SHEHRYAR AHMAD GILL
01-134161-057
ZEESHAN ALI
01-134161-066

Accident Intimation System Using Android Phone

Bachelor of Science in Computer Science

Supervisor: Syed Hassan Tanvir

Department of Computer Science
Bahria University, Islamabad

November 2019

Certificate

We accept the work contained in the report titled "ACCIDENT INTIMATION SYSTEM USING ANDROID PHONE", written by Mr. SHEHRYAR AHMAD GILL AND Mr.ZEESHAN ALI as a confirmation to the required standard for the partial fulfillment of the degree of Bachelor of Science in Computer Science.

Approved by . . . :

Supervisor: Mr. Syed Hassan Tanvir (Lecturer)

_____

Internal Examiner: Mr. Ghulam Ali Mirza (Sr. Assistant Professor)

_____

External Examiner: Mr. Jawad Bashir

_____

Project Coordinator: Ms. Zubaria Inayat (Lecturer)

_____

Head of the Department: Dr. Muhammad Muzammil (Sr. Associate Professor)

_____

November 11^{th}, 2019

Abstract

Traffic accidents are one of the leading causes of fatalities in the world. An important indicator of survival rates after an accident is the time between the accident and when emergency medical personnel are dispatched to the scene. One approach to eliminating the delay between accident occurrence and first responder dispatch is to use in-vehicle automatic accident detection and notifications systems which senses when traffic accident occur and immediately notify emergency personnel. These in-vehicle systems, however, are not available in all cars and are expensive to retrofit for older vehicles. The problem is that no such system in place for locating or identifying where and when accident is taking place and responding to the ones in charge of road accident emergencies. The time by which police and emergency medical team approaches to accidental place, by that time usually many lives are lost because the time taken by information to approach rescue teams are more enough. Therefore the main objective of the project is to come up with a system that could report the accident, give the actual location of the accident area and respond to emergency responder's in short time. This project therefore introduces the usage of automatic accident detection and notification systems such as use of mobile phones example smart phones that can be used to indirectly report accidents through the sensors such as GPS and other developed related applications. We are also developing and implementing the combination of the technologies such as GPS/GSM in order to come up with an overall solution of giving a rescue to injuries from road accidents

Acknowledgments

We sincerely thanks to Syed Hassan Tavir, Lecturer, Department of Computer Science, for providing us the opportunity to do this project " ACCIDENT INTIMATION SYSTEM USING ANDROID PHONE". We are also very thankful to Shehroz Ahmed, Muhammad Talha and Usama Aftab for helping us through our project and also guide us to take the project in the right way. Their participation is sincerely appreciated and gratefully acknowledged for completing this project.

SHEHRYAR AHMAD GILL
ZEESHAN ALI
Islamabad, Pakistan

November 2019

"We all make mistakes, have struggles, and even regret things in our past.
But you are not your mistakes, you are not your struggles,
and you are here NOW with a power to shape your day and future."

Steve Maraboli

Contents

Abstract i

1 Introduction 1
- 1.1 Problem Statement . . . 1
- 1.2 Overview . . . 2
- 1.3 Accident Causes . . . 2
- 1.4 Aims . . . 3
- 1.5 Objectives . . . 3
- 1.6 Applications . . . 3
- 1.7 Targeted Market . . . 4

2 Literature Review 5
- 2.1 History . . . 5
- 2.2 Previous Proposed Systems . . . 5
  - 2.2.1 e-Notify . . . 6
  - 2.2.2 Telematics Model . . . 6
- 2.3 Generations Description . . . 6
  - 2.3.1 First Generation (1G) . . . 6
  - 2.3.2 Second Generation (2G) . . . 6
  - 2.3.3 Third Generation (3G) . . . 7
  - 2.3.4 Fourth Generation (4G) . . . 7
- 2.4 Global Positioning System (GPS) . . . 7
  - 2.4.1 Working of GPS . . . 7
  - 2.4.2 Trilateration . . . 8
- 2.5 Location . . . 8
  - 2.5.1 Latitude and Longitude . . . 8

3 Requirement Specifications 10
- 3.1 Existing System . . . 10
- 3.2 Proposed System . . . 10
- 3.3 Requirements . . . 10
  - 3.3.1 User Scenario . . . 11
- 3.4 Functional Requirements . . . 11
- 3.5 Non-functional Requirements . . . 12
  - 3.5.1 Availability / Reliability Requirements . . . 12
  - 3.5.2 Efficiency Requirements . . . 12
  - 3.5.3 Security Requirements . . . 12

3.5.4 Usability Requirements . . . 12
3.5.5 Modifiable . . . 12
3.6 Use Case . . . 13

4 Design **14**
4.1 Description . . . 14
4.2 Basic Design . . . 15
4.3 Software Implementation . . . 15
4.3.1 Programming of Android . . . 16
4.3.2 Programming of Aurdino . . . 16
4.4 Hardware Implementation . . . 16
4.4.1 Accelerometer . . . 16
4.4.2 Gyro Sensor . . . 16
4.4.3 GPS . . . 17
4.4.4 Bluetooth . . . 17
4.5 System Diagrams . . . 17

5 System Implementation **23**
5.1 Overview . . . 23
5.2 Application . . . 23
5.2.1 Security Perspective . . . 24
5.2.2 Hardware Perspective . . . 24
5.3 System Internal Components . . . 24
5.3.1 Login . . . 24
5.3.2 Finding Location . . . 24
5.3.3 Alert Generation . . . 24
5.4 Tools and Technologies . . . 24
5.5 Milestones . . . 25
5.5.1 Modifications . . . 25

6 System Testing and Evaluation **26**
6.1 Approahces for Testing . . . 26
6.2 GUI Testing . . . 26
6.2.1 Test Case for GUI . . . 27
6.2.2 Forms GUI Test Case . . . 27
6.3 Usability Testing . . . 27
6.4 Performance Testing . . . 28
6.4.1 Performance Test Case . . . 28
6.5 Compatibility Testing . . . 28
6.6 Security Testing . . . 29

7 Conclusions **30**

8 User Manual **31**
8.1 Accident Intimation System . . . 31

References **48**

List of Figures

1.1 Conventional System 2

2.1 Road Accidents 5
2.2 Generations 7
2.3 GPS Trilateration 8
2.4 Latitude 9
2.5 Longitude 9

3.1 System Use Case 13
3.2 Use Case Description 13

4.1 General System 14
4.2 General Block Diagram 15
4.3 Hardware 18
4.4 Sequence Diagram 19
4.5 Flow Chart 20
4.6 Level 0 DFD 21
4.7 Activity Diagram 22

6.1 GUI Test Case 27
6.2 Forms GUI Test Case 27
6.3 Usability Test Case 28
6.4 Performance Test Case 28
6.5 Compatibility Test Case 29
6.6 Security Test Case 29

7.1 Pie Chart 30

8.1 Application front page 32
8.2 Admin Login Pane 33
8.3 Authenticate Login 34
8.4 User Panel 35
8.5 User Car Details 36
8.6 Update User Car Details 37
8.7 Sending SMS 38
8.8 Message Sent 39
8.9 Accident Details 40
8.10 Accident Location 41

8.11 Accident Route Location 42
8.12 Bluetooth App Front Page 43
8.13 Transmitting Bluetooth Module Data 44
8.14 Transmitting Data 45
8.15 Connected to Bluetooth Module 46
8.16 Connecting to Bluetooth Module 47

Acronyms and Abbreviations

GSM	Global System for Mobile
GPS	Global Positioning System
SMS	Short Message Service
GPRS	General Packet Radio Service
FDMA	Frequency Modulation
WIFI	Wireless Fidelity
UTM	Universal Transverse Mercator
IDE	Integrated Development Environment
OS	Operating System
PC	Personal Computer
GUI	Graphical User Interface

Chapter 1

Introduction

The project is for the saving of precious lives getting affected by road accidents mostly occurred due to over speeding or through rash driving. The focus of our project is that how we save the human lives after they met with an accident, for that purpose we want to introduce a system called "Accident Intimation System". The system containing accelerometer and gyroscope which sense an accident and these sensors are already present in the android phone. The android phone send a message to the nearest available ambulance service. Through this project, a person affected by the accident of his/her android phone connected with the hardware device that can inform the concerned person so that he/she can get aid in time.

1.1 Problem Statement

Following are the main reasons which forced us to propose such system:

- Increasing death and injury rate in road accidents.
- Most of deaths occur due to unavailability of medication in time.
- Most of causalities in Pakistan are due to road accidents so this alarming situation encouraged us to select that project to save human lives.
- Another problem which occurred was the research told that ancient projects focused on GSM and GPS module mostly with pressure and temperature sensors. As it included more of hardware, malfunctioning was not easy to handle.
- In the present era most of the death causes are car accidents so the society needs an automated accident system to save the lives of the humans.

Most of causalities in Pakistan are due to road accidents so this alarming situation encouraged us to select that project to save human lives. The research told that ancient projects focused on GSM and GPS module mostly with pressure and temperature sensors.

1.2 Overview

Accident detection systems help reduces fatalities stemming from car accidents by decreasing the response time of emergency responders. Smartphones and their onboard sensors (accelerometers) are promising platforms for constructing such systems. It is a system which uses Android Phone to save human life by sending a message instantly when accident occurs. Human life is precious, in order to provide instant help this system has been developed. Car accident detection system is a type of application that conatins the automated system which contain sensors that detect the accident and send the notifications to the concerned departments and to the concerned persons.. Figure 1.1 show a conventional system

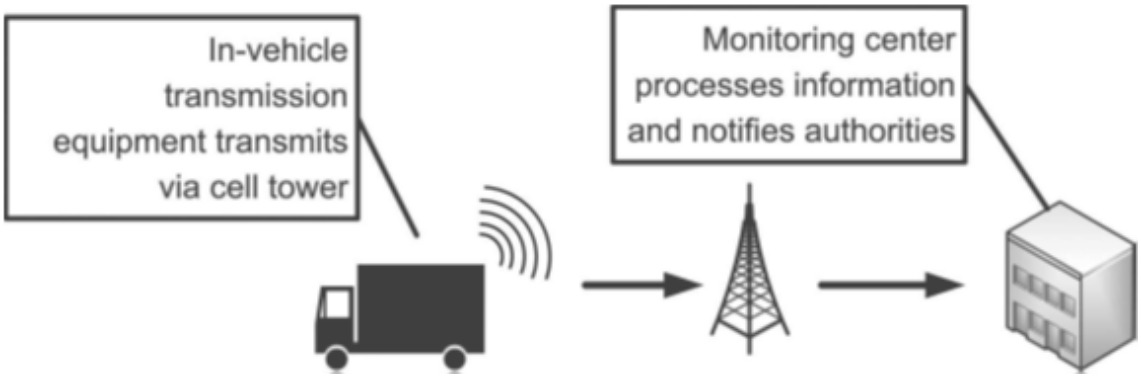


Figure 1.1: Conventional System

1.3 Accident Causes

Accident occurrence is very common and has many causes.Accident can be occurred due to high speed (break fail), due to high temperature (engine burning), due to rapid change in acceleration and orientation (a sudden jerk and turtling).When any personal health issue occurs to the driver e.g. unconscious or minor heart attacks or any criminal act can produce harm to driver or the vehicle e.g. robbery etc.

1.4 Aims

The aims are as follows:

- To make an environment sensitive system so that it can sense any kind of change in environment by using limited sensors to avoid complexity but they covers all the parameters almost.
- Above all to send a message to any desired number.
- To send exact location of the vehicle.
- To program the aurdino according to system's need.
- Interface android phone by using a Bluetooth module.
- To design a system applicationfor the android users. In this way the user using product can have a record of his cars accident.

