A

Report On

"Mobile Phone based Rash Driving Detection"

SUBMITTED TO

Shivaji University, Kolhapur

In the fulfillment of the requirement for the Degree of Bachelor of Engineering

INFORMATION TECHNOLOGY

Submitted By

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KIT's College Of Engineering(Autonomous), Kolhapur

2018-2019

CERTIFICATE

This is to certify that the project report entitled

"MOBILE PHONE BASED RASH DRIVING DETECTION"

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is a bonafide work carried under the supervision of **Prof. S. S. Rabade** and it is submitted towards the fulfillment of the requirement of Shivaji University, Kolhapur for the award of the Fourth Year (Information Technology) of KIT's College of Engineering(Autonomous), Kolhapur in the academic year 2018-2019.

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(Project Guide)	(Head, IT)	(Director)

External Examiner

Place: KITCOEK, Kolhapur

Date: 12/04/2019

DECLARATION

We hereby declare that the project work report entitled **Mobile Phone based Rash Driving Detection** is being submitted to KIT's College of Engineering(Autonomous), Kolhapur affiliacated to Shivaji University, in fulfillment of Bachelor of Engineering (Information Technology) course, is a bonafide report of the work carried out by us. The material content in this report has not been submitted to any university or institution for the award of any degree.

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We express our sincere thanks to all the teaching and non-teaching staff and all those who have directly or indirectly helped in making project a success.

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Abstract

The present world is advancing at the speed of light in the field of trade and business, and the development in technology has been significantly influencing this growth. However, transportation by road is one of the major factors that have been affecting the commercial development of our country. With the increasing vehicular population and their movement on the roads, accidents are also steadily increasing. It has become a nightmare for the authorities to prevent or reduce such fatal accidents on the road and all their efforts are in vain. According to the Indian road accidents survey, every year there are more than 135,000 incidents of road accidents. Out of these, most of them are due to rash driving. According to Indian Constitution, IPC section 279, rash driving is an offence. So, our idea is to design a module which can detect the vehicle whenever it is rashly driven and transmit the data to the concerned authority. For example, when the driver is driving rashly two warning message would be transmitted to the driver to slow down speed and stop rash driving. If he/she continues, a notification would be sent to the police so that they could monitor vehicles to check whether they are driven correctly or not.

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1 Introduction

According to the statistics from World Health Organization (WHO), traffic accidents have become one of the top 10 leading causes of death in the world. Specifically, traffic accidents claimed nearly many lives each day in 2016.This project is for developing an application called smart phone based rash driving detection. Although there are various transport modes but road transportation mode still plays a major role in people lives. In this busy world all people are in hurry to reach their destination as quickly as possible which further leads them to drive fast, without obeying the traffic rules which further lead them to accidents sometimes also to their loss of lives. So there arises the need to monitor the driving style and road irregularities to ensure driver safety.

Drivers under the influence of alcohol or rash driving show a marked decline of perception, recognition, and vehicle control, so they tend to make certain types of dangerous maneuvers.

The system will be detecting rash driving or driving under influence of alcohol using an android application. Since Android phones have gained huge popularity in our lives and use of sensors of the Android phones will become easy to detect the Rash driving, hence this system uses mobile phones for the detection. This system will alert the driver using SMS notification and it will also send notification to police. Thus, the aim of our project is to warn the driver as well as police about the rash driving taking place.

2 Objective

Mobile Phones based Rash Driving Detection system would help reducing the number of traffic accidents.

The Objective of our project is :

- To develop a real time monitoring system with quick response
- Reliable system with better performance
- No extra hardware
- Non-intrusive system and low cost system

3 Literature Survey

3.1 Real Time and Non-Intrusive Driver Fatigue Monitoring

This paper describes a real-time online prototype driver-fatigue monitor. It uses remotely located charge-coupled-device cameras equipped with active infrared illuminators to acquire video images of the driver. The visual cues employed characterize eyelid movement, gaze movement, head movement and facial expression. The simultaneous use of multiple visual cues and their systematic combination yields a much more robust and accurate fatigue characterization than using a single visual cue.

3.2 Electronic Monitoring and Protection System for Drunk Driver Based on Breath Sample Testing

The study in this paper presents a simple electronic design for a system that measure alcohol levels through breath testing and takes steps towards enabling or disabling the driver from turning the vehicle ON based on whether the alcohol level is acceptable or not.

3.3 Shortest Path Calculation: A Comparative Study for Location-Based Recommender System

In this paper, the author compared two of the most common methods used to find shortest path between two points on the earth surface Haversine Algorithm, and Vincenty Algorithm. Haversine Algorithm is used for spherical shapes while Vincenty Algorithm is used for elliptical shapes. Using these formulae gives approximate results about the real distances. Haversine is two times faster than Vincenty, as such, it satisfies the response time evaluation criteria. So author concludes that Haversine is more appropriate for use.

3.4 Driving Style Recognition Using a Smartphone as a Sensor Platform

Driving technique can naturally be divided into two categories: typical (non-aggressive) and aggressive. Understanding and recognizing driving events that fall into these categories can aid in vehicle safety systems. Camera (often multiple), Microphone (often multiple), 3-axis Accelerometer, 3-axis Gyroscope, Proximity, Ambient Light, PWM, Magnetometer, GPS, these devices are powerful, inexpensive and versatile research platforms that make instrumenting a vehicle for data collection accessible to the general public as well as academia. For the system, focus will be with the rear-facing camera, accelerometer, gyroscope and GPS

3.5 A Computer Vision-Based System for Real-Time Detection of Sleep Onset in Fatigued Drivers

Driver exhaustion is the majority frequent reason for the deadly highway accident around the earth. This shows that in the motor vehicle industry, particularly, anywhere a driver of a serious motor vehicle is frequently uncovered to hours of dull driving which causes exhaustion, lacking normal rest time. Appropriate to the normal frequency of driver exhaustion, this has become a part of huge public financial anxiety. Accordingly, a road accident avoidance structure by detecting drivers tiredness, which gauge the point of drivers inattentiveness and present a caution while a possible danger exists, have usually a huge deal of concentration as a gauge to stop an accident, cause by drivers inattentiveness. In this article, drivers tiredness detection structure is using the eyeball detection, so that highway accidents can be avoided productively.

3.6 Study of various techniques for driver behavior monitoring and recognition system

This paper is about behavior frequently studied in conjunction with accident research to accident causes and differences in accident involvement. Traffic psychologists distinguish three motivations of driver behavior: reasoned or planned behavior, impulsive or emotional behavior, and habitual behavior. Additionally, social and cognitive applications of psychology are used, such as enforcement, road safety education campaigns, and therapeutic and rehabilitation programs. The driver can enhance his driving style and decrease accident occurring probability. The important factor in driving monitoring system is the accuracy of it.

4 Problem Statement and Scope

Accidents are increasing rapidly day by day due to Rash Driving and Drunk Driving.

Scope of the project:

- Inbuilt mobile phone sensors will be used to detect the driving behavior
- Analyze the data through accelerometer and orientation sensors
- Incidents and change related to the car will be reflected

5 Requirements

5.1 Hardware Requirements

- Mobile phone with minimum 512 MB of RAM
- Remote control Car (for Testing)

5.2 Software Requirements

- Android version KitKat(v4.4) and above

6 Project Plan

6.1 Roles and Responsibilities

Team Member	Roles	Responsibilities
Mugdha Kumbhar	Project Leader	A project manager's role in overall responsibility for successful planning and to make sure that their team is performing at their best
Mugdha Kumbhar Shraddha Nerlekar Sonali Dhotre	Programmer/ Developer	Developers are responsible for design, testing and maintenance of the software programs for computer operating system or application
Shubham Patil Pradnya Khade Mugdha Kumbhar Shraddha Nerlekar	Tester	A software Tester is responsible for designing testing scenarios for usability testing. They are responsible for conducting the testing then submit their observations to the development team
Pradnya Khade Shraddha Nerlekar	Software Quality Assurance Engineers	Software Quality assurance engineers work with software developers to improve software products during development. They run tests on software or application an analyze effects in order to improve products
Sonali Dhotre Shubham Patil	Maintenance Engineers	Maintenance engineer's work involves design, testing, coding of updated requirements

