University of Mumbai

DAAC: Driver Assessment for Alcohol Consumption and Automatic Cab booking

Submitted in partial fulfillment of requirements

For the degree of

Bachelors in Technology

by

Name: Ansh Dugar
Roll No: 1814064

Name: Jaimeen Unagar
Roll No: 1814077

Name: Shruti Gosain
Roll No: 1814079

Name: Heet Vora
Roll No: 1924007

Guide: Prof. Sagar Korde

Department of Information Technology
K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)

Batch 2018 - 2022

K. J. Somaiya College of Engineering, Mumbai-77

(Autonomous College Affiliated to University of Mumbai)

Certificate

This is to certify that the dissertation report entitled **DAAC: Driver Assessment for Alcohol Consumption and Automatic Cab booking** is bona fide record of the dissertation work done by **Shruti Gosain, Heet Vora, Ansh Dugar, Jaimeen Unagar** in the year 2021-22 under the guidance of **Prof. Sagar Korde** of Department of Information Technology in partial fulfillment of requirement for the Bachelors in Technology degree in Information Technology of University of Mumbai.

_____ _____

Guide Head of the Department

_____

Principal

Date: 30/4/2022

Place: Mumbai-77

K. J. Somaiya College of Engineering, Mumbai-77

(Autonomous College Affiliated to University of Mumbai)

Certificate of Approval of Examiners

We certify that this dissertation report entitled **DAAC: Driver Assessment for Alcohol Consumption and Automatic Cab booking** is bona fide record of project work done by **Shruti Gosain, Heet Vora, Ansh Dugar, Jaimeen Unagar**. This project is approved for the award of Bachelors in Technology Degree in Information Technology of University of Mumbai.

_____

Internal Examiner

_____

External Examiner

Date:

Place: Mumbai-77

K. J. Somaiya College of Engineering, Mumbai-77

(Autonomous College Affiliated to University of Mumbai)

DECLARATION

We declare that this written thesis submission represents the work done based on our and / or others' ideas with adequately cited and referenced the original source. We also declare that we have adhered to all principles of intellectual property, academic honesty and integrity as we have not misinterpreted or fabricated or falsified any idea/data/fact/source/original work/ matter in our submission.

We understand that any violation of the above will be cause for disciplinary action by the college and may evoke the penal action from the sources which have not been properly cited or from whom proper permission is not sought.

Signature of the Student **Roll No.**	**Signature of the Student** **Roll No.**
Signature of the Student **Roll No.**	**Signature of the Student** **Roll No.**

Date:

Place: Mumbai-77

Abstract

Drinking and Driving has become a huge cause of road accidents in today's world. It is found out that more than 60% of road accidents are caused due to drunk driving. Drinking and driving not only affects the person who is drunk but also the ones sitting in the same vehicle or the people and vehicles on road. Therefore, immediate attention should be given to this increasing threat. The aim of our project is to design a system that takes care of this problem, a system that senses the alcohol level of driver by his breath and preventive measures are taken with the help of internet of things. Even though there are enough laws to penalize such drivers but they can't be implemented on a large scale because cops cannot stand on every road to keep looking for drunk drivers. This is probably a major reason for accidents. Hence, there is an immediate need for an adequate system that can check drunk drivers and avoid further threats. Deaths due to drunk-driving are increasing day by day on a large scale which brings us to a question as to how can we minimize these large number of cases.

So this proposed system can help to reduce this problem. The system will basically comprise of a breath analyzing sensor (MQ-3), which will sense the level of alcohol in driver's breath. A heart rate sensor which sense heartbeat and by merging both data we can get more accurate result. In India, the quality legal limit of alcohol in blood is 0.03%, that means 30 micro-liters of alcohol in 100 milliliters of blood. If the alcohol content is above this threshold then the engine will not start (turns off ignition) and the person will not be able to drive. A notification will also be sent to a friend or a relative through our system which would have location and alcohol level. This system would thereafter also call cab (Uber/ Ola), tow truck, or a family person as per the situation selected by person or in case person doesn't respond within 15 minutes cab would be called automatically. Thus, by implementing such system, we can reduce alcohol related road accident. This project can help prevent life and property loss because of drunk reckless driving.

***Key words*:** Drinking and driving, road accidents, alcohol, vehicles, MQ-3 sensor.

Contents

List of Figures

List of Tables

Nomenclature

AIDC	Alcohol and Drugs Information Centre
Arduino IDE	Arduino Integrated Development Environment
EDA	Event Driven Architecture
GSM	Global System for Mobile communication
GPS	Global Positioning System
HTTP	Hypertext Transfer Protocol
LED	Light-emitting diode
Mg/L	Milligram per Litre
MQ-3	Metal Oxide Semiconductor
NIR	Near Infrared
SDD	Software Design Description
SIM808	Subscriber identity module for GPS and GSM functionalities
SMA	Sub-Miniature Version A
SRS	Software Requirements Specification
UI	User Interface
USB-TTL	Universal Serial Bus - Transistor-transistor logic

Chapter 1

Intoduction

This chapter contains the brief introduction to the thesis background, the need and the motivation behind the development of the project. It defines the scope of the project and its uniqueness.

1.1 Problem Definition

Drunk driving has been an ever increasing problem and even with the issues being known to people, it shows no promising signs of reduction. In India, drunk driving majorly contributes to traffic, death and 70% of those are fatal. Road accidents cause 12 lakh deaths and 500 lakh injuries around the world each year and out of which 4,80,000 of these deaths and about 200 lakh fatal injuries are caused by drunk driving. So in order to solve this problem, we have studied it and come up with a feasible solution.

In a developing country like India, driving any kind of vehicle requires a lot of concentration, quick reflex actions and decision-making abilities for the drivers to avoid any road accidents. The consumption of alcohol above a certain limit, affects the normal functioning of the brain and impacts the presence of mind capability of the driver which in turn results in accidents that not only affect the driver but also other passengers. So a system show, if fitted inside the vehicle, will test the many-conditions which can trigger the alarm indicating the drunk or sober state of the driver which can in turn save numerous lives.

1.2 Motivation of the Thesis

Drink and driving is a major problem in India and has also been recognised as a world hazard and due to lack of research and effective measures, this problem still persists.

So as budding engineers, we thought that we should select a project that helps in giving back to society. As the drink driving situation is ever increasing and does not show any promising signs of reduction, we thought why not take the first step by building this project to do our part in reducing the accidents and number of deaths in India.

1.3 Scope of the Thesis

Drinking and Driving proves to be a major problem in cities and at night. The scope of the project includes the following:

- Driver can register and signup on the application.
- Driver needs to upload Driving License and Identity Proof to register on the application.
- Driver has it's own dashboard.
- The detection of the alcohol is done before starting the vehicle.
- After detection, the motor loses supply of power and a notification alert is sent to the emergency contacts saved on the application.
- The notification alert displays the location of the driver with the time.
- An automatic cab booking script books a cab for the driver at his/her location.

1.4 Salient contribution

- Driver is assessed before starting the car which helps in preventing the car from being driven if the driver is drunk.
- If the driver is highly drunk, an automatic cab system is built for the driver.
- The emergency contacts are sent alert notifications as soon the alcohol limit is exceeded.
- The power to the motor is directly cut as soon as the driver is detected to be drunk.

1.5 Organisation of the Thesis

The synopsis comprises of a structural approach which includes the given aspects:

1. Introduction
2. Literature Overview
3. Software Project Management Plan
4. Software Requirement Specification

5. Software Design Document
6. Implementation
7. Software Testing Document
8. Conclusion and Scope of Future Work
9. References

Chapter 2

Literature Overview

This chapter contains all the information about the background surveys, researches being done before actually getting into the project. It provided and did set the ground, emphasizing on the need of the system in the current situation and how well it could benefit the end users.

Part 1: Patent Search Technique Used					
		Patent 1	**Patent 2**	**Patent 3**	**Patent 4**
1	**Patent Search Database Used**	Google Patent	Google Patent	Google Patent	Google Patent
2	**Keywords Used for Search**	Vehicle, Ignition, Interlock.	Device, Measure, Limit	Ignition, Interlock, Vehicle	Blood, Measure, Alcohol
3	**Search String Used**	Vehicle Locking system	Alcohol detecting device	Driver Alcohol Ignition Interlock	Drunk Driving Prevention System
4	**Number of Results/Hits**	320	1,51,000	1,700	1,850
Part 2: Basic Data of Patented Invention / Bibliographic Data					
5	**Title of Invention**	VEHICLE IGNITION INTERLOCK SYSTEMS HAVING TRANS DERMAL ALCOHOL SENSOR	Alcohol detecting device	Driver Alcohol Ignition Interlock	Drunk Driving Prevention System
6	**Publication Number**	EP1874579B1	EP 2 075 151 B1	US 6,229,908 B1	US 2017/0190251A1

7	**Date of Application**	24/04/2019	16/12/2018	22/04/2019	19/09/2016
8	**Name of Inventor/s**	MOBLEY, Larry, J. Raleigh, North Carolina 27614 (US)	Okamoto, Takuya Kyoto Kyoto 600-8530 (JP)	Dean Stockett Edmonds, III, 360 Club View Dr.; Jon William Hopta, 1201 OTHER PUBLICATION S NS2. •s both of Great Falls, sVA	Roger Li-Chung WU, West Covina, CA (US)
Part 3: Technical Part of Patented Invention					
9	**Limitation of Prior Technology/Art**	This checks alcohol through skin which not yet tested properly.	The data could still be fake in case an athlete or young person comes.	The person next to can take test and give wrong data.	Eye detection is faulty in case of any disease.
10	**Brief about Invention**	In view of the above discussion, a vehicle ignition interlock system, according to embodiment's of the present invention, includes a breath analyzer located within a vehicle, a trans-dermal alcohol sensor configured to be worn by the vehicle operator, and a controller operable connected to the breath analyzer, to the trans-dermal	The present invention relates to a detecting device, method, program and system, and more particularly, relates to a detecting device, method, program and system for detecting a fake test of blood alcohol concentration	The invention relates to an interlock that prevents equipment from being operated when the operator is intoxicated by measuring the blood-alcohol level in a bodypart, Such as a finger, and Substantially simultaneously determines whether the operator is the convicted or	The invention is advantageous in that it provides a drunk driving prevention system and method, which detects the eye activity of the driver in the sense of determining the presence of alcohol for indicating whether the driver is capable of driving the vehicle safely. 0012 Another

		alcohol sensor, and to an ignition system of the vehicle. The breath analyzer is configured to detect the breath alcohol level of an operator of the vehicle. The trans-dermal alcohol sensor is configured to detect alcohol through the skin of the vehicle operator. The controller compares detected breath alcohol levels of the vehicle operator with a threshold value, and is configured to prevent vehicle ignition (i.e., prevent the vehicle from being started) if a breath alcohol level detected by the breath analyzer is greater than or equal to a threshold value. Preferably, the controller and trans dermal alcohol sensor are connected and communicate with	(BAC) that another testee different from an actual driver takes on behalf of the actual driver.	principal operator of the equipment, preferably by Scanning the operator's fingerprint and comparing it with a fingerprint image Stored in the interlock's memory.	advantage of the invention is to a drunk driving prevention system and method, wherein the eye activity of the driver can be the eye movements of the driver to be detector in order to determine and analyze whether the eye movements of the driver are involuntary eye movements that Suspects an alcohol concentration of said driver is above a predetermined threshold.

		each other wirelessly.			
11	**How is Invention related to your project**	Alcohol Detection And interlock.	Helps is identifying user.	Interlocking of system in case of alcohol detection.	Detects alcohol level through eye and other medium.
12	**Key Learning Points**	Alcohol detection with skin and breath.	Face recognition.	Finger scanning and breath.	Alcohol detection through eyes.