1.5 Objectives

Basic objectives of this accident detection system are as follows:

- Cost effective system
  It should be cost effective so that it can be purchased by any car owner.
- Real time
  It should be real time so that there is no delay in sending message due to any factor.
- Multitasking
  It should be compatible enough to send message to two numbers, it should be able to send location too.

1.6 Applications

This system has its best applications in following fields:

- Accident Detection.
- Automotive and transport vehicles.
- Security, remote monitoring, transportation and logistics.

1.7 Targeted Market

Following two entities can get the maximum advantage out of this project:

- Vehicle industries
- Vehicle owners

Target market indicates the area of society interested in the project and as it is a security system for vehicles so vehicle owners and industries looking forward to enhance features in their upcoming models of vehicles should be interested in such cost effective and real time systems.

Chapter 2

Literature Review

2.1 History

In past few decades, there is a rapid increase in the mannufacturing of vehicles . In this way the no of accidents also increases that led to the loss of precious human lives. The figure 2.1 shows the no. of road accidents and the death rate.

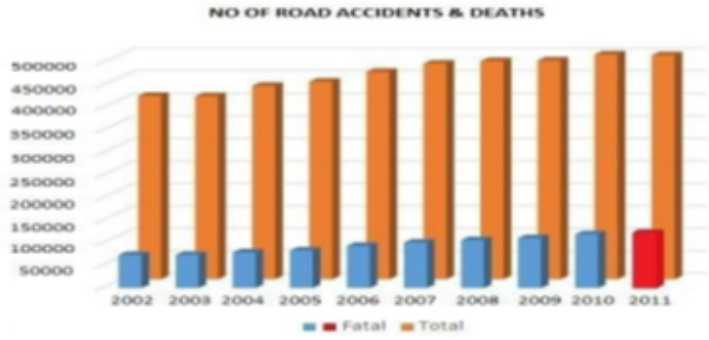


Figure 2.1: Road Accidents

2.2 Previous Proposed Systems

The projects which are taken by the institutes based on researches and those researches mainly focus on the inter vehicle communication system and do not focus on the safety of the human lives. By considering the systems that are working around the world whether it is based on wired system or wireless system which help us to make another application system. Those projects that are related to our proposed system are given below:

2.2.1 e-Notify

The computer scientist Manuel Fogue and his project partners suggest and develop a system called e-Notify, the main idea of the proposed system is to save the human lives and make sure to minimize the death rates. The system offers automated detection which consist of reports that facilitates the driver that was offerewd by this e-Notify Technology.

2.2.2 Telematics Model

There is another model called Telematic model which was introduced by Tanushree Dalai. Tha model is consist of the main three modules and that are:

- Track the location of the accidental vehicle with the help of GPS.
- After that the information that is received through GPS is sending to the Telematic Operator Server via GPRS.

2.3 Generations Description

In the past few years there is a rapid evolution in the IT and the Wireless Industry and these industries working alot in networking areas and the services that they provide. So, they have come with a concept of advancement in technologies. Those technology generations are given below:

2.3.1 First Generation (1G)

First Generation (1G) was straightforward and short range transmitter. NMT, TACS and (later on) AMPS were its outstanding basic systems. Directly off the bat its information transmission was 40MHz and repeat was 800-900MHz, later on 10MHz was added to AMPS to manufacture viability. It had 832 channels and data rate was 10 Kbps. Its most noteworthy shortcoming was its Omni heading. It used Repeat Change (FDMA).

2.3.2 Second Generation (2G)

Second Generation (2G) had various inclinations over First Generation (1G). It reinforced low piece data rate, talk organization, high adequacy range and advance wandering. It uses DMT, TDMA and CDMA. Movement in 2G familiar GSM that leads with 2.5G. Central parts of GSM were BSS, NSS, MSC, VLR, HLR and EIR. Its data rate was 9.6kbps and it had central purposes of fax and fixed correspondence frameworks.

2.3.3 Third Generation (3G)

Third Generation (3G) give organizations free of development stage and plan measures are around the world. IMT2000 is TU-T name of Third Generation (3G) cdma2000 is name of America 3G variety. It included WCDMA I-e air interface development.

2.3.4 Fourth Generation (4G)

In light of new developments in versatile correspondence and greater customer demand there considers Fourth Generataion (4G). Organizations are GSM, GPRS, IMT-2000, WIFI and Bluetooth. It's humble and data move rate is much snappier. Figure 2.2 shows the different generations:

1	1G	FDMA based analog radio systems e.g. AMPS
2	2G	TDMA based digital systems , introduced voice compression e.g. GSM
3	3G	Greater capacity and spectral efficiency, e.g. CDMA
4	4G	All IP , LTE , Heterogeneous networks

Figure 2.2: Generations

2.4 Global Positioning System (GPS)

The Overall Arranging System (GPS) is a space-based satellite course structure that gives region and time information in all atmosphere, wherever on or near the Earth, where there is an unrestricted noticeable pathway to at any rate four GPS satellites. It is kept up by the US government and is straightforwardly accessible by anyone with a GPS beneficiary. A GPS authority can tell its own circumstance by using the position data of itself, and differences that data and in any event 3 GPS satellites.

2.4.1 Working of GPS

To get the distance to each satellite, the GPS transmits a signal to each satellite.

- The signal travels at a known speed.
- The system measures the time delay between the signal transmission and signal reception of the GPS signal.
- The signals carry information about the satellite's location.
- Determines the position of, and distance to, at least three satellites, to reduce error.

2.4.2 Trilateration

The one who receives the information computes position using trilateration. Figure 2.3 shows the GPS Trilateration:

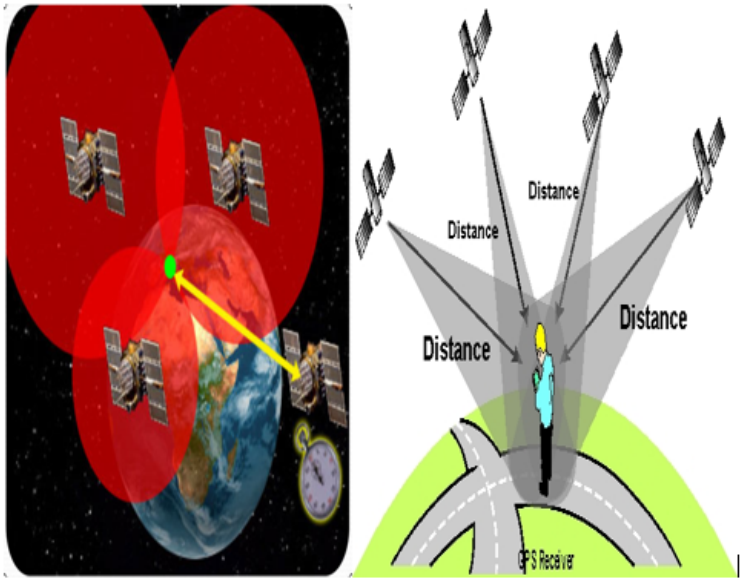


Figure 2.3: GPS Trilateration

2.5 Location

GPS system usually consist of two main formats that are given below:

- Longitude and Latitude
- Universal Transverse Mercator (UTM)

2.5.1 Latitude and Longitude

Figure 2.4 shows the latittude and figure 2.5 shows the longitude of the location:

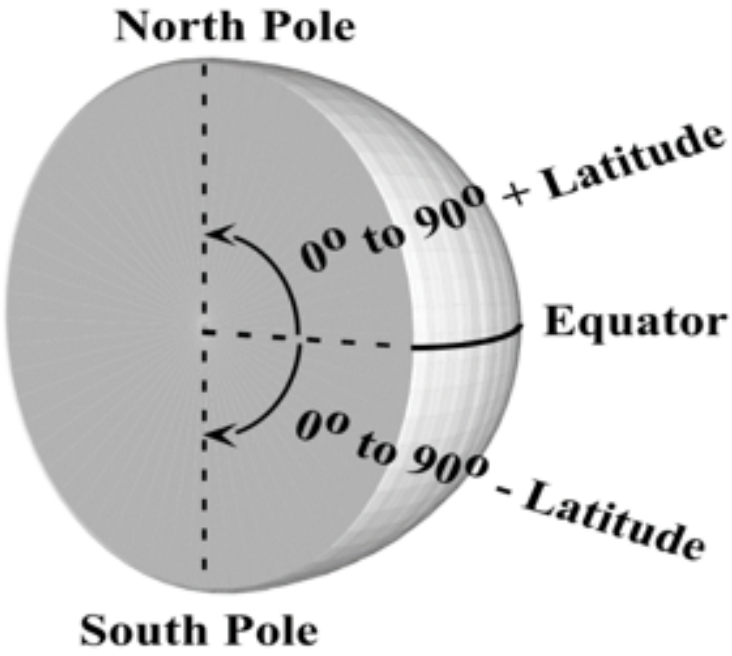


Figure 2.4: Latitude

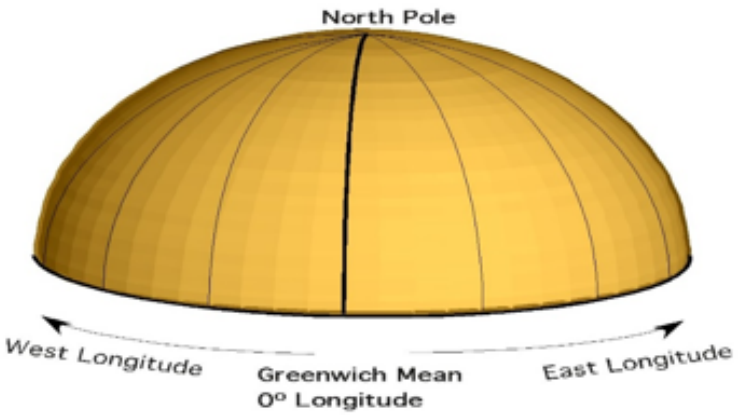


Figure 2.5: Longitude

Chapter 3

Requirement Specifications

3.1 Existing System

Different analyze adventures held by investigate associations and vehicle makers around the world have been focusing on bury vehicle correspondence structures. Considering generally speaking structures for emergency uncovering paying little regard to their particular procedure whether it's wired or remote, portrayed the strong focuses about our proposed systems.

3.2 Proposed System

To design a system which can send a message and location to the desired phone number whenever any kind of accident occurs to the car by using a simple set of components and the complexity is reduced by making research on advance technologies so that system can be updated. With the automatic car detection system we can save the priciouse human lives that decreases the causes of death and on time notification to concerned departments and persons. Most of causalities in Pakistan are due to road accidents so this alarming situation encouraged us to select that project to save human lives. The research told that ancient projects focused on GSM and GPS module mostly with pressure and temperature sensors.

3.3 Requirements

Before developing any system the first thing that needs to be done correctly is requirements specification.

3.3.1 User Scenario

The user interaction with the system is an essential scenario. The User Scenarios of the project are as follow:

- The developer should have the complete control over the application because whenever the updation is required so, the developer can easily manage all the operations.
- The technical user have complete control on the hardware module and application.
- The non-technical user uses that system according to their need for the ssafety purposes.

3.4 Functional Requirements

The functional requirements of the system are listed below:

- The authorize user should enter in to the system.
- The system provide the GPS which helps the concerned persons to reach to the incident as soon as possible.
- The authorize user should always connect with the internet and also connect with the bluetooth of the mobile phone and always on the location of the phone.
- The system can calculate the speed of the vehicle.
- If a new user wants to install the application then he/she should contact to the authorized persons because the application is integrated with the hardware.
- If the system is heat up then the there is a buzzer in the hardware that rings at that time.
- The built in contacts in system should contact with the emergency responders on time.
- The system should send the message to the cencerned persons along with the longitude and latitude of the location.
- The system also send the link with the message and when the receivers click on that link then the google maps show the path that goes to the accidental area.
- The mobile should have the strong signal strength at every time.