Table 1: Roles and Responsibilities

7 Diagrams

7.1 DFD Level 0

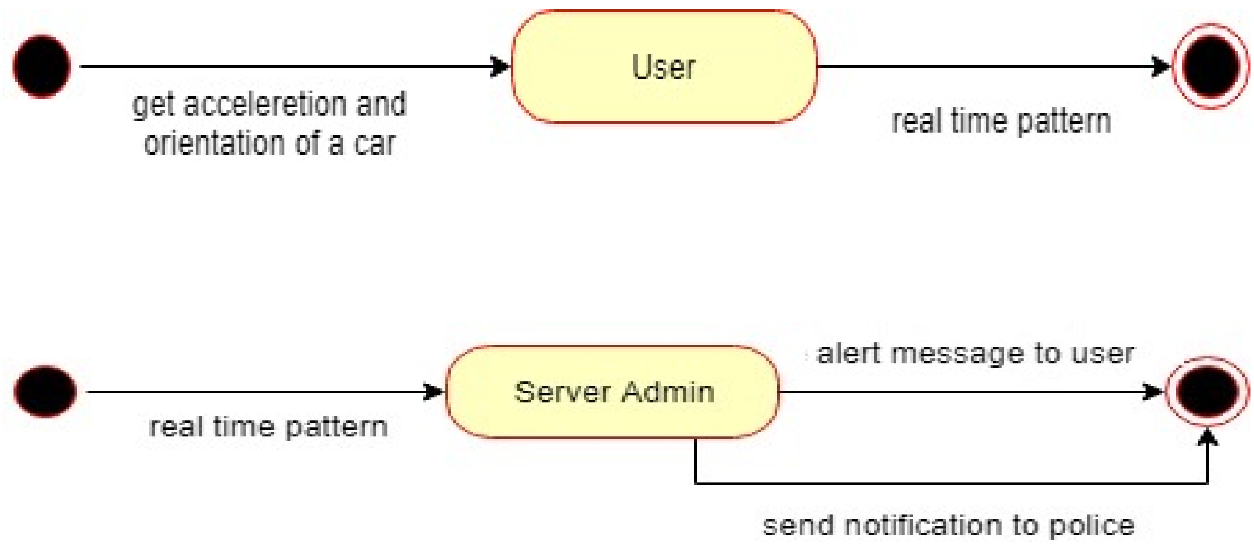

Figure 1: User Module(DFD 0)

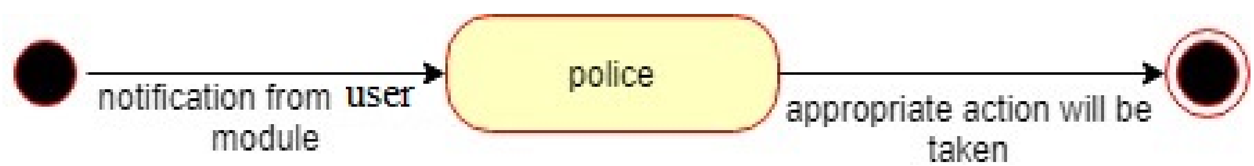

Figure 2: Police Module(DFD 0)

7.2 DFD Level 1

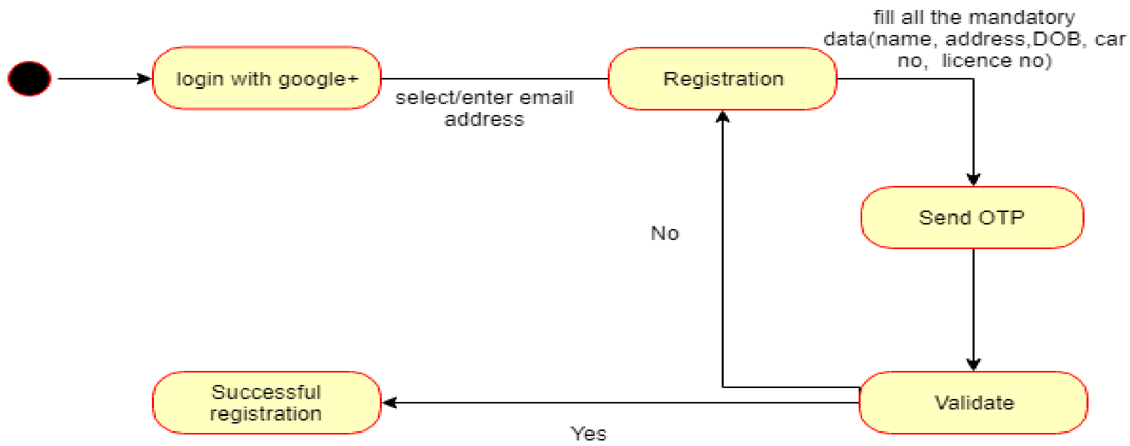

Figure 3: User Module(DFD 1)

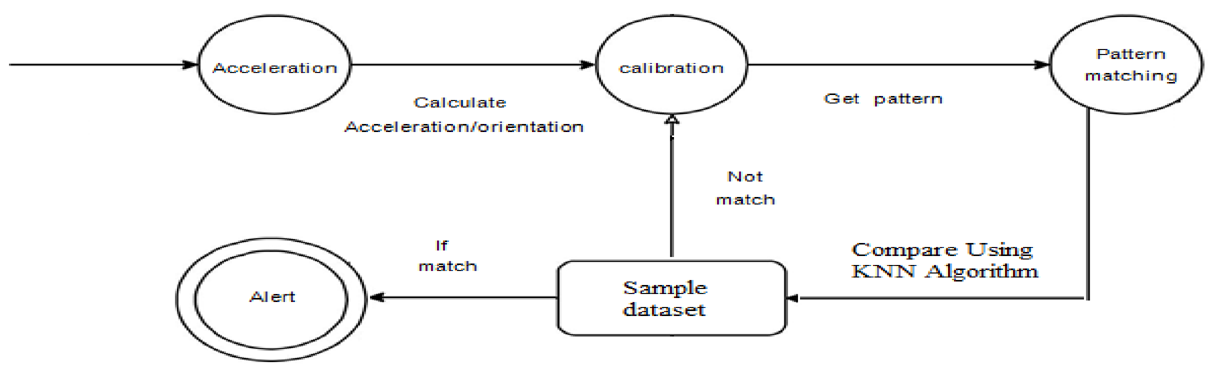

Figure 4: Server Module(DFD 1)

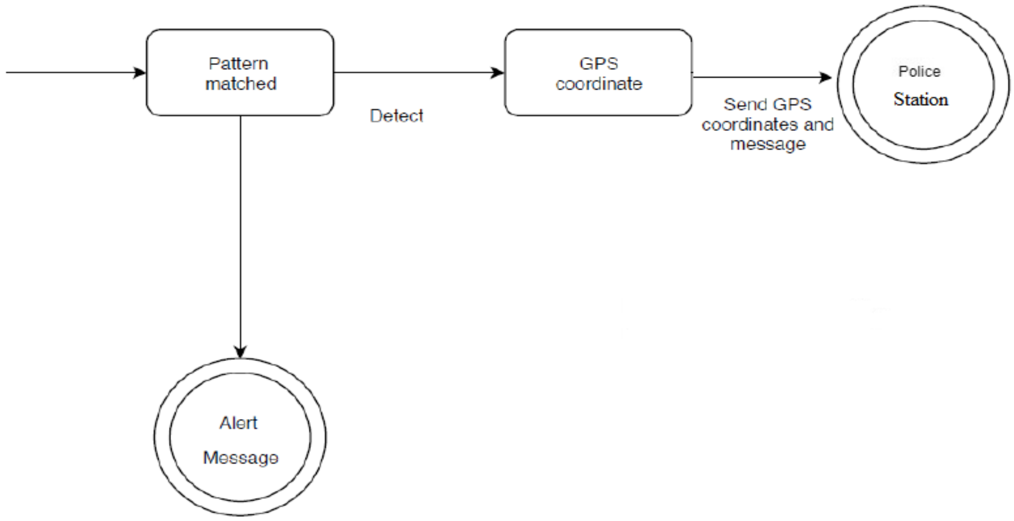

Figure 5: Alert Module(DFD 1)

