A MAJOR PROJECT REPORT ON

Road and Transportation Maintenance System

A report Submitted in partial fulfilment of the requirements of the degree

Bachelor of Technology
IN
COMPUTER SCIENCE AND ENGINEERING

Submitted by

D.JAHNAVI(R170346)

Under the guidance of

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Assistant Professor

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING,

RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES,

RK Valley,

AS A PART OF MAJOR PROJECT

May 2023.

Acknowledgement

The satisfaction that accompanies the successful completion of any task would be incomplete without the mention of the people who made it possible and whose constant guidance and encouragement crown all the efforts success.

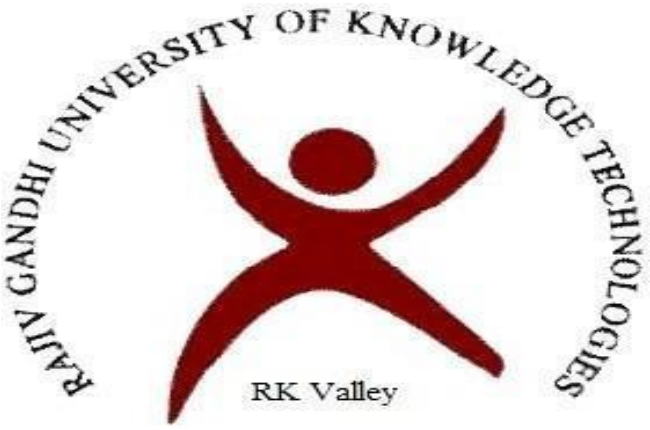
I am extremely grateful to our respected Director, Prof. K. SANDHYA RANI for fostering an excellent academic climate in our institution.

I also express my sincere gratitude to our respected Head of the Department Mr. N. Satyanandaram for his encouragement, overall guidance in viewing this project a good asset and effort in bringing out this project.

I would like to convey thanks to our guide at college Miss. E. SUSMITHA for her guidance, encouragement, co-operation and kindness during the entire duration of the course and academics.

My sincere thanks to all the members who helped me directly and indirectly in the completion of project work. I express my profound gratitude to all our friends and family members for their encouragement.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES, RK VALLEY ,
May 2023.



CERTIFICATE

This is to certify that the report entitled "**Road and Transportation Maintenance System**" submitted by D. Jahnavi(R170346) partial fulfilment of the requirements for the award of Bachelor of Technology in Computer Science and Engineering is a bonafide work carried out by them under my supervision and guidance.

The report has not been submitted previously in part or in full to this or any other University or Institution for the award of any degree or diploma.

E. Susmitha,
Project Internal Guide,
Computer Science and Engineering,
R.K Valley, RGUKT.

N. Satyanandaram,
Head of the Department,
Computer Science and Engineering,
R.K.Valley, RGUKT.

DECLARATION

We are certifying that, I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Signature of the student

D. JAHNAVI

R170346

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ABSTRACT

Roads are the transport infrastructures which play an important role in supporting the economic growth of a region. Therefore, it is necessary to do maintenance efforts so that the roads can function optimally. Recently, there is a rapid development of road transportation network. This situation arises due to the number of vehicles on the road that keeps increasing year by year. Thus, this will increase the possibility of dangerous situations to the road users if roads are not being maintained appropriately. Therefore, in order to keep the road in safe condition, the road management activity should be improved.

So, Here in Cube highways provides a complete software system for road management. It invests in road and highway projects along with other select infrastructure sectors in India. Maintenance all activities such as accidents, issues, bills, safety, Assessment of road pavement conditions in the roads which are maintained by the company.

Tools and Technologies:

Company provides apps and websites for easy maintenance. The Technologies used for frontend development are JavaScript, html, CSS, bootstrap, angular and backend development uses mongo dB, NodeJS, express JS.

1.INTRODUCTION

Road Maintenance means to protect and to repair the construction elements of the road in order to sustain its condition. An effective Road Maintenance Management System (RMMS) is needed in order to maintain the Roads and Highways effectively.