3.5 Non-functional Requirements

3.5.1 Availability / Reliability Requirements

- The proposed system is a mobile application , everyone uses mobile phones therefore they can easily use its facilities.
- In case of any system failure the maintenance time should not exceed 2 days .
- The system should serve 24/7 there should not be any downtime.

3.5.2 Efficiency Requirements

- Location should be detected accurately.
- The system should only the authorizes persons because that application contains hardware as well that why only authorize persons use that.

3.5.3 Security Requirements

- User validation should be done through authorized user name and pass- word.
- The application contains the hardware module thats why its secure.

3.5.4 Usability Requirements

- The user interface should be easy and understandable by the user .
- New user registration should be taken through the authorized persons.
- System should not remember user information next he/she login to the application to save time.

3.5.5 Modifiable

- The system should flexible and should be able to be modified at any time.
- The system should be portable enough to be moved to a new server with minimum downtime.

3.6 Use Case

The Main use case diagram includes the overall system operations and func- tions of the whole system which includes two major actors (Victim and Responser) as shown in below figure 3.1.

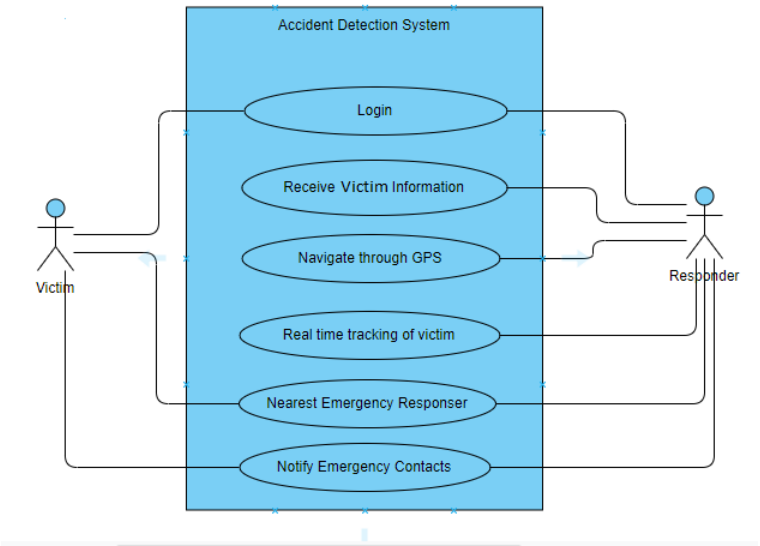


Figure 3.1: System Use Case

The description of the use case is shown in figure 3.2:

Name	Accident Detection System
Actors	Victim, Responder
Pre-conditions	The Accident Detection System use case has completed successfully.
Post-conditions	• Receive victim information • Navigate through GPS • Real time tracking of victim • Nearest emergency responder notify emergency contacts
Main Scenario	• Car met an accident • Automatic emergency alert generated • Notify to the concerned authorities • On heat up system generate emergency alarm
Alternative	• GPS of the android phone is off the system show pop up message.
Assumptions	The GSM is available everywhere.

Figure 3.2: Use Case Description

Chapter 4

Design

4.1 Description

The application system is available only for the Android Phones.To design a system which can send a message and location to the desired phone number whenever any kind of accident occurs to the car by using a simple set of components and the complexity is reduced by making research on advance technologies so that system can be updated. With the automatic car detection system we can save the priciouse human lives that decreases the causes of death and on time notification to concerned departments and persons. Most of causalities in Pakistan are due to road accidents so this alarming situation encouraged us to select that project to save human lives. The research told that ancient projects focused on GSM and GPS module mostly with pressure and temperature sensors. The proposed application ayatem calculate the the accident location with the help of latitude and longitude. Figure 4.1 shows the General System.

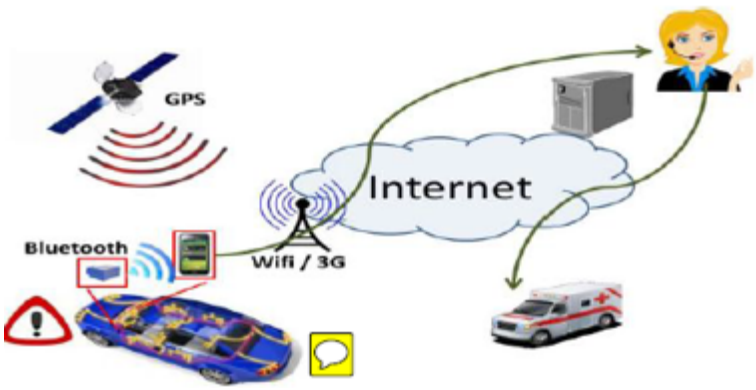


Figure 4.1: General System.

To understand the basic methodology of system several papers and blogs were studied. Collectively all the study resulted in a mechanism having aurdino as the central processing unit and three sensors which are described in components details section along with bluetooth and android phone.

4.2 Basic Design

The basic aim of Accident detection system is to send a message with precise location and taking in account all the parameters of vehicles. A very accurate system needs to be designed which is very flexible and has high tolerance. We want the basic component i.e. aurdino to collect data from temperature sensor and then interpret according to the described logic. Aurdino needs to collect and compile data of temperature sensor and send it to mobile application via bluetooth. With the advancement of technology we are blessed with Android smart phones which have ability to sense the change in acceleration speed and orientation of any body. Using this feature we wanted to reduce the hardware and we used sensors of a smart phone. The acceleration sensor of the android phone have high numerical values so, in our scenario we consider fourth part of the max acceleration because our detection medium is android phone and according to the set threshold, it notifies if the acceleration is increased according to the logic applied. The logic varies according to the medium that contains the Accident Detection System. The interfacing between the hardware and software is accomplished by a Bluetooth module. The Bluetooth module by connecting with the smart phone sends and receives data from it as well as it connects with the PC via aurdino. Figure 4.2 shows the General Block Diagram of the system.

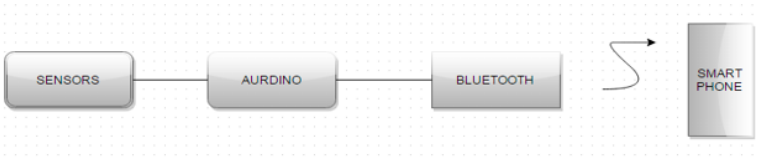


Figure 4.2: General Block Diagram

4.3 Software Implementation

The software implementation was the major part of this project. The basic objective was to use minimum hardware and maximum software to allow its use in normal days with great ease. The software implementation consist of two major parts:

- Programming of android application

- Programming of Aurdino (hardware back-end coding)

4.3.1 Programming of Android

The programing of android was accomplished by using software of Eclipse (2019-06). Eclipse is an Integrated Development Environment (IDE) in the field of computer. It also contains Android Plugin that enable us to create an Android Application.

4.3.2 Programming of Aurdino

Android is a mobile operating system (OS) based on the Linux kernel and currently developed by Google. With a user interface based on direct manipulation, Android is designed primarily for touchscreen mobile devices such as smartphones and tablet computers, with specialized user interfaces for televisions (Android TV), cars (Android Auto), and wrist watches (Android Wear).

4.4 Hardware Implementation

Hardware implementation includes the hardware part of project which was tried to minimize by using only one external sensor and a switch.
Hardware components are as follows:

4.4.1 Accelerometer

An accelerometer is a device that assessments suitable accelerating ("g-control"). Authentic accelerating isn't equal to sort out expanding speed (pace of progress of speed).
For example, an accelerometer still outwardly of the Earth will evaluate an expanding speed g= 9.81 m/s2straight upwards. Incomprehensibly, accelerometers in free fall circumnavigating and stimulating on account of the gravity of Earth will evaluate zero.

4.4.2 Gyro Sensor

It is used in identifying the exact change. It is used in following manner:
Sense the proportion of exact speed produced. It is used in assessing the proportion of development itself for instance checking athletic movement. The resources exact speed conveyed by the sensor's own special improvement. The edges are perceived by methods for joining exercises by a CPU.

4.4.3 GPS

The Global Positioning System (GPS) is a space-based satellite course system that gives region and time information in each and every atmosphere condition, wherever on or near the earth where there is an unrestricted visible pathway to at any rate four GPS satellites.

4.4.4 Bluetooth

Bluetooth is a remote development standard for exchanging data over short partitions (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz[4]) from fixed and mobile phones, and building singular area frameworks (Dish). Made by telecom dealer Ericsson in 1994, it was at first considered as a remote choice rather than RS-232 data joins. It can relate a couple of contraptions, beating issues of synchronization.

4.5 System Diagrams

Figure 4.3 shows the Hardware, figure 4.4 shows the Sequence Diagram and figure 4.5 shows the Flow Chart of the system.