7.3 Use Case Diagram

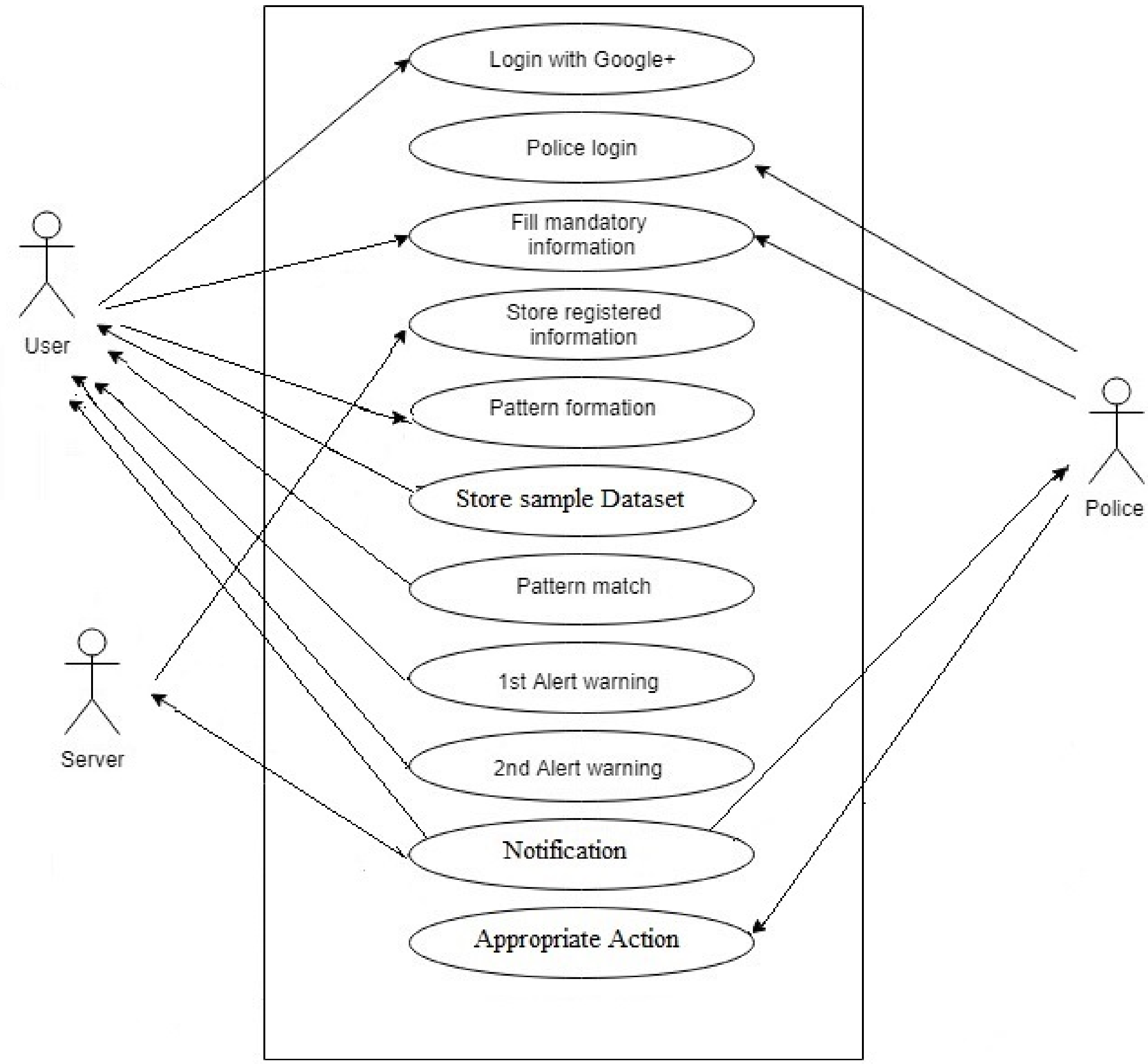

Figure 6: Use Case Diagram

7.4 Sequence Diagram

Figure 7: Sequence Diagram - I

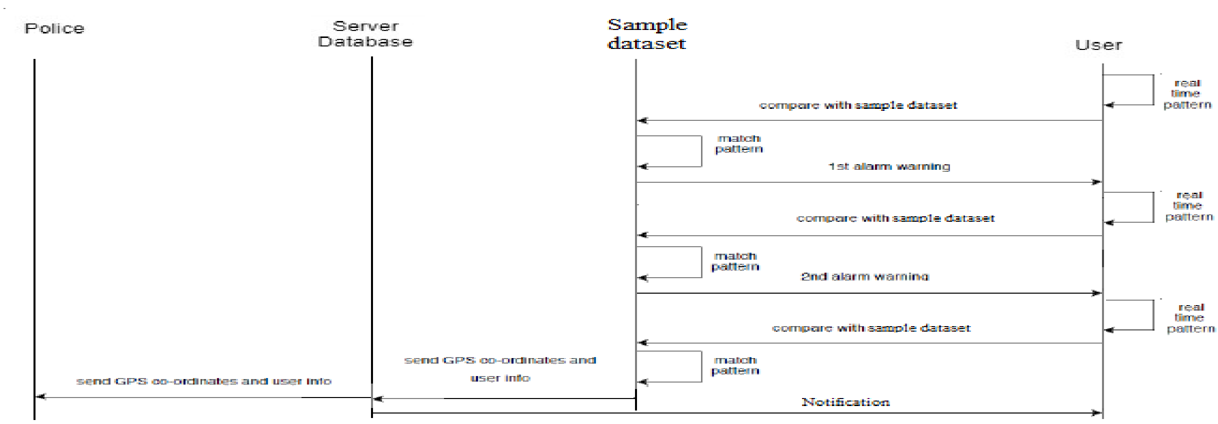

Figure 8: Sequence Diagram - II

7.5 Activity Diagram

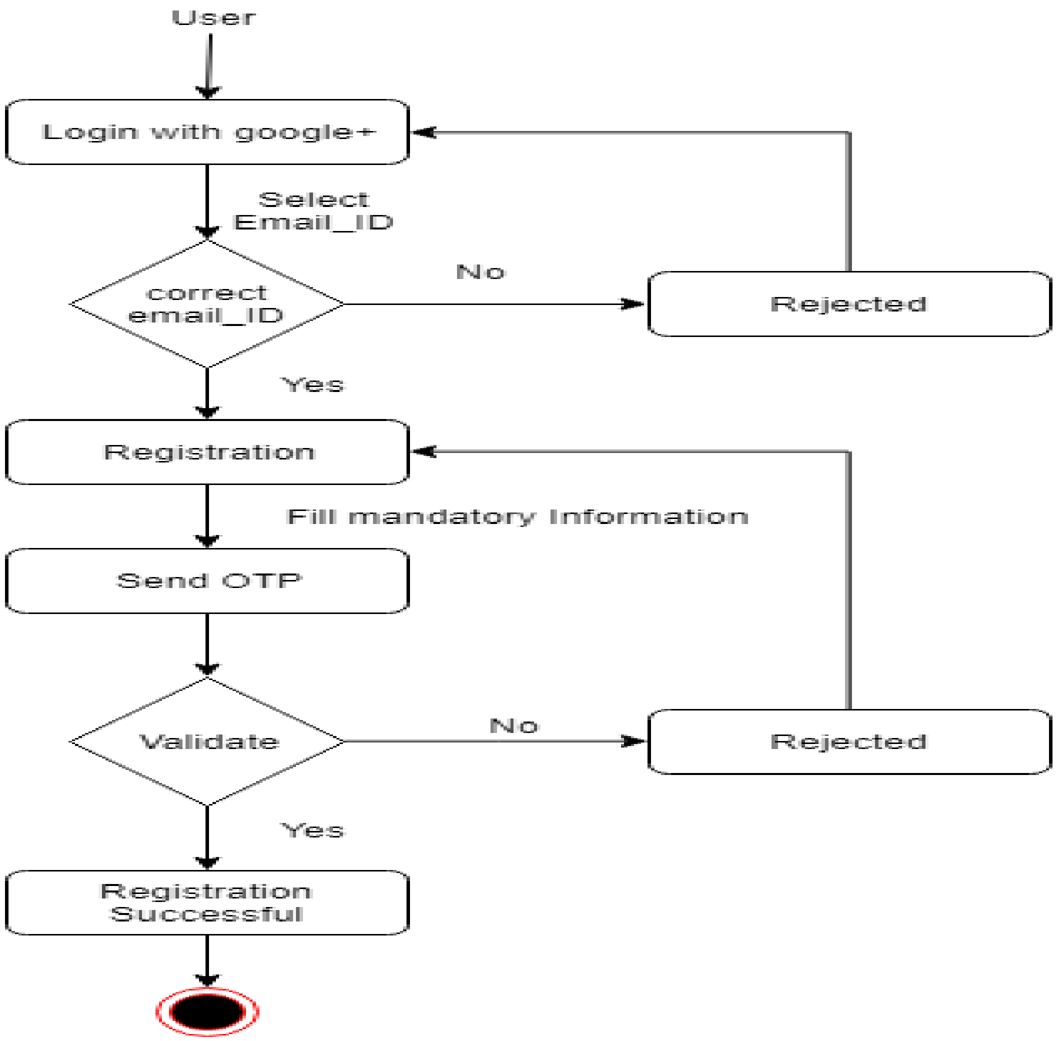

Figure 9: User Module(Activity)