Chapter 3

Software Project Management Plan

This chapter consists of the detailed project plan. The chapter also includes the goals of this project and the expected date of delivery. The software project management plan chapter consists of 4 sections namely: Introduction, Project deliverable, Project organisation and the Project management plan which consists of the timetable.

3.1 Introduction

3.1.1 Project Overview

Alcohol driving is a major problem in India but due to lack of research and measures this problem still remains. A report by Alcohol and Drugs Information Centre (AIDC) revealed that about 40 percent of road accidents in India occur due to driving under the influence of alcohol. It is evident from the statistical data revealed by the research done on road accidents that drunken driving has been recognized as a world hazard. Some of those facts are mentioned below. In India, drunk driving majorly contributed to the traffic deaths and 70 percent of those were fatal. Road accidents cause 12 lakh deaths and 5 crore injuries around the world each year and out of which 4,80,000 of these deaths and about 2 crore fatal injuries are caused by drunk driving.

In a developing country like India, driving any kind of vehicle requires a lot of concentration, quick reflex actions and decision-making abilities for the drivers to avoid any road accidents. The consumption of alcohol above a certain limit, affects the normal functioning of the brain and impacts the presence of mind capability of the driver which in turn results in accidents that not only affect the driver but also other passengers/ travelers. So, a system, if fitted inside the vehicle, will test the many-conditions which can trigger the alarm indicating the drunk or sober state of the driver.

3.1.2 Project Deliverables

Project Duration: 9 Months, Start Date: 30/07/2021

Deliverables	Delivery Date

Literature Survey and Feasibility Test	30th July 2021
Deep Research (Hardware and Sensors)	30th August 2021
Firebase Service (Module 4)	13th September 2021
GPS and Notification (Module 5)	25th October 2021
Android Development	15th December 2021
Alcohol and Pulse Detection (Module 1 and 2)	02nd March 2022
Integration of Hardware and Software	15th April 2022
Testing and Documentation	30th April 2022

3.2 Project Organization

3.2.1 Roles and Responsibilities

Roles	**Description**	**Person**
Documentation	The Readme file, the licence and how to work with the software.	Ansh Dugar, Jaimeen Unagar
Project Manager	Overall planning, risk analysis, execution planning, monitoring and closure planning.	Heet Vora
System analyst	To develop a design of the required system and ensuring that all requirements	Shruti Gosain

	are satisfied.	
Designer	Work hand in hand with the developer in designing the UI and UX of the application.	Jaimeen Unagar
Developer Team	Implementing the functionalities required in the application by backend programming .	Team Working under Heet Vora and Shruti Gosain
Tester	To perform various test cases and check the proper functionality of the application made by the developer.	Team Working under Heet Vora, Shruti Gosain, Ansh Dugar, Jaimeen Unagar
Analyst	To develop the design of required system and ensuring the all the requirements are satisfied	Team working under Heet Vora, Shruti Gosain, Ansh Dugar, Jaimeen Unagar

3.2.2 Tools and Techniques

Activity	**Tools required**	**Technique to be used**
Documentation	MS word, Latex	The procedure would be given in steps wherever necessary labeled images and diagrams will be used.
Software	Arduino IDE, Flutter, Firebase	The software requirements mentioned will be synced accordingly with the hardware requirements to test the output.
Hardware	MQ – 3, GPS, GSM,	The mentioned technologies in the hardware

	Heart Rate Sensor	are used for implementing our hardware circuit.
Meetings	Discord , Google Meet	The agenda of the meeting along with the meeting link would be shared with all the attendees prior the meeting.
Testing	Mobile (responsiveness) selenium, Jmeter, Desktop devices. Having different browsers,testing tools	Test cases will be prepared for the testing team to conduct the tests.

3.3 Project Management Plans

3.3.1 Tasks

Tasks involved in executing this project is:

1. Collect information about how the system is expected to behave/perform.
2. Requirements analysis/ write the SRS Document.
3. Develop an exploratory prototype.
4. Get feedback on the prototype.
5. Risks and Contingency Planning.
6. System design.
7. Development.
8. Deployment of the system.
9. Software Testing

3.3.2 System design and Development Description

The SDD describes the major components of the software design including databases and internal interfaces. The major components in this system are:

1. Alcohol Detection Module:

   This module is used to detect the amount of alcohol consumed by user or we can say level of alcohol on user's body, detected by means of breath.This module consists of MQ-3 Sensor which specifically made to perform like breathalyzer and it is used with arduino circuit.

2. Pulse Detection Module:

   - This module consist of Pulse Rate Sensor which is used to de- tect heart rate of user at time runtime. As the more alcohol is consumed, higher the heart rate become.
   - So we had use this module with coordination to module-1 so that we can thoroughly become sure from both the result before taking action.

3. Location Tracking Module:

   This module is used to get coordinates (location) of the user and it consists of GPS SIM808 which accurately track location.

   It requires GSM SIM808 component which is for network connec- tivity, with the help of GSM GPS send coordinates to the signal which was provided by GSM.

4. Alert Notifier Module:

   This module is used to send email or text notification to the higher authority like Parents, Guardian or Organizational Head as per the category of system selected. This notification describes the situation and details of user who had detected positive by our system, with his/her location.

5. Automatic Cab Pickup/Drop Module:

   This module consist of an automated script which can book cab/ taxi for the user whose alcohol level is detected severe and if system does not receive any

feedback from module-4 (Alert Notifier) means none of the higher authority has response to alert notifi- cation then system automatically book a cab/ taxi automatically for the user with it pickup and drop location fetched by module-3 (Location Tracking).

3.3.3 Risks And Contingency Plan

All the risks encountered during the project will be documented and dele- gated as soon as possible. The risks will be monitored further until resolved and will be solved on priority basis. The priority will be given to the risks depending on their potential impact on the progress of the project. All the risks will be documented in the Risk Information sheet. The RIS document will have a table for each risk that is identified by the project team, and will be documented and monitored until it is mitigated by the team.

3.4 Deliverables and Milestones

3.4.1 Hardware Required

- MQ-3
- GPS GSM (Parameters to be set)
- Heart Rate Sensor
- Alcohol Sensor

3.4.2 Roles and Requirements

Role	**Requirement**
Project Manager	1
System Analyst	2
Technical Lead	1
Database Administrator	1
Developers	2
Testers	2
Total	**9**

3.4.3 Computational hours

Start date of project: 30th July, 2021

Expected End date of project: 1st May, 2022

Total number of months: 09 (36 weeks)

Total number of members required in the team: 4

Considering that each member spends 8 hours on the system i.e. 40 hours per week.

Therefore, Total computational time = 36*40= 1440 hours

3.5 Risks and Contingencies:

Risk	**Risk category**	**Degree of impact 1(low) - 5(high)**	**Contingency Plan**
If the sensors do not work properly at times	Technical Risk	5	Making sure that they are checked and replaced from time to time.
Changes in the UI of the project	Implementati on Risk	2	Making a UI design first and then implementing
Ensuring availability from the team	Business Risk	2	Ensuring availability of another person as replacement
Project Scope Expansion due to flexible nature of project	Budget Risk	2	Having an agreement with that any extra functionality would be added once the stated requirements are fulfilled with additional charge.
Difficulty in	Technical Risk	3	Integrating

integration			from beginning
Working of the hardware and software in unison	Technical Risk	3	Keep updating the software and checking from time to time

3.6 Assignments

Sr no	Tasks	Team member
1	Requirements Gathering	All
2	Planning	All
3	Firebase service(Mod 4)	Heet Vora
4	GPS Tracking(Mod 5)	Ansh Dugar
5	Notification Testing(Mod 5)	Jaimeen Unagar
6	Android App Development	Shruti Gosain,Heet Vora
7	Hardware Management(All Mods)	All
8	Alcohol and Pulse detection	Jaimeen Unagar,Ansh Dugar
9	Code for integration with hardware	All
10	Running and Testing	All
11	Making Changes	All
12	Documentation	All

3.7 Timetable

Figure 3.1 Gantt Chart of the Timetable

Chapter 4

Software Requirements Specification

This chapter consists of the software requirements and specifications. The main purpose of this chapter is to highlight the specifications like the Intended audience, Product functions, Operating environment, Design constraints and the Functional Non-functional requirements.

4.1 Overview

Drinking and Driving has become a huge cause of road accidents in today's world. It is found out that more than 60 percent of road accidents are caused due to drunk driving. Drinking and driving not only affects the person who is drunk but also the ones sitting in the same vehicle or the people and vehicles on road. Therefore, immediate attention should be given to this increasing threat. The aim of our project is to design a system that takes care of this problem, a system that senses the alcohol level of driver by his breath and preventive measures are taken with the help of internet of things. Even though there are enough laws to penalize such drivers but they can't be implemented on a large scale because cops cannot stand on every road to keep looking for drunk drivers. This is probably a major reason for accidents. Hence, there is an immediate need for an adequate system that can check drunk drivers and avoid further threats. Deaths due to drunk-driving are increasing day by day on a large scale which brings us to a question as to how can we minimize these large number of cases. So this proposed system can help to reduce this problem. The system will basically comprise of a breath analyzing sensor (MQ-3), which will sense the level of alcohol in driver's breath. A heart rate sensor which sense heartbeat and by merging both data we can get more accurate result. In India, the quality legal limit of alcohol in blood is 0.03 percent, that means 30 micro-liters of alcohol in 100 milliliters of blood. If the alcohol content is above this threshold, then the engine will not start (turns off ignition) and the person will not be able to drive. A notification will also be sent to a friend or a relative through our system which would have location and alcohol level. This system would thereafter also call cab (Uber/ Ola), tow truck, or a family person as per the situation selected by person or in case person doesn't respond within 15 minutes cab would be

called automatically. Thus, by implementing such system, we can reduce alcohol related road accident. This project can help prevent life and property loss because of drunk reckless driving.