Figure 4.3: Hardware

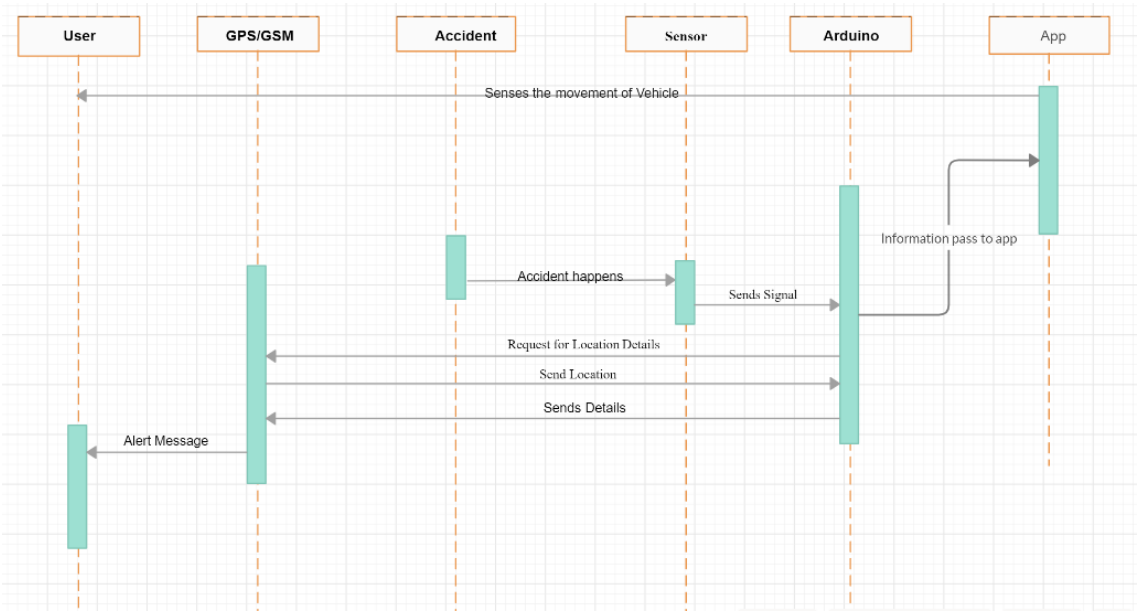


Figure 4.4: Sequence Diagram

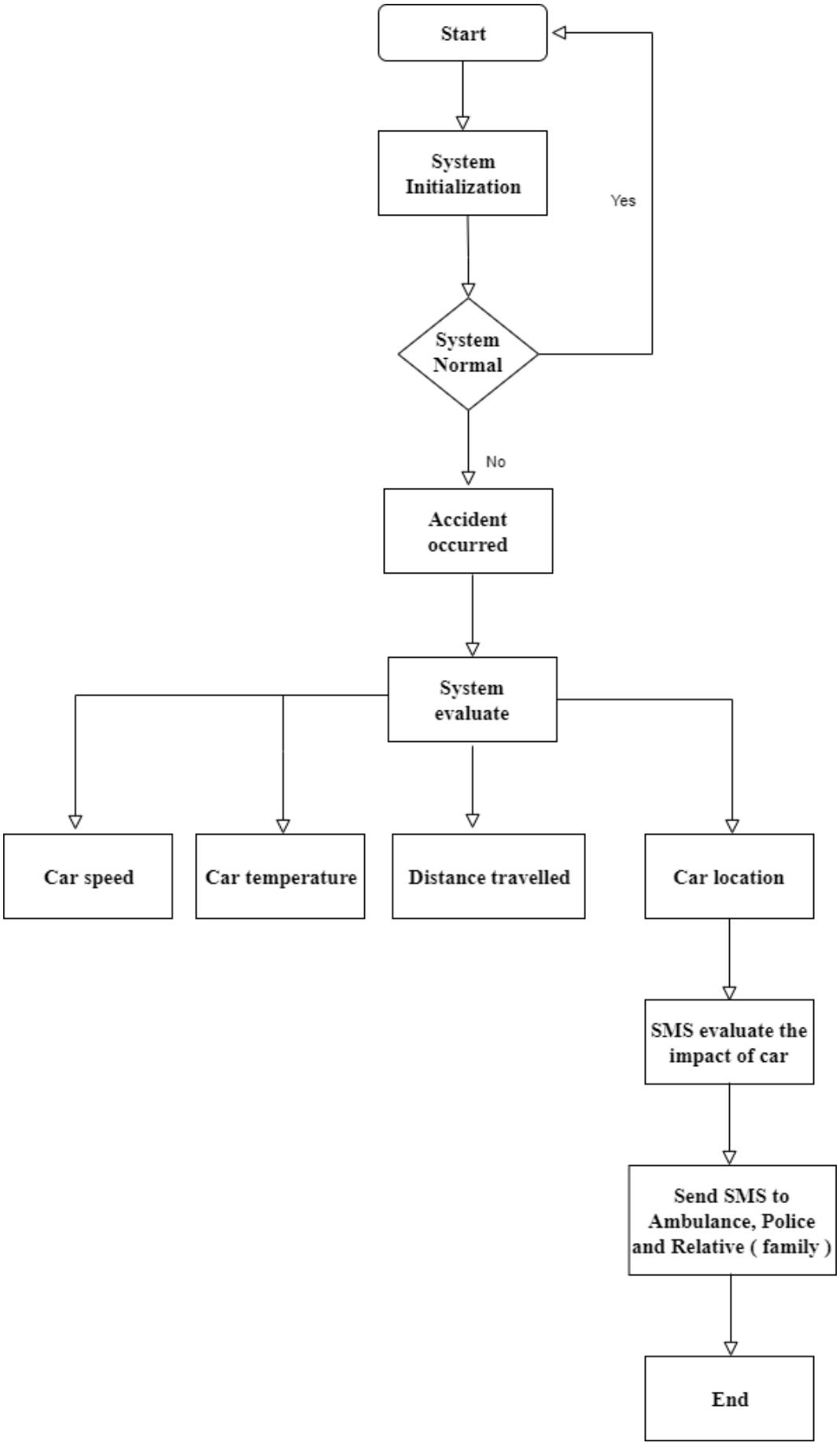


Figure 4.5: Flow Chart

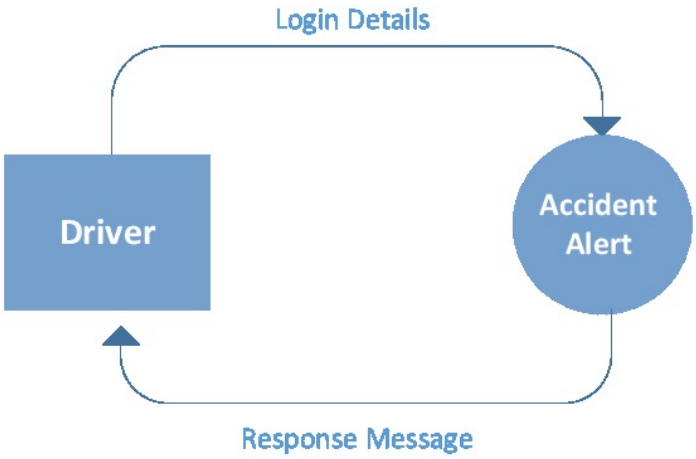


Figure 4.6: Level 0 DFD

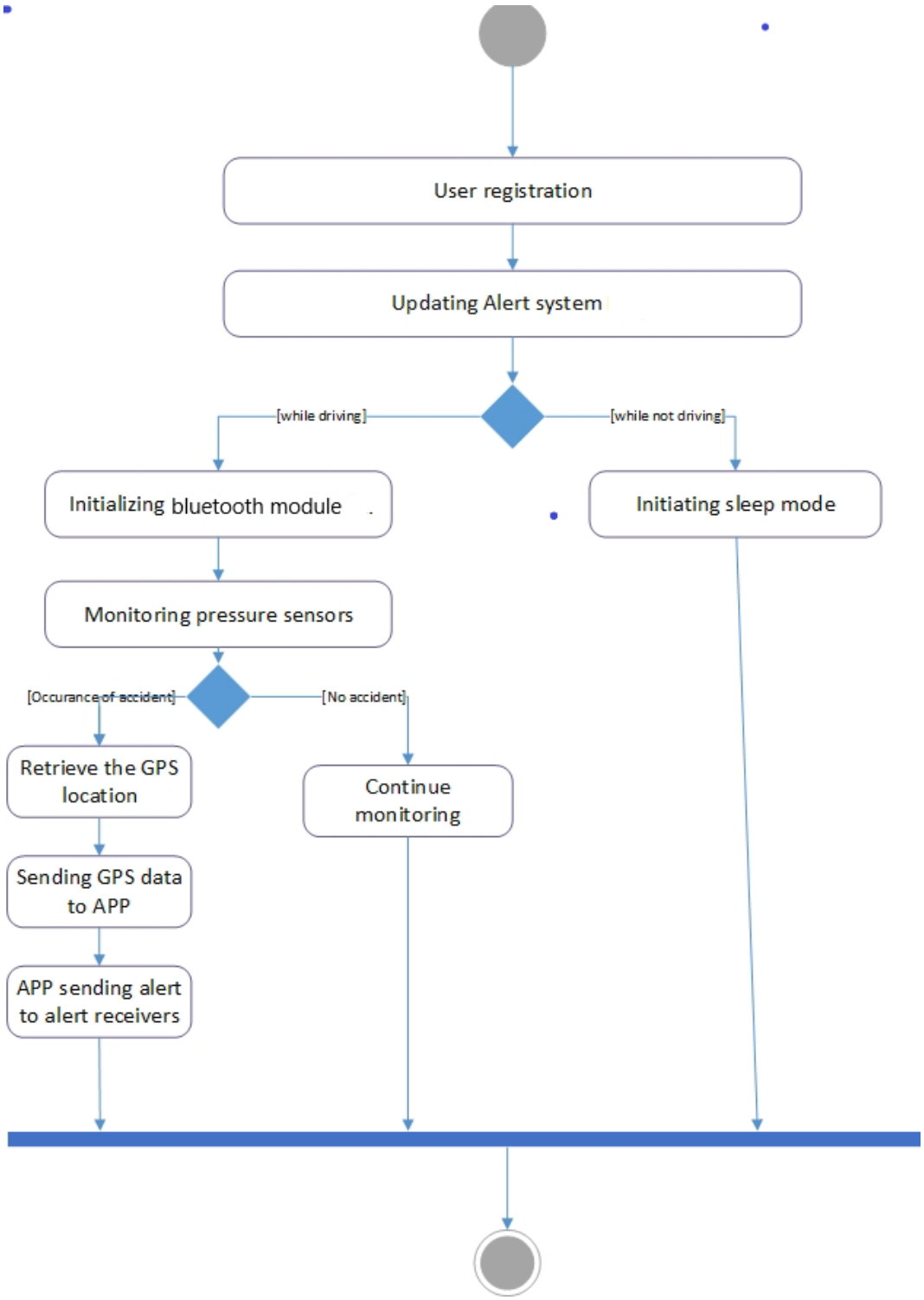


Figure 4.7: Activity Diagram

Chapter 5

System Implementation

5.1 Overview

As it is a system used for security purposes specially in the vehicles so, it founds its major applications in the field of vehicles. In vehicles this system fulfills several functions that are given below:

- Sophisticated security
- Monitors all hazards and threats
- Alert message to mobile phone for remote information
- Mobile number can be changed at any time

5.2 Application

The applications contains the fiollowing :

- Time efficiency
- Instant alert
- Life safety
- Accident Detection
- Security Surveillance
- Automotive and transport vehicles
- Security, remote monitoring, transportation and logistics

5.2.1 Security Perspective

Using Android Phone to save human life by sending a message instantly when accident occurs. Human life is precious, in order to provide instant help this system has been developed to serve humanity.

5.2.2 Hardware Perspective

- This project tackles accidents so we will use Android phone and sensors as principle hardware.
- To sense the accident, sensors will be used and microcontroller will process the sensed synced data.
- A real time system responding in time to avoid any catastrophe.

5.3 System Internal Components

5.3.1 Login

The user enter the username and password that is provided by the administration and authenticate the user login.

5.3.2 Finding Location

If the car met an accident, through GPS the current location of the victim is fetched in the form of longitude and latitude.

5.3.3 Alert Generation

When a car met an accident the system automatically send a message which contains the location of the incident.

5.4 Tools and Technologies

Hardware:

- Arduino
- Bluetooth module
- Buzzer
- Android Phone

Software:

- Arduino IDE
- Eclipse IDE

Technology:

- Accelerometer
- Gyro
- GPS

5.5 Milestones

Firstly we will do the research work related to this project to get a better understanding about the design and implementation then we will go to hardware implementation along with software work and at the end, we will do the interfacing to get best of it.

5.5.1 Modifications

- The application also calculates the speed of the vehcile and the distance travelled by the car.
- The bluetooth sends the data of the temperature sensor to the application so, the driver notify about temperature of the cars engine.
- A buzzer is introduced in the system that generates emergency alarm if the temperature of the engine is heating up.

Chapter 6

System Testing and Evaluation

Security aspects for any kind of applications are very important where alot of hackers wants to enter in the system so, if we are not fulfill the security parameters then the product become a flop product because now a days every user wants security.

6.1 Approahces for Testing

In the given section Approaches for Teesting should be evaluated. There aren some test cases that heve been described in the next few sections .
The test cases that we will covereed in this chapter will be:

- GUI Testing
- Usability Testing
- Performance Testing
- Comptibility Testing
- Security Testing

6.2 GUI Testing

In GUI Testing the application user interface is tested that either the application is working as per requirements or not. This testing is done by carrying out a number of tassks and compiring that obtained result with requirements that we defined in proposal .

