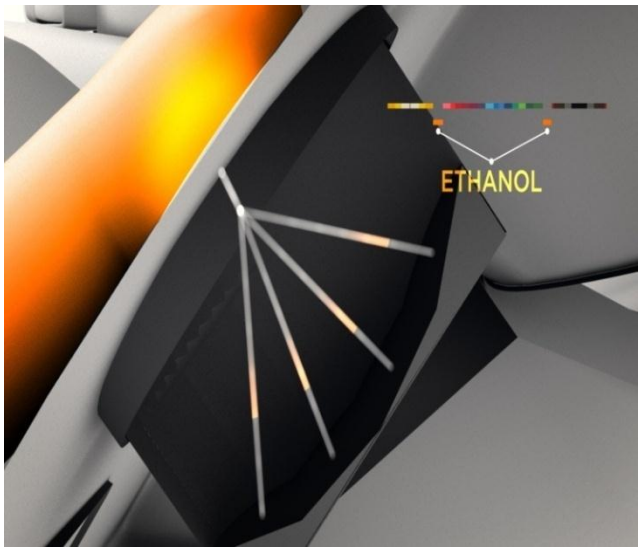


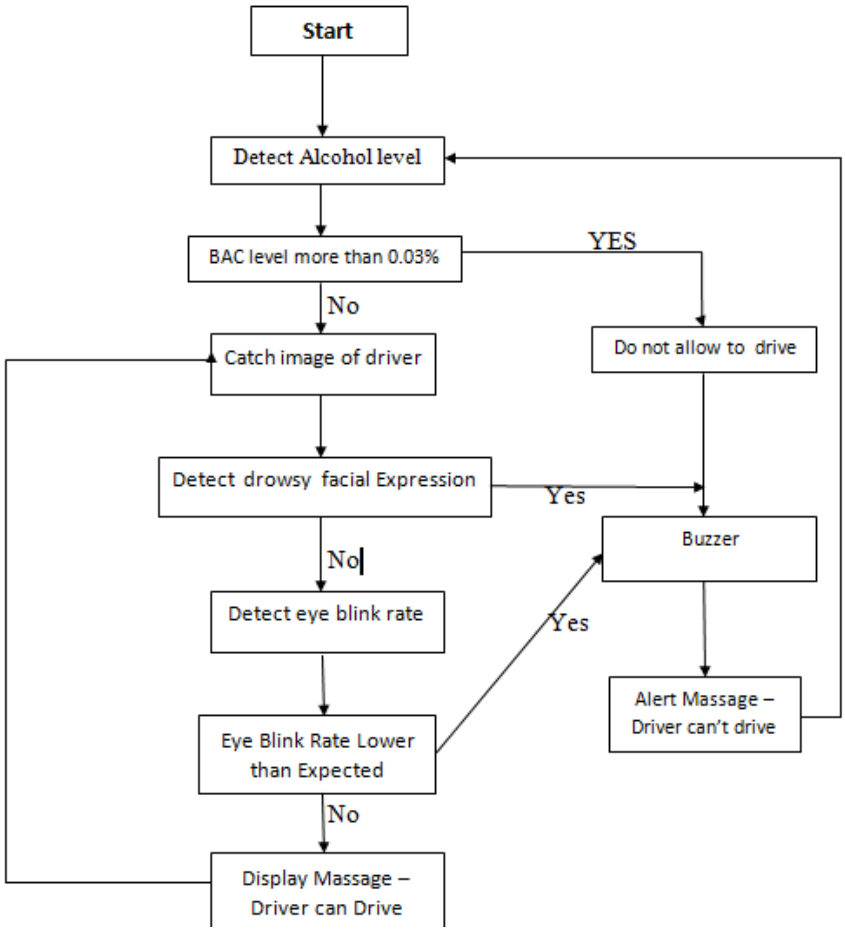
Fig. 2 Touch Base Sensor [19]

For drowsiness, we will use facial expression recognition, eye gaze detection and also provide the alert system to avoid accident. We will use hd camera for image processing system in which the camera catch image of driver.