4.2 External Interface Requirements

4.2.1 User Interfaces

- Mobile Application
- Registration and Login Page
- User Dashboard
- Alcohol Detection Values
- Pulse Detection Values
- Location Tracking
- Alert Notifier
- Automatic Cab Pickup/ Drop

4.2.2 Hardware Interfaces

• **MQ-3**: MQ-3 is a cost-effective semiconductor sensor that detects the presence of alcohol gases in a person's breath, from 0.05 mg/L up to 10 mg/L concentrations. The material used for sensing here is SnO2(Tin dioxide), whose conductivity in clean air is low and the conductivity increments with the concentration of alcohol gases present in breath. It is highly sensitive to alcohol and has some resistance to disturbance caused due to gasoline, vapor and smoke. The sensor provides both analog and digital outputs. MQ-3 liquor sensor can be effectively interfaced with Microcontrollers, Arduino Boards, Raspberry Pi, and so on.

• **GPS**: GPS or global positioning system is used to find the specific location of objects. It gives location as latitude and longitude. This system has a GPS module to send the position information to friends and relative of the person (who is driving) when high amount of

alcohol is detected in his breath. GPS is a satellite-based route system and has a system of 24 satellites situated into the orbit. It can work in any climate conditions and at any place. A GPS antenna must be locked on to the signal of at least 3 satellites to calculate 2D location and track movement. With four or more satellites in the sight, GPS is able to calculate the user's 3D location (latitude, longitude and altitude). Once the position of our vehicle is calculated, the GPS can find other attributes like, speed, distance to destination etc.

• **GSM:**. SIM808 Bluetooth Compatible GSM/GPRS/GPS Development Board With GPS Antenna (Arduino and Raspberry Pi Compatible) is a development board; with SIM808 module which makes you able to use GSM communication and GPS features with your Arduino or Raspberry Pi. With this module, you can send and receive SMS; trace a location and you can even build your own cell phone.SIM808 module on-card functions as GSM communicator and GPS receiver.

The module is 5 – 26V power supply when the power supply is less than 2A the need for 9V This. Direct. Road power supply port for Another 3.5 – 4.2V suitable lithium for battery power supply. Computer debugging USB – TTL can be.is suitable portable. Two sets of SMA antenna port presented the GPS and GSM antenna. two sets of IPX port, easy to embed in the aluminum box to lead out the antenna. 1 way of TTL serial port, the GPS and GSM functions can be arbitrarily switched.

• **Heart Rate Sensor**: An analog heart rate pulse sensor. It can be used to measure your heart bpm. It returned values from 0 to 1023 analog reading. The basic heartbeat sensor consists of two sides, on one side the LED is placed along with an ambient light sensor and on the other side we have some circuitry. This circuitry is responsible for the amplification and noise cancellation work. The LED with a detector like the light (earlobe). Some of the light is absorbed by the blood and the transmitted or the reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in the form of the electrical signal and is proportional to the heartbeat rate.

4.2.3 Software Interfaces

• **Arduino IDE:** The Arduino Integrated Development Environment or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a tool bar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them. Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension.ino.

• **Flutter**: Flutter is Google's free and open-source UI framework for creating native mobile applications. Released in 2017, Flutter allows developers to build mobile applications with a single codebase and programming language. This capability makes building both iOS and Android apps simpler and faster

• **Firebase**: Firebase is a platform developed by Google for creating mobile and web applica tions. It was originally an independent company founded in 2011. In 2014, Google acquired the platform and it is now their flagship offering for app development.

4.3 Software Product Features

Our goal is to give better knowledge of system deals with resolving problem of a person driving after consumption of alcohol. This system checks whether the level a person is at a state to drive vehicle, and system would allow accordingly or would just shut down the system if limit is breached.

Our Modules in the Products/ Project are:

• Alcohol Detection

• Pulse Detection

• Location Tracking

• Alert Notifier

• Automatic Cab Pickup/Drop

The objective is to develop various modules which can be useful to solve above problem. The Brief about various modules which are used to develop the system are:

Module-1: Alcohol Detection This module is used to detect the amount of alcohol consumed by user or we can say level of alcohol on user's body, detected by means of breath. This module consists of MQ-3 Sensor which specifically made to perform like breathalyzer and it is used with arduino circuit.

Module-2: Pulse Detection This module consist of Pulse Rate Sensor which is used to detect heart rate of user at time runtime. As the more alcohol is consumed, higher the heart rate become. So we had use this module with coordination to module-1 so that we can thoroughly become sure from both the result before taking action.

Module-3: Location Tracking This module is used to get coordinates (location) of the user and it consists of SIM808 which accurately track location. It require GSM SIM808 component which is for network connectivity, with the help of GSM GPS send coordinates to the signal which was provided by GSM.

Module-4: Alert Notifier This module is used to send email or text notification to the higher authority like Parents, Guardian or Organizational Head as per the category of system selected. This notification describes the situation and details of user who had detected positive by our system, with his/her location.

Module-5: Automatic Cab Pickup/Drop This module consist of an automated script which can book cab/ taxi for the user whose alcohol level is detected severe and if system does not receive any feedback from module4 (Alert Notifier) means none of the higher authority has response to alert notification then system automatically book a cab/ taxi automatically for the user with it pickup and drop location fetched by module-3 (Location Tracking).

4.4 Software performance requirements

4.4.1 Reliability

A reputed hosting service for the application would be used, so the chances of crashing are minimal.

4.4.2 Availability

The application would be available at all times. A backup would be taken at regular intervals for recovery purposes.

4.4.3 Security

The details of the driver/user should be seen only by the seller/manager and not any other drivers/users.

4.4.4 Maintainability

Checking the hardware regularly and maintaining it.

4.4.5 Portability

Application is portable on any type of android phones.

4.4.6 Performance Handling multiple entries on the android application can be done easily.

Chapter 5

Software Design Description

This chapter consists of the software design. It includes the data flow architecture and the use cases of the project.

5.1 Introduction

5.1.1 Design Overview

Our goal is to give better knowledge of a system that deals with resolving the problem of a person driving after consuming alcohol. This system checks whether a person is in a condition to drive the vehicle safely. The system would allow accordingly, or would just shut down the system if the alcohol limit is breached. Our Modules in the Products/ Project are:

a) Alcohol Detection

b) Pulse Detection

c) Location Tracking

d) Alert Notifier

e) Automatic Cab Pickup/Drop

5.1.2 Requirement Traceability Matrix

A matrix showing where each feature identified in the SRS is supported by the design components is displayed below.

RTM	Android Application	Sensors	Arduino Integrated Development environment	Alcohol/Pulse > LIMIT	Database
Alcohol Detection		x	x	x	X
Heart Rate Detection		x	x	x	X
Notification Alert	x			x	X
GPS Tracking	x		x	x	
Automatic booking of cab	x			x	

5.2 System Architectural Design

5.2.1 Chosen System Architecture

AEIOU Summary:

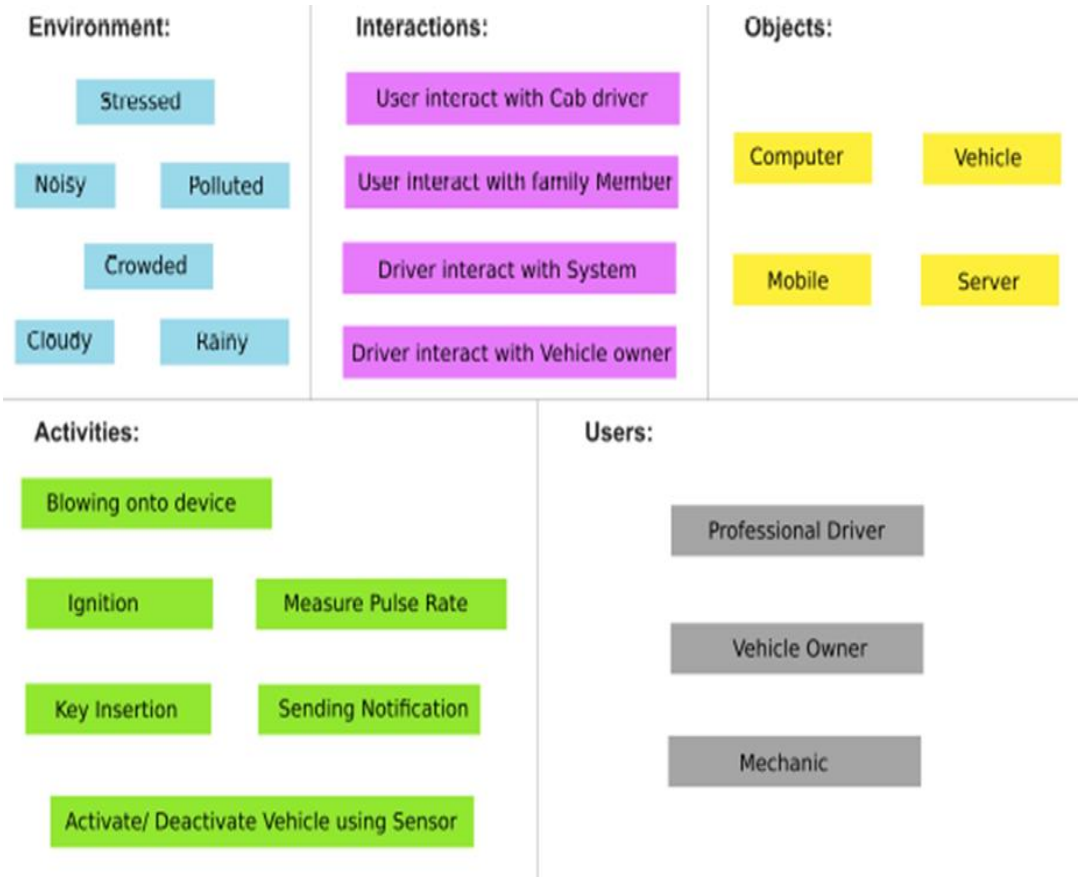

Figure 5.1 AEIOU System Structure

Description:

AEIOU stands for 5 elements to be coded: Activity, Environment, Interaction, Object, and User.

Activities are objective coordinated arrangements and it describes what are the modes people work in, and the specific activities and processes they go through?

Environments incorporate the whole field where exercises occur.

Interactions are between an individual and some other person or thing; they are the structured squares of exercises to get the intended results.

Objects are building squares of the earth, some of the key components include the services which we use in day to day lives like computer, vehicle, mobile, server etc.

