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Accident Spot Detection Using Android

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Abstract: *Road and traffic is most important issue not only for Indian government but also for common people. Mostly,it is found that road accident happning are more frequent at certain specific locations i.e black spot. The analysis of these black spot can help in identifying certain road accident factor that make a road accident to oc- cur frequently in that locations. In this project we apply statistics analysis and data mining algorithms on the Fatal Accident dataset as an attempt to address this problem. Association rule mining is one of the popular data mining techniques that iden- tify the causes of accident of road accident. In this project, we first applied k-means algorithm to group the accident locations into four level, zero level, first level, second level and third level accident location. k-means algorithm takes accident level count as a factor to cluster the locations. Then we will use association rule mining to identify these locations. The rules show different factors associated with road accidents at different locations. For all this we will provide accident data that are issue from Nashik city commissionar office. Safety driving suggestions will be making based on accident data, association rules, classification model, and clusters obtained.*

Keywords: Eclat algorithm, Clustering, Classification, Association, GPS tracking, Accident

I. INTRODUCTION

To identify important factors to road accidents in Nashik we have obtained a large data set every accident recorded in the nashik district commissioner office in the Year 2014-2017.

1.1 Overview

Nowadays, nobody in this world is ready to look what's happening around them. Even though, if any accident occurs no one cares about it..A large number of deaths are caused by Traffic accidents worldwide.
The global crisis of road safety can be seen by observing the significant number of deaths and injuries that are caused by road traffic accidents. In many situations the family members or emergency services are not informed in time.
This results in delayed emergency service response time, which can lead to an individual's death or cause severe injury. This is an intention to implement an innovative solution for this problem by developing an Accident Spot detection System using android smart phone from the accident zone.

1.2 Motivation

Road accidents and traffic is most important issue not only for Indian goverment but also for common people. Road safety becomes a major public health concern. Everyday lots of vehicles driving on the road, and traffic accidents happens at any time and anywhere.some people die in accident also.As human being we all want to avoid accident and stay safe. To find out how to drive safer, data mining technique could be applied on the traffic accident dataset to find out some valuable information,thus give driving suggestion.

1.3 Problem Statement and Objectives

To develop a project for identifying the blackspots on roads of nashik city where frequently accidents happened. The attributes of Eclat algorithm like execution time, depth first search reduces memory requirement like this attributes of Eclat algorithm matches to our data set. The data set collected from Commisioner of Nashik. Using data mining technique such as Eclat algorithm, Association rule, Kmeans clustering and FP growth we are identifying the black spots on roads

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and identify the geographical location where frequently accident occur.After identification of black spots user get information through user application.

Objective

- To build an excessive speed indication system and warning alert system via voice alert, remote accessing of speed by parents.
- To provide an accident prevention system condition monitoring system using GPS and maps.
- To provide location tracking using Google map plotting.
- To study scientific analysis of traffic data.
- The main objective of our project is to find accident black spot and to identify the causes of road accident to reduce the crimes level using Data Mining approach.
- The road traffic and accidents statistics must be presented in such away to make it easier to be both recognized and interpreted by a human operator
- To find out frequent crime location on road.
- To Reduce the Human Death Ratio due to Road Accident in India.
- If accident takes place, quick transmission of message to preconfigured contacts to intimate the victims.
- To provide maximum assistance even in unpopulated area.
- To incorporate the technology and make more versatile applications of defense& war fields definition, its applications, necessity, and objective are given here.
- Basic need of system give detail about that software, which protocol issued for complition the operation of proposed system.

1.4 Project Scope

Detection of black spot of nashik city Will help to government authorities and common citizen also.
This project will also helpful to another city.
Scientific study of road traffic data will help to give safety driving suggestion that will reduce the fatality rate.

1.5 Methodology

Relevant Mathematics Associated with the Project

System Description:

- Input: Nashik city road wise data set provided by commissioner officer of Nashik.
- Output: Identification of black spot.

Functions

- Success Conditions: Identification of blackspots.
- Failure Conditions: Foggy weather, slippery surface, gravel roads and oily road.

Input: Nashik city road wise data set provided by commissioner officer of Nashik.
Output: Identification of black spot.
Conclusion: Our system is generic hence, our system is NP-Complete.Ch

II. LITERATURE SURVEY

Today road accidents and crime are increasing abruptly and it is one of the major causes for the death of tourist. The time between the accident/crime and when the ambulance and any other help reach that location of accident/crime plays an important role in saving their lives. Accident and crime are leading cause of death that is the number of tourist face problem of any type of crime than the number of tourist people killed in all our wars. In this application if our accident/crime happens then the people can click photos and post them on the app so that the photos will be shared further

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by application to the nearby hospital so that the people would get the treatment. But here we have to depend on other people and it is a little time consuming one. Hence, to provide efficient help to our tourist is necessary. That's why we introduce new application which gives the tourist traveller a voice message from our application because of that the tourist people keep safely take their ways of travel.

