

# PROVIDING MORE SEAFY WITH DRIVER MONITORING SYSTEM AND SMART VEHICLE

Rohan Pawar<sup>1</sup>, Prasad Pawar<sup>2</sup>, Chaitanya Chavan<sup>3</sup>, Ms. Sweety G Mahajan<sup>4</sup>

<sup>1,2,3,4</sup> Department of Information Technology, SVIT college (Nashik), Maharashtra, India

## ABSTRACT

Nowadays the driver safety or vehicle safety is one of the most wanted systems to avoid accidents and be safe in our day-to-day life. So objective of this project is to provide the mechanism and ensure the safety of driver as well as the passengers in that vehicle. In this Project we are building a system for advance safety mechanism which protects the driver as well as passengers of that vehicle by driver monitoring and also road monitoring using the face recognition and object recognition and give indications and alerts as per the scenario to the driver for a safe and secure travel. As per the title we also provide a system which can convert a simple car or vehicle into a smart vehicle by deferent indications and features like parking sensors, tyre pressure sensor, fuel level sensor, speed sensor, door open alert and much more in very cheap cost as compare to the smart cars which are really very expensive. The result of this project we ensure the safe travel in our own vehicle with some additional smart features which gives fast and exact information and suggestions to driver to make the travel more e client and also save time and money.

**Keyword:** Android Application, Arduino, Driver Monitoring, Face Recognizing Object Recognizing, Security, Smart Vehicle, Speed Sensor Detection

## 1.INTRODUCTION

### 1.1 Problem Definition:

To be safe, a driver must pay attention and exercise sound judgment. However, when the driver is stressed, fatigued, or drowsy, these abilities get degraded. Stress degrades driving performance and increases the likelihood of trac accidents.

### 1.2 Proposed Solution:

Our system is portable and can be implemented on any vehicle it has more features of the smart vehicles which make our existing car or vehicle a smart vehicle by using the reverse parking sensors with camera, the front facing camera for the road signs detection and give the alerts depending on the survey also it has tyre pressure sensors, fuel level sensors, door open alert, anti-theft functions etc. combine these features we build a single system which overcomes the accidents and save the life of the driver as well as the passengers. We also have an android app which gives us all the details of our smart vehicle and the details of the sensors in a single place.

#### 1.2.1 Portable Device:

Our system is based on a portable device which is compatible and easily adoptable to all the vehicle. The vehicles which are old and has no advance functions can be converted into the smart vehicles with the features we proposed in our system. Not only the old cars and vehicles but also the new cars and vehicles can use our system to make their existing vehicles smart.

### 1.2.2 Android App:

The android app gives us all the information about the vehicles status like tyre pressure, car temperature and other information in a single place. There is no need to open the car and check the information of vehicle it shows all on the android app.

### 1.2.3 Two Camera Setup:

The two cameras work separately but act as a one system if any problem occurs in any one of the camera view the system alerts and in very critical conditions the vehicle will stop in some time. The first camera is for the driver drowsiness detection and another is for the road sign and object detection which helps the driver from both the side.

### 1.3 Objective:

1. Accident Prevention.
2. Driver Safety
3. Notify with alert about the every problem or fatigue.
4. Smart vehicle assistance with smart features.
5. Convert our own normal car to smart car in cheap cost.
6. Help the driver to fully focus on the road.

### 1.4 Need of System:

In our day to day life we see the accidents are happening by the silly mistakes done by the driver or by the distraction of focus from road as the Indian Federation of Road Safety (IFROS) reported that approximately 100 000 crashes occur per year and 374 per day in India owing to drowsy driving. So we proposed a system named as Driver Monitoring System and Smart Vehicle which gives us the facility of read the drivers drowsiness, fatigue and the road signs along with the smart vehicle features assist the driver to prevent the accident and help driver to drive safely and easily.

