AKHIL BHARATIYA MARATHA SHIKSHAN PARISHAD'S

ANANTRAO PAWAR COLLEGE OF ENGINEERING & RESEARCH

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Project Presentation
On
"Pothole detection using mobile sensors"

Presented By

Shyam Adsul 5401
Umesh Salunke 5409
Shruti Landge 5419
Vaibhavi Adhikari 5420

Guided By

Prof. A. N. Kalal

Outlines

Introduction

- Roads in India normally have speed breakers so that the vehicle's speed can be controlled to avoid accidents. However, these speed breakers are unevenly distributed with uneven and unscientific heights.
- The system gather side by side data from the vibrations and the GPS sensors, and further process.
- We will use the application of accelerometer and the GPS to detect potholes and gather the exact location of the pothole.
- Automated embedded sensing systems, including smartphones, have two general classes of sensors to be used for pothole detection: microphone and accelerometers.

Review Literature

Sr. No	Title	Domain	Algorithm	Description
1.	Machine learning based real time pothole detection system for smart transportation using IoT[2020]	Machine Learning	Random Forest	➢ The reason of better performance are: ➢ Random Forest algorithm avoids over-fitting problem in classification problems and with a single training pass, the same Random Forest can be used for classification as well as regression tasks.
2.	Pot-holes detection on Indian Roads using Mobile Sensors [2018]	Machine Learning	SVM	➢ Support Vector Machine – Accuracy – 99.6% ➢ Naïve Bias – Accuracy – Accuracy – 98.4% ➢ K-Nearest Neighbours – Accuracy – 98.0% ➢ This above accuracy's are about algorithms, In practical way implementation of project accuracy may varry.
3.	Road Quality Management System using Mobile Sensors[2017]	None	None	➢ System consists of 3 subsystems: Sensing the data, Data processing and plotting the data. These three subsystems work independent of each other, but have one Center point they revolve around.

Problem Definition, Aim, Objective

- **Problem Definition**

  Designing such system that can analyse the data collected from GPS and accelerometer to detect the path-hole and sense these potholes while driving and send notification to driver and owner of vehicle. If the driver drive vehicle in high speed then this situation can be known to owner with the help of this system.

- **Aim:**

  Designing such application that can detect potholes using mobile senser. .

- **Objectives:**

- Detect the presence of potholes and report those potholes to the driver's smartphone as well as owner's smartphone.
- Upload the pothole locations to a remote database that stores pothole location data for all users of this app.
- To provide a system which will provide information about the pothole so that user will take proper prevention step.

Scope of Project

- The scope of the project is to automatically detect the pothole through the sensors, and send the notification to owner. This system will be used to not only detect different potholes on the road but also provide the information related to potholes. system will Inform a user about whether they are driving rash or slow.

Requirements

Sr. No.	Hardware Requirements	Software Requirements	Tools and Technology used :Tools Used:	Technology Used
1	Atleast 2 android devices with OS 6 and above.	Android SDK.	Android Studio	Java
2	Atleast 2 GB RAM	Xampp server	Android SDK	Android
3	Atleast 20 GB Hard-disk	Android Studio		FCM
4		JDK 1.8 or above		

System Overview

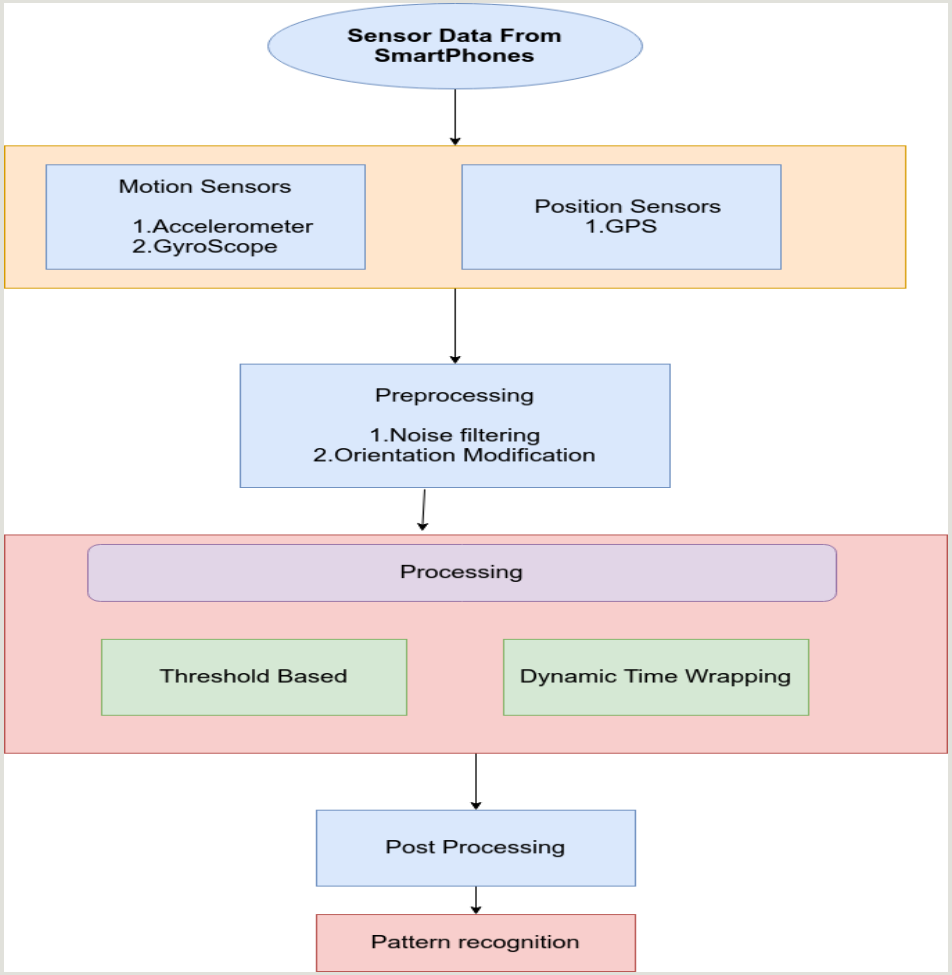
- **Proposed system**

  The proposed system will automatically detect/identify pothole on the road by using accelerometer, GPS, Gyroscope, etc.