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III. SOFTWARE REQUIREMENT SPECIFICATION

In this chapter we are going to have an overview on problem definations; system requirements Like software requirements, hardware Requirements and system features like text representation,
machine learning algoritm.

3.1 Problem Definition

To develop a project for identifying the black spots on roads of nashik city where frequently accidents happened. The attributes of eclat algorithm like execution time,Depth first search reduces memory requirement like this attributes of eclat algorithm Matches to our data set.the data set collected from commissioner of Nashik. Using Data mining technique such as Eclat algorithm, Association rule and Fp-growth we are identifying the black spot on roads and identify the geographical location where frequently accident occur. After identification of black spot user get information through user application.

3.2Functional Requirement

3.2.1 System Feature

1. Nashik citizens and also useful for other city.
2. Ministry of Tourism.
3. Ministry of health and family welfare.
4. Department of health and Human Service(HHS).
5. National Mediation Board(NMB).

3.3 System Requirements

3.3.1 Hardware Requirements

- Smart Phone with GPS: 3GB
- Ram: 1GB

3.3.2 Software Requirements

- Operating System: Windows XP and later versions
- IDE: Android studio v2.3.3
- Programming Language: Java, Android
- Algorithm: Eclate algorithm

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IV. SYSTEM DESIGN

4.1 System Architecture

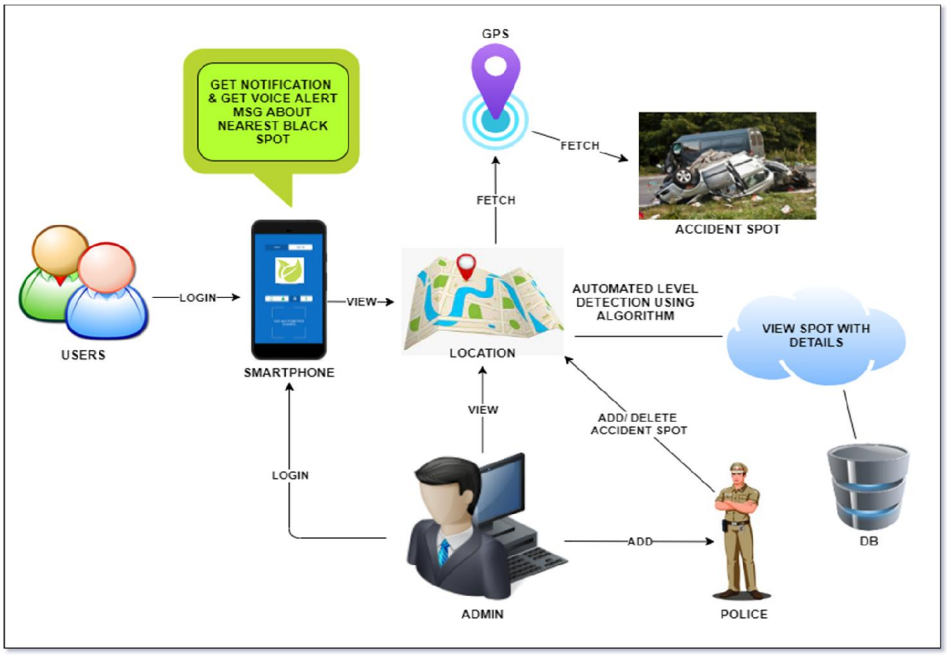

Figure 4.1: System Architecture

- **Admin:** Admin add the police admin, police admin can add all black spot like crime location on map.
- **Police:** Police will integrate the black spot of crime's and then decide the level of crime according to admin's police decided the danger level of that spot level wise. All spots are to be declared as level wise like Level A, Level B, Level C. These levels are define by using Eclat Algorithm, using this algorithm the crime's spot will be define in above three level of dangerous zone from which people can be alerted and safely choose their path of travelling.
- **User:** User can integrate google map in their mobile with android application. After integrating google map user can see the crime and crime spot on that map, using these spots user can choose their root of traveling which is beneficial for them. In road travelling they also see the crime spot. All crime spot are included by the police. Police added crime black listed spot on integrated map which is help people to travel. If tourist or people reach on any crime location and they use this android application then our proposed system send voice message to people and get alert them and send information about nearby black spot on which crime which will held hence that spot is counted in black list spots.

4.2 UML Diagrams

This Section content nine UML Diagram, which clearly specify the exact functionality of the prototype and they are as follows,

- Class Diagram
- Package Diagram
- Use case Diagram
- Activity Diagram
- Sequence Diagram
- Component Diagram
- Deployment Diagram

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Class Diagram

In class diagram there are 5 classes 1)admin 2)police 3)ministry 4) blackspot 5) user
In admin there are admin id datatype is integer admin name, address , mob as string.
In police there is police id in as integer police name ,address, mob, rank declare as string.
In police section we can view black spot,decide level ,add description, set voice alert message. In ministry id as integer, name as string in this we can view admin, police, blackspot.in black spot section spot description, location, alert message declare as string.in user user id as integer user name and mobile as string and two function which is get black spot and get voice alert.