1.1 PURPOSE

This website is used to maintain the activities related to Roads and Highways. The Purpose of the website is to reduce the manpower in the roads, and all will be done in software itself. If there are any type of issues (accidents, bills, pavements, assets, incidents) all would be maintained in the software Itself.

It is also used for newly constructing roads. This website is used to store the required information for construction example Raw Materials, Labour, Payments and Bills etc...

1.2 FEATURES

This website is used to provide the information about accidents, issues, incidents occur in the particular road. It also contain the details about Bills, Pavements, Vendors and all the details about how many vehicles are passed on the road, how many accidents or issues happening on the particular road etc…

Whatever Issues happening on the road are updated and filled in this website we store the information and maintain the activities in the road. If the road has any Pothole or any issues(damages) in the road and the manager report in the website, then the related person can see and rectify or reconstruct that particular damages. It also manages the assets (lights, signboards, footpath etc..) on the highways.

2. REQUIREMENT ANALYSIS

2.1 Requirement Specification

2.1.1Functional requirements

- Graphical User Interface to interact with the website.
- MongoDB and NodeJS to store and retrieve the information.

2.1.2. Hardware Requirements

- System: Pentium Dual Core
- Hard Disk: 120 GB
- Monitor: 15'' LED
- Input Devices: Keyboard, Mouse
- Ram: 1 GB

2.1.3. Software Requirements

- Operating system: Windows 10
- Coding Language: HTML, CSS, JavaScript, Bootstrap, Angular, NodeJS.
- Tool: Visual Studio
- Database: MongoDB.

2.2 Technologies Used

HTML

It is a markup language for formatting and displaying web documents and web pages. It gives basic structure to the webpage without any styling. HTML elements tell the browser how to display the content. It can be assisted by technologies such as Cascading Style Sheets and scripting languages such as JavaScript for styling and functionality.

CSS

It gives styling for the web pages created by HTML. It gives 'look and feel' to the website.

Types of CSS

- Inline CSS (Using styles as attributes in html elements)
- Internal CSS (Including a separate Style tag in html document)
- External CSS (Using external file for styling)

Bootstrap

Bootstrap is a CSS framework which helps in developing web pages very faster and with little efforts. Helps to customize the CSS properties. Used for developing responsive and mobile- first websites. Components like navbar, carousel, utility, cards, dropdowns, buttons etc.

JavaScript

JavaScript is used to develop interactive web applications. Used to develop Dynamic websites. JavaScript is the programming language of the Web. Responsible for performing actions in a website.

JavaScript is a high-level, often just-in-time compiled language that conforms to the ECMAScript standard.

Angular

Angular is a development platform, built on TypeScript. As a platform, Angular Includes:

1. A component-based framework for building scalable web applications.
2. A collection of well-integrated libraries that cover a wide variety of features, including routing, forms management, client-server communication, and more.
3. A suite of developer tools to help you develop, build, and update your code.

NodeJS and MongoDB

Node. JS is a JavaScript that commonly powers web servers. Developers can use these two pieces of technology, along with MongoDB Atlas, a fully managed, multi-cloud database service, to rapidly create modern applications.

MongoDB and Node.js have a long history of working well together and are paired in many popular tech stacks, including the MEAN stack (MongoDB, Express.js, AngularJS, and Node.js) and more recently, the MERN stack (MongoDB, Express.js, React.js and Node.js).

3. SOFTWARE ENVIRONMENT

Visual Studio Code (IDE)

Visual Studio Code, also commonly referred to as VS Code is a source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.

Visual Studio code is a free, lightweight but powerful source code editor that runs on your desktop and on the web and is available for windows, macos, Linux, and RaspberryPi OS. It comes with built-in support for JavaScript, Typescript, and Node.js and has a rich ecosystem of extensions for other programming languages (such as C++, C#, Java, Python, PHP, and Go), runtimes (such as .NET and Unity), environments (such as Docker and Kubernetes), and clouds (such as Amazon Web Serives, Microsoft Azure, and Google Cloud Platform).