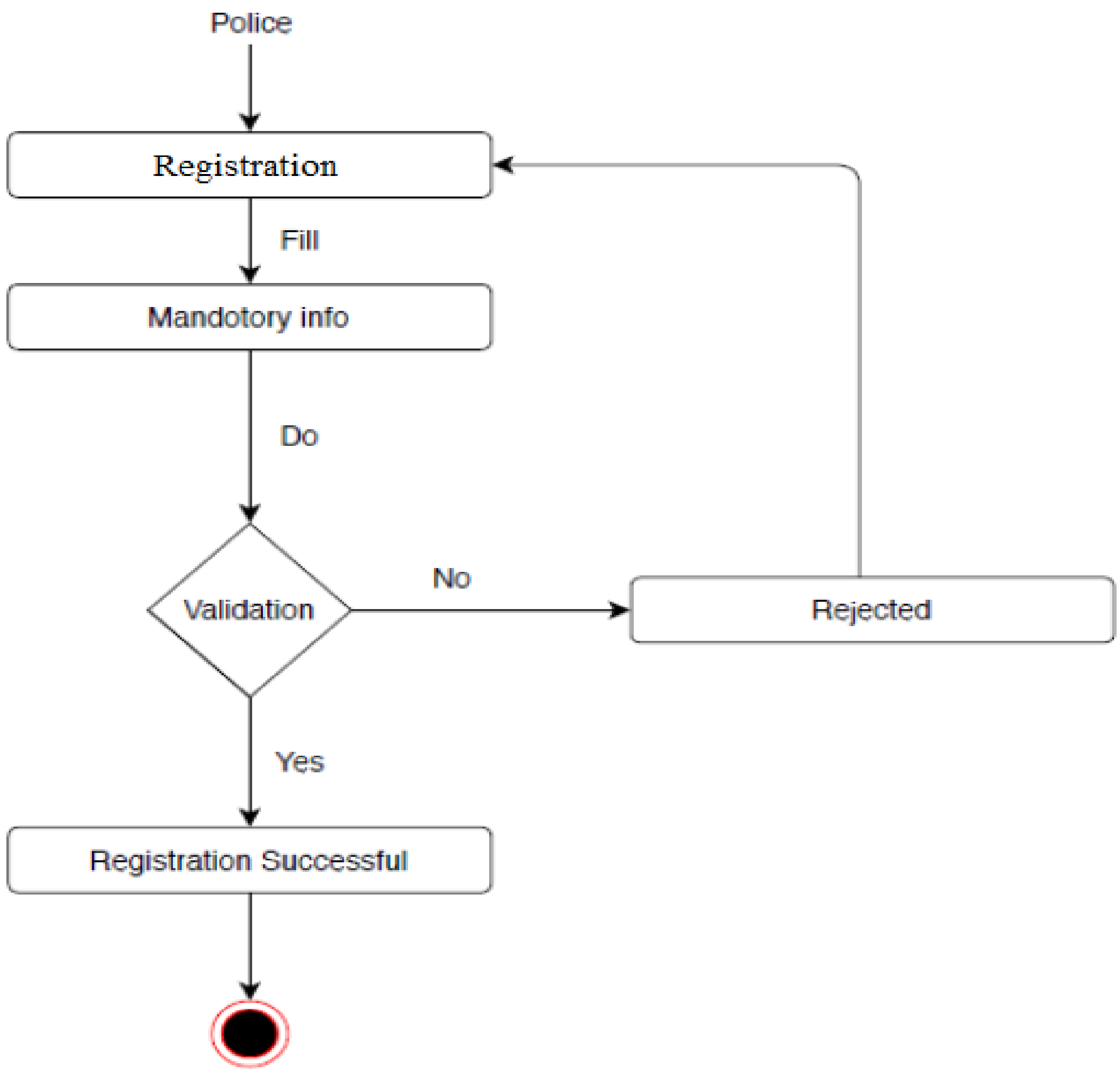

Figure 10: Police Module(Activity)

7.6 Class Diagram

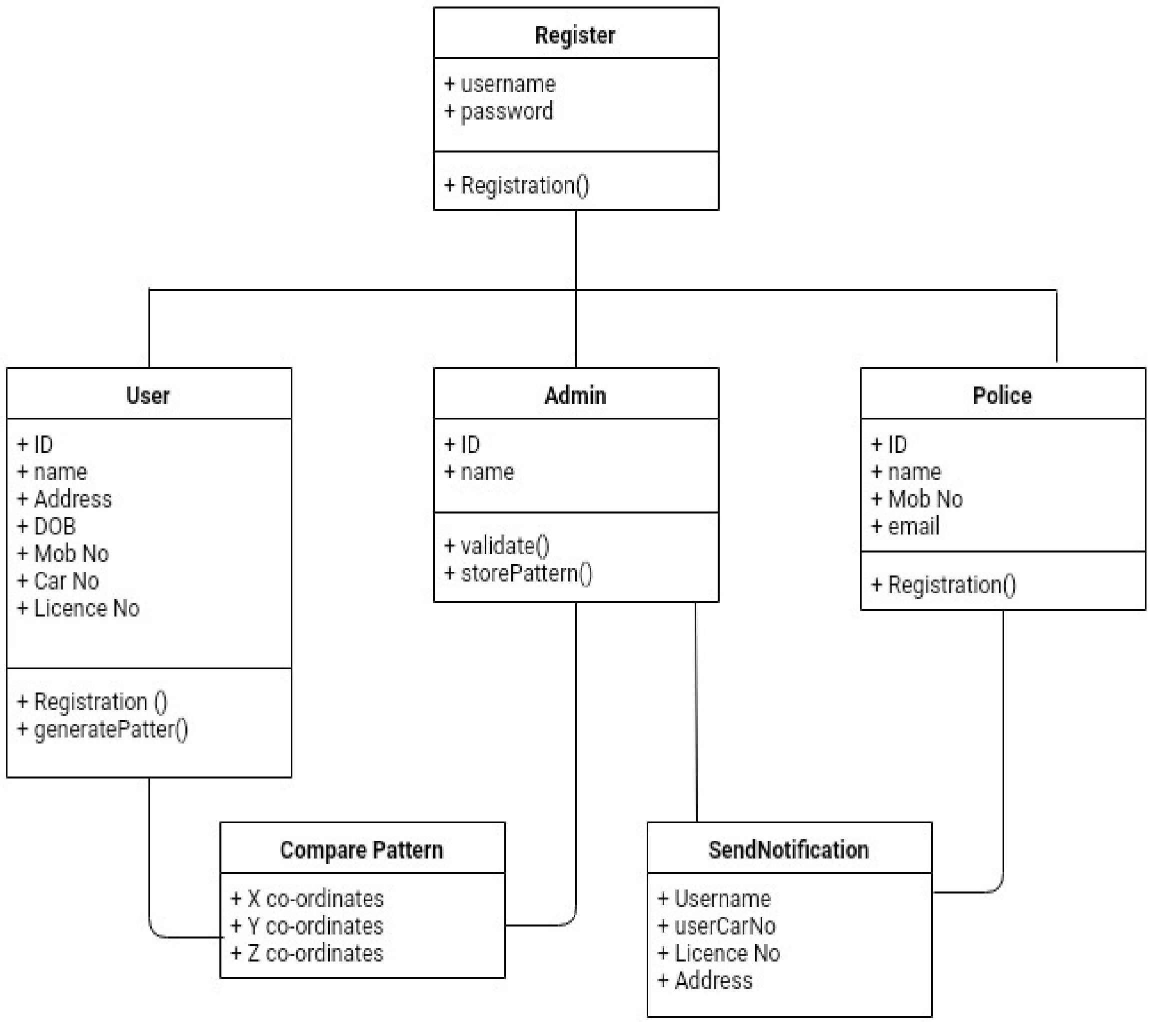

Figure 11: Class Diagram

7.7 ER Diagram

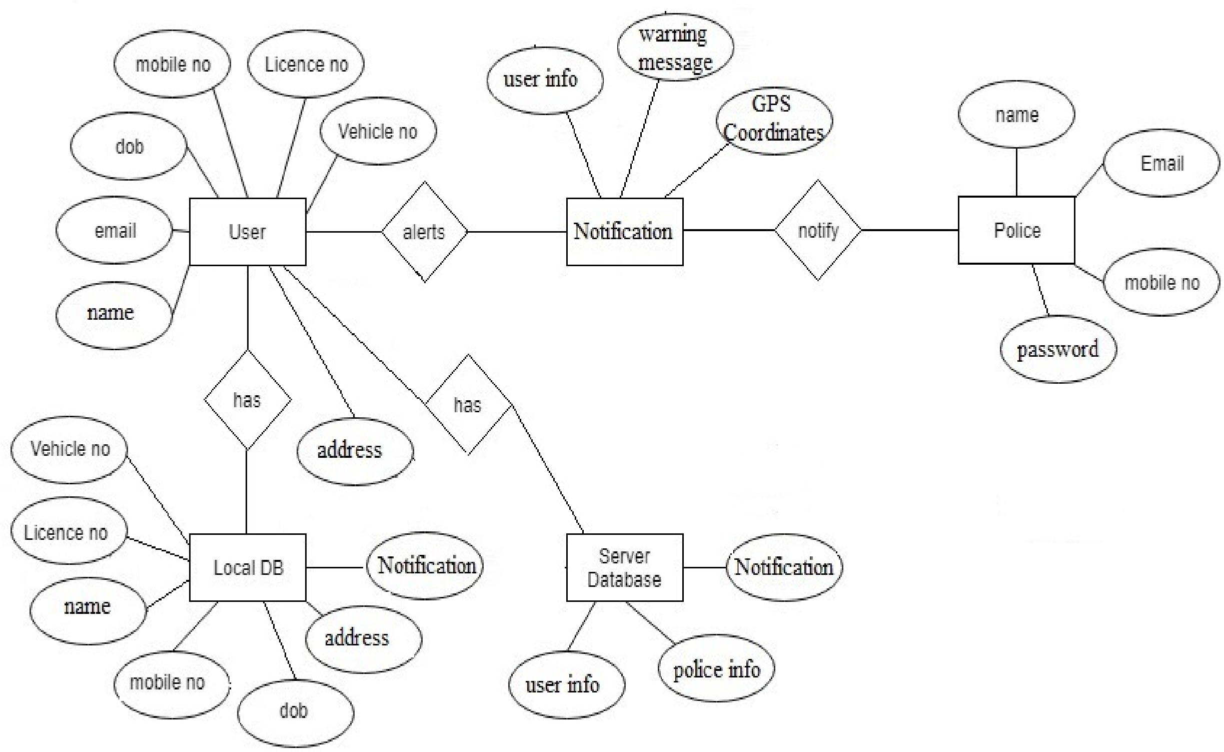

Figure 12: ER Diagram

8 Implementation

8.1 Modules

8.1.1 User Module

The user module will be responsible for real time monitoring and reporting of driving behavior. User will login to an app present in smartphone equipped with accelerometer sensor. The data set related to different types of driving patterns which are essential for pattern matching is also present at user. When driver starts driving the car, readings from accelerometer sensor will be taken periodically and pattern matching will be done. If rash driving pattern is detected, user will be alerted and if user repeats rash driving, his GPS coordinates will be sent to the server.