### 1.5 System Architecture:

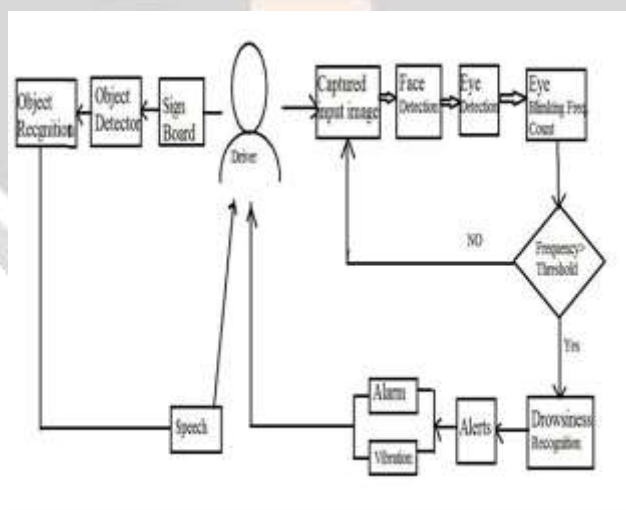


Figure 1.1: System Architecture

## 2 IMPLEMENTATION:

### 2.1 Algorithm:

#### 2.1.1 Sensor Algorithm:

//Description: TO Sense changes in values of sensors.

//Input : Physical movements, liquid, air pressure.

//Output: Alert Dialog to User App and in vehicle dashboard monitor.

START

Step 1: Initialize Bluetooth connection with the hardware.

Step 2: Enter the correct User ID & Password.

Step 3: if (System.Connected == true)

```
{
  getService();
} else
```

```
{
  displayMessage(String errorMessage);
}
```

Step 4: Read the Value of Sensor.

Step 5: Send to system over the Bluetooth.

Step 6: if(Pressure < Threshold)

```
{
  AlertDialog(String Notification);
}
```

Step 7: To detect the values of sensors.

Step 8: Give Alert Notification to user App and system.

Step 9: To stop Alert, click the o button on the dashboard.

END

#### 2.1.2 Drivers Drowsiness Detection Algorithm

//Description: To Detect the Drivers Drowsiness.

//Input: Physical movements, Face movements, Eyes movements.

//Output: Alert Dialog to User's vehicle dashboard monitor.

START

Step 1: Initialize Camera and System.

Step 2: Detect the Drivers Face and eyes as well as road signs.

Step 3: if ((DriverDrowsiness == true) || (RoadSign==true))

{

giveAlert();

}else

{

displayCurrentVideoFootage();

}

Step 4: Give Alert Notification On user system.

Step 5: To stop Alert, click the o button on the dashboard.

END

### 2.1.3 Mathematical Model

$I = \{ i1, i2 \}$

Where,

$I$  = Set of Input.

$i1$  = Gas Pressure.

$i2$  = Camera Footage.

$F = \{ f1, f2, f3, f4, f5, f6 \}$

Where,

$F$  = Function for processing

$f1$  = Authentication/Registration

$f2$  = BLUETOOTH Connection

$f3$  = Value of Sensor

$f4$  = Alert Notification.

$f5$  = Driver Drowsiness Detection.

$f6$  = Sign Board Detection.

$O = \{ o1, o2, o3 \}$

Where,

$O$  = output.

$o1$  = Sensor Alert Given.

$o2$  = Driver's Drowsiness Detected.

