

## **INTEGRATED DESIGN PROJECT (IDP II)**

### **USER MANUAL DOCUMENT GOLF – SECTION A**

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## Table of Contents

|                                      |    |
|--------------------------------------|----|
| TOOL DESCRIPTION.....                | 2  |
| 1.0 GENERAL INFORMATION.....         | 3  |
| 1.1 System Overview .....            | 3  |
| 1.2 Organization of the Manual ..... | 3  |
| 2.0 SYSTEM SUMMARY .....             | 4  |
| 2.1 System Configuration.....        | 4  |
| 2.2 User Access:.....                | 4  |
| 3.0 Using of the System .....        | 5  |
| 3.1 Car setup .....                  | 5  |
| 3.2 device setup.....                | 5  |
| 3.3 display setup .....              | 5  |
| 3.4 Start button .....               | 6  |
| 3.3 Navigation page.....             | 6  |
| 3.4 Show state page.....             | 7  |
| 3.5 current location page.....       | 7  |
| 3.6 Inattention detection:.....      | 8  |
| Talking detection .....              | 8  |
| Hand detection .....                 | 8  |
| 3.7 Drowsiness detection .....       | 9  |
| 4.0 Risk Management: .....           | 10 |

## TOOL DESCRIPTION



Sound Box

Display

Pi Camera

Raspberry Pi

## **1.0 GENERAL INFORMATION:**

General Information section explains in general terms the system and the purpose for which it is intended.

### **1.1 System Overview**

In recent years, driver inattention or distraction is one of the major causes for road accidents. The inattention and anger detection system should be designed in such a way that it triggers the alert system only when the driver is distracted beyond the acceptable limit. Every year, In Bangladesh, many car accidents due to driver fatigue and distraction occur around the world and cause many casualties and injuries. It occurs in Bangladesh primarily owing to the reckless driving of the drivers. Driver State Monitoring System (DSMS) is one of the main approaches for driver fatigue or distraction detection and accident prevention. Driver face monitoring systems capture the images from driver face and extract the symptoms of fatigue and distraction from eyes, mouth and head. The system estimates driver alertness based on extracted symptoms and alarms if needed.

### **1.2 Organization of the Manual**

The user's manual consists of the following sections.

1. General Information
2. System Summary
3. Using of System

General Information section explains the purpose for which the tool is intended.

System Summary provides a general overview of the system. It outlines the uses of the system's hardware and software requirements, System's configuration, user access and risk factors.

Getting Started section presents briefly system menu.

Using of System section will have a detailed description of system functions.

## 2.0 SYSTEM SUMMARY

System Summary provides a general overview of the system. It outlines the uses of the system's hardware and software requirements, System's configuration, user access and risk factors.

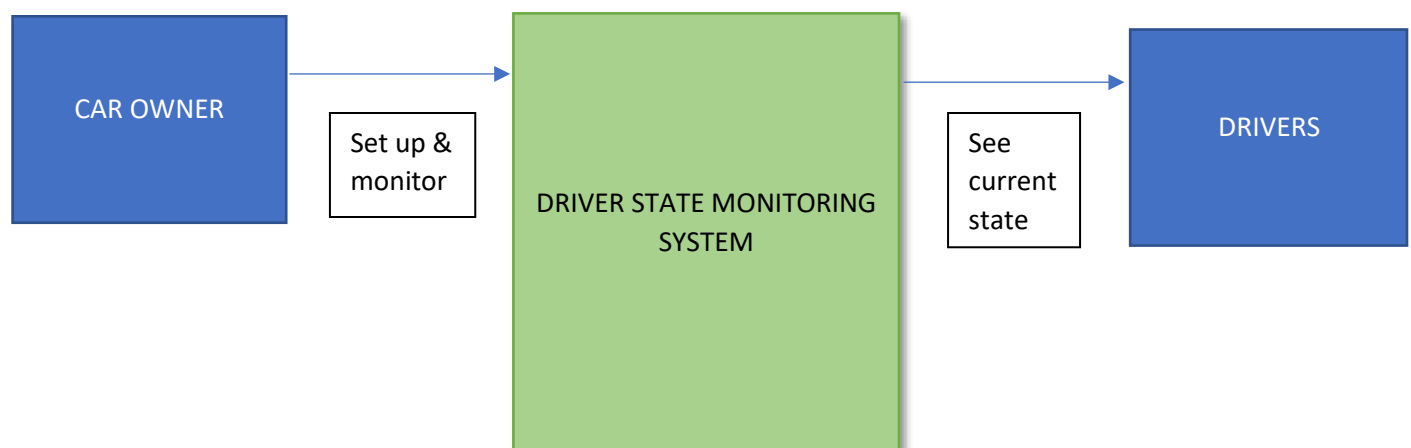
### 2.1 System Configuration:

Oversee operates on a dedicated device which is integrated with a web app and hardware tools. The hardware part has raspberry pi, pi camera, accelerometer and GPS sensor and a soundbox for the alarm. Maximum features can be run without any internet connection. Data are fetched simultaneously from firebase to show the driver his/her current state. For this feature we need to connect with the internet. It also requires for showing the current location on google map and suggesting nearby parking spots and coffee shops.