6.2.1 Test Case for GUI

The general GUI test case:

Test Case ID	TC-1
Description	Tests the GUI
Applicable For	Android (Lollypop (5.1) – Pie (9.1))
Initial Conditions	Equipment is as set up as per requirements
Steps	**Tasks and Results**
1	Open the application: **PASS**
2	Verify that all the tabs are working properly: **PASS**
3	Checks for internal links and buttons working properly: **PASS**

Figure 6.1: GUI Test Case

6.2.2 Forms GUI Test Case

Test Case ID	TC-2
Description	Tests the GUI
Applicable For	Android (Lollypop (5.1) – Pie (9.1))
Initial Conditions	Equipment is as set up as per requirements
Steps	**Tasks and Results**
1	Open the Login Page: **PASS**
2	Verify that the login button working properly: **PASS**
3	Checks for invalid username and password: **PASS**
4	Verify that each selection in every manner is working properly: **PASS**

Figure 6.2: Forms GUI Test Case

6.3 Usability Testing

The Usability Testing helps in identifying the dsign and userinterface related issues in the system. The main purpose of this testing is to identify the UI/UX related issues in the system.

Test Case ID	TC-3
Description	Tests the usability of system
Applicable For	Android (Lollypop (5.1) – Pie (9.1))
Initial Conditions	Equipment is as set up as per requirements
Steps	**Tasks and Results**
1	Verify that button, icons are relatable to user: **PASS**
2	Verify that user can easily navigate: **PASS**
3	Verify that user satisfy about the features: **PASS**
4	Verify that user can easily complete tasks: **PASS**

Figure 6.3: Usability Test Case

6.4 Performance Testing

The Performance Testing includes the processes of identifying the system speed responsiveness and system stability of the application. It helps in identifying the performance peoblem by giving the hidhlights that where an application might faail or down or what are the lags in the application.

6.4.1 Performance Test Case

Test Case ID	TC-4
Description	Tests the performance of the system
Applicable For	Android (Lollypop (5.1) – Pie (9.1))
Initial Conditions	Equipment is as set up as per requirements
Steps	**Tasks and Results**
1	Verify that the load time of the application is minimum: **PASS**
2	Verify that response time is very small: **PASS**
3	Verify that user satisfy about the performance: **PASS**
4	Verify that application works well under slow connection: **FAIL**

Figure 6.4: Performance Test Case

6.5 Compatibility Testing

Compatibility Testing is the type of software testing which is used to test whether the softwware can run on other hardware , operating systems and mobile devices etc.

Test Case ID	TC-5
Description	Tests the compatibility of the system
Applicable For	Android (Lollypop (5.1) – Pie (9.1))
Initial Conditions	Equipment is as set up as per requirements
Steps	Tasks and Results
1	Verify that application can run on Android: **PASS**
2	Verify that application run on IOS: **FAIL**
3	Verify that application run on Windows Phone: **FAIL**
4	Verify that application run on Black Berry: **FAIL**

Figure 6.5: Compatibility Test Case

6.6 Security Testing

Security Testing is described as a kind of programming testing that ensures programming structures and applications are free from any risks , perils that may risky. The target of security testing is to recognize the perils in the system and weak concentrations in the structure, so the system doesn't stop working or abused. It furthermore helps in perceiving all possible security risks in the system and help planners in fixing these through the possible well being endeavors.

Test Case ID	TC-6
Description	Tests the security of the system
Applicable For	Android (Lollypop (5.1) – Pie (9.1))
Initial Conditions	Equipment is as set up as per requirements
Steps	Tasks and Results
1	Verify that application does not allow any invalid user: **PASS**
2	Verify that application allow only authorized user: **PASS**
3	Verify that the password is in hidden form: **PASS**

Figure 6.6: Security Test Case

Chapter 7

Conclusions

The project “ACCIDENT INTIMATION SYSTEM USING ANDROID PHONE ” has been implemented and tested successfully. The hardware component also works correctly and sending the accurate information to the android phone application. We have tested that application on various android phones and its work correctly and sending the accurate information of the accident location to the concerned departments and persons. To minimize the death and severe conditions due to accidents, android technology has been introduced where immediate action would be take place by ambulance/police service which might reduced the severity. Figure 7.1 shows the Pie Diagram:

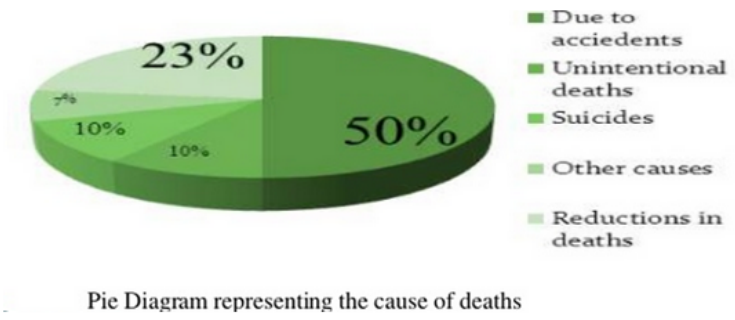


Figure 7.1: Pie Chart

The positioning has been done in form of longitude and latitude along with exact location of vehicle by making use of Google Maps. The accidents can be detected so we can save precious lives by proving aid in time.

Chapter 8

User Manual

8.1 Accident Intimation System

Figure 8.1: Application front page

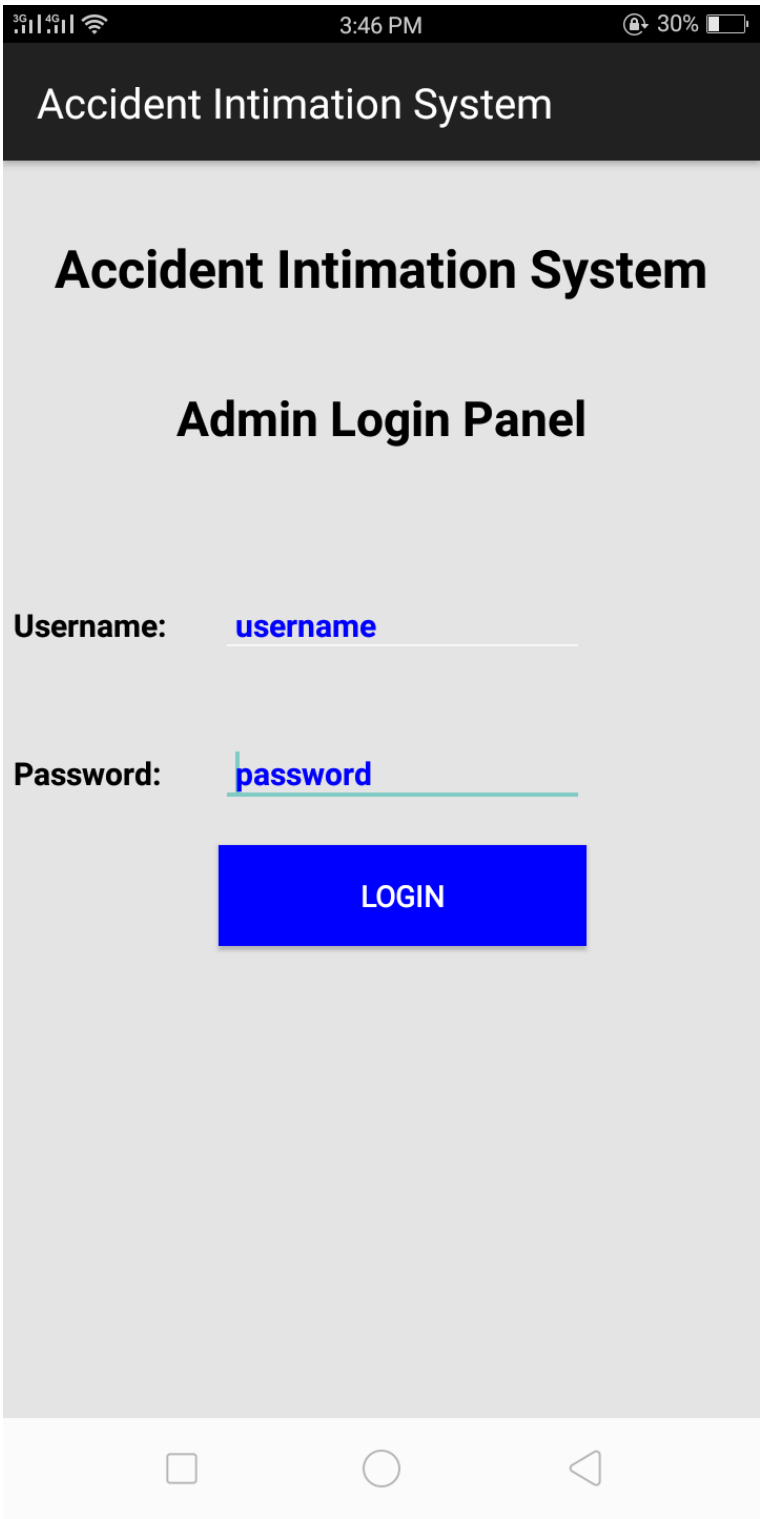


Figure 8.2: Admin Login Panel

- Enter the username and password.
- Without entering the username and login you cannot login to the system.
- Press the login button for system success.

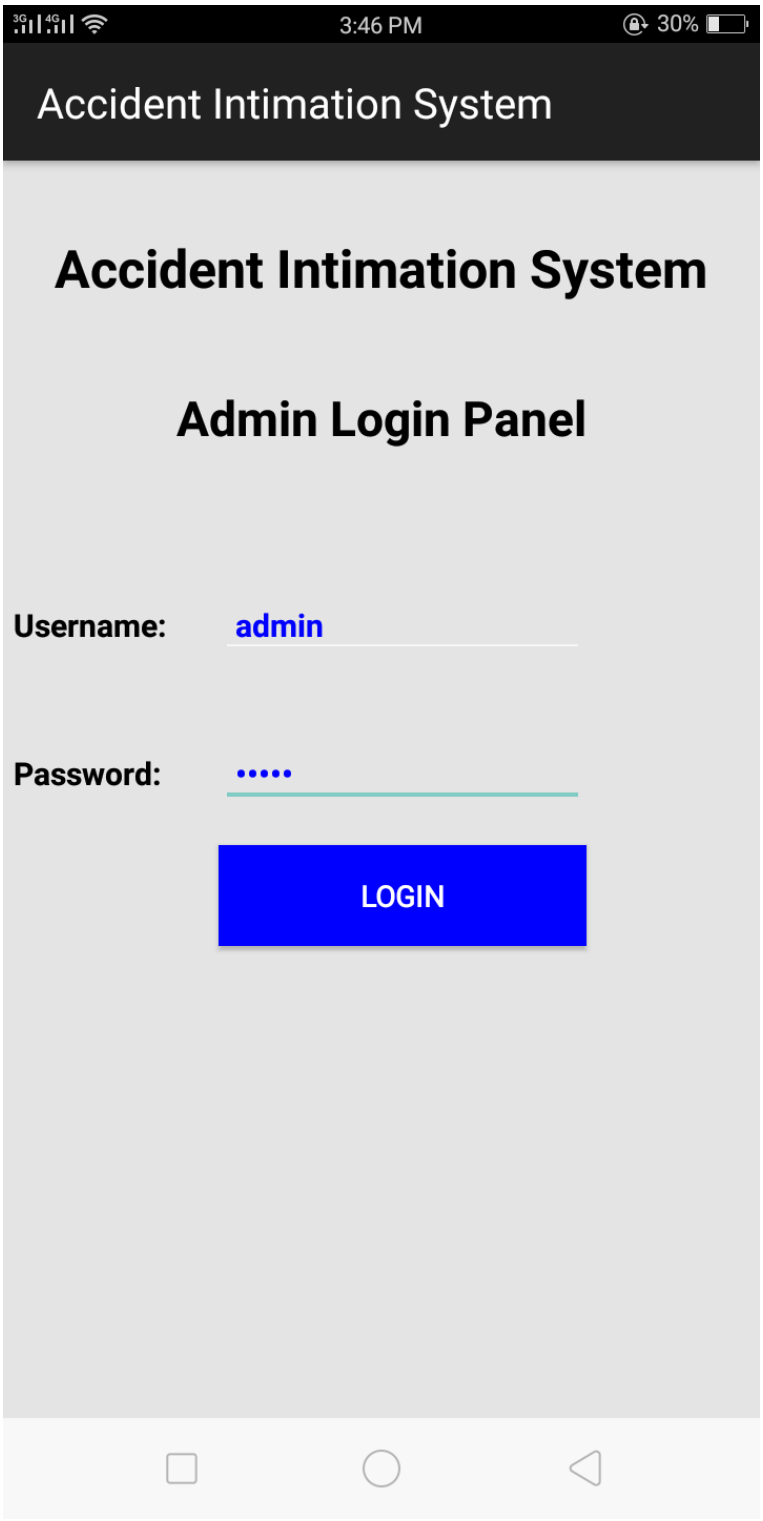


Figure 8.3: Authenticate Login

- Authenticate the username and password.
- If the authentication is successful login.
- If the authentication is not successful re-enter username and password.

