

# DROWSINESS DETECTOR USING RASPBERRY PI

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**Abstract** - This paper gives a better approach for real time detection of drowsiness, alcohol and temperature detection as every year there are an increase in the number of accidents due to many reasons and among those drowsiness & alcohol consumption plays a main role in accidents. So, while driving when people are drowsy or if a driver has consumed alcohol may even lose their mental stability for deciding what to do when these situations occur & also it can lead to losses of the driver physically and also financially for the driver and also for the passenger. So, to bring the alertness of drivers, in this paper we use adaptive technology which would help in prevention of accidents along with drunk detection using alcohol sensors. So, this project is based on Real time.

**Key Words:** Raspberry Pi Drowsiness Detection

## 1.INTRODUCTION

In current situations in the world, accidents are a serious issue and the scale of accidents is increasing every year rapidly. So, this issue is mainly occurring due to driver drowsiness and there is also a scenario when a driver consumes alcohol there are chances of accidents. So, to reduce this kind of issue we have to find new different kinds of technologies. Different kind of technologies are can be used for detecting the driver drowsiness and as first major point is that can measure the consumption of alcohol and second major point is by continuously monitored by blinking of eyes and we can even detect by head posture and also if any actions like yawning and third major point is that by the temperature sensor.so there are three major factors and there are reasons behind the fatigue they are listed as sleepless nights , due to lack of fitness , over time duties etc.

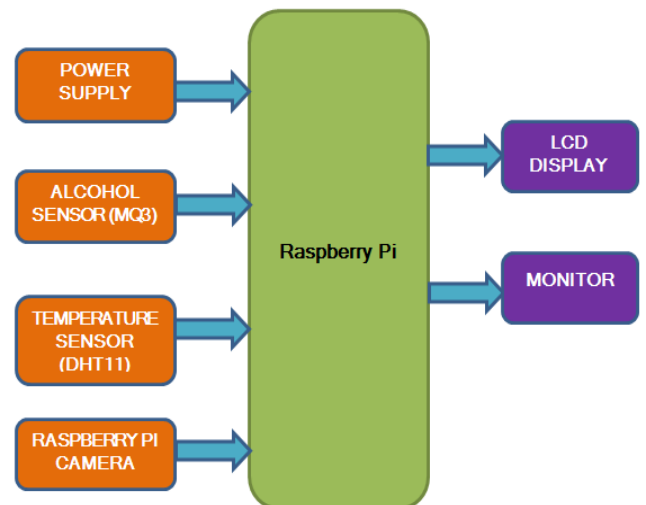
So as per human psychology there are some common points to be followed such as humans work for at least eight hours per day and need to take some rest at night. So, for example a cab driver works during the day and also continuously works late without any rest, so this may lead to lack of sleep so this may make an effect on driver's health so this kind of issues may lead to fatigue. So, if the driver doesn't take rest and travels in the car then the driver may feel drowsy and also it depends on the driver fitness like for example if the driver is under some medications may lead to different kinds of effects on his health and even this can be a major point for drowsiness. The body has side effects due to such activities. adrenalin secretion controls Sympathetic activities and acetylcholine controls parasympathetic activities. Whenever

the driver suffers from fatigue in that situation, acetylcholine will be maximum and by this a part of the eyes such as iris and pupil get enlarged.

## 2. PROPOSED SYSTEM

This project is used to detect drowsiness of the driver in real time. System is designed using embedded and computer vision. Behavioral based approaches are used were eye closing, blinking frequency closing rate, pupil and iris edge detection. Haar cascade feature and Hough transform of digital image processing are used to obtain the eye object details processing further. On the other hand, we have also added an alcohol sensor to measure BAC (Blood Alcohol Content). Image processing uses a Raspberry Pi

**Image -1:** Block Diagram of Proposed System



### A. Raspberry Pi

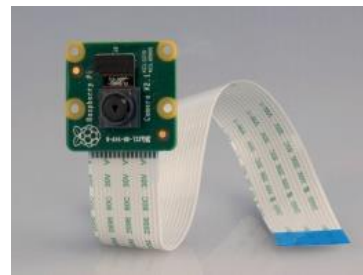
Raspberry Pi is a compact computer board that was developed in the United Kingdom in association with Broadcom in the year 2012. Raspberry Pi is a small IC computer kind of board which communicates with the external device to provide a desired output. Raspberry Pi is nowadays used in many scientific and engineering fields to build mini and major projects. One of the main reasons to use Raspberry Pi in our project is because of the compact size and cost. It is also used to dump minor and major codes which can be used in different odd projects. Raspberry Pi is more or less like modern equipment in which an operating system can be loaded. The version of Raspberry Pi operating system used in our project is Raspbian Buster. These boards are used in

many applications in the field of robotics, automation etc. The requirement to use Raspberry Pi is

- Memory card
- Power supply
- Display screen
- HDMI Cable



**Image -2:** Raspberry Board



### B. Face Detection

Face detection it is a modern technology where it can be used in any type of field's which detects faces of human in the type of digital image and this algorithm works on the basis of detection of frontal human faces. Mainly in this project it detects the eye regions eye blinking rate and eye closing duration is measured to detect driver drowsiness. Because when driver is sleepy his eye lids are different from before scenarios. So, in this system the position of the iris and eye states will be monitoring in real time based on its before scenarios. We do not need to pay attention to where the faces are located in the images its only concern is about their position in the given images. Face detection and eye detection is done using camera.

### C. Eye Detection

The eye detection we use in our project is using Haar cascade using OpenCV. There will be a camera installed in front of the driver capturing Image / Video. These images / videos will be converted into numerous frames. In OpenCV there will be a Haar-face-classifier loaded. These frames will be compared with the predefined features available in the Haar-face-classifier. When these features match, the face is detected and is displayed in the form of a rectangular frame around the face. Comparing this with the OpenCV eye-Haar classifier, eyes are exposed and squares are sketched around both the eyes.

### D. Alcohol Detection

Alcohol is detected using an alcohol sensor by calculating the alcohol content in the blood (Blood Alcohol Content (BAC)). Here we use an Alcohol Gas sensor (MQ3) as more cost effective and can detect alcohol between 0.05 mg/L - 10 mg/L. Material used is SnO<sub>2</sub>, as the conductivity is low in pure atmosphere. Conductivity rises as the alcohol increases. This sensor is sensitive to alcohol and highly resistive to the interference due to exhaust, mist and gasoline. Output is both analog / digital and can be connected with Microcontroller, Arduino and Raspberry Pi etc. This Alcohol sensor is similar to the breath analyzer as it exposes the alcohol content in breath much faster. The output is analog based on alcohol content. The circuit is simple as it needs one resistor. The plain interface can be 0-3.3V ADC.



**Fig:** MQ-2 Sensor

### E. Temperature Sensor

Temperature Sensor (LM35) is a precision IC sensor. Its output differs based on the temperature around it. It is compact, cheaper and can be used to measure temperature between -55 to 150 degrees Celsius and there will be a rise of 0.01V (10mV) for every degree Celsius in temperature. It senses temperature changes every 1 degree Celsius the temperature is converted to electrical voltage by an IC circuit, where the change in temperature is proportional to the change in the output voltage. The LM35 can be mounted with the adhesive however there will be a variation due to surroundings.



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