### 2.2 User Access:

Oversee has mainly two types of users:

- Owner of bus, truck or car rent
- Drivers



## 3.0 USING OF THE SYSTEM:

### 3.1 Car setup:

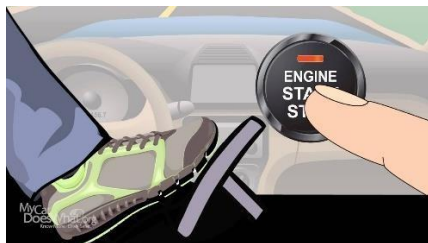
The device needs to set up with the car engine so that every time the car engine starts, the device automatically turns on and monitor drivers current state and detect if he/she is drowsy or inattentive.

### 3.2 device setup:

The device must be set up in such a way that the full face of the driver is in alignment with the camera, and face features are clearly visible. So that the detection can go smoothly.

### 3.3 display setup:

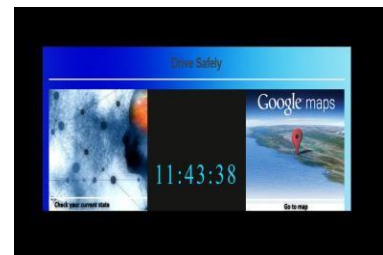
The display has to be in a position where it is visible to the driver and all the passenger. If its not set up in a correct manner, then driver wouldn't be allowed to observe his/her current state. Also, the passengers need to see the display so that they can be aware of current state of driver and ensure a safe journey.



Step – 1: Start the Car



Step – 2: Bring your face into View



Step – 3: automatic display setup

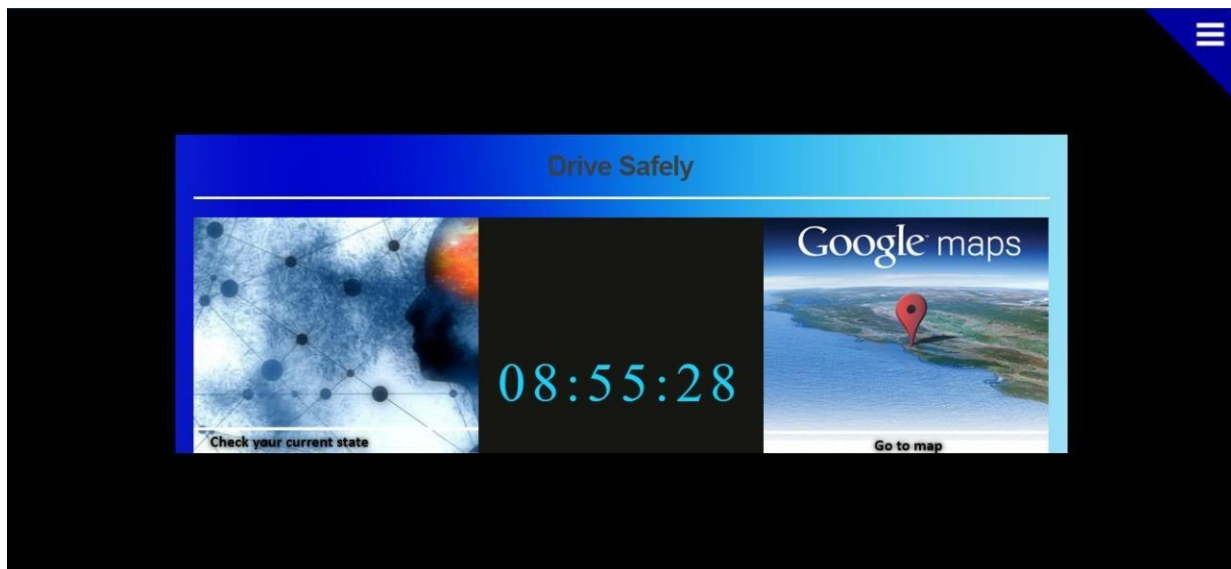
### 3.4 Start button:

This is the homepage of our display. When the start button is pressed the device starts operating.



