

# FACIAL LANDMARKS & DROWSINESS DETECTION SYSTEM USING OPEN COMPUTER VISION

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**ABSRTACT:** On road, accidents are playing a terrific role in many lives. The accidents are due to drowsiness, drunken condition, not wearing a seat belt, red light jumping, etc. Out of this drowsiness is contributing more than 40% of reported accidents and remaining are due to drunken state of the driver, or not wearing a seat belt. The main features of our project are

- 1. Drowsiness detection
- 2. Alcohol detection
- 3. Seat belt indicator

By using this system we can prevent the accidents and prevent safety on roads.

**KEY WORDS:** Driver, Drowsiness, Alcohol detection, Seat belt indicator, Buzzer, Vibrator motor, Ignition control.

# **1. INTRODUCTION:**

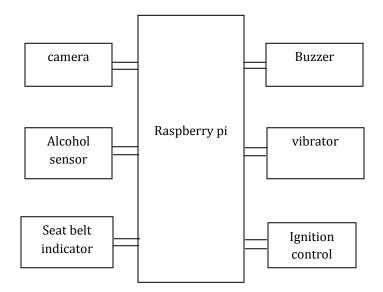
Accident is an unexpected event, typically sudden in nature and associated with injury, loss or harm. Drowsy driving has become a leading cause of car accidents, largely because few people are getting the recommended amount of sleep. Missing even a few hours of sleep per night could significantly increase the chances a drowsy driving collision will occur.

# 2. MAIN CONCEPT:

The main theme of our project is used to detect the driver's drowsiness, alcohol detection and seat belt indication using Raspberry Pi zero.

# **3. PROPOSED SYSTEM:**

#### **3.1. BLOCK DIAGRAM:**



## **3.2. RASPBERRY PI ZERO:**

Raspberry pi zero is the pi, but at a largely reduced size of only 65mm long by 30mm wide and at a very economical price with the addition of wireless LAN and Bluetooth. The pi zero has been designed to be as flexible and compact as possible with mini connectors and an unpopulated 40-pin GPIO. The heart of raspberry pi zero is a 1GHz BCM2835 single core processor, with 512MB RAM. Each case has a standard base featuring a cut-out to allow access to the GPIO, and a choice of three lids: a standard lid, a GPIO lid and a camera lid.

#### **3.3. RASPBERRY PI CAMERA:**

The use of raspberry pi camera is used to detect the eyes of the driver. Raspberry pi camera is inserted into raspberry pi by using ribbon cable. The cable slots into connectors situated between Ethernet and HDMI ports.



#### **3.4. DROWSINESS DETECTION:**

Based on the face and eye detection we use various computer vision techniques. This describes to determine if the eyes are open or closed. In this we use raspberry pi camera to detect drivers eyes. The camera captures the video and then divides into consecutive frames, it then checks for every five frames. If the eyes are closed for a certain period of time then the system draws the conclusion that the driver is falling asleep and issues a warning signal.

#### **3.5. ALCOHOL SENSOR:**

The alcohol sensor which we use here is MQ-3 sensor which is also called as groove gas sensor. The groove gas sensor module is useful for gas leakage detection. It is suitable for detecting alcohol gas. This is used to detect whether the driver is in drunken condition or not, if suppose the driver is in drunken condition then the ignition will be turned OFF.

#### **3.6. SEAT BELT INDICATOR:**

Seat belt is an effective safety tool that not only saves life but also significantly reduces the severity of injury. The seat belt indicator indicates to wear a seat belt. If the driver doesn't wear the seat belt then the ignition will be turned OFF. Failure to use the seat belt is a major risk factor for road traffic deaths and injuries.

#### **3.7. BUZZER:**

A buzzer or deeper is an audio signaling device, which may be mechanical or electro mechanical. The use of buzzer is used to issue warning signal.

#### **3.8. VIBRATOR:**

Vibrators are one of the device which wakens up driver from the drowsiness state. These vibrators are fixed up to the steering, if the driver is in sleep the system issues a buzzer signal and similarly produces vibrations to the body from the vibrators which are fixed to the steering.

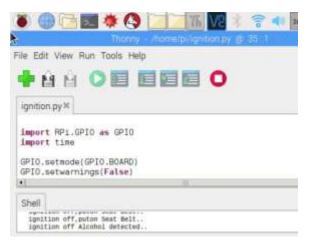
#### **3.9. IGNITION CONTROL:**

It is used to generate a very high voltage from the battery, and to send this to each spark plug inturn, igniting the fuel air mixture in the combustion chambers, if the driver is in drunken condition and the driver doesn't wear the seat belt then automatically turns off the ignition.

#### 4. WORKING:

First when the driver gets into the car it checks for two conditions whether the driver is in drunken state and the driver had put the seat belt or not. If either of the conditions proved to be wrong the ignition will gets turned off. Next the camera play its role. By using VNC viewer we first go to the home page of viewer and run the commands which are used to detect the eye regions of the driver. First it checks for the face region of the driver. If the face is found then it goes for the eye detection process. If the detection of eye is success then it extracts the regions of eye by using eye aspect ratio (EAR). The camera starts capturing the video and the video is divide into frames and checks for every 5 consecutive image frames. The images which are captured are dumped into SD card which is inserted into the raspberry pi board. The images dumped into SD card by using WIN-32 software. Then the system determines whether the eyes are open or closed. If the eyes are closed for a certain period of time then the system draws the conclusion that the driver is drowsy and issues a beep signals from the buzzer and similarly produces vibrations to the body from the vibrator motor which is fixed to the steering.

## 5. RESULT:



Detection of alcohol and the driver doesn't wear the seat belt, so ignition turned off



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Driver eyes are in the open state (EAR=0.305)



Eyes are fully closed (EAR=0.094)

## 6. CONCLUSION:

Our project successfully concludes that the drowsiness detection and alert system is a step forward to avoid road accidents in future. So by using this system death and accidents rates can be reduced due to drowsiness detection or alcohol consumption or a seat belt indication.

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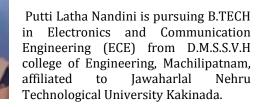
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