FACIAL RECOGNITION : Facial recognition is a computerized application which is capable to identify person's face and changes which cannot be seen by our naked eyes.[3] Haar Cascade is a Machine learning Object detection algorithm used to identify specific objects in an image which helps in facial expression recognition.[7] When the driver sits in his regular position then camera scans his face and stored in the memory. The driver's scan face will compare with stored image and process. When it detects any changes in his face, it gives the message alert to the driver by buzzer.

EYE GAZE DETECTION: Eye gaze detection in which Eye blinking rate will help to indicates the drowsiness level of the driver. Generally, for adults there is an interval of 2-10 seconds between each eye blink.[8] The camera scan eye of the driver, after detected eye area it will count eye blink. The eye detection algorithm only detects the eyes if they were opened, this will helps in detecting the drivers drowsiness. If the driver has his eyes closed and count the number of times the drivers blinks. One among two eyes is enough to detect the eye blink rate. The rate of blinking eyes will decrease then system detects driver is in sleepy mood. The system needs to alert the drowsy driver to avoid accident use the buzzer.

Eye Aspect Ratio (EAR) is use to detect the difference between top edge of eyes and bottom edge of eyes using image processing. In which cached image compare with existing data so show massage if difference between two edges are less.



Above flow chart shows the proposed system follows the steps to detect & prevent accident. In the proposed system if blood alcohol concentration level less than 0.03% then alert massage shows and do not allow to drive car. Further steps are detect for drowsy state of driver and if driver in sleepy mood then buzzer will blow for avoid accident & show the appropriate massage.

5. METHODOLOGY

An online survey was taken using the google forms. Link of the form was circulated on social media platforms. The questionnaire was designed in form to test the above proposed hypothesis which verify the certain parameters.

- **Participants**: - To test this hypothesis, this study uses two conditions i.e., first one is helpful and second one not helpful. Total 57 participants data were collected from different states.
- **Measures**: -

Gender	Yes	No	Total
Male	23	3	26
Female	27	4	31
Total	50	7	57

Table 1: Collected data by online survey

Here is the formula for calculating the expected value.

Formula: - **Expected Value = (row total) * (column total)/ (grand total)**

$\mathbf{E_{11}}$ = (26 * 50)/57 = **22.807**

$\mathbf{E_{12}}$ = (26 * 7)/57 = **3.193**

$\mathbf{E_{21}}$ = (31 * 50)/57 = **27.193**

$\mathbf{E_{22}}$ = (31 * 7)/57 = **3.807**

We have obtained these expected values, now we need to compare this value with what has been observed. To do this, we need to calculate the X^2 statistic, which is shown below.

X^2 = ∑ (Observed value – Expected value)

Expected value

In this formula we have to subtract the expected value from the corresponding observed value. After subtraction has been completed, we have to square them and after squaring result we have divide it by expected value. We have to perform this step for every value and at the end we have to add this answer together.

Calculation table for above example is given below.

Obs	Exp	Obs - Exp	(Obs – Exp)²	(Obs – Exp)²/Exp
23	22.807	0.193	0.037249	0.00163
3	3.193	-0.193	0.037249	0.01166
27	27.193	-0.193	0.037249	0.00136
4	3.807	0.193	0.037249	0.00978
Total				**0.02443**

Table 2: Calculation table

Therefore, value of X^2 is 0.02443

Degree of Freedom = (no. of rows - 1) * (no. of columns - 1)

Degree of freedom = (2 - 1) * (2 - 1) = 1

6. EXPERIMENT

Test value of independent sample where calculated at the significant level 90% using chi-square test. By using this test, we calculated X^2 value. With help of survey, we able to test the multiple parameters in test. The calculated chi value is 0.02443 and tabulated chi value at 90% significant level is 2.71 with degree of freedom 1.

7. RESULT

The test value of independent sample calculated by chi-square test with help of online survey analysis in that most of the participants have the basic knowledge of driving and also know the traffic rules. Therefore the responded person very well known the effects of drunk and drive & effects of drowsiness while driving, so its seems to hypothesis accepted.

8. CONCLUSION

In this paper proposed system is use to detect & prevent the car accidents. The survey reponsed people needs to include this system to avoid accidents. The results of proposed system it satisfying the participants according to survey analysis.

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