KNN Algorithm

In k-NN classification, the output is a class membership. An object is classified by a majority vote of its neighbours, with the object being assigned to the class most common among its k nearest neighbours (k is a positive integer, typically small).

If k = 1, then the object is simply assigned to the class of that single nearest neighbour.

1. Determine parameter K = number of nearest neighbours
2. Calculate the distance between the query-instance and all the training samples
3. Sort the distance and determine nearest neighbours based on the Kth minimum distance
4. Gather the category r of the nearest neighbours
5. Use simple majority of the category of nearest neighbours as the prediction value of the query instance.

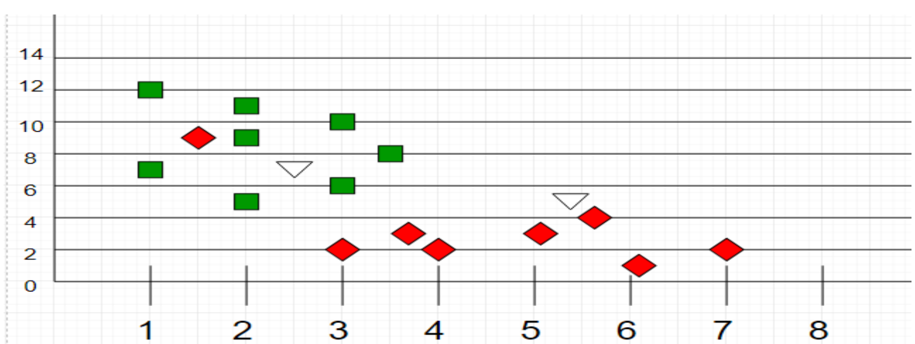

Figure 13: Cluster Formation

8.1.2 Server Module

The server stores the data related to registered user, registered police and the notification. If rash driving pattern is detected at user module and user data along with GPS coordinates will be sent to the police module.

8.1.3 Police Station Module

The police station module will receive information about rash driving including GPS coordinates of the driver and can take appropriate actions on the driver.

8.2 Implementation Design

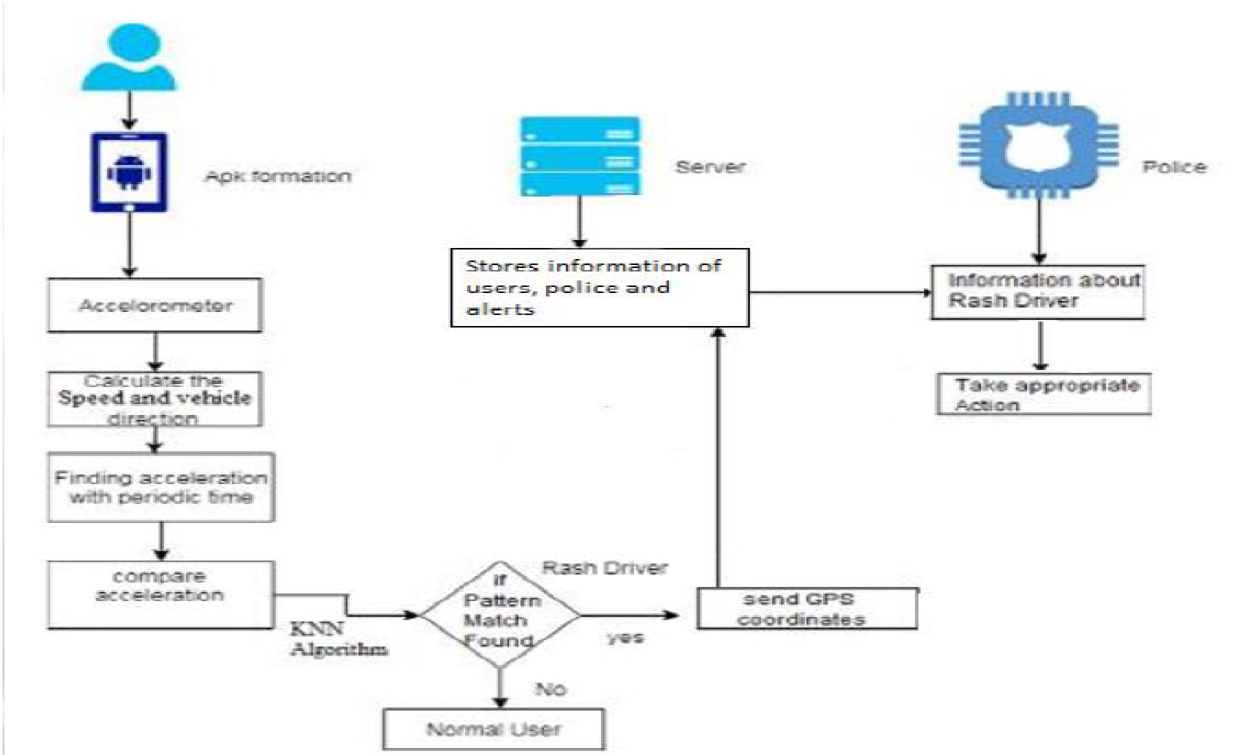

Figure 14: Project Flow

Phase 1

As discussed earlier, the input for this system will be continuous driving patterns. For this purpose we used the in-built sensors of the mobile phone. The User login module is the important part of phase 1 as we will have to get the information about the user related to his registered information such as Car number, license number.

The User module login was completed in phase 1 along with Police module login. The Police module login is a webpage where the police will be notified about the user. If the rash driving is detected firstly 2 warning will be given to the user so that the user can improve his driving behavior and the 3rd warning will be the text message.

Phase 2

Pattern matching was the most important aspect in phase 2 implementation. Pattern matching was done with the help of KNN algorithm in android. For pattern matching the dataset was created with the help of a car model to generate dangerous driving pattern.

The user and police connectivity was done with the server database. After detection of pattern matching, police will be notified in the police website. GPS co-ordinates of the user will also be sent to the police website.

8.3 Training sample

8.3.1 Straight Set

x	y	z
-1.352	5.073	17.554
1.08	5.145	15.68
-1.551	-0.564	17.719
-3.87	0.601	19.494
-1.022	0.763	15.741
-2.525	-15.564	19.494
0.046	2.303	15.815
0.046	2.303	15.815
2.337	-0.372	19.494
-3.683	-3.782	15.458
4.195	4.368	16.971
-2.301	-2.372	18.431
-1.731	-4.401	16.917
3.013	2.846	15.593
3.013	2.846	15.593
-0.709	-1.51	16.443
-1.068	1.597	16.015
-0.955	1.417	17.512
5.815	0.619	14.203
1.093	-3.339	19.494

Table 2: Straight Coordinates

8.3.2 ZigZag Set

x	y	z
-9.677	-4.997	19.494
-1.605	3.645	18.19
-7.274	-4.554	16.354
13.754	1.409	7.267
-7.908	0.938	14.084
-3.823	0.17	19.494
-9.116	-2.895	17.157
2.808	-5.75	19.494
-12.829	-0.11	18.573
15.008	1.013	8.935
-5.012	0.938	15.894
13.735	-2.34	15.38
-14.896	-0.688	14.149
-3.886	-0.807	15.314
-2.807	-3.069	19.494
-9.677	-4.997	19.494
-1.605	3.645	18.19
-7.274	-4.554	16.354
13.754	1.409	7.267
-7.908	0.938	14.084

Table 3: ZigZag Coordinates

8.3.3 U-Turn Set

x	y	z
-1.451	2.853	15.491
-1.35	0.693	14.746
-0.612	0.083	14.52
0.73	-4.201	12.337
0.209	-1.856	11.572
-1.43	-0.636	10.256
5.7	-3.512	14.423
1.748	-1.505	10.83
-1.451	2.853	15.491
-1.35	0.693	14.746
-0.612	0.083	14.52
0.73	-4.201	12.337
0.209	-1.856	11.572
-1.43	-0.636	10.256
5.7	-3.512	14.423
2.098	0	9.878
1.748	-1.505	10.83
-1.451	2.853	15.491
-1.35	0.693	14.746
-0.612	0.083	14.52