Users are the individuals whose practices, inclinations, and requirements are being

watched. What are their jobs and connections? What are their qualities and biases?

5.2.2 Discussion of Alternative Designs

Event-Driven Architectural Model:

An event-driven architecture (EDA) is a framework that orchestrates behavior around the production, detection and consumption of events as well as the responses they evoke. An event is any identifiable occur- rence that has significance for system hardware or soft- ware. An event- driven architecture consists of event creators and event consumers. The creator, which is the source of the event, only knows that the event has occurred. Consumers are entities that need to know the event has oc- curred; they may be involved in processing the event or they may sim- ply be affected by the event. EDA includes security risks and increased complexity. Because EDA systems are often extremely loosely coupled and highly distributed: we don't always know exactly what compo- nents are part of the system and the dependencies between them. The system can become opaque and some small event could trigger an un- foreseen chain of relations. Hence Event Driven Architecture was implemented.

5.2.3 System Interface Description

- Arduino IDE will be used for testing the hardware functioning.
- Android Studio is the platform used to create the application.
- Firebase will be used as a database with the app to store the details.

5.3 Detailed Description of Components

Arduino IDE

The Arduino Integrated Development Environment or Arduino Software (IDE) contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them. Programs

written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension.ino.

Flutter

Flutter is Google's free and open-source UI framework for creating native mobile applications. Released in 2017, Flutter allows developers to build mobile applications with a single codebase and programming language. This capability makes building both iOS and Android apps simpler and faster.

Firebase

Firebase is a platform developed by Google for creating mobile and web applications. It was originally an independent company founded in 2011. In 2014, Google acquired the platform and it is now their flagship offering for app development.

MQ-3

MQ-3 is a cost-effective semiconductor sensor that detects the presence of alcohol gasses in a person's breath, from 0.05 mg/L up to 10 mg/L concentrations. The material used for sensing here is SnO2(Tin dioxide), whose conductivity in clean air is low and the conductivity increases with the concentration of alcohol gasses present in breath. It is highly sensitive to alcohol and has some resistance to disturbance caused due to gasoline, vapor and smoke. The sensor provides both analog and digital outputs. MQ- 3 liquor sensor can be effectively interfaced with Microcontrollers, Arduino Boards, Raspberry Pi, and soon.

GPS

GPS or global positioning system is used to find the specific location of objects. It gives location as latitude and longitude. This system has a GPS module to send the

position information to friends and relatives of the person (who is driving) when a high amount of alcohol is detected in his breath. GPS is a satellite-based route system and has a system of 24 satellites situated into the orbit. It can work in any climate conditions and at any place. A GPS antenna must be locked on to the signal of at least 3 satellites to calculate 2D location and track movement. With four or more satellites in the site, GPS is able to calculate the user's 3D location (latitude, longitude and altitude). Once the position of our vehicle is calculated, the GPS can find other attributes like, speed, distance to destination etc.

GSM

SIM808 Bluetooth Compatible GSM/GPRS/GPS Development Board With GPS Antenna (Arduino and Raspberry Pi Compatible) is a development board; with SIM808 module which makes you able to use GSM communication and GPS features with your Arduino or Raspberry Pi. With this module, you can send and receive SMS; trace a location and you can even build your own cell phone.SIM808 module on-card functions as GSM communicator and GPS receiver.

The module is 5 – 26V power supply when the power supply is less than 2A the need for 9V This. Direct. Road power supply port for Another 3.5 – 4.2V suitable lithium for battery power supply. Computer debugging USB – TTL can be.is suitable portable. Two sets of SMA antenna port presented the GPS and GSM antenna. two sets of IPX port, easy to embed in the aluminum box to lead out the antenna. 1 way of TTL serial port, the GPS and GSM functions can be arbitrarily switched.

Heart Rate Sensor

An analog heart rate pulse sensor. It can be used to measure your heart bpm. It returned values from 0 to 1023 analog reading. The basic heartbeat sensor consists of two sides, on one side the LED is placed along with an ambient light sensor and on the other side we have some circuitry. This circuitry is responsible for the amplification and noise cancellation work. The LED with a detector like the light (earlobe). Some of the light is absorbed by the blood and the transmitted or the

reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in the form of the electrical signal and is proportional to the heartbeat rate.

5.4 User Interface Design

5.4.1 Description of User Interface

- **Login Signup Page**

  Login Signup Page will be used to maintain the records of the users which will be available to access the services on the portal.

- **User Dashboard**

  Users will be able to see all the details of the fine along with the location, date time.

- **Location**

  Location services can be available for the users to get the cab services.

- **Notification**

  Alert Notifications will be sent to the driver's family/ friends in case if he/ she has been driving under the influence of alcohol.

- **Automatic Cab Pickup/ Drop**

  Using the location of the driver who has been driving under the influence of alcohol cab service can be availed.

5.4.2 Screen Images

Software:

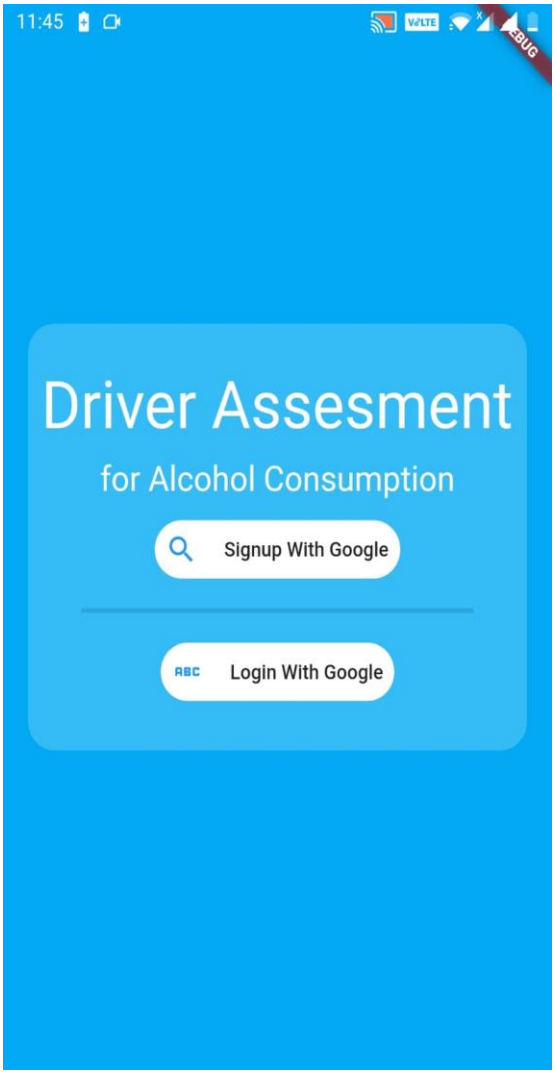

Figure 5.2 Index Screen

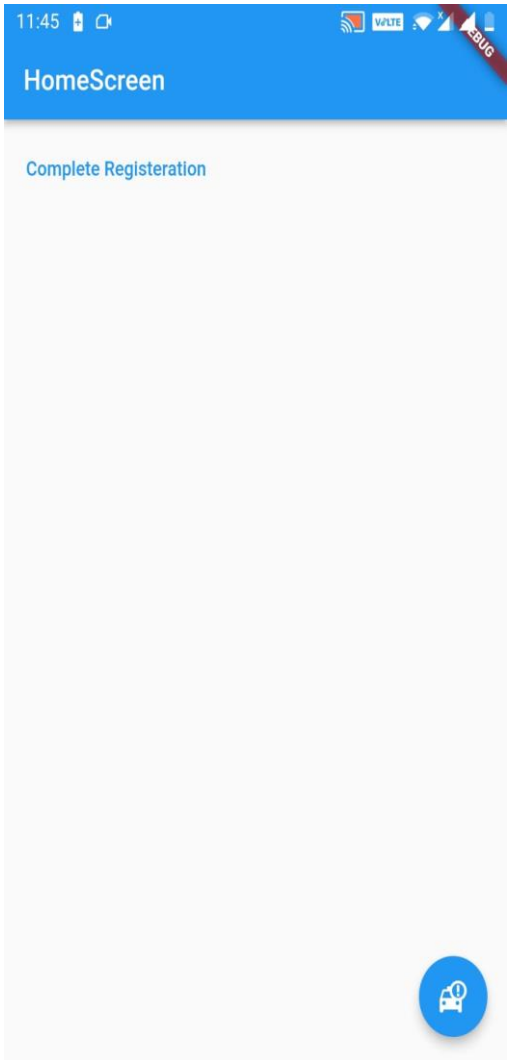

Figure 5.3 Home Screen for complete registration

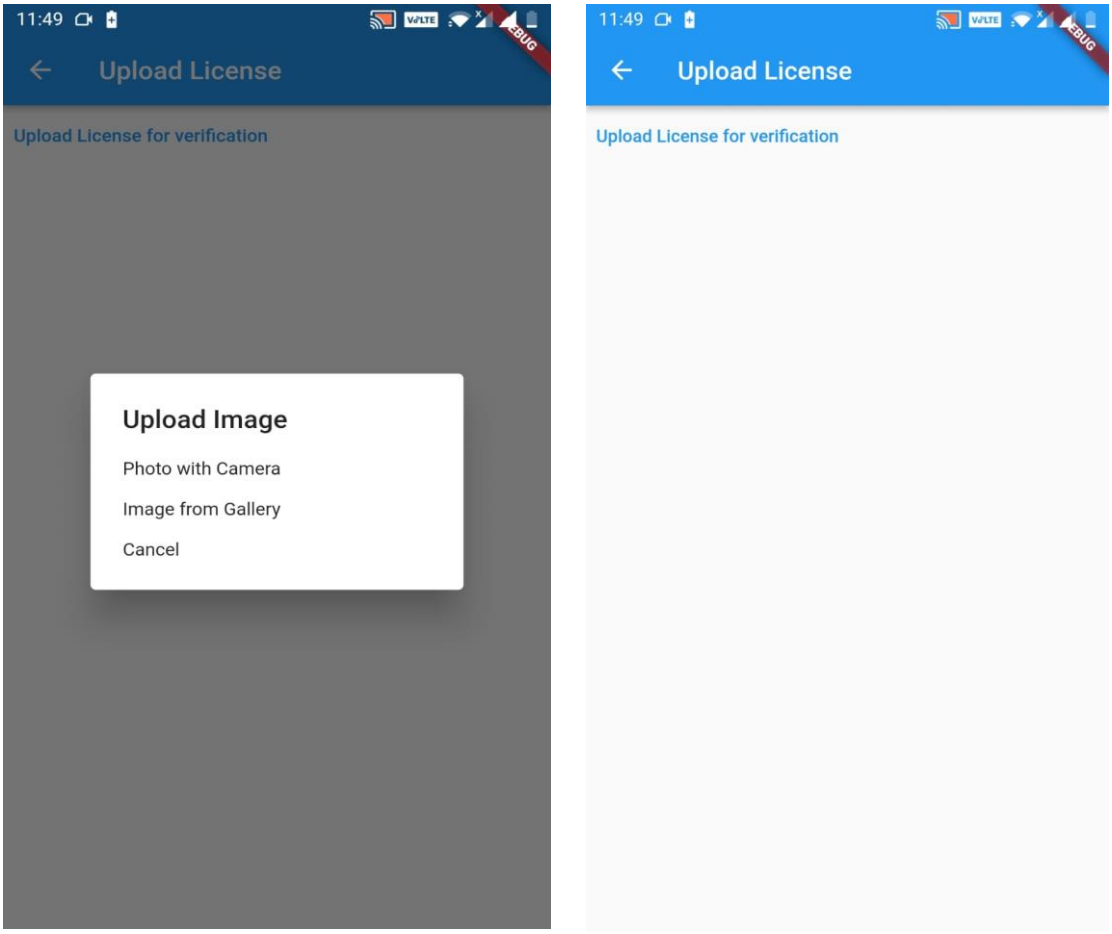

Figure 5.4 and Figure 5.5 : Image Uploading Screen for License and user ID

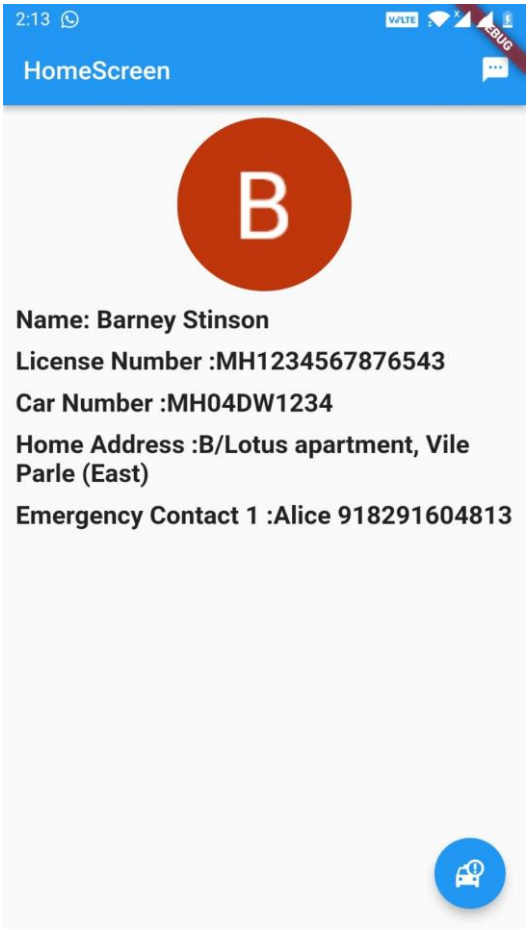

Figure 5.6 Driver Dashboard

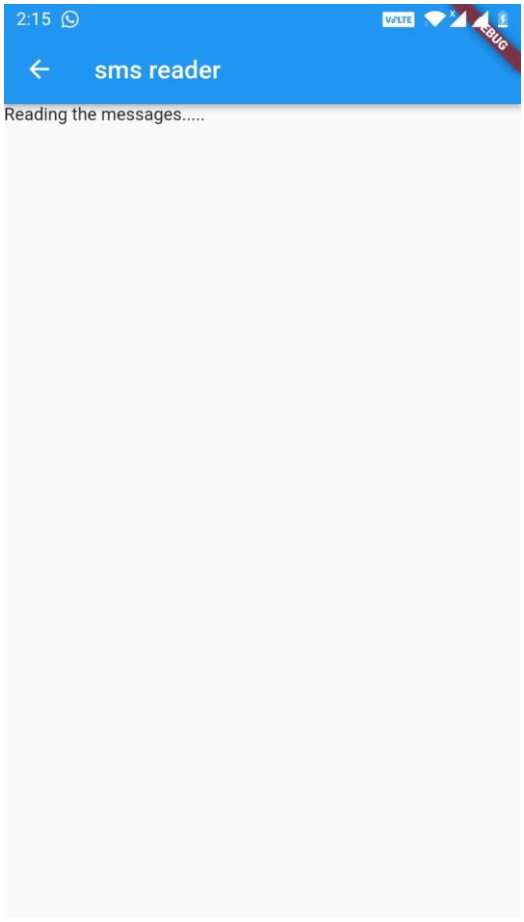

Figure 5.7 Reading Message through GSM

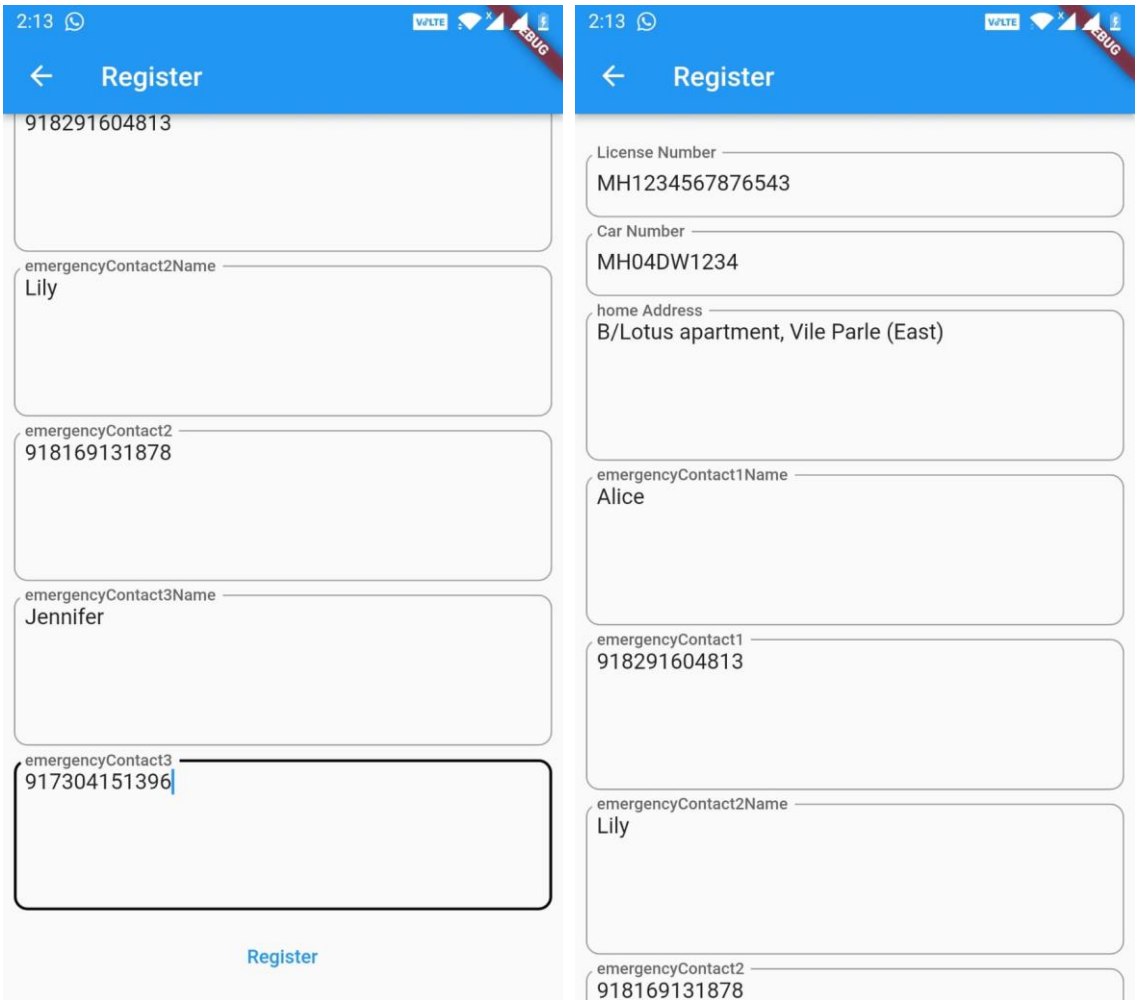

Figure 5.8 and 5.9 : Registration Page for the application

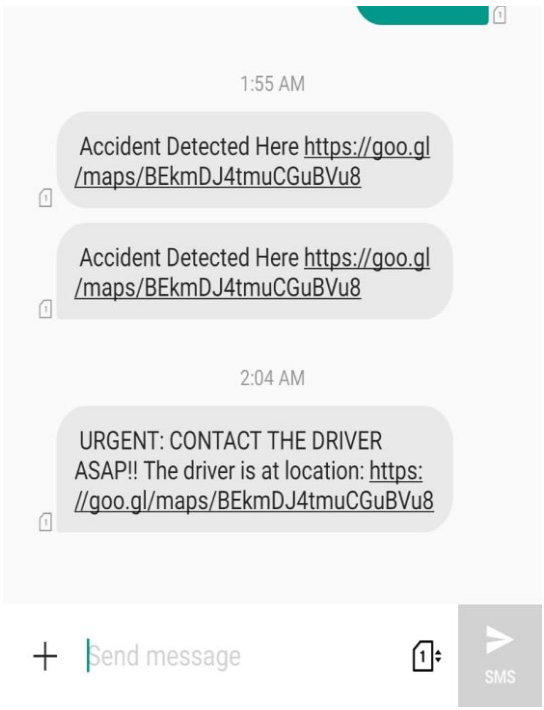

Figure 5.10 Message Received

Figure 5.11 Uber Application

Hardware:

Figure 5.12 MQ3 Sensor

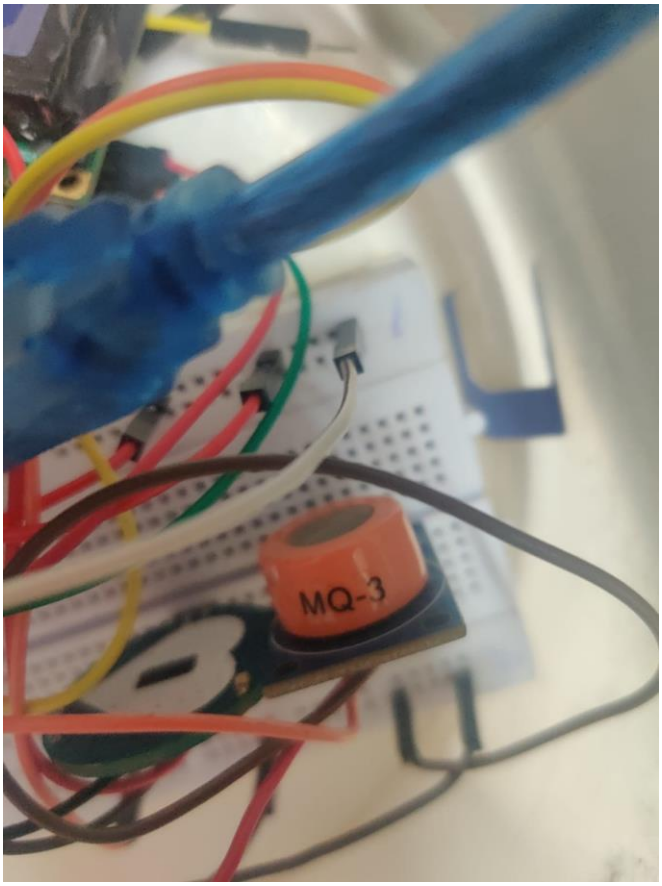

Figure 5.13 MQ3 Sensor in the circuit

Figure 5.14 SIM808 sensor

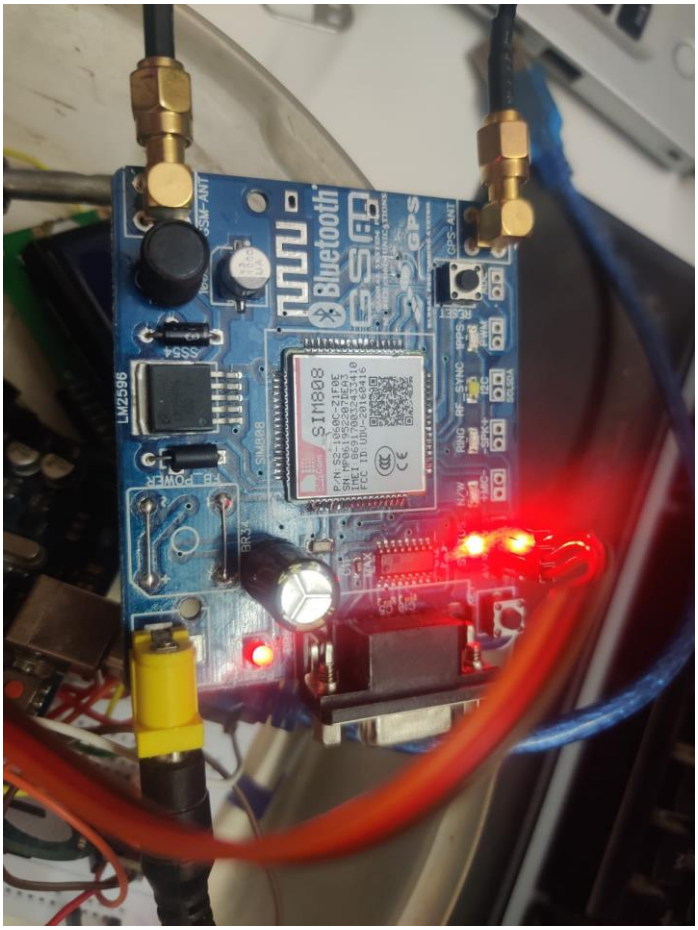

Figure 5.15 SIM808 sensor in the circuit

Figure 5.16 Pulse Rate Sensor

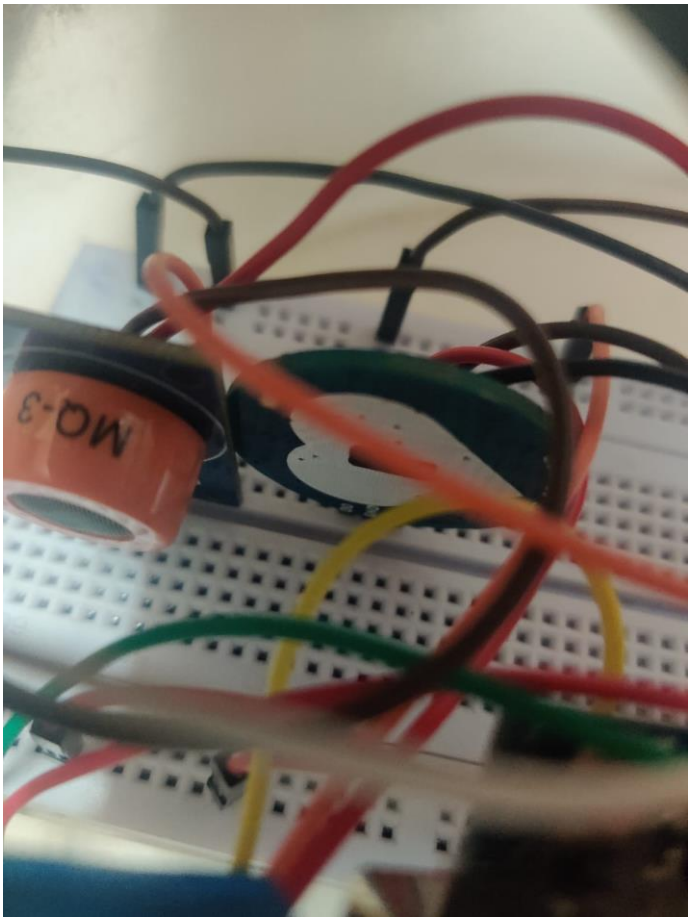

Figure 5.17 Pulse Rate Sensor in the circuit

Figure 5.18 Motor

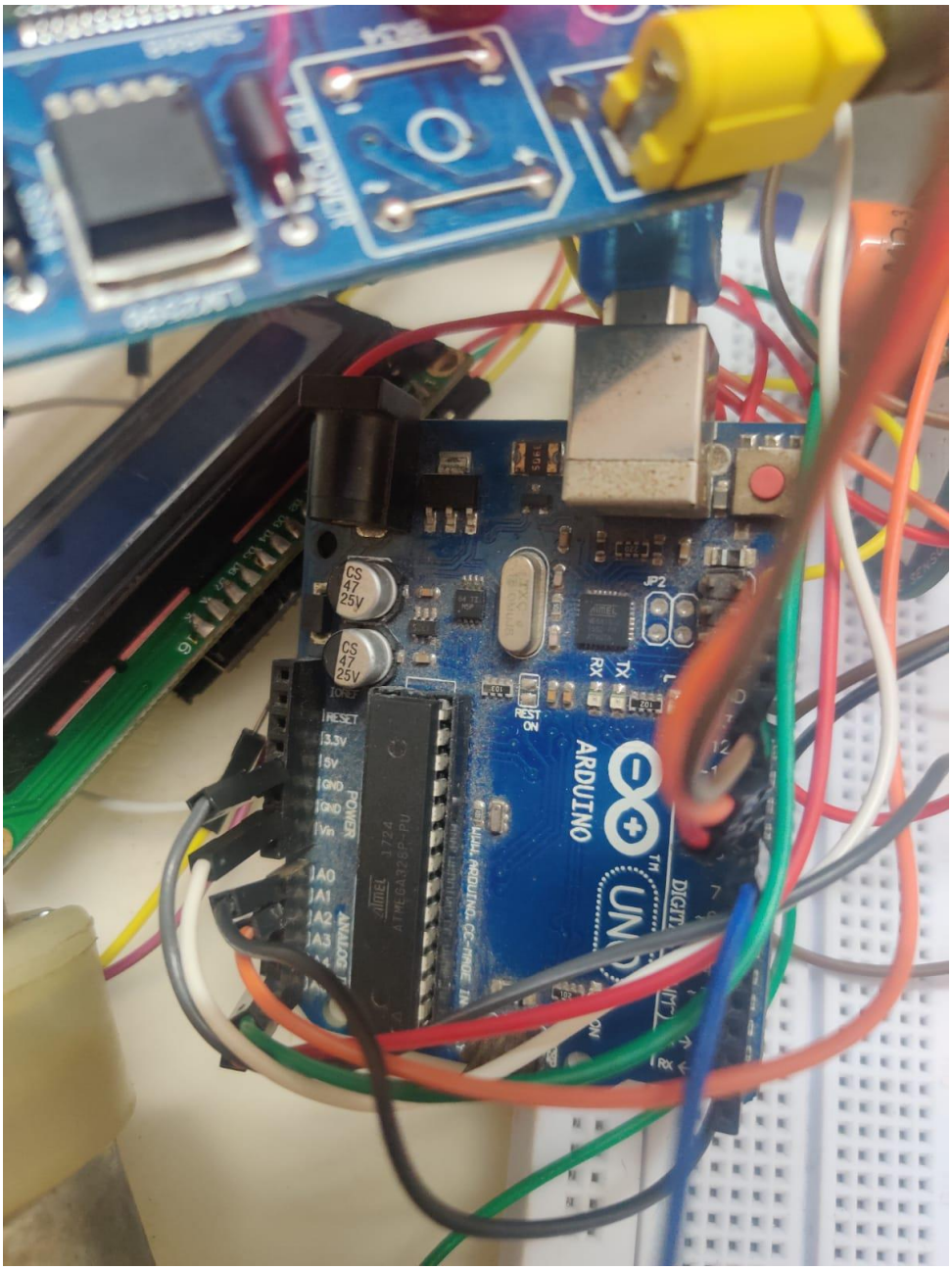

Figure 5.19Arduino UNO

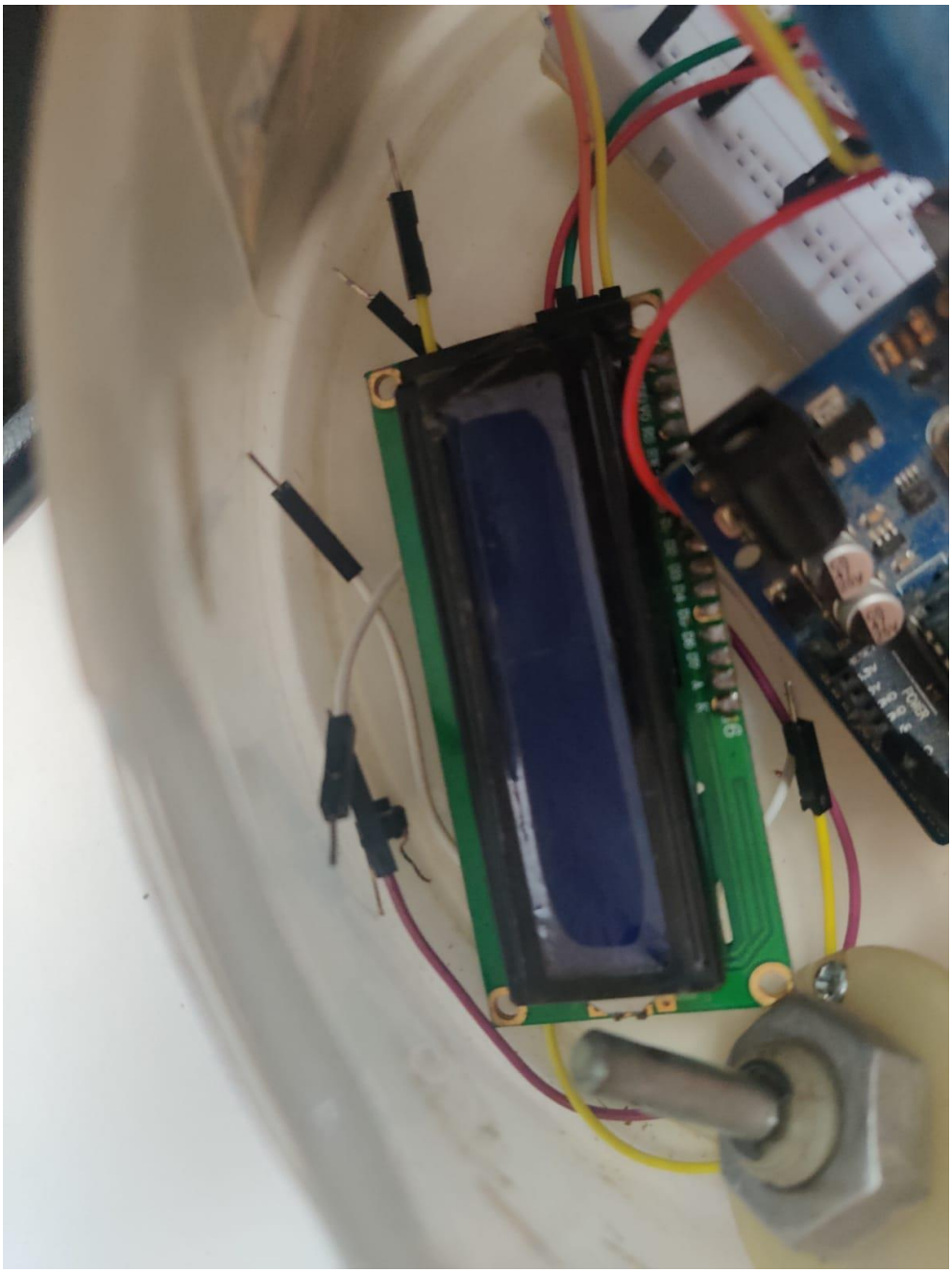

Figure 5.20 LED Display

5.4.3 Objects and Actions

a) Admin Page: This is the dashboard for the admin.

b) Index Page: This Page is the landing page for anyone who visits the app. From here new users can register and existing ones can login.

c) Registration Page: Here any driver can register with their information.

d) Login Page: Here any registered driver can login into their respective profiles.

e) Driver Dashboard: This is the Dashboard the driver sees after logging in. Over here the driver can check the values of the test and the fine will be displayed along with the location, date time.

f) Alcohol Detection, Pulse Detection: Used for finding out whether the driver is under the influence of alcohol.

g) GPS Alert Notification: Alert notification will be sent to the driver's family/ friends and GPS will be used to book the cab.

h) Automatic Cab Pickup/ Drop: Cab will be available depending on the driver's location.

Chapter 6

Implementation

This chapter discusses the technologies used in the development of the project along with the methodology used and also gives a brief insight in the form of screenshots of the project with description for better

6.1 Technologies Used:

- **Hardware** :

MQ-3

MQ-3 is a cost-effective semiconductor sensor that detects the presence of alcohol gasses in a person's breath, from 0.05 mg/L up to 10 mg/L concentrations. The material used for sensing here is SnO2(Tin dioxide), whose conductivity in clean air is low and the conductivity increases with the concentration of alcohol gasses present in breath. It is highly sensitive to alcohol and has some resistance to disturbance caused due to gasoline, vapor and smoke. The sensor provides both analog and digital outputs. MQ-3 liquor sensors can be effectively interfaced with Microcontrollers, Arduino Boards, Raspberry Pi, and so on.

GPS:

GPS or global positioning system is used to find the specific location of objects. It gives location as latitude and longitude. This system has a GPS module to send the position information to friends and relatives of the person (who is driving) when a high amount of alcohol is detected in his breath. GPS is a satellite-based route system and has a system of 24 satellites situated into the orbit. It can work in any climate conditions and at any place. A GPS antenna must be locked on to the signal of at least 3 satellites to calculate 2D location and track movement. With four or more satellites in the site, GPS is able to

calculate the user's 3D location (latitude, longitude and altitude). Once the position of our vehicle is calculated, the GPS can find other attributes like, speed, distance to destination etc.

GSM:

SIM808 Bluetooth Compatible GSM/GPRS/GPS Development Board With GPS Antenna (Arduino and Raspberry Pi Compatible) is a development board; with SIM808 module which makes you able to use GSM communication and GPS features with your Arduino or Raspberry Pi. With this module, you can send and receive SMS; trace a location and you can even build your own cell phone.SIM808 module on-card functions as GSM communicator and GPS receiver.

The module is 5 – 26V power supply when the power supply is less than 2A the need for 9V This. Direct. Road power supply port for Another 3.5 – 4.2V suitable lithium for battery power supply. Computer debugging USB – TTL can be.is suitable portable. Two sets of SMA antenna port presented the GPS and GSM antenna. two sets of IPX port, easy to embed in the aluminum box to lead out the antenna. 1 way of TTL serial port, the GPS and GSM functions can be arbitrarily switched.

Heart Rate Sensor:

An analog heart rate pulse sensor. It can be used to measure your heart bpm. It returned values from 0 to 1023 analog reading. The basic heartbeat sensor consists of two sides, on one side the LED is placed along with an ambient light sensor and on the other side we have some circuitry. This circuitry is responsible for the amplification and noise cancellation work. The LED with a detector like the light (earlobe). Some of the light is absorbed by the blood and the transmitted or the reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in the form of the electrical signal and is proportional to the heartbeat rate.

- **Software** :

Arduino IDE

The Arduino Integrated Development Environment or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them. Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension.ino.

Flutter

Flutter is Google's free and open-source UI framework for creating native mobile applications. Released in 2017, Flutter allows developers to build mobile applications with a single codebase and programming language. This capability makes building both iOS and Android apps simpler and faster.

Firebase

Firebase is a platform developed by Google for creating mobile and web applications. It was originally an independent company founded in 2011. In 2014, Google acquired the platform and it is now their flagship offering for app development.

6.2 Algorithm

- The user registers on the application by feeding the necessary information.
- The hardware checks the alcohol and the pulse level of the driver before he starts the car.
- If the user is drunk, there is an immediate cut off of the power supplied to the engine.
- The location of the user is taken with the help of GPS and the message is sent to the software via the GSM sensor.
- The software reads the message and sends it to the emergency contacts with the location of the driver.
- The driver can also book a cab where the pick up and drop location will automatically be fed from the database.
- This system is used before starting the vehicle.
- The data of the user is stored in the database (Firebase) and can be used to keep a tally of the number of times the driver was found to be drunk.

6.3 Implementation

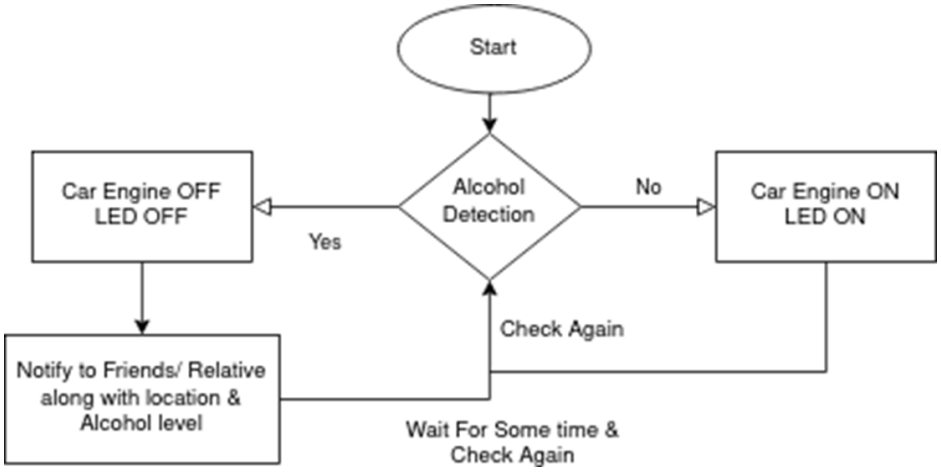

Figure 6.1 Flow of the circuit

HARDWARE/SOFTWARE	INPUT	OUTPUT
Heart Rate Sensing	Touch our thumb or finger in heart beat sensor and light detecting resistor	The light will get absorbed by the blood through the thumb or finger tissue and a certain colored light will indicate the working of heart rate sensor.
Alcohol Level Sensing	Breath of the driver	Alcohol detection by changing color of the LED.
GPS Location Tracking	Alcohol detection	Track the coordinates of the driver
SIM800C (Alert notification)	GPS tracking	Sending SMS
Arduino Uno	Sensor's otputs	Connecting the components of various modules

Chapter 7

Software Test Document

This chapter will explain the test approach, test plan and the test cases with respect to the project. The test logs and results are com puted in a tabular form in this chapter.

7.1 Introduction

7.1.1 System Overview

Alcohol driving is a major problem in India but due to lack of research and measures this problem still remains. A report by Alcohol and Drugs Information Centre (AIDC) revealed that about 40 percent of road accidents in India occur due to driving under the influence of alcohol. It is evident from the statistical data revealed by the research done on road accidents that drunken driving has been recognized as a world hazard. In India, drunk driving majorly contributes to the traffic deaths and 70 percent of those were fatal. Road accidents cause 12 lakh deaths and 5 crore injuries around the world each year and out of which 4,80,000 of these deaths and about 2 crore fatal injuries are caused by drunk driving. In a developing country like India, driving any kind of vehicle requires lot of concentration, quick reflex actions and decision-making abilities for the drivers to avoid any road accidents. The consumption of alcohol above a certain limit, affects the normal functioning of the brain and impacts the presence of mind capability of the driver which in turn result in accidents that not only affect the driver but also other passengers/ travelers. If fitted inside the vehicle, will test the many-conditions which can trigger the alarm indicating the drunk or sober state of the driver.