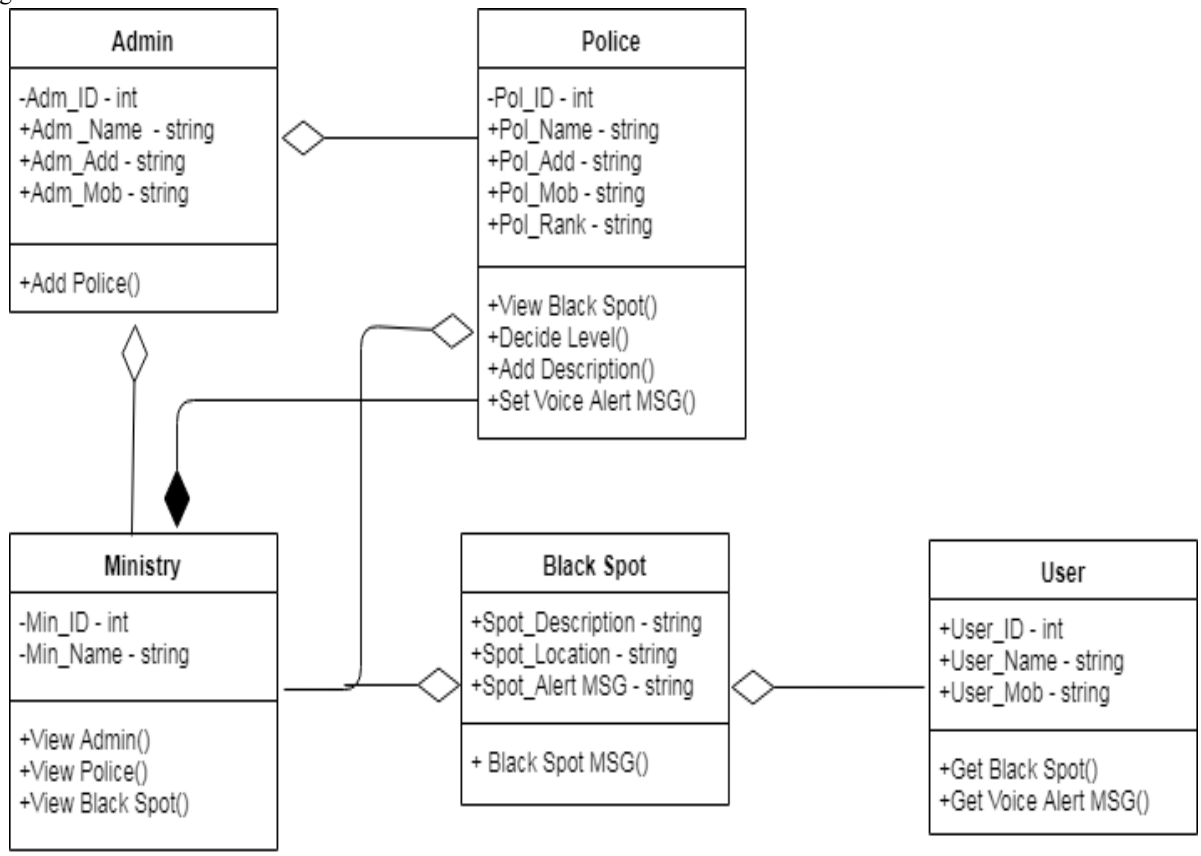

Figure 4.2 class diagram

Package Diagram

Ministry have three section 1)Admin 2)Police 3)Black Spot
In First section we can view admin in which admin add police.
In second section, police can see where level decide and add description of black spot.
After that police set alert message and add black spot on map.
Police section is connected to black spot section. Black spot is access by user. In Black Spot section there are 3 sub section that is level of black spot, voice alert message and black spot description and it will access by user

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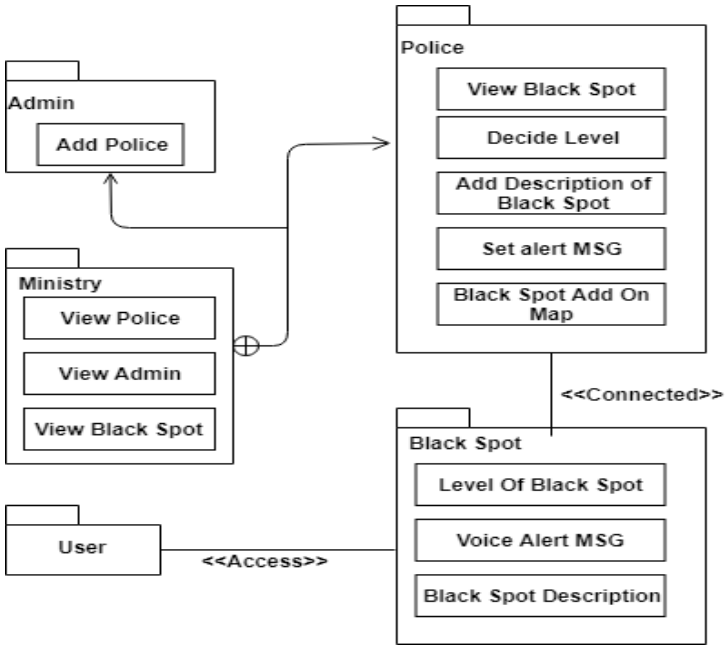