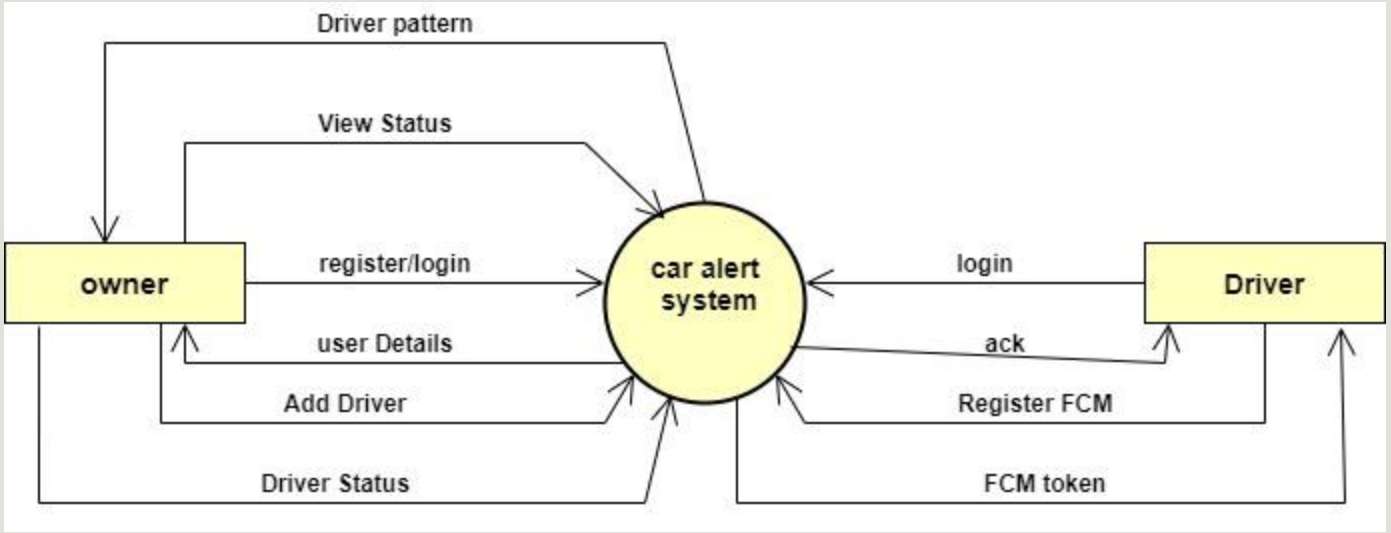
- **Proposed Output**

  - To detect the pothole.
  - To inform a user about the pothole (both user mean driver and owner) so user can decide road condition and on this road how driver driving the vehicle this information can get owner of vehicle

