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# Anti Sleep Alarm for Driver Using IOT and Machine Learning

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**ABSTRACT:** Drowsiness and drunken driving causes the road accidents. This project proposes a real time detection of driver's drowsiness as well as alcohol intoxication and subsequently alerting them. The main aim of this proposed system is to reduce the number of accidents due to driver's Drowsiness and alcohol intake to increase the transportation safety. This proposed system contains 8-megapixels digital USB camera, PC loaded with Raspbian-OS, Alcohol sensor (MQ-3) is used to detect the intake of alcohol in percentage if the intoxication matching fails GSM get triggered on and transmits warning message. The PC with Open CV is serially interfaced with Arduino Uno. GSM, Bluetooth, relay circuitry and buzzers are interfaced with Arduino Uno. This will perform some task like the alarm notification and switching off the car power source.

**KEYWORDS:** Detection drowsiness, Arduino uno, Open Cv

## I. INTRODUCTION

The aim is on improving the safety of the driver without being obtrusive. Visual cues were obtained through eye blink rate by using a camera, which typically characterize the level of alertness of a person. These were extracted in real-time and systematically joined to check the fatigue level of the driver. The system can monitor the driver's eyes to detect short periods of sleep lasting 3 to 4 seconds. The system implemented in this approach runs at 8-15 frames per second. The application was implemented using Open CV environment with a single camera view. This system was used to detect the drowsiness of the driver and thereby reducing the road accidents.

Drunken driving is a most reason of accidents in almost all countries all over the world. Alcohol Detector in Car system is designed for the safety of the people inside the car. This project should be fitted / installed inside the vehicle. Integrated approach of using concurrent engineering practices for developing the methods of ruggedisation for GPS Vehicle Tracking System is adopted. Development and deployment of GPS based vehicle tracking and alert system which allows inter-city transport companies to track their vehicle in real time and provides an alert system for reporting on accidents occurrences. Nowadays, internet are used almost in any application and field, even small item registered with code and update in database then can buy it by online system.

Numbers of vehicles are significant increase every year and many cases of vehicle theft and missing thus internet of things (IoT) is a technology can be use to overcome the issues. Current generation smart phones provide robust sensor suites including accelerometers, Ultrasonicsensor, gassensor, and cameras. These sensors allow smart phones to be used for various sensing tasks such as activity monitoring, personal health, and environment monitoring. Smart phones also provide a powerful communication platform as they are generally equipped with ZigBee, Wi-Fi, and 3/4G data connection. Smart phones are extremely portable and have powerful processing and storage capabilities.

The monitoring, reorganization and controlling of the data are the key concern of Wireless Sensor Network. The inaccessible interface and actual monitoring with the physical world can be done easily by mote of the network. The wireless sensor networks differ from general data networks, because WSN are application oriented, planned and deployed for dedicated purpose. The wireless sensor network provides extensive range of the applications such as in green monitoring, defense, health, etc.. The liveness in plan, enhanced mobility, consistency, broadcast range, reduced power, cost-effective etc are the good features of these network. Additionally, the system uses the ZigBee technology for wireless communication. This technology is most trustworthy and apposite for interior and outdoor applications. The ZigBee can be configured in star, mesh or peer to peer topology. A demanding subject in scheming WSNs is

inadequate power supply for sensor nodes in some application. This IOT module is proposed to protect the people from unnecessary deaths caused by road accidents due to drunken driving.

## II. LITERATURE SURVEY

**A Fuzzy Based Method for Driver Drowsiness Detection:** This paper describes a novel approach for an intelligent driver drowsiness detection system using visual behavior of the driver. The estimation of driver's vigilance is successfully made by combining facial and eye symptoms using fuzzy logic controller. Experimental result using fuzzy-logic simulation in Matlab show the performance of the developed approach in term of robustness and reliability.

**Detecting Driver Drowsiness Using Wireless Wearables:** The National Highway Traffic Safety Administration data show that drowsy driving causes more than 100,000 crashes a year. In order to prevent these devastating accidents, it is necessary to build a reliable driver drowsiness detection system which could alert the driver before a mishap happens. In the literature, the drowsiness of a driver can be measured by vehicle-based, behavior-based, and physiology-based approaches. Comparing with the vehicle-based and behavior-based measurements, the physiological measurement of drowsiness is more accurate.

**Driver Drowsiness Detection Based on Time Series Analysis of Steering Wheel Angular Velocity:** A novel driver drowsiness detection method based on time series analysis of the steering wheel angular velocity is proposed in this paper. Firstly, the steering behavior under the fatigue state is analyzed, followed by the determination of the temporal detection window, and then, the data series of the steering wheel angular velocity in the temporal detection window is selected as the detection feature.