4. IMPLEMENTATION

4.1 Graphical user interface

The user interface is kept simple and understandable. The user need not take any additional effort to understand the functionality and navigation in the application. The UI designing should be easily understandable and should know where the input is given. Hints are given to help the user in giving the correct input.

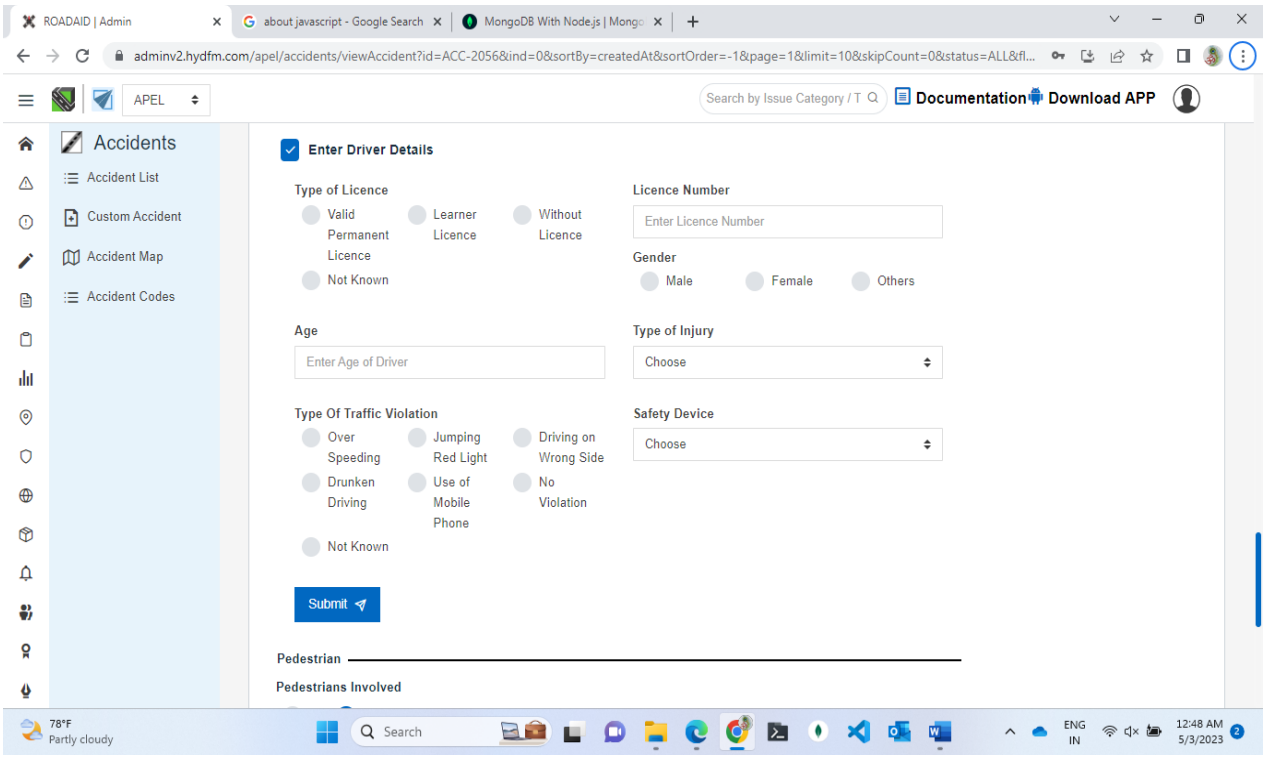
4.2 Logic & Sample Screenshots

There would be an Accidents Module which shows the details about all the accidents occur in the road.

➢ In Accidents page there will be 4 components.

➢ ACCIDENT LIST.

