

# DRIVER DROWSINESS DETECTION IN FACIAL IMAGES AND HEART ATTACK MONITORING SYSTEM BASED ON ECG SIGNAL

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## ABSTRACT:

*Driver drowsiness detection is a key technology that can prevent fatal car accidents caused by drowsy driving. Drowsiness or fatigue is a major cause of road accidents and has significant implications for road safety. Several deadly accidents can be prevented if the drowsy drivers are warned in time. A variety of drowsiness detection methods exist that monitor the drivers' drowsiness state while driving and alarm the drivers if they are not concentrating on driving. The relevant features can be extracted from facial expressions such as eye closure, and head movements for inferring the level of drowsiness. The biological condition of the drivers' body, as well as vehicle behavior, is analyzed for driver drowsiness detection.*

*In this paper we have proposed to detect driver is drowsiness and its heartbeat is working properly or not.*

## INTRODUCTION:

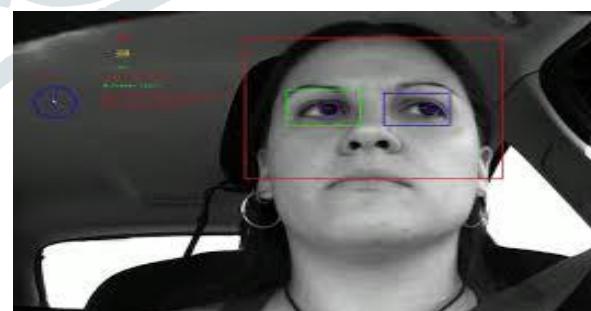
Rise in fatalities due to road accidents is increasing rapidly in India each year. There are a number of factors that have contributed to the rise in road accident related injuries and fatalities in the past few years with nearly half a million injuries being reported in 2016 across the country [1]. In developing countries like India, the absence of a centralized accident reporting and rescue system is a contributing factor towards a high percentage of accidents resulting in fatalities. Based on a recent report, 55 accidents occur in Indian roads every hour and out of those 17 people die [2]. In 2016, 480652 road accidents occurred in India where 494624 people got injured and out of those 150785 (30.48%) couldn't survive [3].

Driver Drowsiness is one of the leading causes of road accidents. It affects the mental vigilance of the driver and reduces his personal capacity to drive a vehicle in full safety. Drowsiness is the intermediate state between alert and wake fullness and sleep, to be distinguished from fatigue. It is a

fluctuating state of reduced awareness that is believed to be a major

Factor in about 20% of road crashes. Accidents related to drowsiness, during the survey, often occur on the motorways, but also on the main roads, even inside the localities. They occur in the daytime as well as at night. A vehicle, whose driver falls asleep, may go without being braked, skid or lose track. For these reasons our work is to be considered. Some research; estimate that somnolence plays an important role with regard to accidents on the road each year. Example of driver drowsiness drivers, who are in a normal state and they are put in dangers, unexpected situations and urgencies.

Driver assistance system development have been required to prevent the accidents due to driver drowsiness, because all the time he cannot control the vehicles some risks may happen due to driver's tiredness, or inattention. This system helps to bring the attention of a driver.



To develop an embedded system that detects driver drowsiness level and warns him or her of his or her state. This study aims at collecting the drowsiness symptoms from the driver's face through analysis of the driver's eye state. This will be achieved through processing video images obtained through a sensing technology. The outcome of the video will be used to determine the drowsiness levels and then provide a warning to the driver if he or she is drowsy. The objectives of this project are to develop a drowsiness detection system that

can prevent accidents and improve safety on the roads. This system able accurately monitors the open or closed state of the driver's eye.

### PROPOSED METHOD:

The development of a drowsiness detection system that yields reliable and accurate results is a challenging task as it requires accurate and robust algorithms.