Architecture

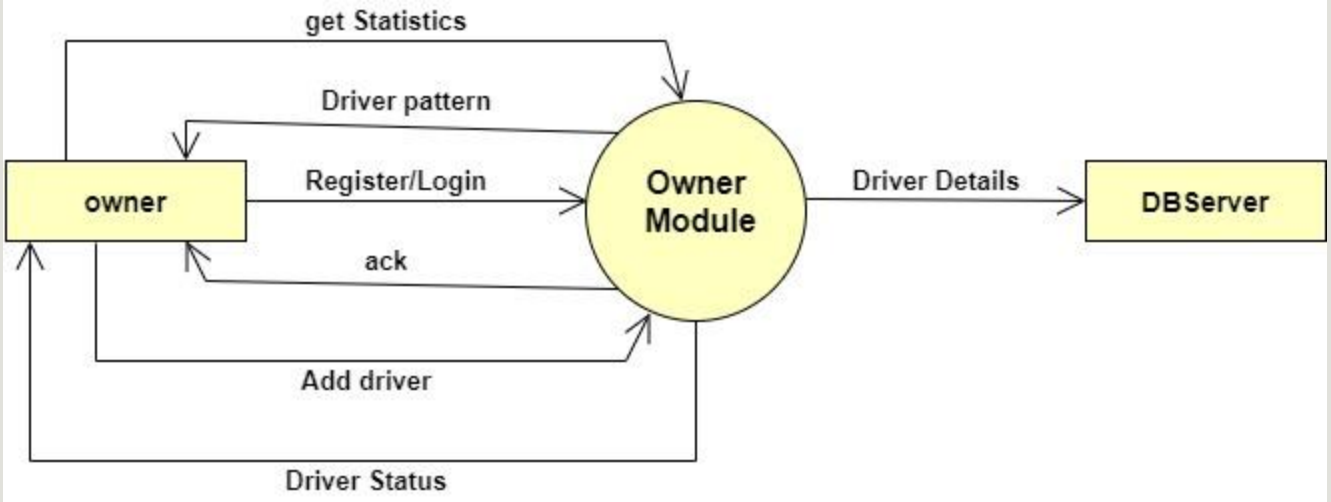


Data Flow Diagram



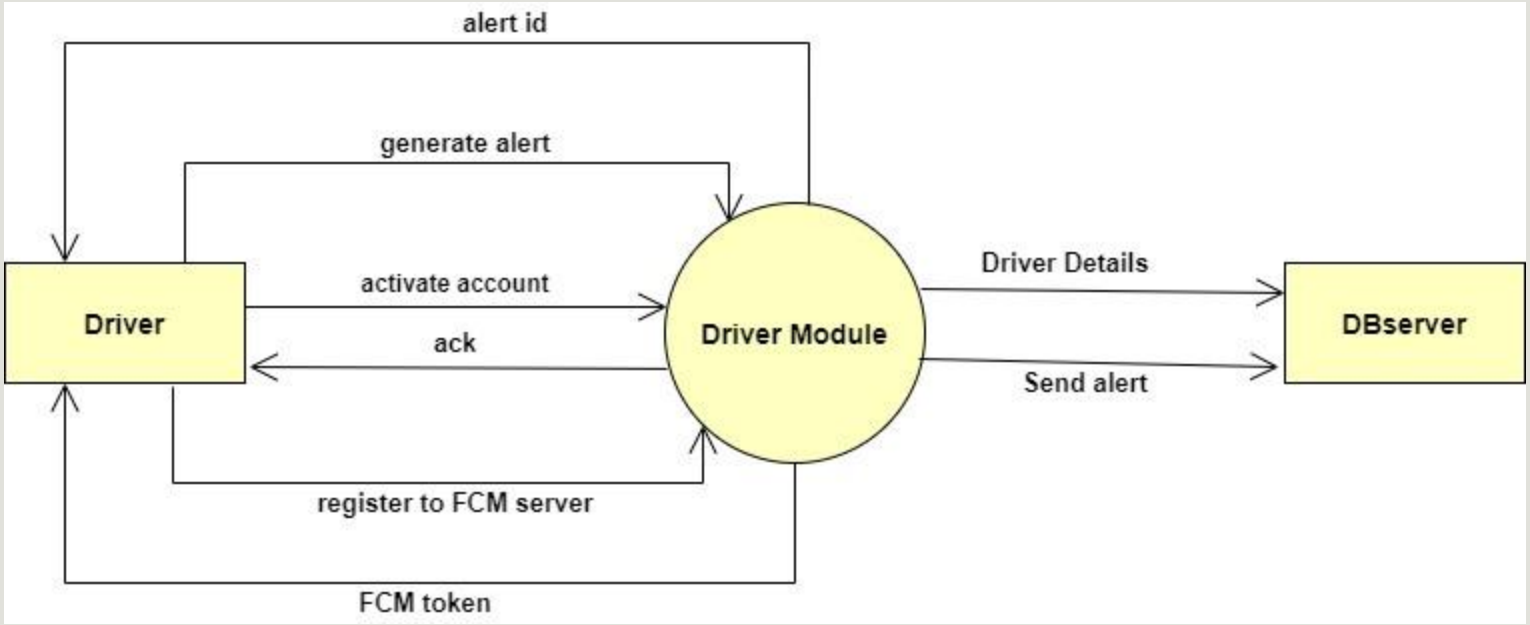
DFD0

Data Flow Diagram