$o3$  = Road Sign Detected,

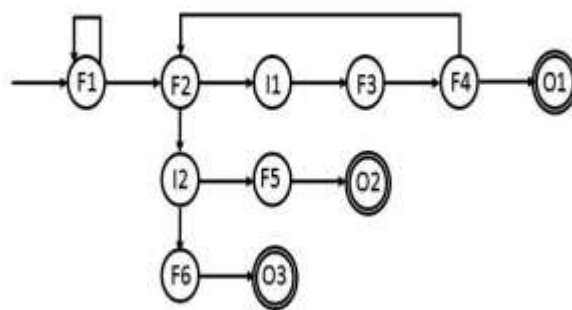


Figure 2.1: Mathematical Model

## 2.2 Binding Circuit:

### 2.2.1 IR Sensor Circuit layout

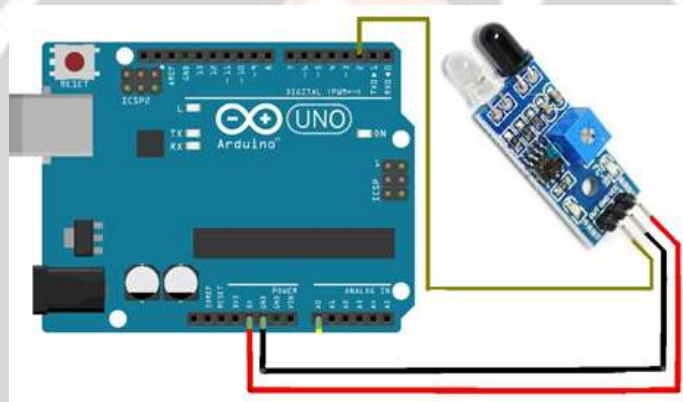


Figure 2.2: IR Circuit Diagram

### 2.2.2 DIP-6 Air Pressure Sensor Circuit Layout

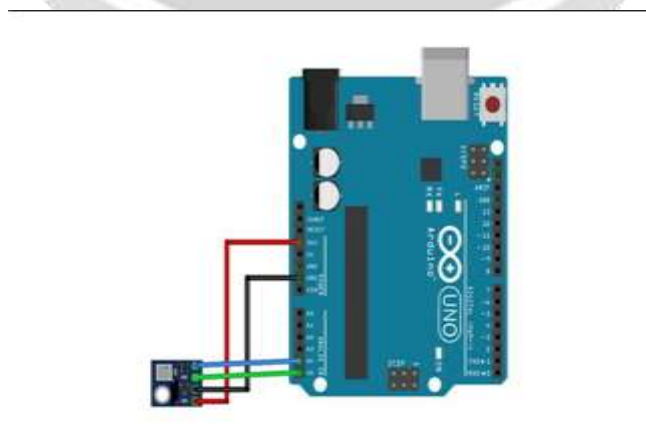


Figure2.3: DIP-6 sensor Circuit Diagram

### 2.2.3 Moisture Sensor Circuit Layout:

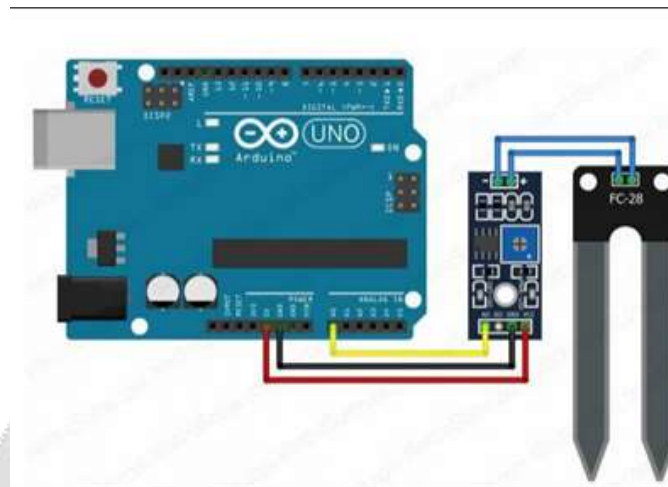


Figure 2.4: Moisture sensor Circuit

## 3. SNAPSHOTS :

### 3.1 Login Screen:

The Login form is used to logged in the system for authorized user and it has two attributes one is mobile number and password.