**A review on driver drowsiness based on image, bio-signal, and driver behavior:** The ratio of accidents caused by drowsiness, increases slightly year by year. The most victims of this case are young adult and mostly happens in developed country. Therefore, to reduce the number of accidents caused by drowsiness, researchers around the world develop some methods for detecting drowsiness on driver's face automatically. They propose various features such as visual, non-visual, and vehicular. Visual features are extracted from driver's face and recorded by camera.

## III. PROPOSED SYSTEM

The whole system is built upon OpenCV image processing library and QT as editor. The primary focus is given to the faster drowsiness detection and processing of data. The system is used to detect the eyes whether they are closed or open in real-time through the logitech camera, where drivers are not connected to any external devices and also malfunctioning is highly impossible. A method for detecting driver drowsiness/sleepiness is developed on Arduino microcontroller board. The readings taken from different sensors used in this project it has an MQ-3 alcohol gas sensor to detect alcohol, if consumed by the driver and relay circuit to stop him from performing the drive if alcohol consumed. The alarm will be activated when the driver has consumed alcohol or driver head nods frequently. when driver eyes get closed.

A Haar Classifier is a machine learning approach for visual object detection originally developed by Viola & Jones. It was originally intended for facial landmark and shape predicting but can be used for any object. In the proposed concept, the driver face is continuously recorded using a camera, to detect the hypo-vigilance level. Then the closed eye gesture was detected for drowsy detection. The eye blink frequency exceeding the normal rate is the fatigued state. The micro sleep that lasts for 3 to 4 seconds are the good indicator of the fatigued state. This closed eye gesture was implemented using Open CV. It will alert the driver about his/her fatigue using a buzzer.

For tracking the location of the drunk driver for remote communication, satellite based GPS (global positioning system) receiver module, with antenna is used. GPS module used in the system uses civilian GPS signal to provide location accuracy of 30-50 m within 5 minutes or less, the initial time required to lock the satellite in a moving vehicle [49]. The purpose of the active tracker is to get the real-time location information of vehicle with drunk driver.

This work proposes a system to detect hand-held cell phone usage during the act of driving.

The system uses ring indicator for detecting this activity. The system's output could be a warning that can regain the driver's attention exclusively to the vehicle and the road or a warning for a transport company or enable a buzzer. We are using the alcohol sensors to sense the consumption of the alcohol upto the preset percentage. If the driver's alcohol consumption exceeds the limit, the buzzer turns on to warn the driver and ignition will not turn on.

This project involves measure and control of the eye blink using IR sensor. The IR transmitter was used to transmit the infrared rays in the eye. The IR receiver was used to receive the reflected infrared rays of eye. If the eyes were closed, it means that the output of IR receiver is high otherwise the IR receiver output is low. This is to know whether the eyes are in closing or opening position. This output is given to a logic circuit to indicate the alarm.



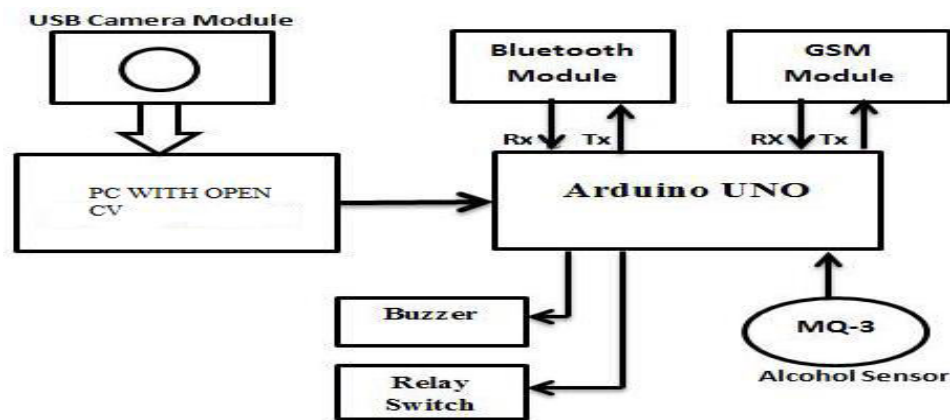


Figure1: System Architecture

#### IV. METHODOLOGY

There are two types of anti-sleep alarms. The First type of alarm is built right into the car and uses sensors, cameras and other high-tech tricks to discern a driver's fatigue and correct the problem accordingly. The second type fits over the driver's ear and sounds an alert when the driver starts to fall asleep. In this section results are obtained using software and hardware platforms to achieving the objective of driver drowsiness detection and alcoholic intoxication.