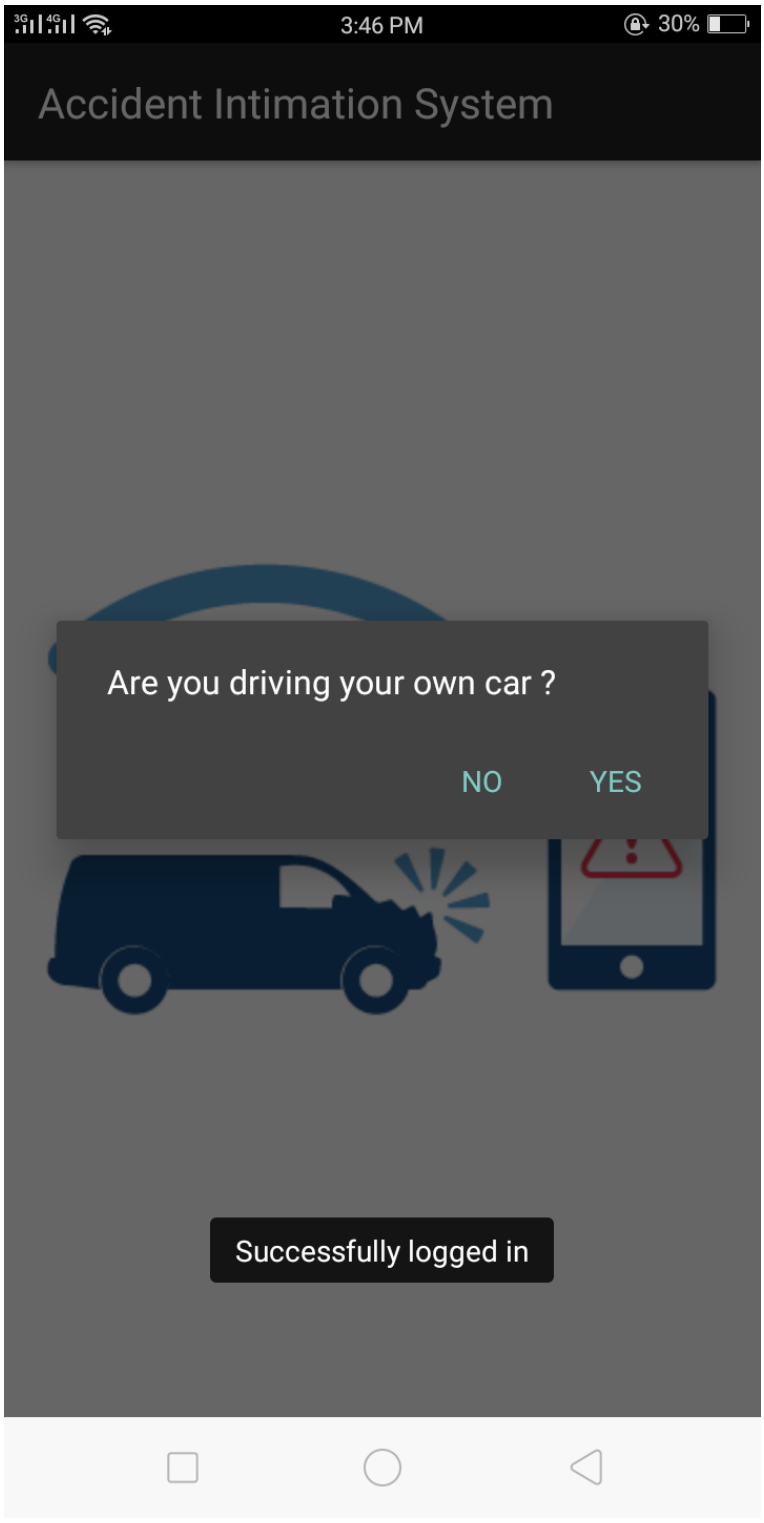


Figure 8.4: User Panel

- Click yes if you are driving your own car.
- Click no if you are not driving your own car.

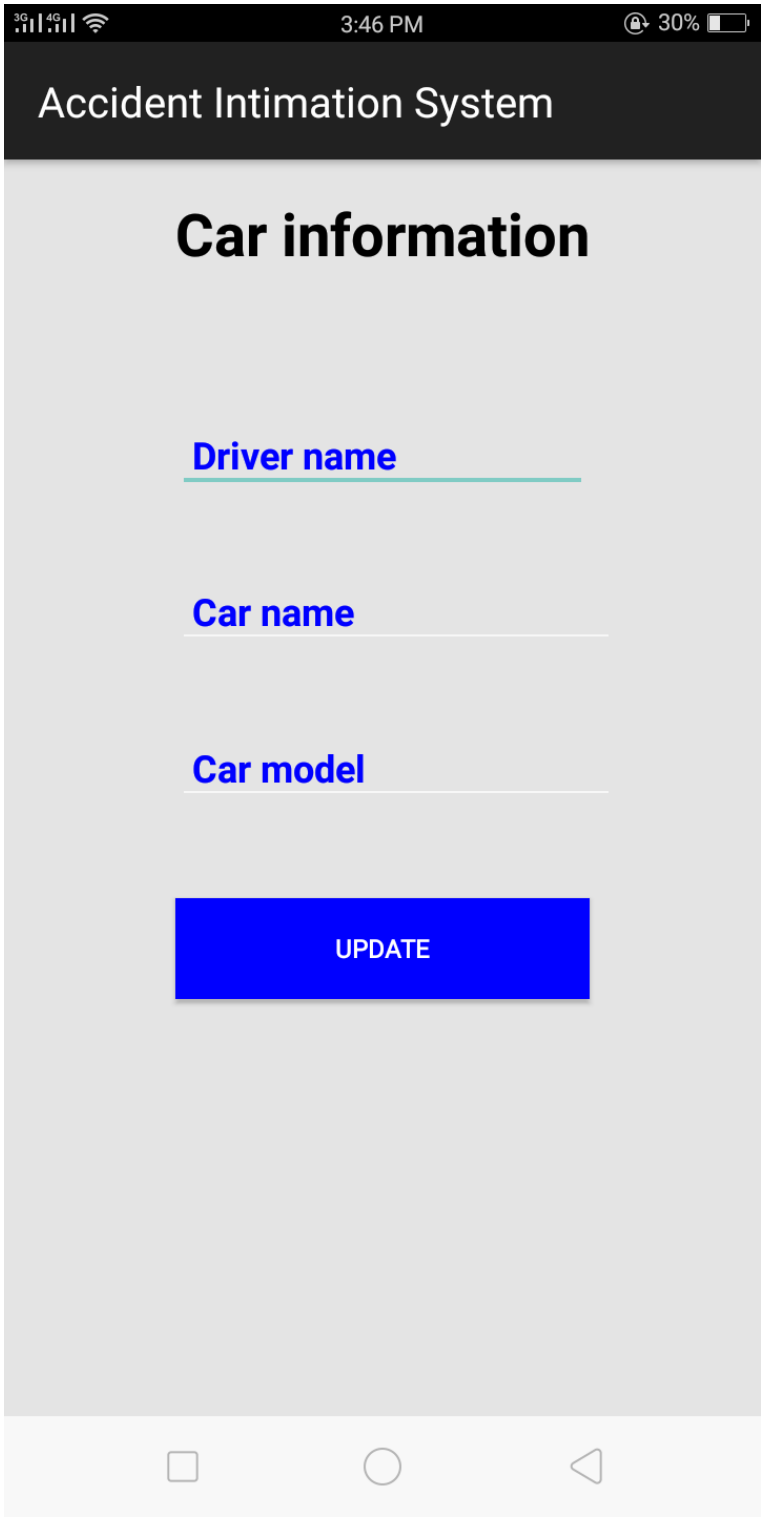


Figure 8.5: User Car Details

- Enter the detail of your car.
- Enter the name and model of the car.