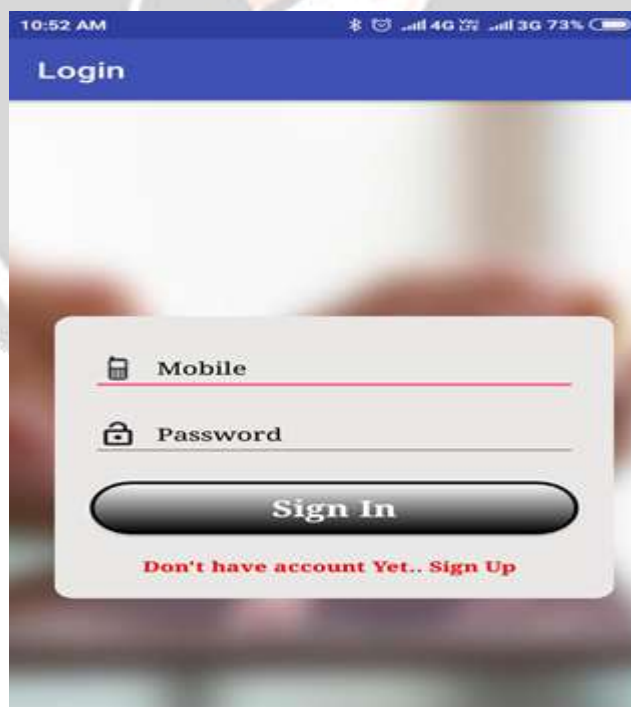
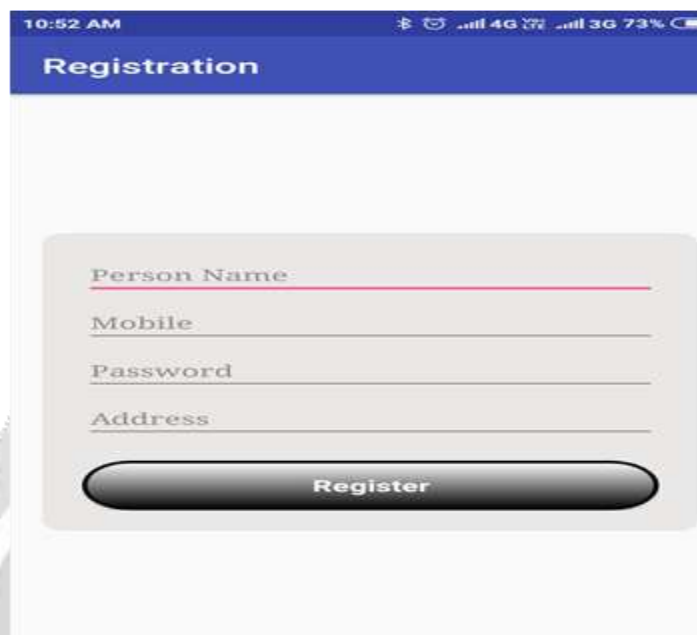


Figure 3.1: Login Screen

### 3.2 Registration Screen:

This is a part of login system where new user can create a new login ID with name, mobile number, address and a Password.



The image shows a mobile application registration screen. At the top, there is a blue header with the word "Registration" in white. Below the header, there is a light gray rounded rectangle containing four input fields: "Person Name", "Mobile", "Password", and "Address". Each field has a corresponding label above it. Below these fields is a black button with the word "Register" in white. The background of the screen is white, and there is a faint watermark of a lightbulb in the center.

Figure 3.2: Registration Screen

### 3.3 Connectivity Screen:

In this form the BLUETOOTH connection is get established between hardware device and our mobile Application



The image shows a mobile application connectivity screen. At the top, there is a blue header with the text "Select btSerial device from paired devices:". Below the header, there is a list of paired Bluetooth devices. Each device entry consists of the device name and its MAC address. The devices listed are: ARTIS BT111 (99:66:32:4B:4C:BC), OnePlus X (C0:EE:FB:70:D7:BC), WS-887 (88:58:56:24:D7:5E), LOGIN (00:1B:10:00:2A:EC), mini-X6 (FC:58:FA:7C:67:1F), DESKTOP-BJ2CS54 (94:39:E5:C8:10:AA), Anushka (D0:FB:8C:BF:E4:B0), HC-05 (20:18:07:13:5F:12), SONY (0C:84:DC:EB:45:BC), and ACTON (40:EF:4C:CD:B5:9D). At the bottom, there is a text prompt: "If no devices are listed please pair your device in Android settings".

Figure 3.3: Connectivity Screen



### 3.4 App Home Screen:

In this screen the various sensor values are displayed like Stress level sensor, Door indication, fuel level and tire air pressure value.



Figure 3.4: App Home Screen

### 3.5 System Home Screen:

This is the home screen of system where three operations are done like Sign and face Detection, Image Classification(Training) and Exit.