Table 4: U-Turn Coordinates

8.3.4 Long U-Turn Set

x	**y**	**z**
-3.059	-1.118	10.655
-2.128	-0.192	10.056
-2.154	-0.839	10.089
-1.533	1.172	15.048
-3.522	0.636	15.046
-2.086	2.176	16.116
4.356	-3.323	10.155
-3.469	0.565	19.494
-2.198	2.516	19.494
-1.36	-3.822	10.053
0.566	-2.797	16.895
-0.369	3.613	11.154
-1.8	-2.853	11.622
-3.624	4.69	19.494
-3.059	-1.118	10.655
-2.128	-0.192	10.056
-2.154	-0.839	10.089
-1.533	1.172	15.048
-3.522	0.636	15.046
-2.086	2.176	16.116

Table 5: Long U-Turn Coordinates

8.3.5 Reverse Set

x	y	z
0.574	-0.922	13.963
-0.598	-1.781	13.363
-2.896	-1.601	19.494
3.151	2.906	10.076
3.212	0.338	12.382
4.076	-2.485	19.141
-0.931	-2.66	11.307
-2.401	4.629	9.562
1.462	-2.317	9.719
0.574	-0.922	13.963
-0.598	-1.781	13.363
-2.896	-1.601	19.494
3.151	2.906	10.076
3.212	0.338	12.382
4.076	-2.485	19.141
-0.931	-2.66	11.307
-2.401	4.629	9.562
1.462	-2.317	9.719
0.574	-0.922	13.963
-0.598	-1.781	13.363

Table 6: Reverse Coordinates

9 Testing

9.1 Types of Testing

9.1.1 Unit Testing

This is the first level of testing. In this, different modules are tested against the specification produced during design for the modules.Unit testing is essentially for verification of the code produced during the coding phase, and hence goal is to test the internal logic of the modules. It is typically done by the programmer of the module.

9.1.2 Integration Testing

This is the next level of testing. In this, many unit tested modules are combined into subsystems, which are then tested. The goal here is to see if the modules can be integrated properly. Hence, the emphasis is on testing interfaces between modules. This testing is performed to expose defects in the interfaces and in the interactions between integrated components or systems.

9.1.3 System Testing

System testing of software or hardware is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements. System testing falls within the scope of black box testing, and as such, should require no knowledge of the inner design of the code or logic. As a rule, system testing takes, as its input, all of the "integrated" software components that have passed integration testing and also the software system itself integrated with any applicable hardware system.

9.2 Test Cases

9.2.1 Police Module

Police Registration Form

Test Case Id	**Scenario Name and Decription**	**Input 1 First Name**	**Input 2 Last Name**	**Input 3 Mobile no.**	**Input 4 Email**	**Input 5 Password**	**Input 6 Confirm password**	**Expected output**	**Remark**
TC1	Register	valid	valid	valid	valid	valid	valid	User registered successfully	Data stored into database
TC2	Register alternative flow, Invalid entry	valid	valid	invalid	valid	valid	valid	Mobile no. format not valid	-
TC3		valid	valid	valid	invalid	valid	valid	Email address invalid or does not exist	-
TC4	Registration password and confirm password: invalid entry	valid	valid	valid	valid	invalid	valid	Password format not valid	-
TC5		valid	valid	valid	valid	valid	invalid	Confirm password format not valid	-
TC6		valid	valid	valid	valid	valid	invalid	Password and confirm password should be same	Registration failed; Re-enter confirm password

Table 7: Police Module Registration

Police Module Login Form

Test Case ID	Scenario Name and Description	Input 1 Login ID	Input 2 Password	Expected output	Remarks (if any)
TC1	1) Login	valid input	valid input	user is allowed to login	-
TC2	2) Login alternative flow Invalid entry	invalid input	valid input	login id is invalid	login id does not exist in database
TC3		valid input	invalid input	password invalid	password is not in specified format
TC4		valid input	valid input	password invalid	password does not exist in database
TC5		invalid input	invalid input	login id and password invalid	id and password are not in specified format
TC6	3) Login alternative flow : exist	valid/invalid input	valid/invalid input	user comes out of the system	-

Table 8: Police Module Login

Police Module Notification

Test Case Id	Scenario Name and Decription	Input 1 Unseen	Input 2 Seen	Input 3 Mark as done	Expected output	Remark
TC1	Notification received	Notification not seen	-	-	Status becomes 0	Data stored in database (Notification should be seen)
TC2		-	Notification seen	-	Status becomes 1	Action should be taken
TC3		-	-	Marked as done	Status becomes 2	Action is taken and stored in database
TC4	GPS co-ordinate: click on link	-	seen	-	Map should open	-

Table 9: Police Module Notification

9.2.2 User Module

Registration

Test Case Id	Scenario Name and Decription	Input 1 Name	Input 2 Address	Input 3 Mobile no.	Input 4 DOB	Input 5 Licence no.	Input 6 Car no.	Expected output	Remark
TC 1	1.Register	Valid	Valid	Valid	Valid	Valid	Valid	Registration Successful	Data Stored in the Database and App Stared
TC 2	2.Register Alternative flow: Invalid Entry	Invalid	Valid	Valid	Valid	Valid	Valid	Name Invalid	Registration Failed
TC 3		Valid	Invalid	Valid	Valid	Valid	Valid	Address Invalid	Registration Failed
TC 4		Valid	Valid	Invalid	Valid	Valid	Valid	Mobile No. format Invalid	Registration Failed
TC 5		Valid	Valid	Valid	Invalid	Valid	Valid	DOB format Invalid	Registration Failed
TC 6		Valid	Valid	Valid	Valid	Invalid	Valid	Licence No. format Invalid	Registration Failed
TC 7		Valid	Valid	Valid	Valid	Valid	Invalid	Car No. format Invalid	Registration Failed
TC 8		Invalid	Invalid	Valid	Valid	Valid	Valid	Name and Address Invalid	Registration Failed
TC 9		Invalid	Valid	Invalid	Valid	Valid	Valid	Name and Mobile No. Format Invalid	Registration Failed
TC 10		Invalid	Valid	Valid	Invalid	Valid	Valid	Name and DOB format Invalid	Registration Failed
TC 11		Invalid	Valid	Valid	Valid	Invalid	Valid	Name and Licence No. Format Invalid	Registration Failed
TC 12		Invalid	Valid	Valid	Valid	Valid	Invalid	Name and Car No. Format Invalid	Registration Failed
TC 13		Valid	Invalid	Invalid	Valid	Valid	Valid	Address and Mobile No. Format Invalid	Registration Failed
TC 14		Valid	Invalid	Valid	Invalid	Valid	Valid	Address and DOB format Invalid	Registration Failed
TC 15		Valid	Invalid	Valid	Valid	Invalid	Valid	Address and Licence No. Format Invalid	Registration Failed
TC 16		Valid	Invalid	Valid	Valid	Valid	Invalid	Address,Car No. Format Invalid	Registration Failed
TC 17		Valid	Valid	Invalid	Invalid	Valid	Valid	Mobile No. and DOB Format Invalid	Registration Failed
TC 18		Valid	Valid	Invalid	Valid	Invalid	Valid	Mobile and Licence No. Format Invalid	Registration Failed
TC 19		Valid	Valid	Invalid	Valid	Valid	Invalid	Mobile No. And Car No.	Registration Failed
TC 20		Invalid	Invalid	Invalid	Valid	Valid	Valid	Name, Address, Mobile No. Invalid	Registration Failed
TC 21	3.Register Alternative flow: Invalid Entry for Licence,Car No.	Valid	Valid	Valid	Invalid	Invalid	Valid	DOB and Licence No. Format Invalid	Registration Failed
TC 22		Valid	Valid	Valid	Invalid	Valid	Invalid	DOB and Car No. Format Invalid	Registration Failed
TC 23		Valid	Valid	Valid	Valid	Invalid	Invalid	Licence No. and Car No. Format Invalid	Registration Failed
TC 24		Valid	Valid	Valid	Invalid	Invalid	Invalid	DOB and Licence No. Car No. Format Invalid	Registration Failed

Table 10: User Module Registration

9.2.3 Server Module

Database Creation and Connection

Test Case ID	**Scenario and Description**	**Input 1 Connection String**	**Input 2 IP Address**	**Input 3 Name**	**Input 4 Pass**	**Input 5 MySQL**	**Expected Output**	**Remark**
TC1	1) Database creation and connection	Yes	Yes	Yes	Yes	Yes	Database created and connected	-
TC2	2) Any one field is incorrect	No	No	No	No	No	Not created or connected	Give correct input