Figure 8.6: Update User Car Details

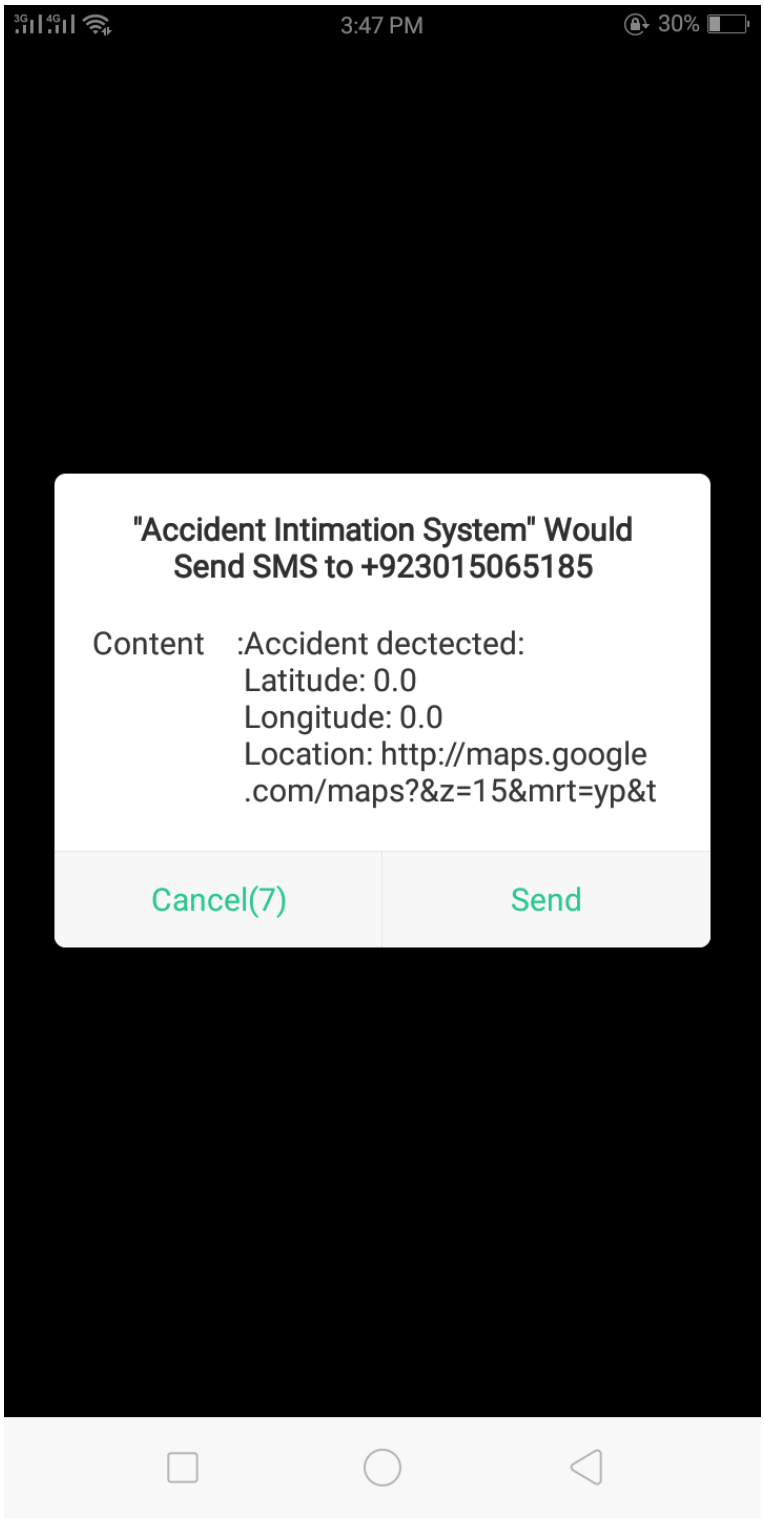


Figure 8.7: Sending SMS

Figure 8.8: Message Sent

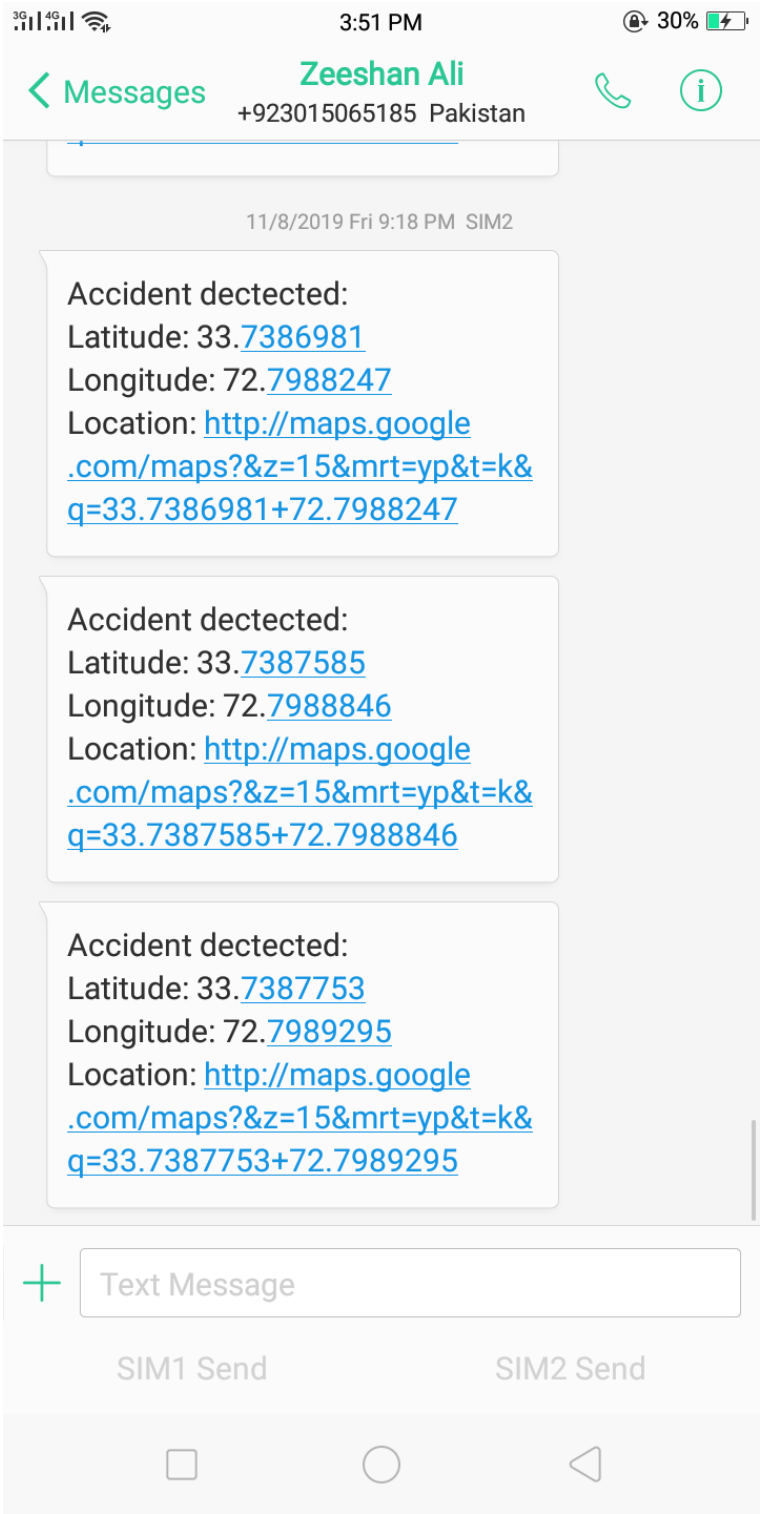


Figure 8.9: Accident Details

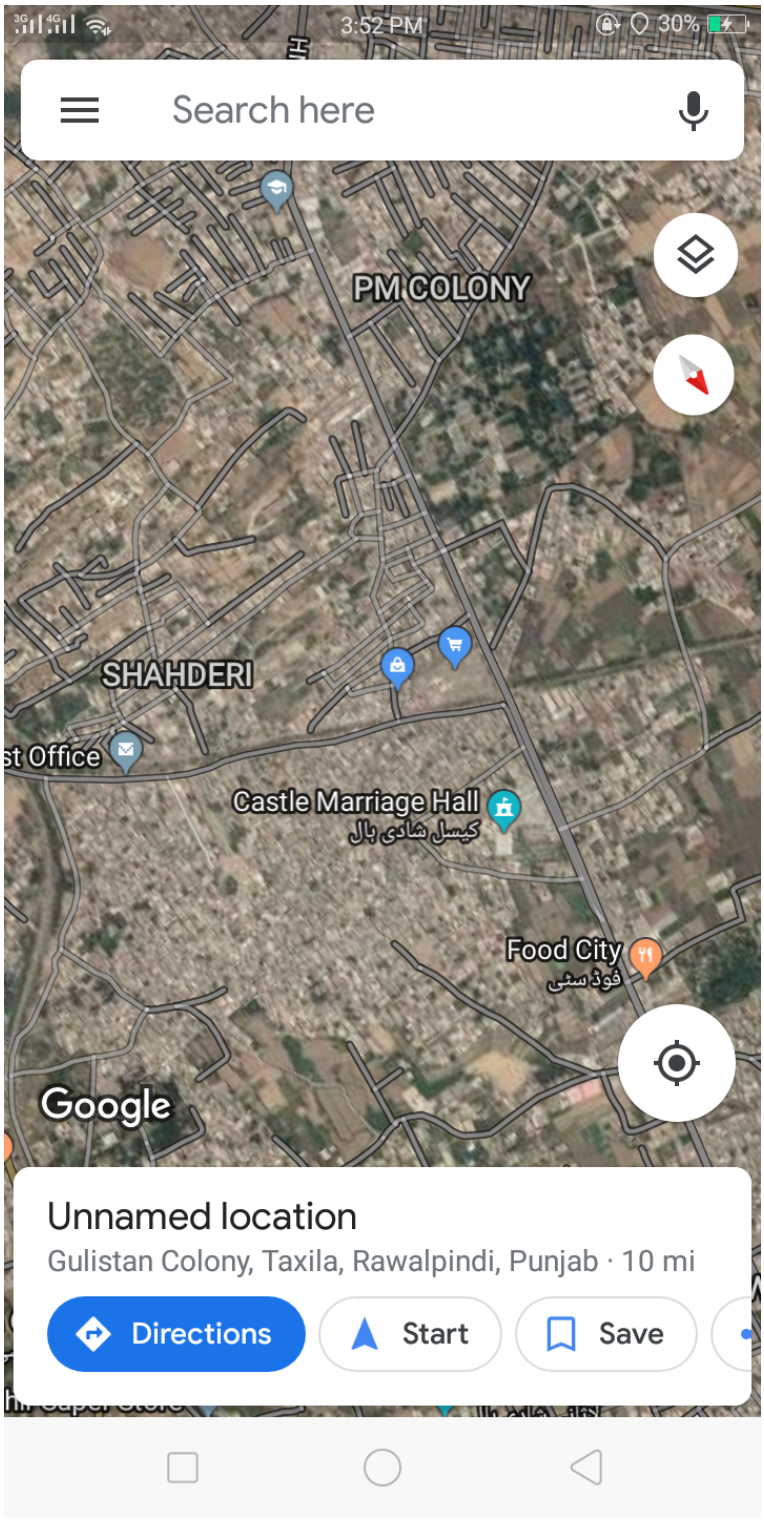


Figure 8.10: Accident Location

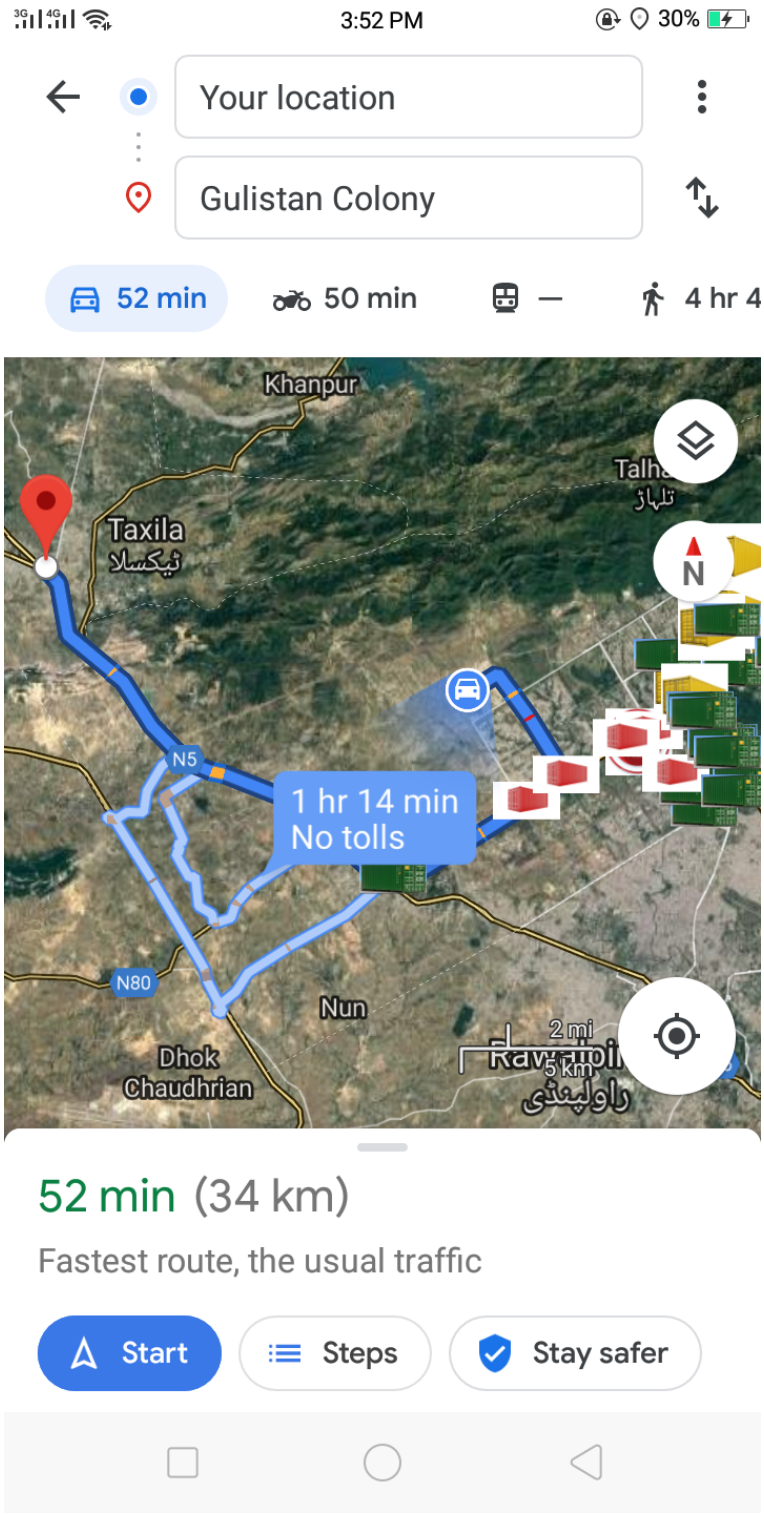
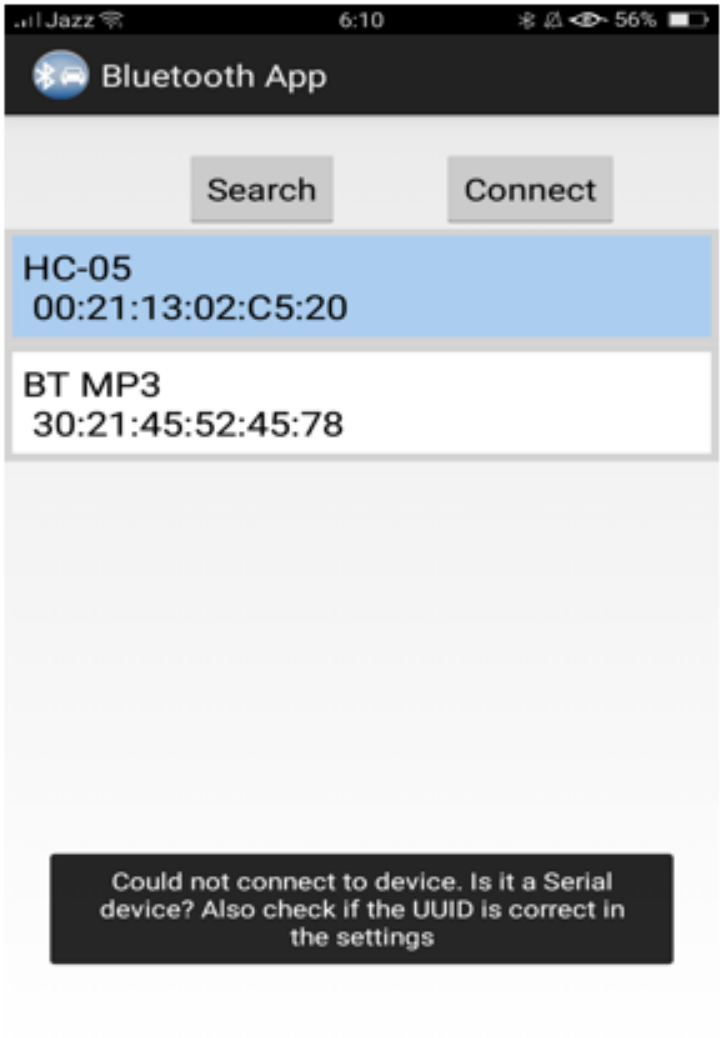


Figure 8.11: Accident Route Location



Error case buetooth not found

Figure 8.12: Bluetooth App Front Page

Figure 8.13: Transmitting Bluetooth Module Data

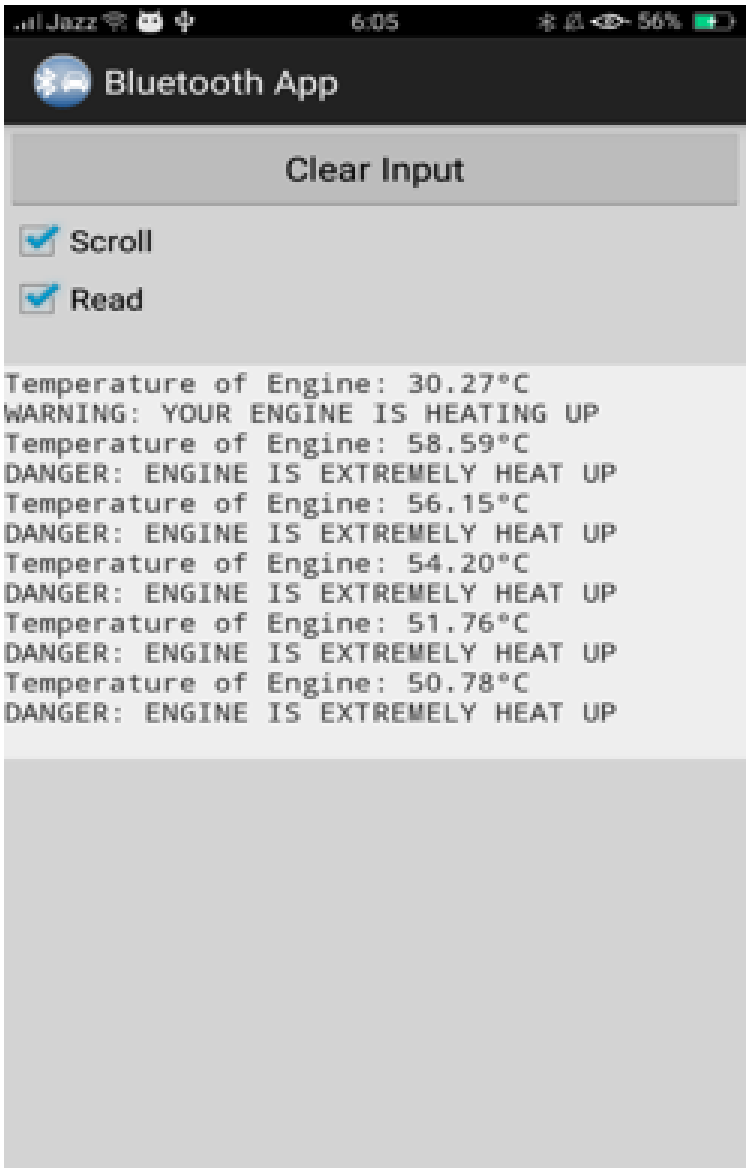


Figure 8.14: Transmitting Data

Figure 8.15: Connected to Bluetooth Module

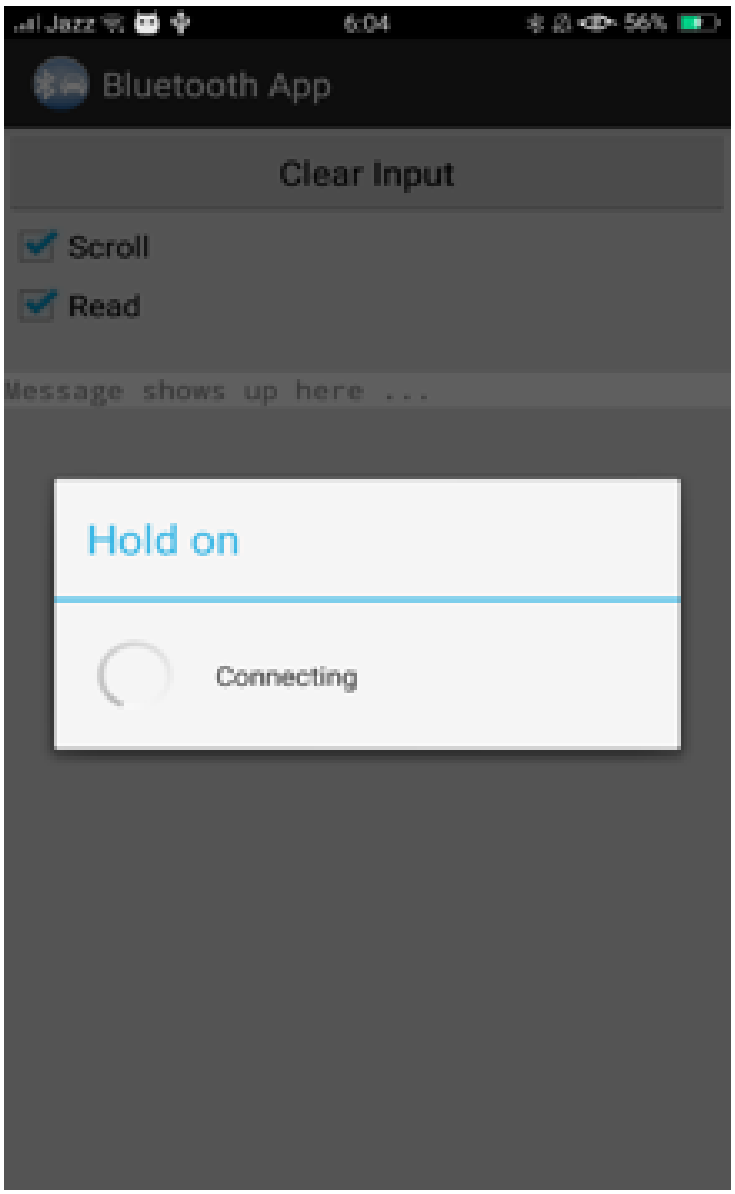


Figure 8.16: Connecting to Bluetooth Module

References

[1] Fogue, Manuel and Garrido, Piedad and Martinez, Francisco J and Cano, Juan-Carlos and Calafate, Carlos T and Manzoni, Pietro *IEEE Vehicular Technology Magazine, 7(3):90–100, September 2012.* No Citations.

[2] Tanushree Dalai, "Emergency Alert and Service for Automotives for India", International Journal of Advanced Trends in Computer Science and Engineering(IJATCSE), Mysore, India, Vol.2, No.5, Pages: 08-12 (2013) Special Issue of ICETCSE 2013.