Figure 4.3 Package diagram

Use Case Diagram

In use case diagram blackspot means where the accident should occur also user view the geographical location and get voice notification the work of system admin to add dataset means adding dangerous zone locations to create general blackspot and view blackspot and also view blackspot, view geographical location add by system admin and get voice notification.

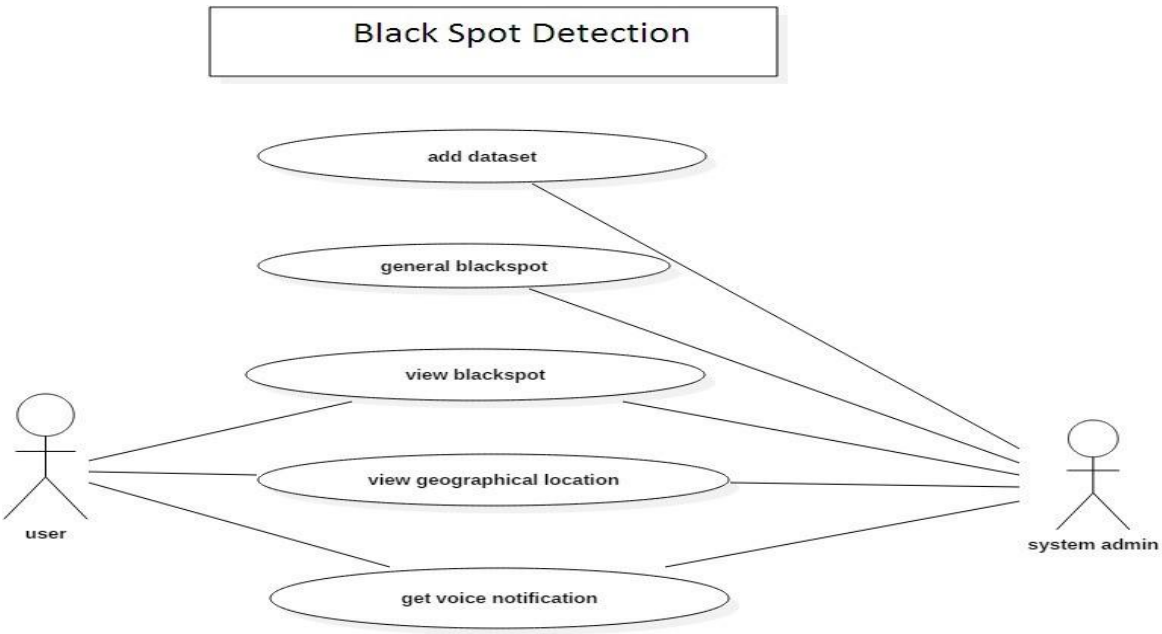

Figure 4.4 use case diagram

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Activity Diagram

Activity diagram is another important diagram in UML to describe dynamic aspects of the system. Activity diagram is basically a flow chart to represent the flow form one activity to another activity. The activity can be described as an operation of the system. So the control flow is drawn from one operation to another.

In activity diagram admin add police user and ministry.

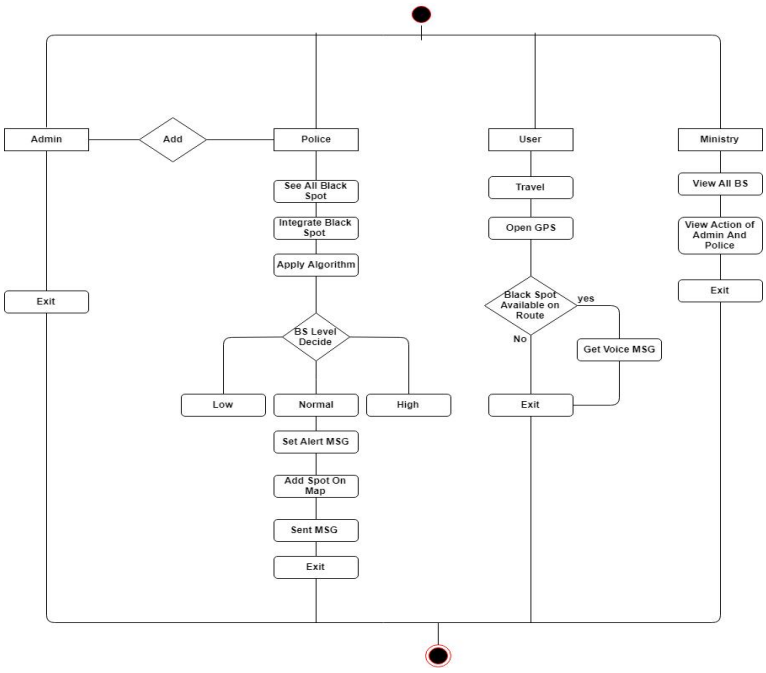

Figure 4.5 Activity diagram

Sequence Diagram

In sequence diagram for black spot detection system there is user for login and response to Gps and through Eclat algorithm then Analyser check the Gmap the Gmap read and process to recognize blackspot detect system.