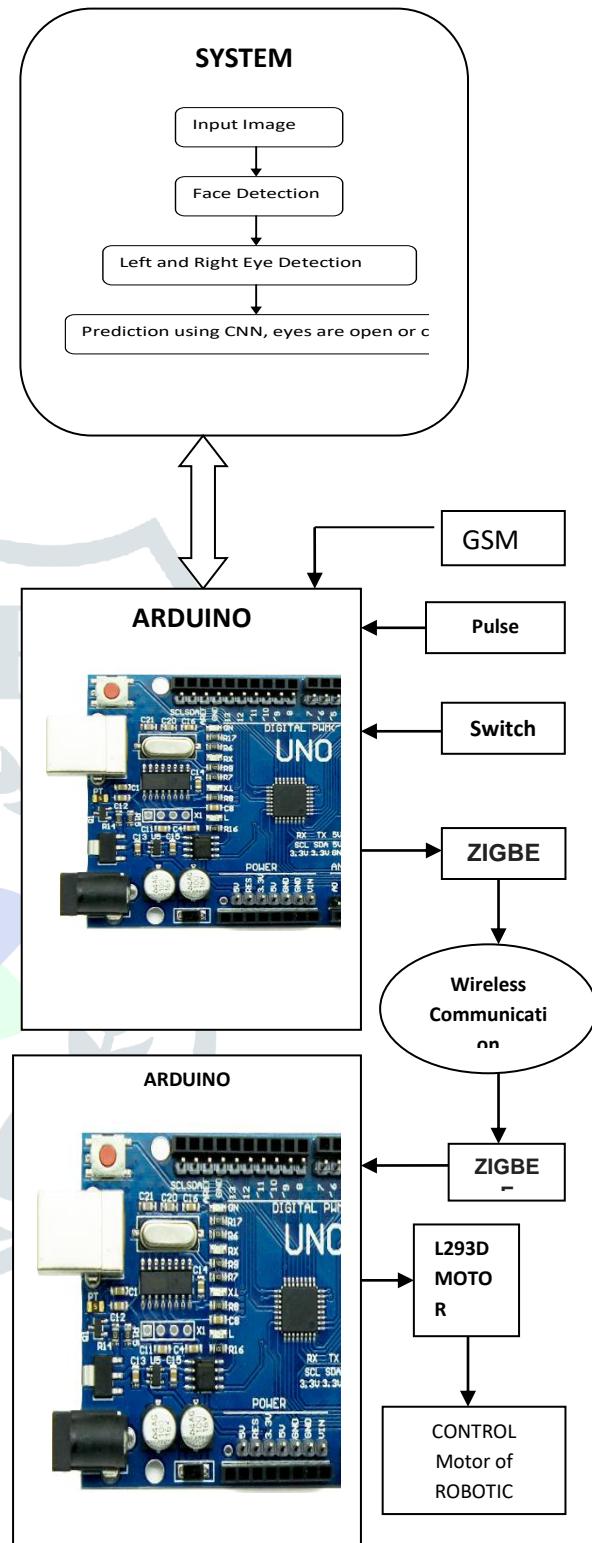
Due to variation of shape, size and color of face it is difficult to make face detection method and further eye detection in face image. To overcome this we have used harr feature based face and eye detection method.

As the microcontroller cost are higher so project cost will also increase. For making this project cost effective we have used arduino as connector between main system and ECG sensor.

From System It will continuously monitor the driver eye if both eye are closed for more than 18 iteration then buzzer sound will come and simultaneously car will turn left and park automatically by itself.

If person eye is closed for more than 18 iteration then it will send signal to arduino attached to system then in arduino it will check for push switch is on or not if on then check for human pulse then it will sent the signal to receiving arduino using zigbee and for controlling for robotic motor for stop it or keep moving.

### System



### Arduino UNO:

Here Arduino is connected with multiple sensor and it will keep on collecting data from different sensor and send the data through zigbee to Raspberry Pi.