### 3.3 Navigation page:

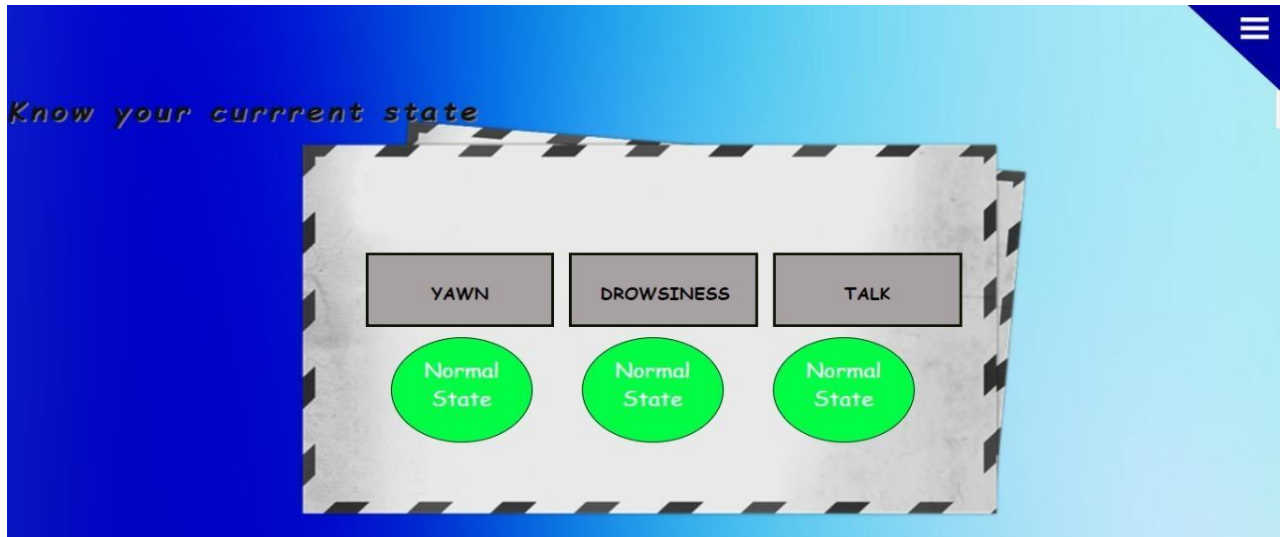
driver can select option to check his/her emotional state or nearby location.





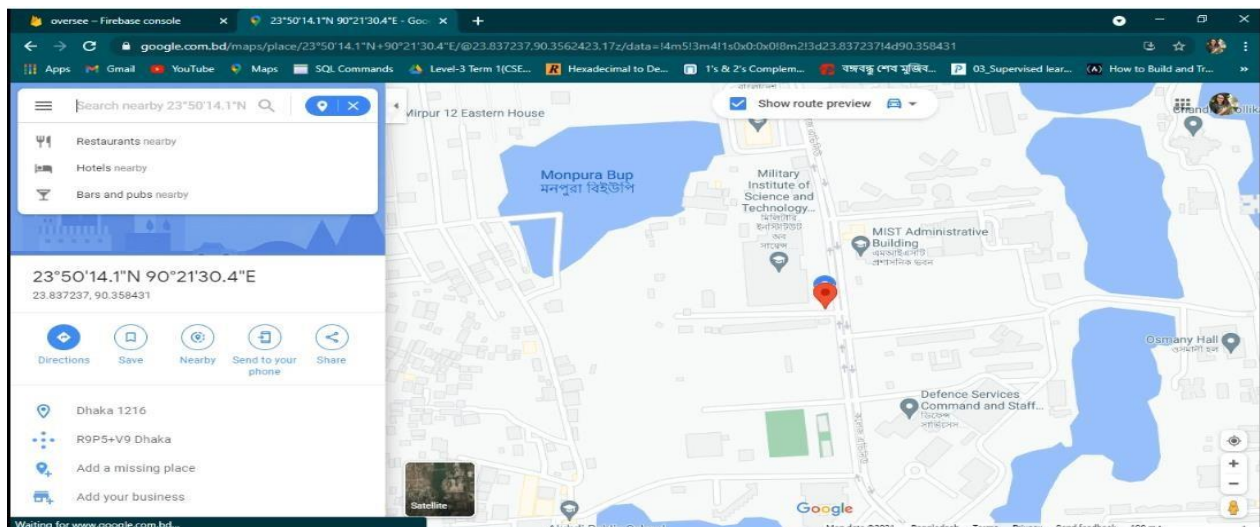
### 3.4 Show state page:

Driver can see his/her current state in this page. If driver is drowsy, inattentive or talking.