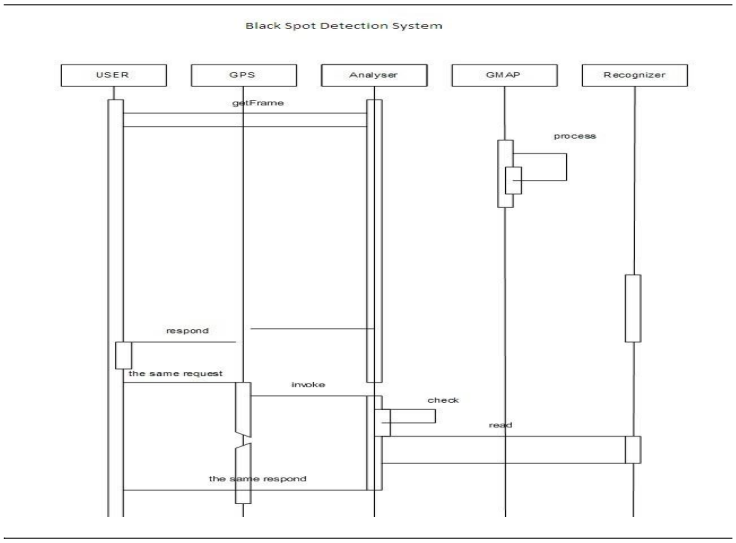

Figure 4.6 sequence diagram

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Component Diagram

In component diagram there are components namely admin, police, black spot, user, map aap, alert voice message,data set of blackspot, ministry etc

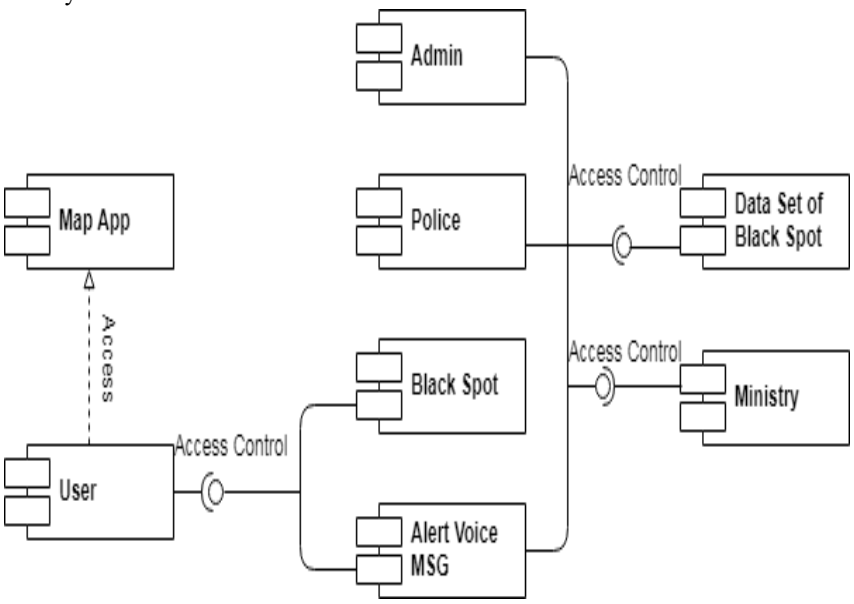
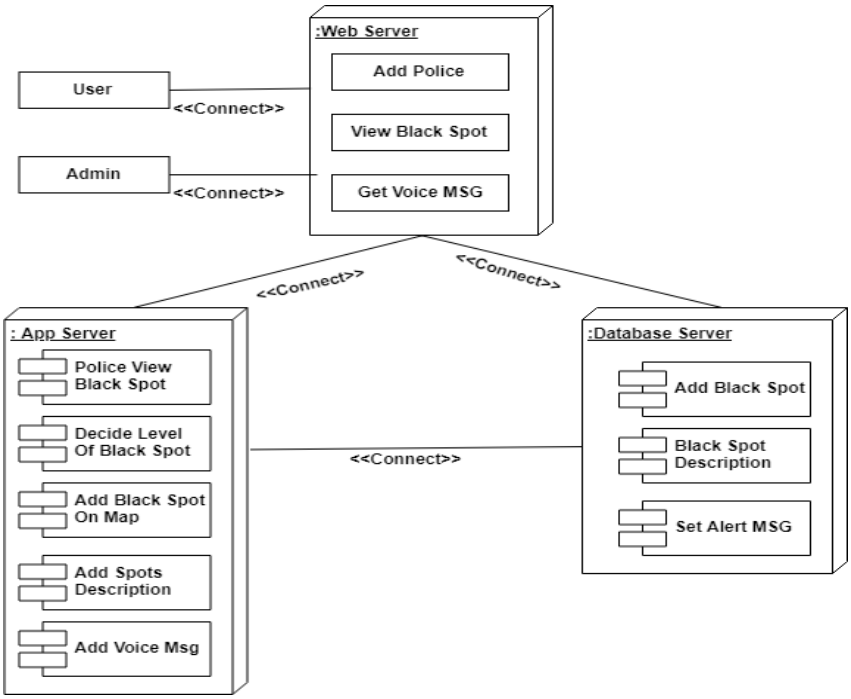