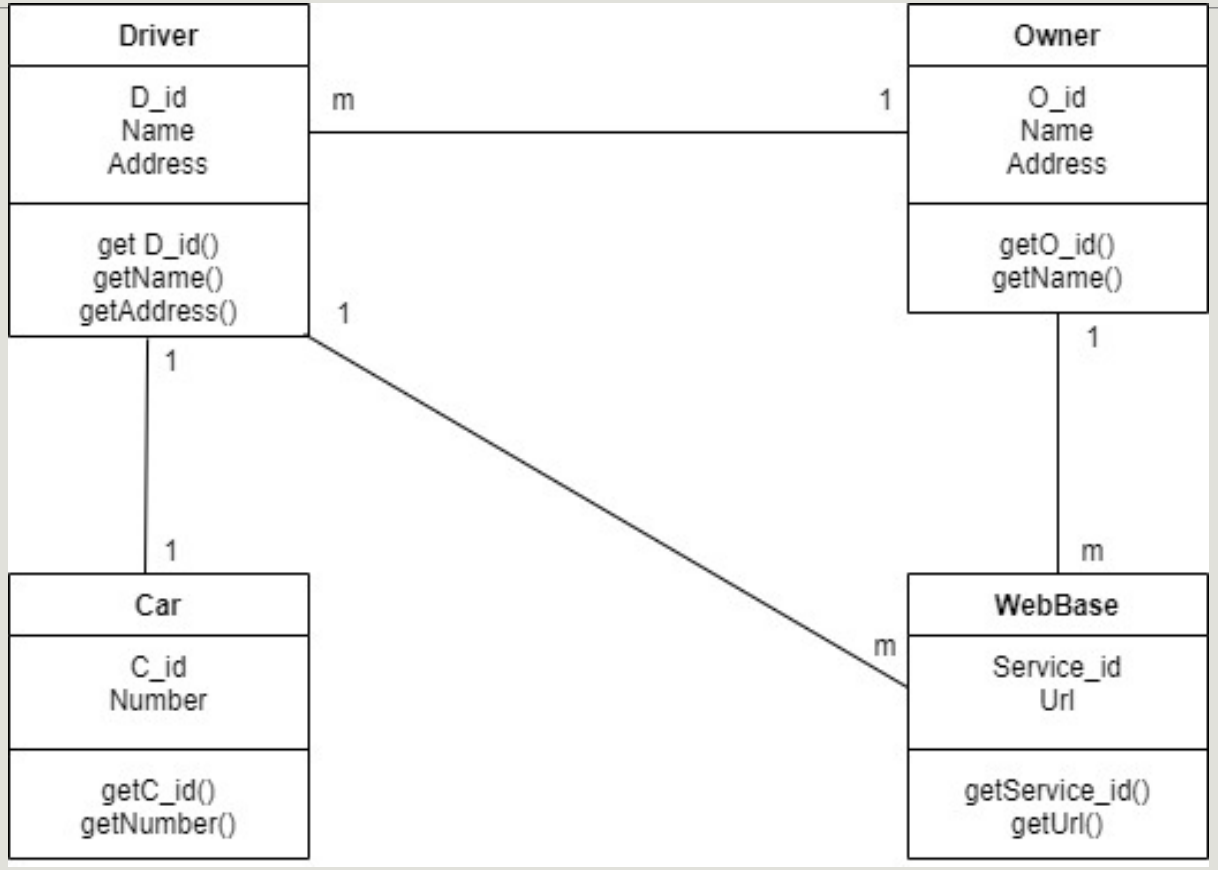
DFD1

Data Flow Diagram



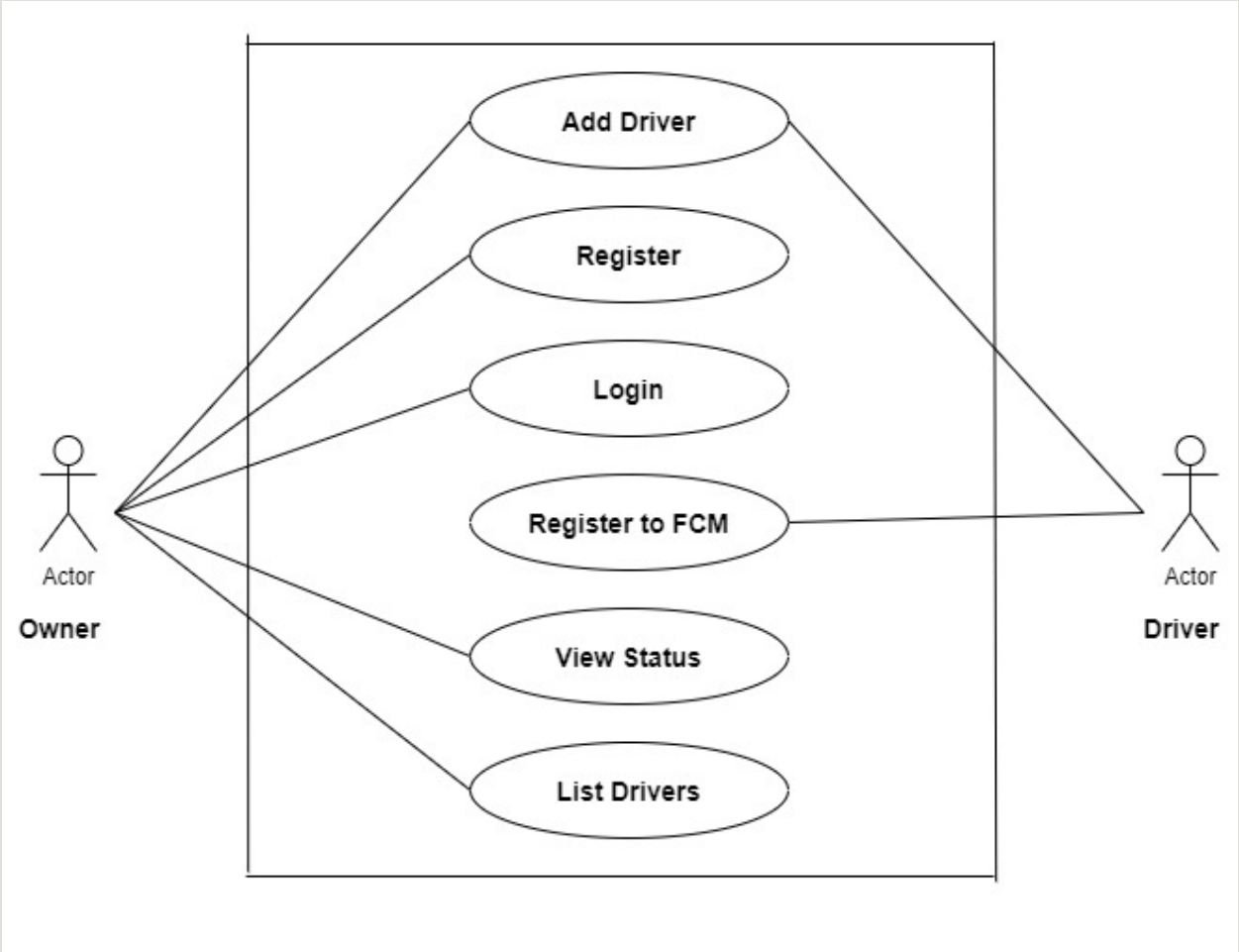
DFD2

Class Diagram

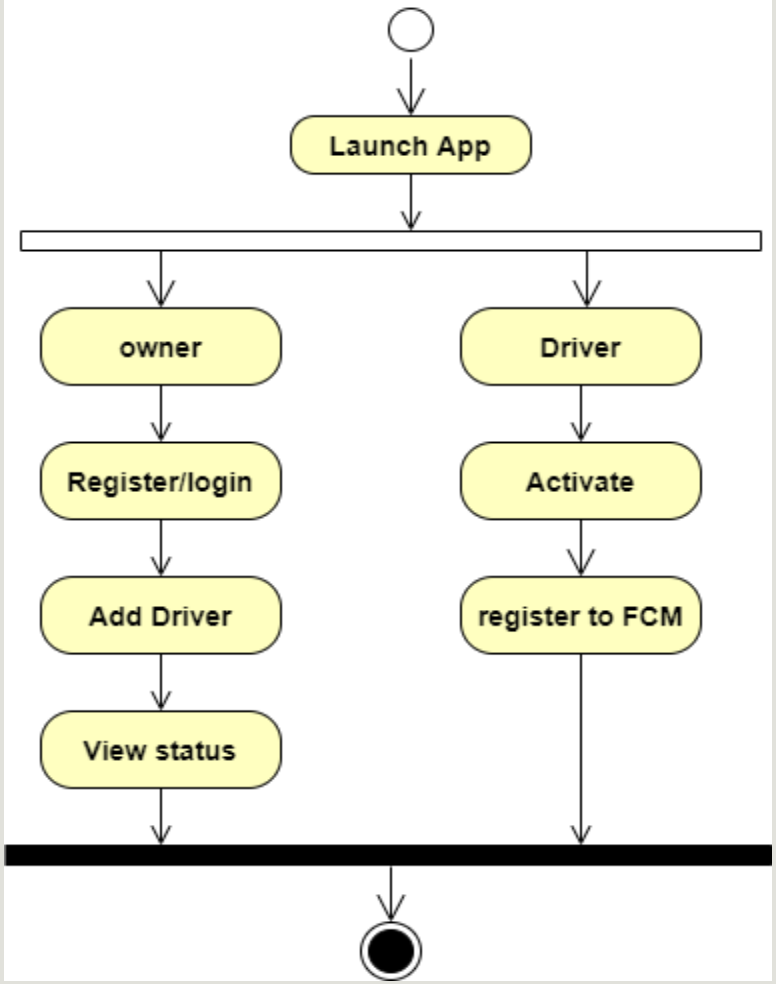


Class Diagram