Table 11: Database creation and connection

10 Screenshots

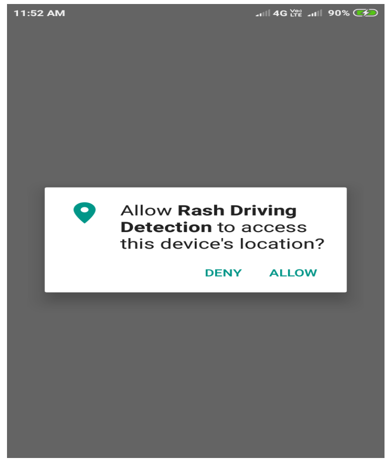

Figure 15: Asks permission for device location

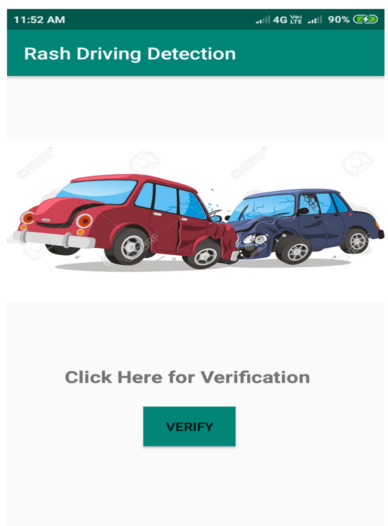

Figure 16: Verification Page

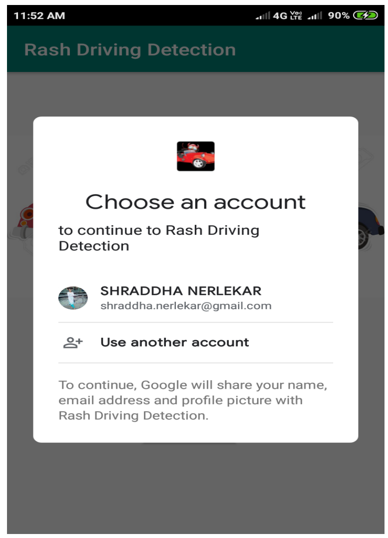

Figure 17: Sign in with Google account

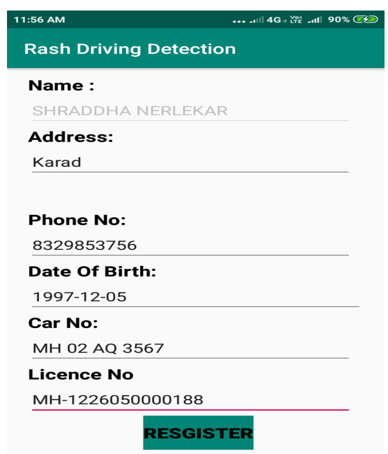

Figure 18: Registration Form

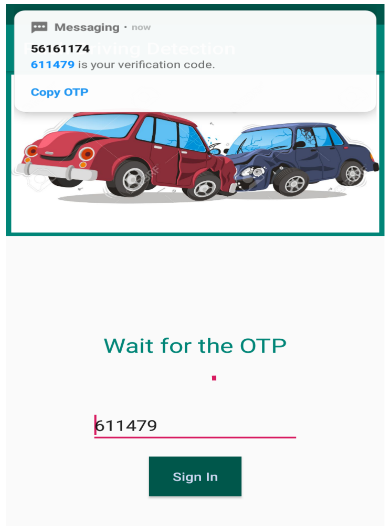

Figure 19: Auto generated OTP

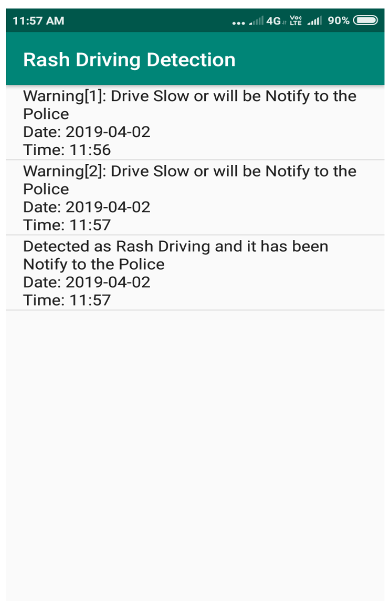

Figure 20: Notification

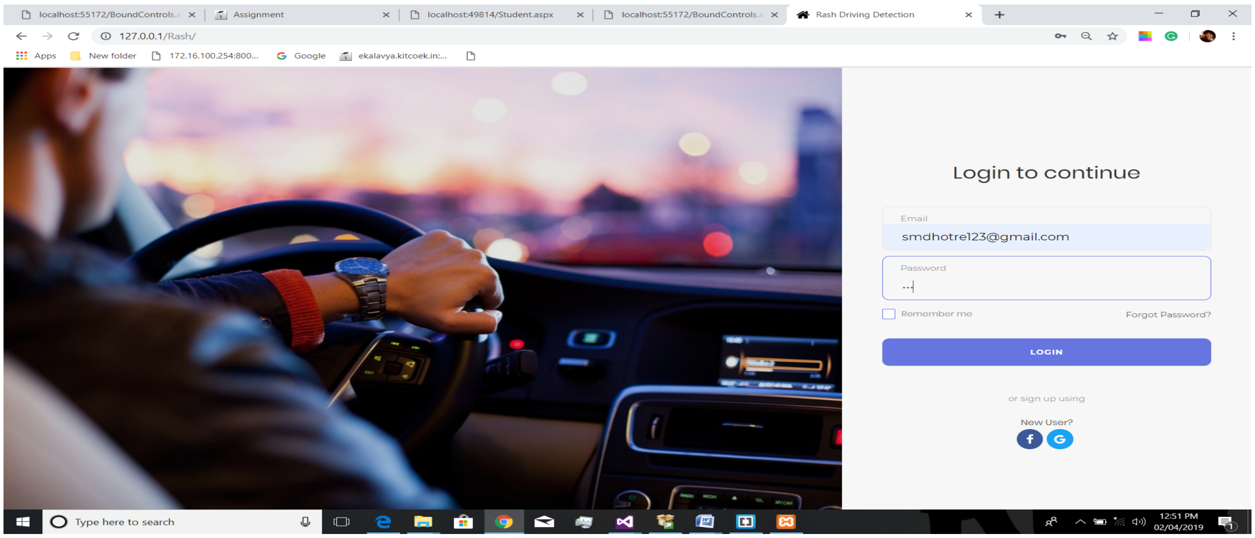

Figure 21: Website : Login Page

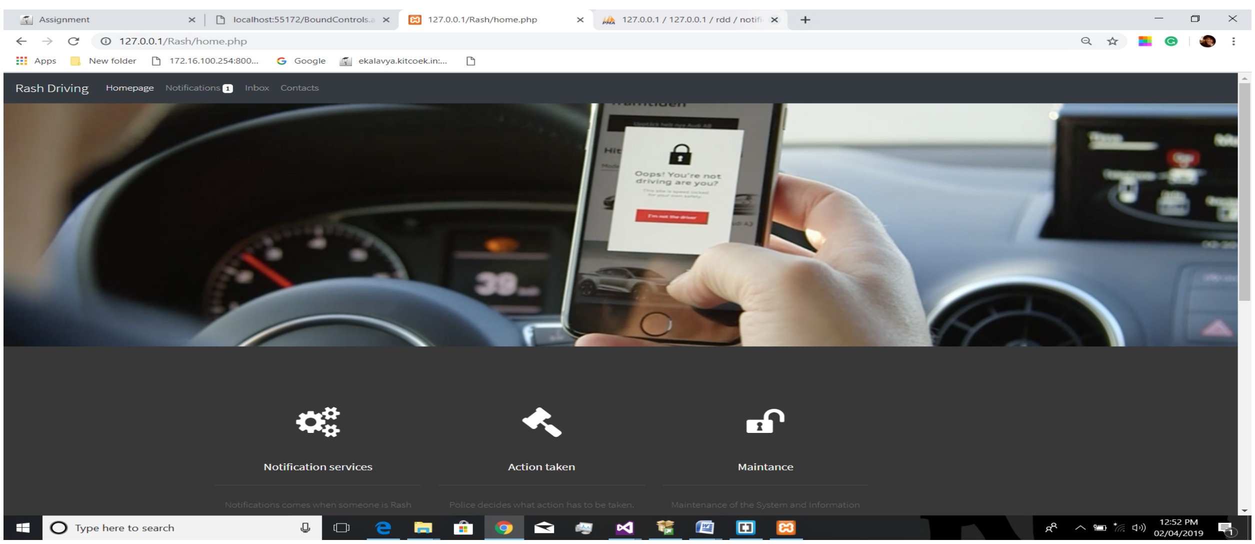

Figure 22: Website : Home Page

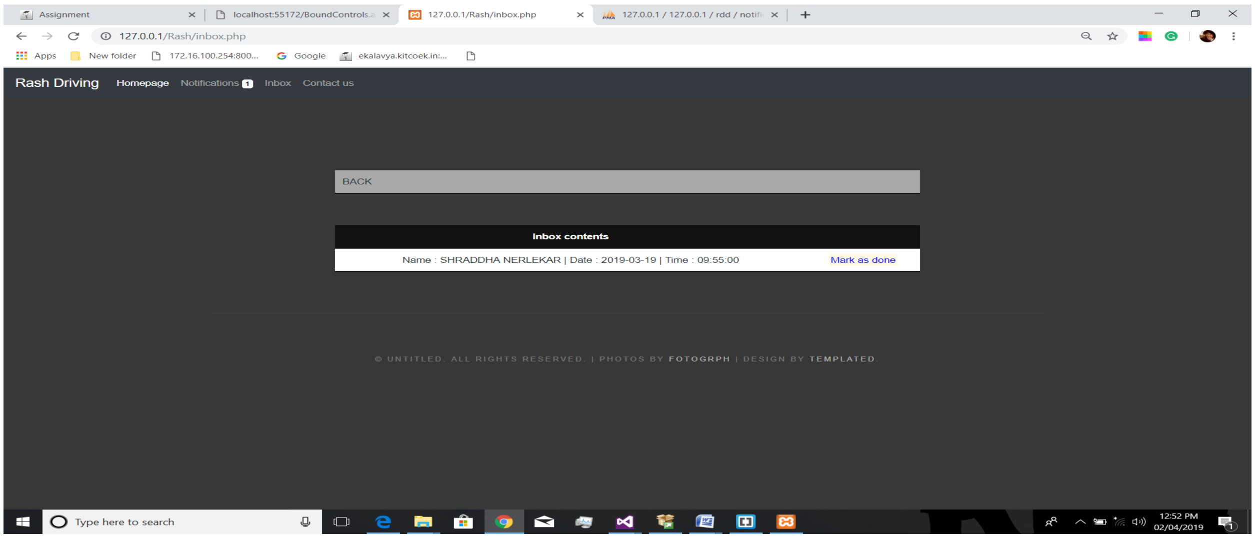

Figure 23: Website : Notification

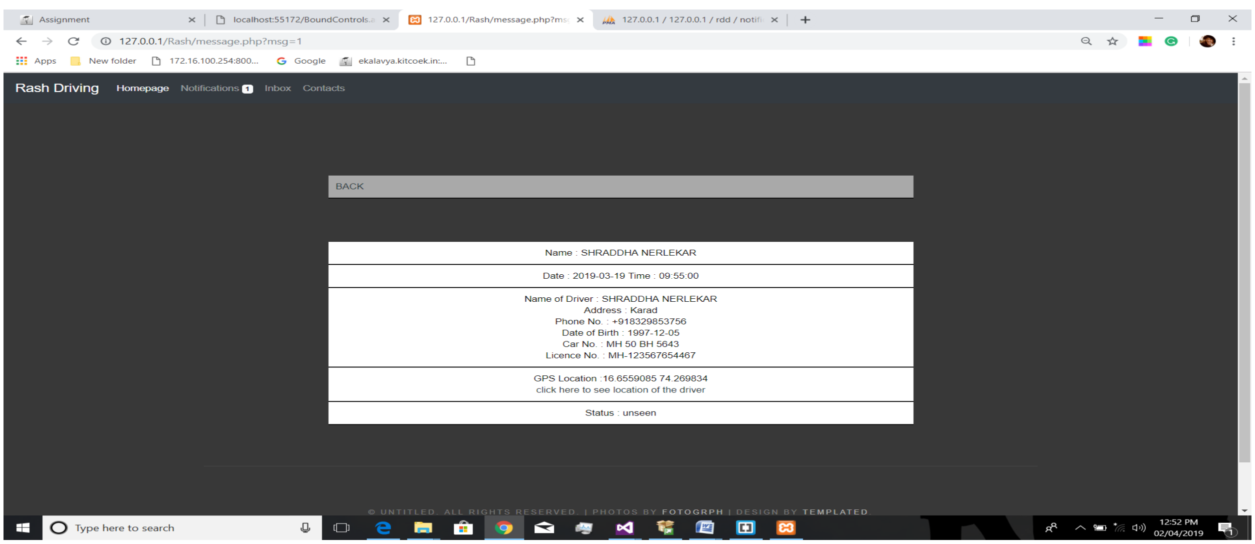

Figure 24: Website : Inbox

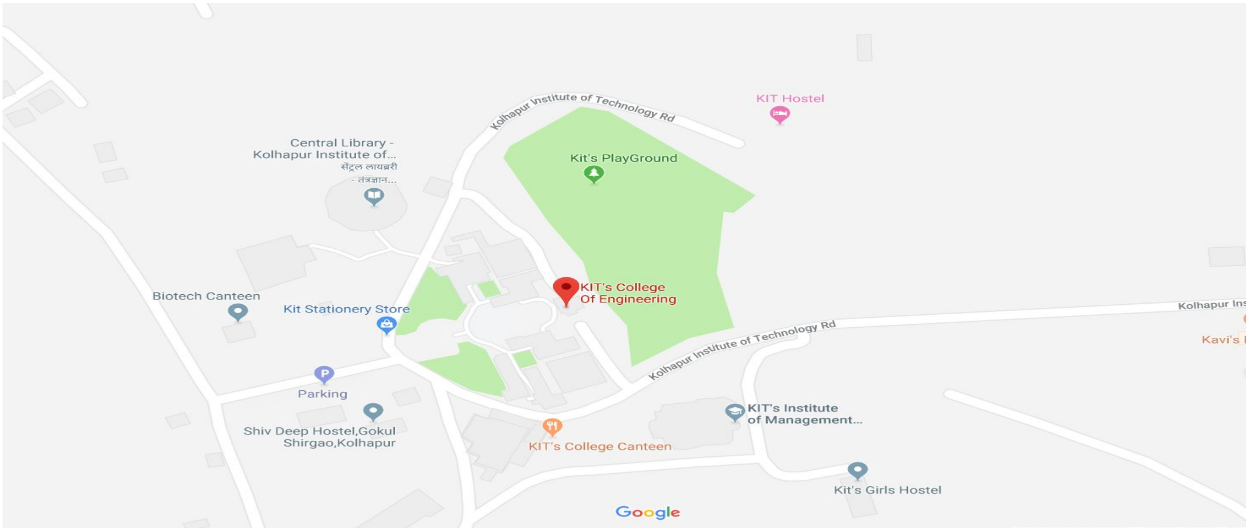

Figure 25: Website : Map

Police will get to know location of the user in Google Maps when Rash Driving is detected

11 Future Scope

Since our main application is Mobile Phone based Rash Driving Detection, we have taken 5 types of training patterns, we hope to extract all types of training patterns in future work. Obviously these training pattern patterns should be taken with the help of trained riders for the cause of safety.

For the verification of Licence no. and Car no. we hope to get the permission to access RTO database

We hope to resolve the problem of detecting nearest police station with the help of Haversine algorithm which will calculate the minimum distance between police station and the incident location and will notify the nearest police station.

12 Conclusion

In this Project ,we introduced a system using smartphone for collecting real-time sensor data, processing according to the conditions and sending notifications when rash driving is detected, so that the police can take appropriate action on the driver. The solution requires only a mobile phone placed in vehicle ,collect and analyze the data from its acccelerometer and orientation sensor to detect any abnormal or dangerous driving movement typically related to rash driving.

13 References

13.1 Papers