7.1.2 Test Approach

- **Regression Testing** : Every time a new module is added leads to changes in the program. This type of testing makes sure that the whole component works properly even after adding components to the complete program. 1

- **Black Box Testing** : Black Box Testing, also known as Behavioral Testing, is a software testing method in which the internal structure/design/implementation of the item being tested is not known to the tester. These tests can be functional or non-functional, though usually functional. This method is named so because the application, in the eyes of the tester, is like a black box; inside which one cannot see. This type of testing also involves providing invalid inputs to show that the system fails if the input parameters are not as mentioned. Here, we do not consider the structure of the code. The inputs and the outputs are of primary importance.
- **Manual Testing** : Manual testing is the process of manually testing software for defects. It requires a tester to play the role of an end user whereby they use most of the application's features to ensure correct behavior. To guarantee completeness of testing, the tester often follows a written test plan that leads them through a set of important test cases.

7.2 Testing

7.2.1 Features to be tested

- Alcohol detection
- Pulse detection
- Location tracking
- Alert notifier
- Automatic cab pickup/Drop

7.2.2 Features not to be Tested

Every feature will be tested.

7.2.3 Testing Tools and Environment

Test	Purpose	Testing tool
Alcohol detection test	• It typically denotes the user who has consumed alcohol. • When we spray alcohol based-spray on a piece of paper and bring it close	• MQ-3 • Arduino IDE

	to the breathalyzer, it senses and gives feedback if alcohol is detected or not by changing the color of led.	
Pulse detection test	• Pulse rate sensor is used to detect the heart rate of the user at runtime. • The more the amount of alcohol consumed, the higher the heart rate.	• Heart rate sensor • Arduino IDE
Location Tracking and notification test	• Get the users' live location. • It works with the coordination of 3 satellites and uses radio waves to communicate with which it can pinpoint users' location. (coordinates) • It generally detects the longitude and latitude from where the user was found to be drunk-driving or trying to drive the vehicle. • When a user has alcohol consumption level greater than a certain limit, it automatically detects the coordinate of that location where the user was present.	• SIM808 • Arduino IDE

7.3 Test Cases

1. **Can login with correct credentials and provide a valid session.**

Purpose	To login into the system with correct user ID and password
Inputs	User ID and password
Expected	Valid Credentials

Outputs	
Test Procedure	Provide user ID and password already saved in the database.

2. Cannot login with incorrect credentials.

Purpose	To not login into the system with correct user ID and password
Inputs	User ID and password
Expected Outputs	Invalid Credentials
Test Procedure	Provide user ID and password not saved in the database.

3. Alcohol level detection

Purpose	To check the amount of alcohol content in the breath.
Inputs	Blow onto the device.
Expected Outputs	MORE/LESS than limit.
Test Procedure	Blow onto the device to check the alcohol content in the breath. If the value is found to be greater than the limit, the count of the user will be taken.

4. Heart Rate Detection

Purpose	To check the pulse of the driver

Inputs	Check the heart rate using heart rate sensor
Expected Outputs	MORE/LESS than limit
Test Procedure	We need to touch our thumb or finger to the heartbeat sensor and light detecting resistor or a photo-diode will start detecting the user 's heartbeat.

5. Location Tracking

Purpose	To track the location of the driver.
Inputs	Using SIM808 to get location of the user/driver
Expected Outputs	Getting the location
Test Procedure	The sensor will detect the latitude and longitude from where the user is found to be drunk-driving. When a user has alcohol consumption level greater than a certain limit, it automatically detects the coordinate of that location where the user was present.

6. Alert notifier

Purpose	Send notification alert.
Inputs	Based on previous modules.
Expected Outputs	Getting notification.
Test Procedure	It uses SIM808 which is a miniature cellular module which allows for GPRS transmission, sending and receiving SMS.

7. **Automatic cab pickup/drop**

Purpose	Book a cab for the driver/user.
Inputs	• A script which can book cab/driver for the user whose alcohol level is detected severely. • If the system does not receive any feedback from the alert notifier module, it means that none of the higher authority has responded to the alert notifier and the system automatically books a cab/taxi for the user and with the pickup and drop location fetched by location tracking module.
Expected Outputs	Booking a cab for the driver/user
Test Procedure	An automated script which can book a cab/taxi for the user whose alcohol level is detected severely (based on previous modules).

7.4 Test Logs

Test case ID	**Description**	**Input**	**Expected Output**	**Actual Output**	**Status**
TC-1	Can login with correct credentials and provide valid	username and password	Valid credentials	Valid credentials	Pass

	session				
TC-2	Cannot login with credentials	username and password	Invalid credentials	Invalid credentials	Pass
TC-3	Alcohol level detection	Breath of the driver	MORE/LESS than limit	MORE/LESS than limit	Pass
TC-4	Heart Rate detection	Touch your thumb or finger in heartbeat sensor	MORE/LESS than limit	MORE/LESS than limit	Pass
TC-5	Location tracking	Using SIM808 to get location of the user/driver	Getting location	Getting location	Pass
TC-6	Alert notifier	Based on previous models	Get notification	Get notification	Pass
TC-7	Automatic cab pickup/drop	An automated script which can book a cab/taxi for the user whose alcohol level is detected severely (based on previous modules).	Cab is booked to pick up the driver	Cab is booked to pick up the driver	Pass

Chapter 8
Conclusions and Scope for Future Work

This chapter presents the conclusion that will merge all the key points discussed in the thesis and also presents the difficulties faced in the development of the application and the plan going ahead along with

8.1 Conclusions

The system DAAC: Driver Assessment for alcohol consumption is an autonomous drunk driver detection and alerting system that detects the drunk driver situation of the vehicle with high level of certainty. The system is able to detect the drunk driver situation initially or during the driving condition and activates the alter mechanisms for local persons along with remote indication to the authorized persons. The main aim of the drunk driver detection system in DAAC is to decrease the chances of loss of lives in accidents occurring because of intoxicated drivers and hence improve public safety. Based upon the latest semiconductor gas sensing technology, satellite-based GPS system and high-speed GSM SIM808, the system is cost-effective, reliable, fast, at a distance measuring system that can be easily housed in a vehicle. The development cost of the device would be less than ₹1000. The design of the system is in compliance with the legal rules defined by the state government traffic and road safety governing bodies. Since the design is flexible, by resetting and locking different threshold levels the system can be used in many countries.

8.2 Scope for future work

In the coming years, such a system may become mandatory in vehicles and may also play a major role in making lives secure during driving. Such a system in a vehicle will help people to avoid drinking and also it will be useful to prevent kids from drinking and driving. It improves safety and security of the person on the road. This system reliability can further be enhanced by the use of multi-sensor fusion using breath-based sensors at different locations in the vehicle, touch based sensor like Near Infrared (NIR) tissue Spectroscopy which can detection blood

alcohol level, an application can be used to control whole system and get regular acknowledgment of the driver and of sensors. There is a possibility to incorporate other features such as maintaining records of driver, ensure more safety by assessing and detecting the alcohol levels during driving, etc.

References

1. Blomberg Richard D, Peck Raymond, Moskowitz Herbert, Burns Marcelline, Fiorentino Dary , “Crash Risk of Alcohol Involved Driving: A Case-Control Study”, R.C. Peck and Associates, Southern California Research Institute, 2005.

2. Lukas Scott E, Zaouk Abdullatif, Ryan Elizabeth, McNeil Jane, Shepherd Justin, Willis Michael, Dalal Neeraj, Schwartz Kelly, “Driver Alcohol Detection System for Safety (DADSS) - Preliminary Human Testing Results”, 25th International Technical Conference on the Enhanced Safety of Vehicles (ESV), Detroit Michigan, United States 2017.

3. Zhenlong Li, Xuewei Li, Xiaohua Zhao, and Qingzhou Zhang, College of Metropolitan Transportation, Beijing University of Technology, China,“Effects of Different Alcohol Dosages on Steering Behaviour in Curve Driving” Epub 2018 Aug 7.

4. Melanie Anthony,Ruchi Varia, Arjun Kapadia,Mrinmoyee Mukherjee, “Alcohol Detection System to Reduce Drunk Driving”, International Journal of Engineering Research & Technology (IJERT).

5. Alan Wayne Jones, Linköping University | LiU · Division of Drug Research, Department of Biomedical and Clinical Sciences,“The Relationship between Blood Alcohol Concentration (BAC) and Breath Alcohol Concentration (BrAC): A Review of the Evidence,ResearchGate”,Article Jan 2010.

6. Prof . Dr.D.G.Jha, Swapnil buva “Alcohol Detection in Real-Time To Prevent Drunk Driving” IOSR Journal of Computer Engineering (IOSR-JCE) ,PP 66-71.

7. Hironori Wakana,Masuyoshi Yamada, “Portable Alcohol Detection System for Driver Monitoring”, 27- 30 Oct. 2019.

8. Piyush Vinay Phalak1, Shashank Kowekar 2 and Shruti Joshi3,“Smartphone and Sensor Based Drunk Driving Prevention System”,INTERNATIONAL JOURNAL FOR RESEARCH IN EMERGING SCIENCE AND TECHNOLOGY, VOLUME-2, ISSUE-9, SEP-2015.

9. Vasundhara Ramireddy, G. Varsha, A. Sharath Kumar, “ALCOHOL DETECTION AND VEHICLE

10. https://www.newindianexpress.com/lifestyle/health/202 1/oct/07/sobering-effect-on-drunk-driving-and-awareness-2368705.html

11. https://timesofindia.indiatimes.com/city/mumbai/no-breathalyzers-cops-plan-to-sniff-out-drunk-drivers/articleshow/79963983.cms.

12. https://theprint.in/india/maharashtra-govt-suspends-breath-analyser-tests-due-to-coronavirus/382389/

13. https://www.sae.org/publications/technical-papers/content/2016-01-1498/

14. https://www.sciencedirect.com/topics/nursing-and-health-professions/breath-alcohol-analyze

15. https://www.electronicwings.com/sensors-modules/gps-receiver-module

16. https://www.circuitdigest.com

17. https://patents.google.com/

18. https://www.ncbi.nlm.nih.gov/

19. https://www.strawdogs.co/2018/06/MQ-Gas-Sensors-List/

20. https://www.shindengen.com/products/electro/motorcycle/dccdi

21. https://www.researchgate.net

Author's Publications

Acknowledgement

The successful implementation of the project and its final observed results required thorough and constant guidance and we are extremely privileged to have received that all along the duration of project. All that we have accomplished at the end of this tenure was only possible because of such supervision and assistance and we cannot forget to thank the ones who have directly or indirectly helped us through this journey. We respect and thank our project guide **Prof. Sagar Korde**, who provided us with an opportunity to do the project work and gave us all the support and guidance which made us complete the project in due time and satisfactory manner. We are extremely thankful for providing such a great support system, although she had a busy schedule managing the college affairs and different activities. We owe our deep gratitude for taking keen interest in our project work, encouraging and guiding us all along, till the completion of our project by providing all the necessary information for developing a good system.