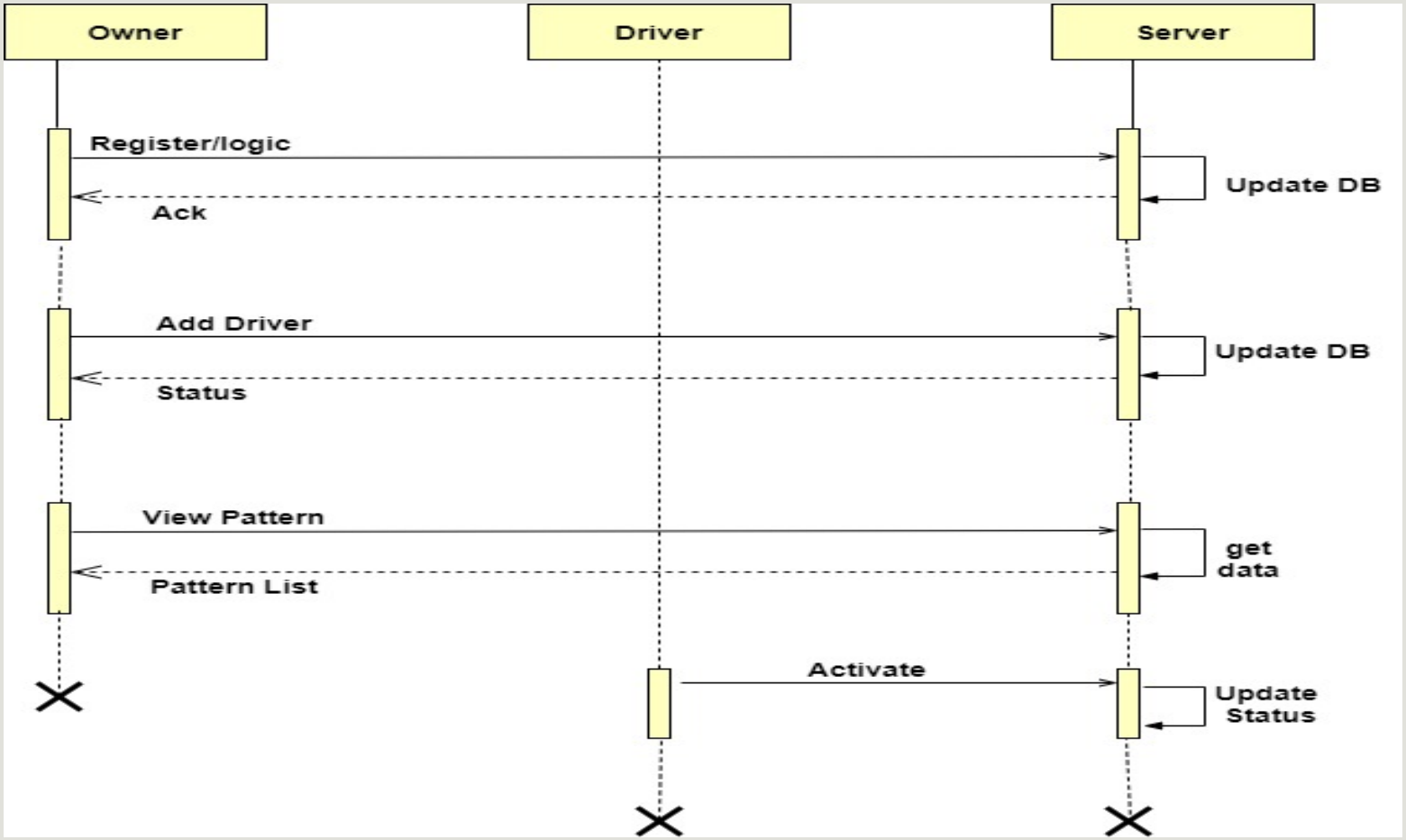
Use Case Diagram



Activity Diagram



Sequence Diagram



SVM Algorithm

Algorithm Details:

Step1: Import the dataset.