### 3.5 current location page:

Map has an option called nearest. By clicking this option user can check nearest restaurant, coffee shop, parking slot. This is a feature of google map which we are using for our convenience.





### 3.6 Inattention detection:

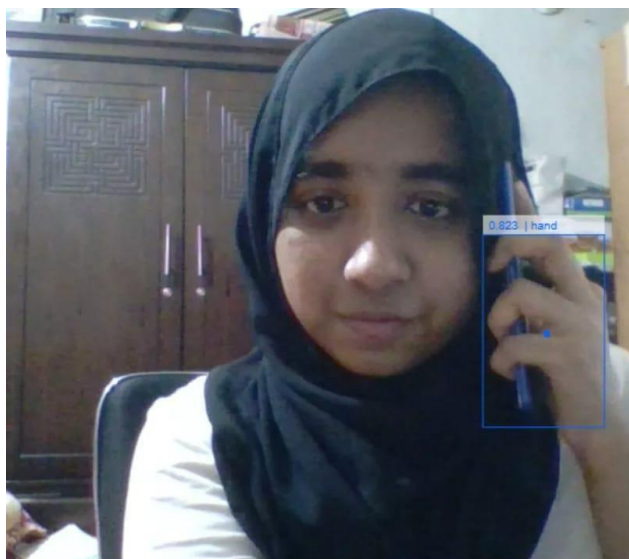
The inattention is detected by measuring two parameters. Talking detection and hand detection.

#### 3.6.1 Talking detection:

If the driver is side talking with someone for a certain time say 60 sec, then the face is not detected and it alerts the driver that he is talking while driving and being inattentive.

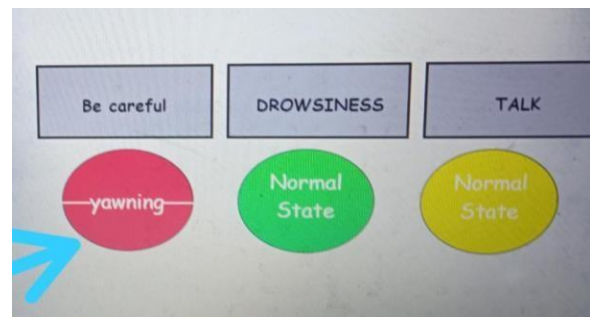
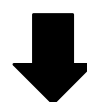
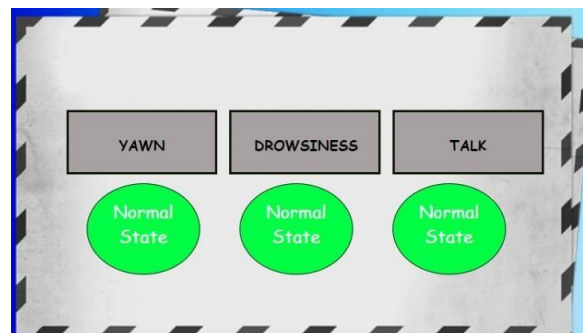
#### 3.6.2 Hand detection:

If the driver is talking holding the phone or the camera detects one hand of the driver that means both hands of the driver is not on steering. It can lead to a very dangerous state while driving. So, if one hand is detected the driver is alerted that he is being inattentive.



### 3.7 Drowsiness detection:

Drowsiness is detected by measuring the eye aspect ratio (EAR) and yawning detection. If the driver is yawning for a certain time, the device will alert the driver that he/she is drowsy and must take rest or park the car. In the web app the yawn detection color will go red and blink and also the voice command from the sound system will tell the driver to be alert.



## 4.0 Risk Management:

| Risk of Project |                                  |   |  |                              |                          |
|-----------------|----------------------------------|---|--|------------------------------|--------------------------|
| Risk number     | Description                      | Mitigation Plan (to avoid)                  | Contingency Plan                                 | Impact                       | Likelihood of occurrence |
| 1.              | Error in fetching data           | Checking of equipment's                     | Restart the sensors                              | Wrong result                 | medium                   |
| 2.              | Failure in integrating all parts | Check every equipment before connection     | Set up individual parts                          | The system will collapse     | medium                   |
| 3               | Sensor burn                      | Carefully handle every sensor               | Replace the sensors with alternatives            | The data would be inaccurate | High                     |
| 4               | Raspberry pi burn                | Minimize the amount of data                 | Check the storage and run the system accordingly | The device will breakdown    | Low                      |
| 5               | Failure in device placement      | Placement should be accurate to detect face | Remove the whole set up and do it again          | The result won't be accurate | medium                   |