Figure 4.7 component diagram

Deployment Diagram

In deployment diagram user and admin are connected to web server and the web server are connected to app server and database server.



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V. PROJECT PLAN

In this chapter we are going to have an overview about how much time does it took to complete each task likePreliminray Survey Introduction and Problem Statement, Literature Survey, Project Statement, Software Requirement and Specification, System Design, Partial Report Submission, Architecture Design, Implementation, Deployment, Testing, Paper Publish, Report Submission and etcetera.

This chapter also gives focus on stakeholder list which gives information about project type, customer of the proposed system, user and project member who developed the system.

5.1 Team Organization

No	Stakeholder	Not detected
1	Project Type	Accident Detection module
2	Customer	Transport ministry officer
3	User	Police and admin
5	Project Team Member	1)Shivani Rayate 2) Aarzoo Mansuri 3) Pooja Patalpure 4) Aarti Boarse

Table 5.1: Team Organization

5.2 Project Estimate

The System Implementation plan table, shows the overall schedule of tasks complition and time duration required for each task.

Task No.	Task Name	Start Date	End Date
1	Preliminary Survey	02-08-2021	03-08-2021
2	Introduction and Problem Statement	06-08-2021	10-08-2021
3	Literature Survey	13-08-2021	25-08-2021
4	Project Statement	28-08-2021	30-08-2021
5	Software Requirement and Specification	31-08-2021	02-09-2021
6	System Design	04-09-2021	07-09-2021
7	Partial Report Sub-Mission	30-09-2021	10-12-2021
8	Architecture Design	20-12-2021	27-12-2021
9	Implementation	20-12-2021	28-02-2021
10	Deployment	03-03-2022	09-03-2022
11	Testing	10-03-2022	15-03-2022
11	Paper Publish	25-03-2022	12-04-2022
12	Report Submission	25-04-2022	-

Table 5.2: System Implementation Plan

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5.3 Timeline chart

The PERT Chart Stands for program evaluation review technique. This PERT Chart of the prototype shows the schedule and coordinated tasks with in the project implementation span.

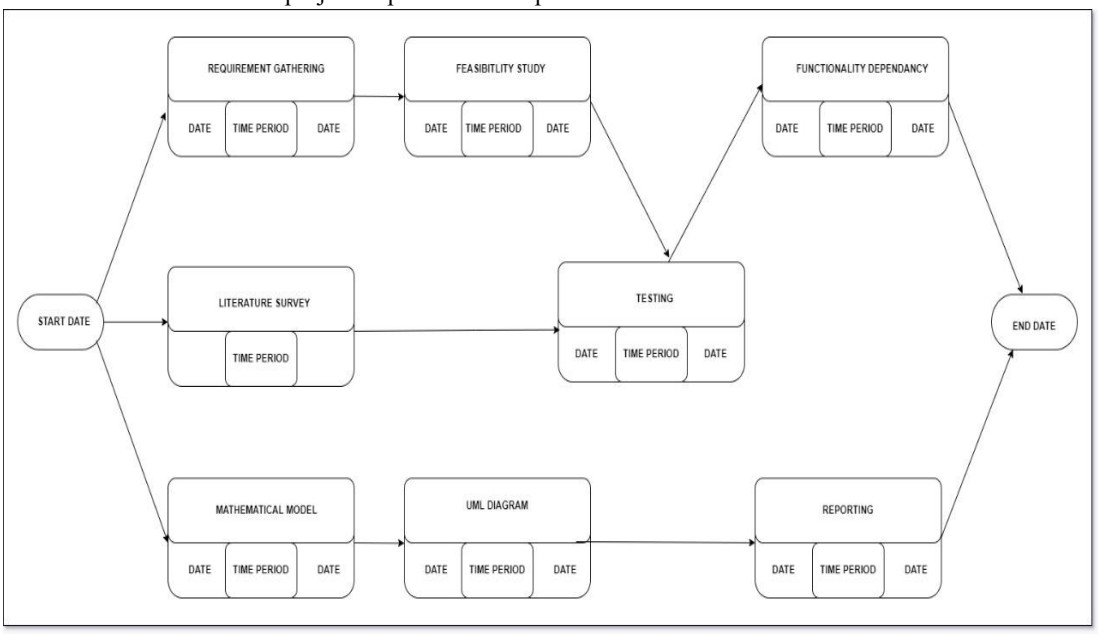

Table 5.3: Timeline chart

VI. SYSTEM IMPLEMENTATION

6.1 Overview of Project Model

Nowadays, nobody in this world is ready to look what's happening around them. Even though, if any accident occurs no one cares about it..A large number of deaths are caused by Traffic accidents worldwide.