Besides eye and head movements, another visual cue that can potentially capture one's level of drowsiness is his/her eyes and faces detection analysis. Making a real time application with computer vision is very effective and efficient challenging task that needs processing powerful system. OpenCV is open source software, which is used for creating computer vision. OpenCV is available in C, C++, and Python and Java programming languages extension.

Raspberry controller small sized ARM 11 open source controller with the GPU provides up to 1.5Gpixels of graphics processing and processing 700 MHz. It can be over clocked maximum 1500MHz. PC with OPEN CV can work with Raspbian operating system, which is a light weight Linux. Raspbian OS is loaded with programming software and OpenCV. It supports interfacing of various low level and high level peripherals including USB camera and GPIO's.

In case of driver is in sleepy or finding fatigue, the message will be sent by using GSM and buzzer will be turned on till the GSM positive message from car owner. Haar Feature based Cascade Classifier technique, it is a machine learning based approach where a cascade function is trained from a lot of positive and negative images, and this positive image is used for detecting face region and eye region the update of region of interest ROI. Open CV is packed with a trainer as well as detector. The open CV is used for creating user defined object classifier. The object classifier that has been created is stored in.xml file extension classifier can be used in the later stages of programming. Also in this paper we use canny operator edge detection for recognize exact coordinate of eyes region. On the other hand of the system arduino is used for detection of the alcohol consumption by the person, alcohol gas sensor or breathalyzer MQ-3 is interfaced.

Arduino will detect samples of the person who is driving drunk or not. Based on the output from arduino, an alarm will be turned on and the car's ignition power source can be cut down through a relay to stop the car or preventing the driver to start the car. If driver is in over limit drunk then the message will be sent by using GSM and buzzer will be turned on till the GSM positive message from car owner.

#### V. RESULT AND DISCUSSION

When the driver's eyes are closed for 10 seconds or longer, the suggested drowsiness detection system determines their tiredness. The detection technology can tell the difference between a normal eye blink and being sleepy. The technology may be readily installed in any car and is not invasive. For 30 frames in a row, the driver's eyes were kept closed. Despite the driver wearing glasses, the technology is still able to identify tiredness. The wide eyes are noticed under typical driving circumstances. When the eyelids have been closed for 30 consecutive frames, as seen in Fig 2 drowsiness can be shown.

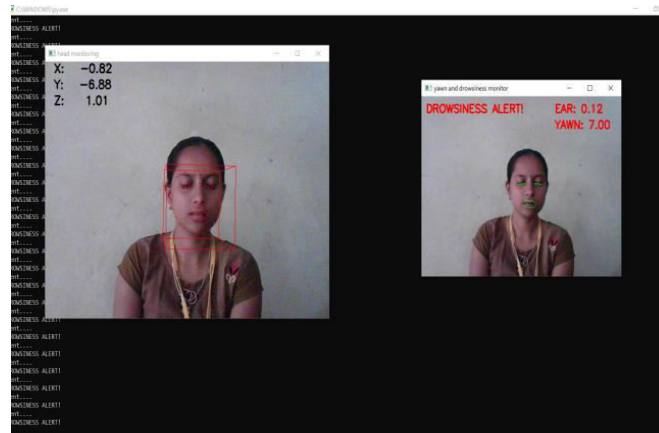


Fig 2:Drowsiness Detection

## VI. CONCLUSION

A driver alertness detection system was proposed based on fatigue detection in real-time. The proposed method easily detects the eye blink and the drowsiness. Information about the eyes position was obtained through image processing algorithms. Image processing offers a noninvasive approach to detect drowsiness without any annoyance and interference. An algorithm for performing face recognition was used. It was found that with this algorithm, a good measurement of the blink rate was obtained. The proposed algorithm was able to detect the eyes at medium and high illumination and independent of gender and age, but for optimal detection the camera had to be positioned as front as possible. In order to prevent the effects of poor detection due to insufficient light, night vision camera was implemented so that better results, unaffected by lack of brightness, will be obtained. Safe driving will be ensured by indicating the driver using a buzzer indicator.

This paper provides much advanced facility in now a day's life as it can easily have implemented in vehicles with multi stage testing such a way that we can avoid accidents caused by Drunken driving. Thus, by this we can reduce the alcohol related road accidents and hence these kind of detectors has great importance in the future which we are going to implement with IOT. Through this project we present hardware programming of IOT device to facilitate as alcohol detector and preventive device. This work proposed a system to detect hand-held cell phone usage during the act of driving. The system uses ring indicator for detecting this activity. The system's output could be a warning that can regain the driver's attention exclusively to the vehicle and the road or a warning for a transport company or enable a buzzer. We are using the alcohol sensors to sense the consumption of the alcohol upto the preset percentage.

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