Step2: Explore the data to figure out what they look like.

Step3: Pre-process the data.

Step4: Split the data into attributes and labels.

Step5: Divide the data into training and testing sets.

Step6: Train the SVM algorithm.

Step7: Make some predictions or classification.

Threshold Algorithm

Algorithm Details:

Step1: Register to mobile's sensor listener.

Step2: Capture sensors values <x,y,z> using accelerometer.

Step3: Calculate force on axis as gX=x/gravity.

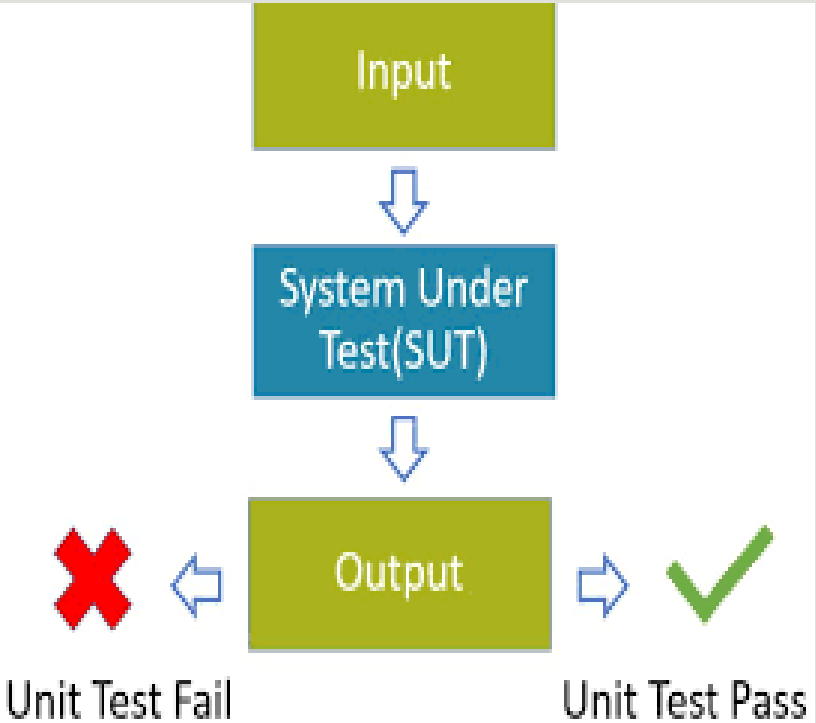
Step4: Calculate gForce as SqureRoot(gX*gX+gY*gY+ gZ*gZ)

Step5: Compare gForce with threshold(3.25) if it is greater than threshold raise event.

Software Testing

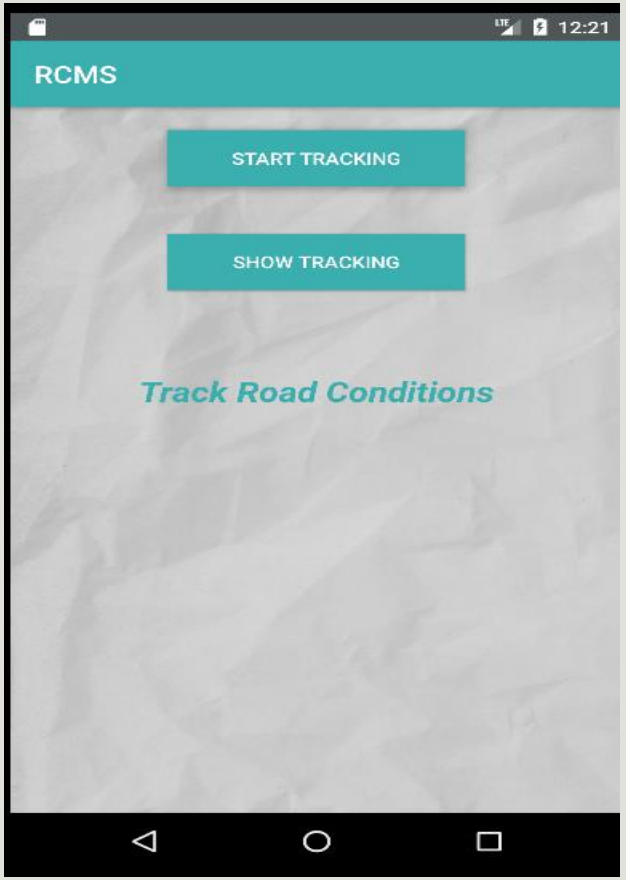
Unit Testing :

Unit Testing is a type of software testing where individual units or components of a software are tested. The purpose is to validate that each unit of the software code performs as expected.