[3] Tamil, E.M., D.B. Saleh, and M.Y.I. Idris, "A Mobile Automobile Tracking System with GPS/GSM Technology", Proceedings of the 5th Student Conference on Research and Development (SCORED), Permala Bangi, Malaysia, May 2007.
[4] Fan, X., W. Xu, H. Chen, and L. Liu, "CCSMOMS:A Composite Communication Scheme for Mobile Object Management System", 20th International Conference on Advanced Information Networking and Applications, Volume 2, Issue 18-20, April 2006, pp. 235–239.
[5] Hsiao, W.C.M., and S.K.J. Chang, "The Optimal Location Update Strategy of Cellular Network Based Traffic Information System", Intelligent Transportation Systems Conference, 2006.
[6] Ioan Lita, Ion Bogdan Cioc and Daniel Alexandru Visan, "A New Approach of Automobile Localization System Using GPS and GSM/GPRS Transmission," Proc. ISSE ' 06, pp. 115-119, 2006.
[7] Wen Leng and Chuntao Shi, "The GPRS-based location system for the long-distance freight", ChinaCom '06, pp1-5, Oct.2006.
[8] Hapsari, A.T., E.Y. Syamsudin, and I. Pramana, "Design of Automobile Position Tracking System Using Short Message Services And Its Implementation on FPGA", Proceedings of the Conference on Asia South Pacific Design Automation, Shanghai, China, 2005