The global crisis of road safety can be seen by observing the significant number of deaths and injuries that are caused by road traffic accidents. In many situations the family members or emergency services are not informed in time.

This results in delayed emergency service response time, which can lead to an individual's death or cause severe injury. This is an intention to implement an innovative solution for this problem by developing an Accident Spot detection System using android smart phone from the accident zone.

6.2 Algorithm Details

A. Eclat-Algorithm

Eclat algorithm works on basis of depth first search. It is very simple algorithm to find the frequent item sets. This algorithm uses vertical database. It cannot use horizontal database. If there is any horizontal database, then we need to convert into vertical database. There is no need to scan the database again and again. Eclat algorithm scans the database only once. Support is counted in this algorithm. Working of Eclat Algorithm In this algorithm, n number of input are given which generated frequent item sets. Number of accidents will be available with all details of accidental location reason and number of accidents happened That data will be proceed as input to Eclat algorithm which will give output of frequent item sets about that area which have accidental location with reason and number of accidents.

1. Transform the horizontally formatted data to the vertical format by scanning the database once.
2. Get TID list for each item, the support count an itemsets is the length of the TID set of the itemsets.
3. The frequent kitemsets can be used to construct the candidate (k+1)-itemsets.
4. This process repeats, with k incremented by 1 each time, until no frequent items or no candidate itemsets can be found.

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VII. SOFTWARE TESTING

In this chapter there is relevant explanation on testing strategies use to test the system, and test cases.

7.1 Types of Testing

Testing Strategy used for testing the system are as follows,

1. Unit Testing
2. Integration Testing
3. Regression Testing

A. Unit Testing

In case of unit testing, each software component, software modules or software subsystemis tested independent of any other components involved in the whole software system.

That is individual software modules or software components are tested in unit testing. The main agenda behind unit testing is to verify and validate each and every unit of the software system by checking its working and performance and comparing it with the software specification.

The significant control paths are tested and verified to discover errors within the boundaryof the module and the component level design used for the same.

B. Integration Testing

Integration testing is a kind of testing meant for building the software architecture along with finding out the errors related with the interfacing. After successful execution of unit testing, software subsystem will be collected together and combined together in order to build the whole software system as it is specified and defineat high level design.

Integration testing is an efficient procedure for verification of the structure of a software system and validation of order of execution of software system while conducting tests to determine errors allied with interfacing.

C. Regression Testing

During the software development procedure, whenever the software system is modified by means of editing, removing, adding source code, software developers need to be sure thatthe new version of the software is good as earlier version.

Tests that focus on the software modules that have been modified or altered and focus on overall functionality of the software system when the software functions are likely to be affected by the modifications or change.

7.2 Test Cases & Test Results

Test cases are written for two module and they are as follows,

1. Registration module
2. Login module

A. Registration Module

Sr. No	Test Type	Test Scenario	Precondition	Test Case Steps	Expected Result	Result
1	Positive	Open applicati on	Launch Browser and open URL	Check whether application is open or not if user correct url in address field.	Application welcome page should be open.	Pass
2	Positive	Register link	Open URL	Check whether registration page is open or not if user click on registration link.	Registration page should be open.	Pass

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3	Positive	Register_ Valid Username	Open URL	Check whether username field accepts only alphabets or not.	Username should be accepted.	Pass
4	Positive	Register_I nvalid Password	Open the url	Check whether password field accepts blank or not.	Password should not be accepted.	Pass
5	Positive	Register_I nvalid Username	Open URL	Check whether username field accepts blank or not.	Username should not be accepted.	Pass
6	Positive	Register_V alid Password	Open URL	Check whether password field accepts aphabets+ numeric character or not.	Password should be accepted.	Pass

Table 7.1: Test Cases for Registration Module

B. Login Module

Sr.No	Test Type	Test Scenario	precondition	Test Case Steps	Expected Result	Result
1	Positive	Login link	Click on login module	the	Login page should be open.	Pass
2	Positive	Login_Valid username	Click on login module	Check whether username field accept register username or not	Username should be accepted.	Pass
3	Positive	Login_Invalid username	Click on login module	Check whether username field accepts unregister username or not	Username should not be accepted.	Pass
4	Positive	Login_Valid LoginButton	Click on login module	Check whether home page is display or not if user enter correct username and password and click on login button.	Home page should be display.	Pass
5	Positive	Login_Invalid LoginButton	Click on login module	Check whether error message is display or not if user enter correct username and incorrect password and click on login button.	Error message should be display.	Pass