Project Implementation

A) Owner Side:



Project Implementation

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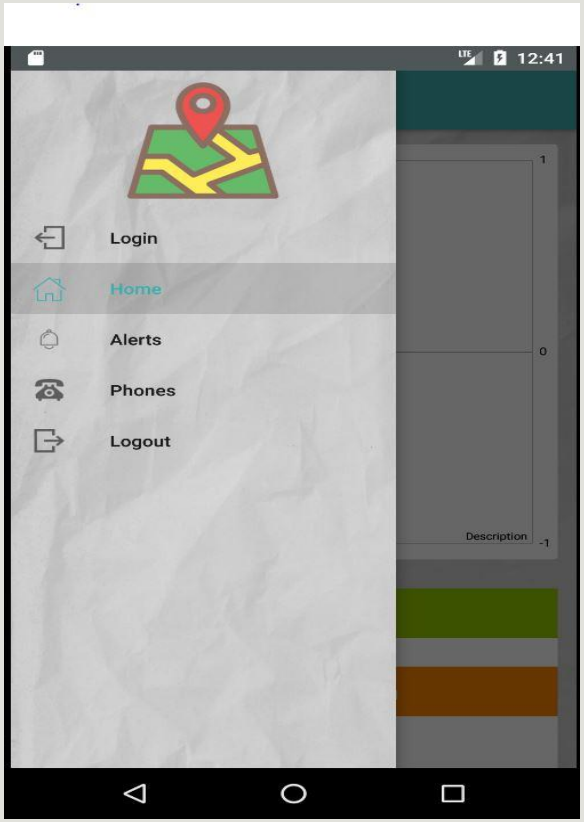
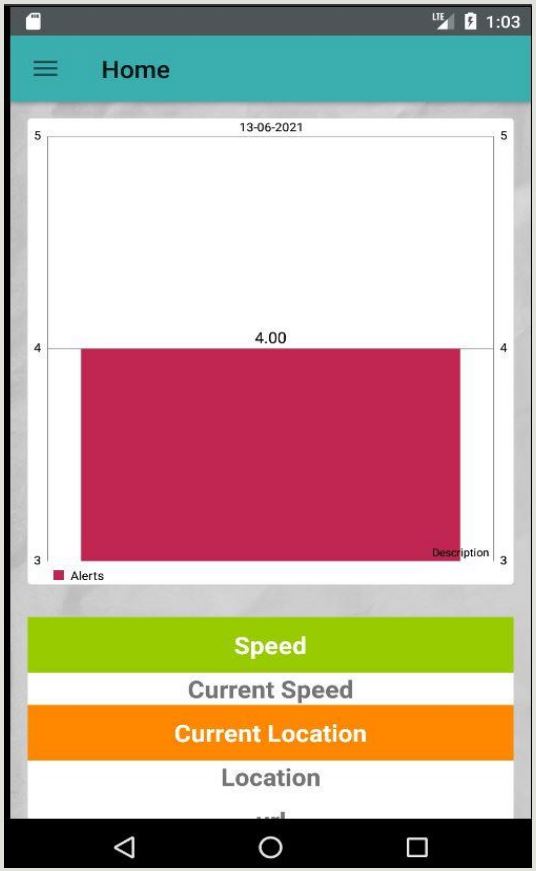