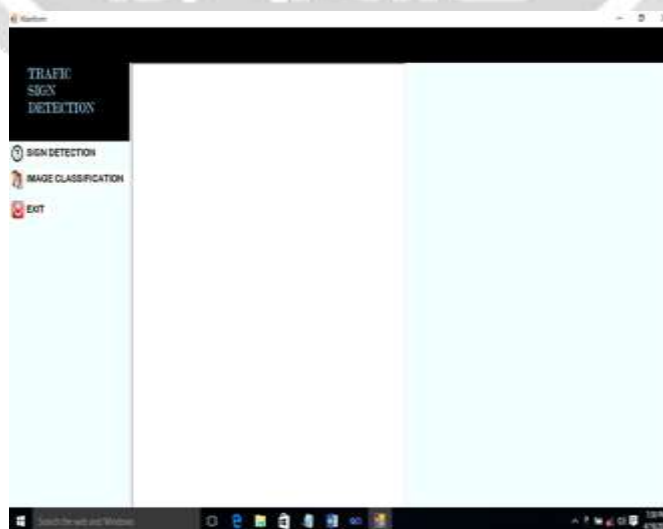


Figure 3.5: System Home Screen



### 3.6 Image Classification Screen(Training)

In this window we Train our system to identify new Road Signs



Figure 3.6: Image Classification Screen

### 3.7 Sign and Driver Detection Screen

In this window we detect the road signs as well as the drivers Drowsi-ness as shown in gure.

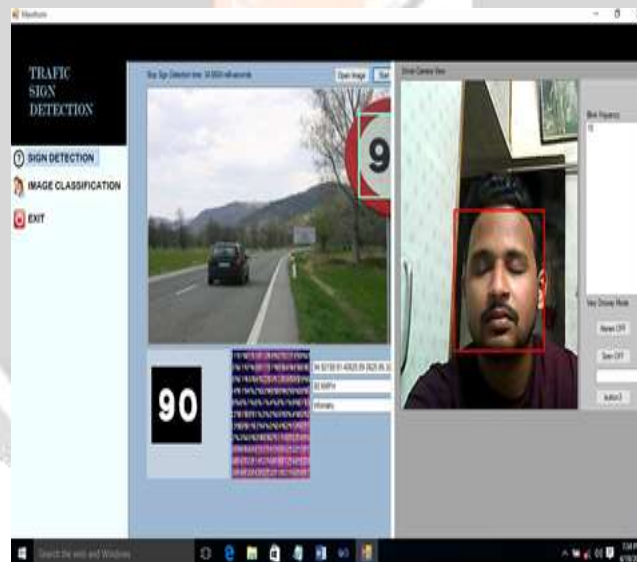


Figure 3.7 : Sign and Driver Detection Screen

## 4 . RESULT

As the research done by AAA Foundation for Traffic Safety majority of the driving accidents are done by the less sleep and the drowsiness in the driving so our system change and make the driver's sleeping habits more good and stay him awake during the driving so the accident occurs in very minor conditions like 0.2% or less as compare to previous conditions.



## 5 . CONCLUSIONS

The system gives constant and continuous operation, 24 hours a day. It depends on the vehicle's battery. This system can be used for any model of the car, there is no need to add special hardware to the vehicle except Camera. This system is multitasking that is at a time two tasks are performed by the system one is Drowsiness detection and other is road sign detection. Reduction in continuous human surveillance. As this is an automatic system so driver doesn't need to check whether system is on or off. All the functions like detection of drowsiness and activating alarm are automatic. Good for driver's safety. As this system is based on the eye blinking frequency so rate of error is negligible. It provides real-time drowsiness feedback to the driver, due to which the driver can save himself from the breaking the rules like, to break signal or to take wrong direction, etc.

It avoids the tendency to break the rules like sign breaking, because the speech signal is continuously bombarded on the driver by its signal. It saves the time of driver, because of sign board detection. Because of sign board detection assistance driver doesn't need to ask directions to the pedestrians.




## ACKNOWLEDGEMENT

We take this opportunity to express hearty thanks to all those who helped us in the completion of project "Driver Monitoring System and Smart Vehicle"

## REFERENCES

- [1] Wearable Device-Based System to Monitor a Drivers Stress, Fatigue, and Drowsiness: IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT, MARCH (2018)
- [2] Drowsiness detection using spectrum analysis of eye movement and effective stimuli to keep driver awake, DENSO Technical Review, vol. 12, pp. 113-118, (2006)
- [3] Head Pose and Eye State Monitoring (HEM) for Driver Drowsiness Detection, International Journal of Innovative Science, Engineering & Technology, Vol. 1 Issue 9, (2014)

**BIOGRAPHIES**

	Rohan S Pawar, Department of Information Technology, SVIT Collage, Nashik
	Prasad S Pawar, Department of Information Technology, SVIT Collage, Nashik
	Chainatya T Chavan, Department of Information Technology, SVIT Collage, Nashik.