1. Z. Zhu and Q. Ji, "Real Time and Non-Intrusive Driver Fatigue Monitoring", in the 7th International IEEE Conference on Intelligent Transportation Systems

2. Hussain A. Attia, Maen Takruri, Halah Y.Ali,Electronic Monitoring and Protection System for Drunk Driver Based on Breath Sample Testing, 5th International Conference on Electronic Devices, Systems and Applications (ICEDSA), 2016

3. Hagar Mahmoud and Nadine Akkari, Shortest Path Calculation: A Comparative Study for Location-Based Recommender System, 2016 World Symposium on Computer Applications Research.

4. Sarah Kadhim Alluhaibi1, Munaf S. Najim Al-Din2, Aiman Moyaid3, International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 11 (2018) pp. 8856-8861 Research India Publications.Driver Behavior Detection Techniques: A survey

5. A. B. Albu, B. Widsten, T. Wang, J. Lan and 1. Mah, "A Computer Vision-Based System for Real-Time Detection of Sleep Onset in Fatigued Drivers", in 2008 IEEE Intelligent Vehicles Symposium, pp. 25-30, June 2008.

6. Study of various techniques for driver behavior monitoring and recognition system Ambily Mohan Final Year M. Tech, Dept. of Computer Science Engineering, Sree Narayana Gurukulam College of Engineering Kerala, India.
   INTERNATIONAL JOURNAL OF COMPUTER ENGINEERING TECHNOLOGY (IJCET)

7. Driving Style Recognition Using a Smartphone as a Sensor Platform Derick A. Johnson and Mohan M. Trivedi 2011 14th International IEEE Conference on Intelligent Transportation Systems Washington, DC, USA. October 5-7, 2011

13.2 Links

1. https://console.developers.google.com

2. https://developers.google.com/identity/sign-in/web/sign-in

3. https://googleweblight.com/i?u=https://blog.nxp.com/connectedcar/howto-detect-vehicle-presence-or-movements-withmagnetometershl=en-IN

4. https://firebase.google.com/tocs/or/android/google-signin
5. https://examples.javacodegeeks.com/android/core/hardware/sensor/android-accelerometer-example/
6. https://stackoverflow.com/questions/32249284/how-do-i-get-sensor-readings-of-an-android-mobile-eg-accelerometer-gyroscope
7. https://github.com/halfhp/androidplot/blob/master/docs/attrs.md
8. https://developer.android.com/guide/topics/ui/notifiers/notifications
9. https://developer.android.com/training/run-background-service/create-service