The Arduino UNO is ATmega328 based microcontroller board. It is one of the most popular prototyping boards. The board comes with built-in arduino boot loader. It has 14 GPIO pins, 6 PWM pins, 6 Analog inputs and on board UART, SPI and TWI interfaces, an on-board resonator, a reset button, and holes for mounting pin headers. While programming the board, it can be connected to the PC using USB port and the board can run on USB power. The Arduino UNO has 32 Kb Flash memory, 1 Kb EEPROM and 2 Kb SRAM. The board can be connected to different Arduino Shields for connectivity with Ethernet, Bluetooth, Wi-Fi, Zigbee or Cellular network and it can be connected to most of the IoT platforms.

### Zigbee:



Zigbee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs, designed for small scale projects which need wireless connection. Hence, Zigbee is a low-power, low data rate, and close proximity wireless ad hoc network.

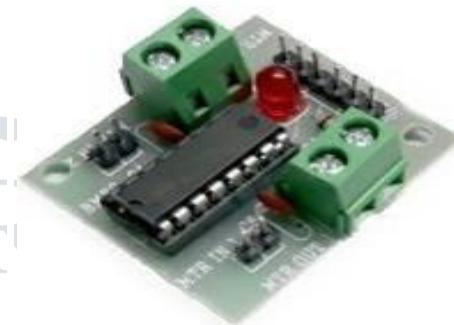
### Heartbeat Sensor:

Heartbeat Sensor is an electronic device that is used to measure the heart rate i.e. speed of the heartbeat. Monitoring body temperature, heart rate and blood pressure are the basic things that we do in order to keep us healthy.



Pulse Sensor

### L293D motor driver:



A motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver act as an interface between Arduino and the motors.

### Motor



The main principle in controlling a DC Motor with arduino uno lies with the Motor Driver. A Motor Driver is a special circuit or IC that provides the necessary power (or rather the current) to the motor for smooth and safe operation.

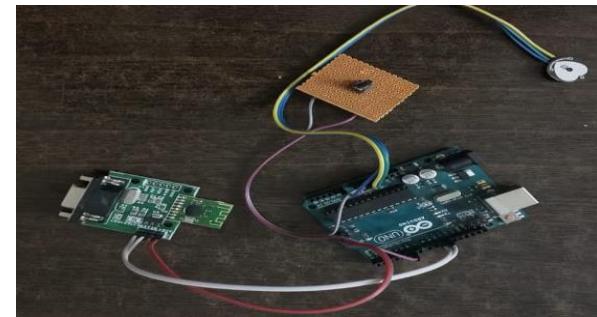
The aim of this project is to safely connect a motor to the arduino uno and control it i.e. make it rotate control.

Even a small 5V DC Motor draws a high initial current of around 300 – 400 mA. This current will then fall down 150 – 200 mA as the motor gains speed to around.

**Sender****GSM MODULE**

**GSM** stands for Global System for Mobile Communications and is the network standard for much of the world. ... While T-Mobile and AT&T are both **GSM** carriers and share the same EDGE radio frequency, they use different 3G frequencies, and most devices released in the United States can **only** connect to one or the other.

It is a mobile communication **modem**; it stands for global system for mobile communication (**GSM**). ... A **GSM** digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot.

**Arduino UNO with Zebee and pulse sensor****Receiver****Robot vehicle model controlled by main module**

The result shows the proper working of our proposed method, and it can be used for avoiding vehicle accident due to driver drowsiness. If driver is drowsing for some interval of time then system will produce alarming sound and our proposed robotic vehicle will turn left and stop until driver are awake again. In meanwhile pulse sensor will keep on monitoring driver heartbeat.

**CONCLUSION:**

This paper has discussed a system for assisting driver which is very effective for preventing major accidents caused due to driver drowsiness. Algorithms related to image processing have been used to identify the state of driver. A buzzer is used to alert the driver if he/she is drowsy. With reference to the centre of gravity the position of driver's head is determined and accordingly the current state of driver is identified. A camera of appropriate resolution is used to sense the movement of eyes. If a driver's eye is closing more frequently then also an alarm is generated. Plus sensor will monitor the plus of human.

**RESULT:****Drowsiness detection:****Open Eye and Closed Eye**

Our proposed model can be used for automatic parking of vehicle if driver is drowsing such that road accident can be prevented.

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