Table 7.2: Test Cases for Login Wall

IJARSCT
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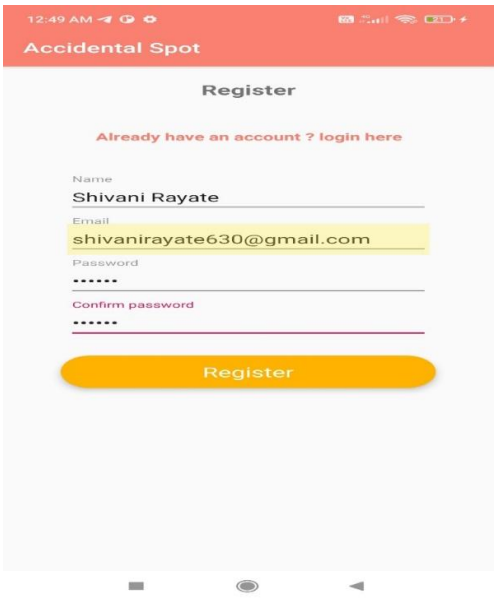
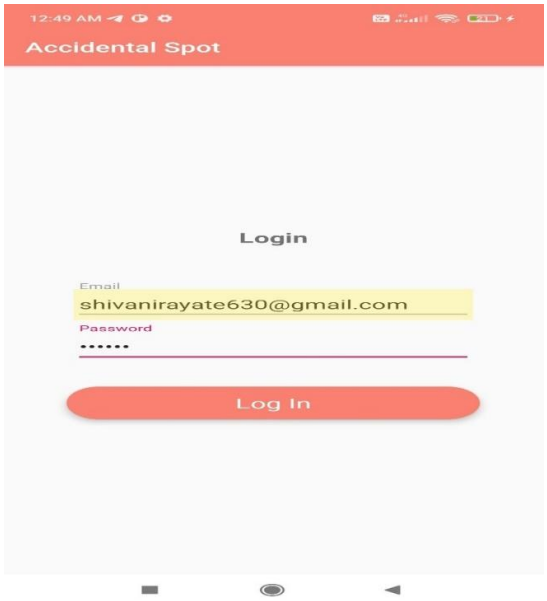
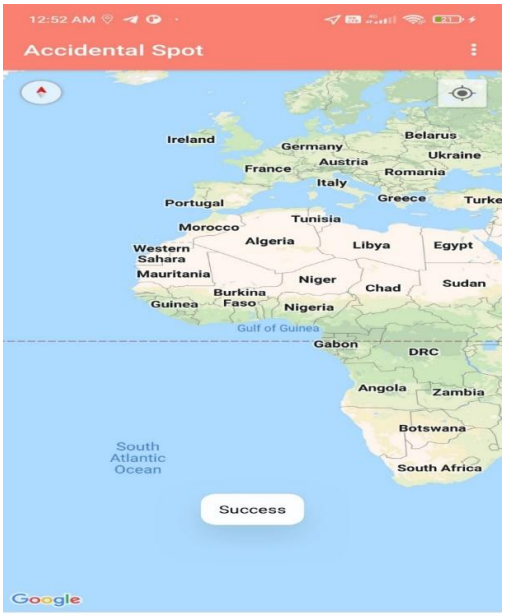
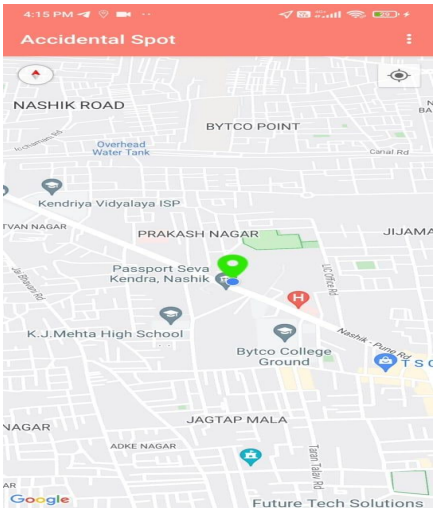
VIII. RESULT

8.1 Screenshots









IX. CONCLUSION

9.1 Conclusion

In this study, the technique of association rules with a large set of accidents data to identify the reasons of road accidents were used.The main result of this study is that although the characteristics of humanity and behavior are very important in occurrence of all road accidents but we can understand that spatial features and infrastructure play a major role in the accident. In this study it is tried to choose the interesting and superior rules to provide a lot of valuable information for

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policies to provide better safety policies. This article can be a step towards providing useful information for highway engineers and transportation designers to design safer road.

9.2 Applications

- Ambulance management
- Police department
- Tool way accident management
- Road travelling services
- Blood bank

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