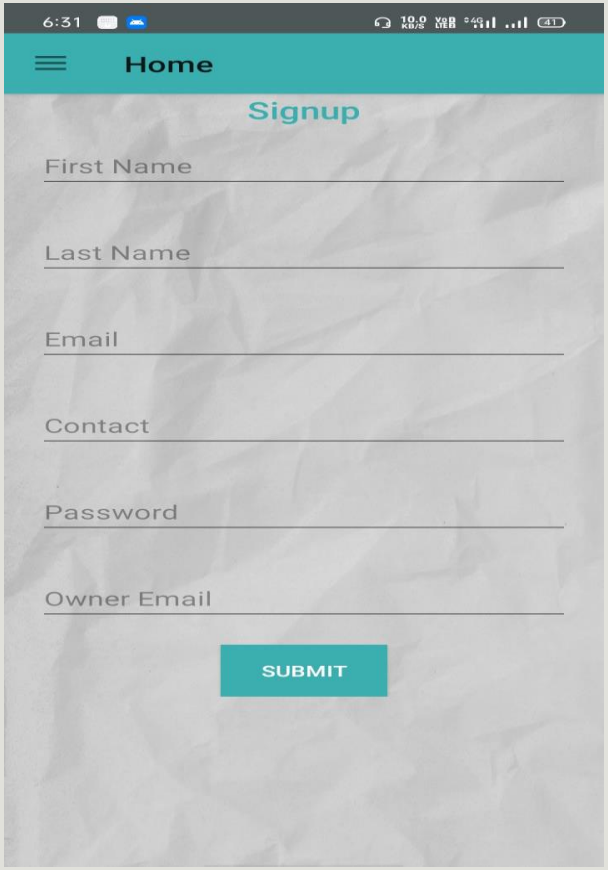


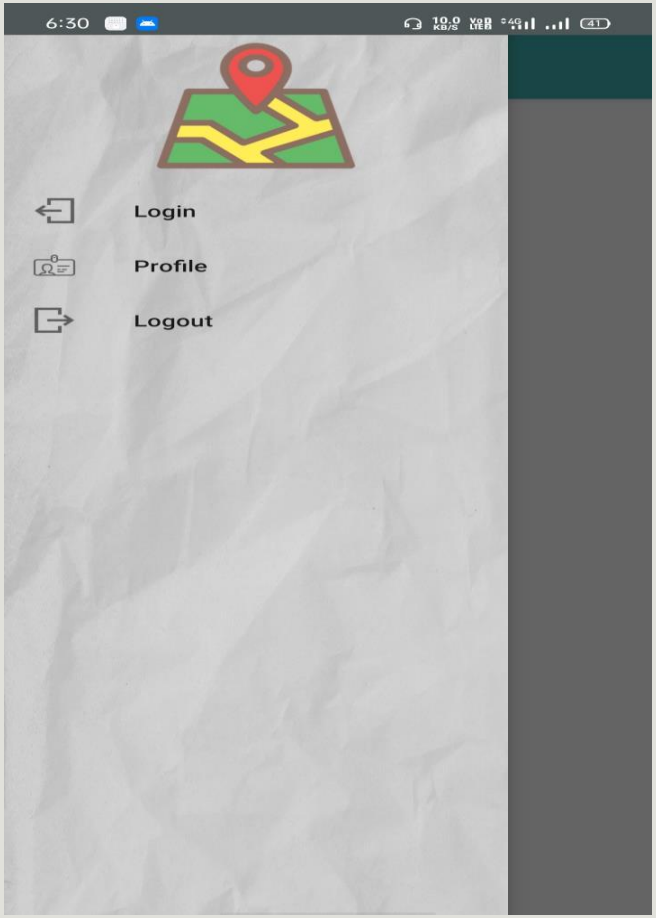
Project Implementation

A) Owner Side:

Project Implementation

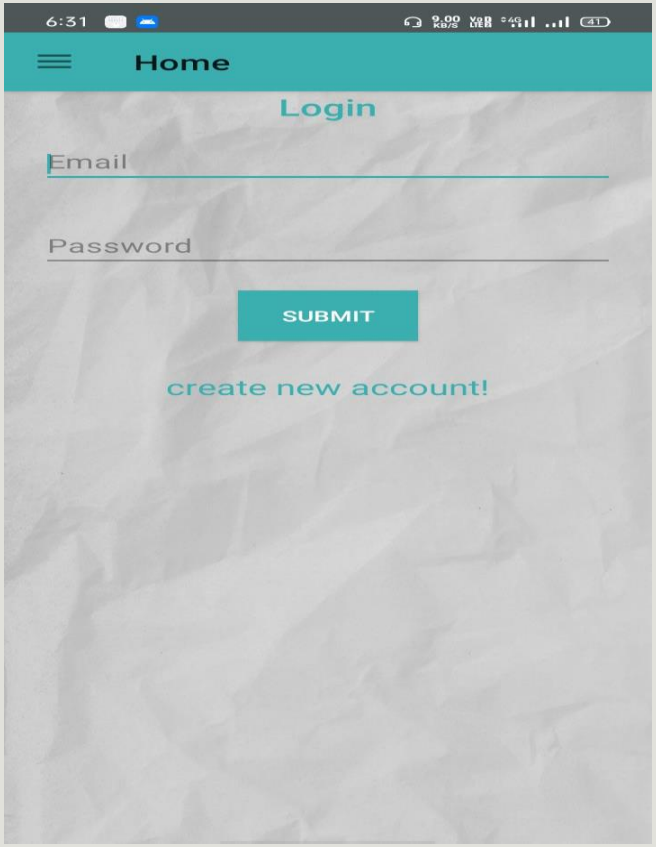
B) Driver Side:

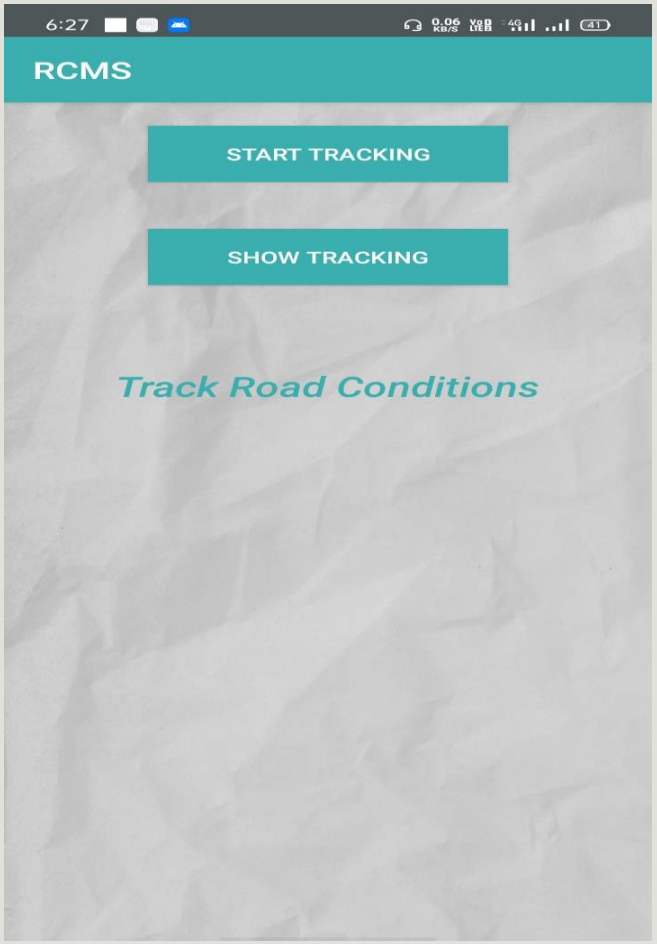




Project Implementation

B) Driver Side:





Conclusion

- The purpose of this system is to find out the location of potholes on the road using the mobile sensors. Android Smartphone sensors are having more importance in this project, as they are cost effective and increase scalability of system. With help of our project we can reduce vehicle maintenance cost

References

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