On clicking on the accidents list page, we redirected to accident details page. In accident details page we are showing the details of the accident. In that page I made a change that every accident should have a vehicle and every vehicle should have a driver for it. I added a FORM PAGE AND DETAILS displaying of vehicle and driver and I display and update the details in the form page itself after submitting the vehicle driver details and I added some alerts based on requirement.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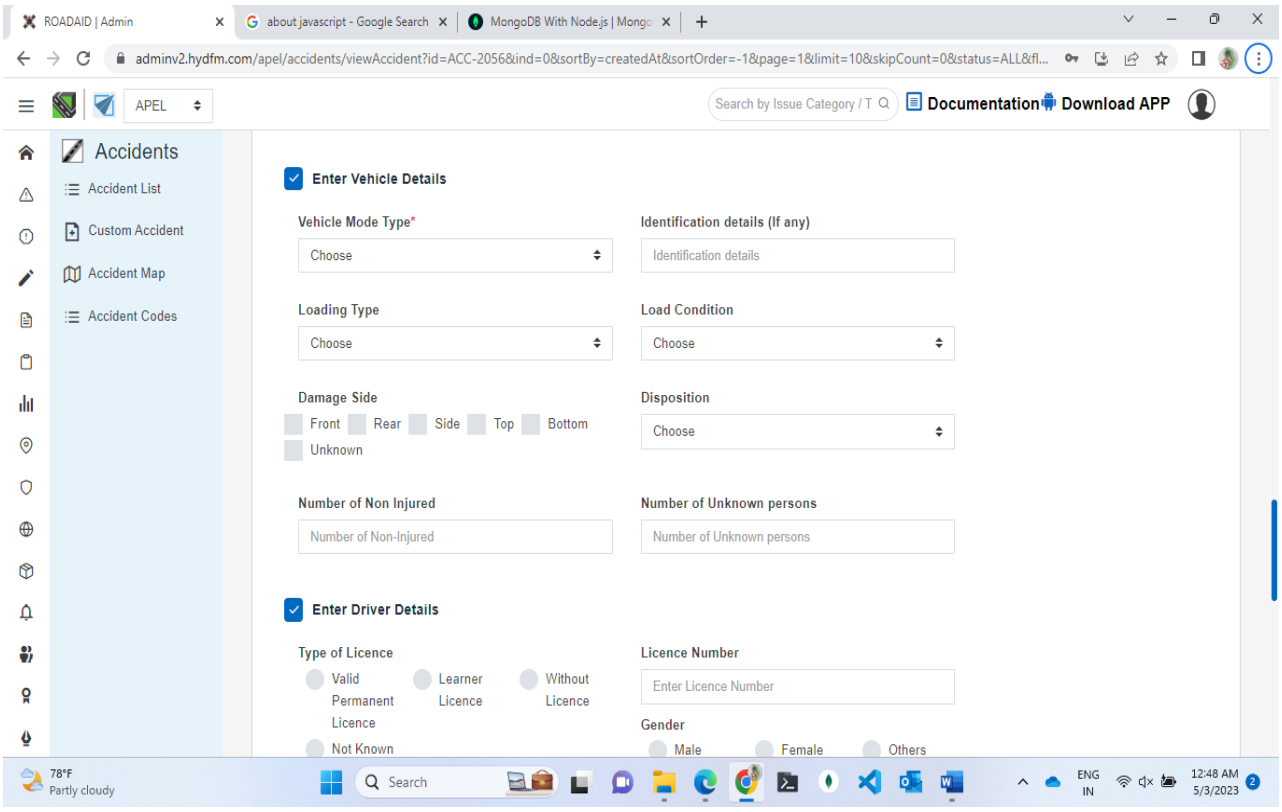
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Accident Map
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Enter Vehicle Details
Vehicle Mode Type*
Choose
Identification details (If any)
Identification details
Loading Type
Choose
Load Condition
Choose
Damage Side
Front
Rear
Side
Top
Bottom
Unknown
Disposition
Choose
Number of Non Injured
Number of Non-Injured
Number of Unknown persons
Number of Unknown persons
Enter Driver Details
Type of Licence
Valid Permanent Licence
Learner Licence
Without Licence
Not Known
Licence Number
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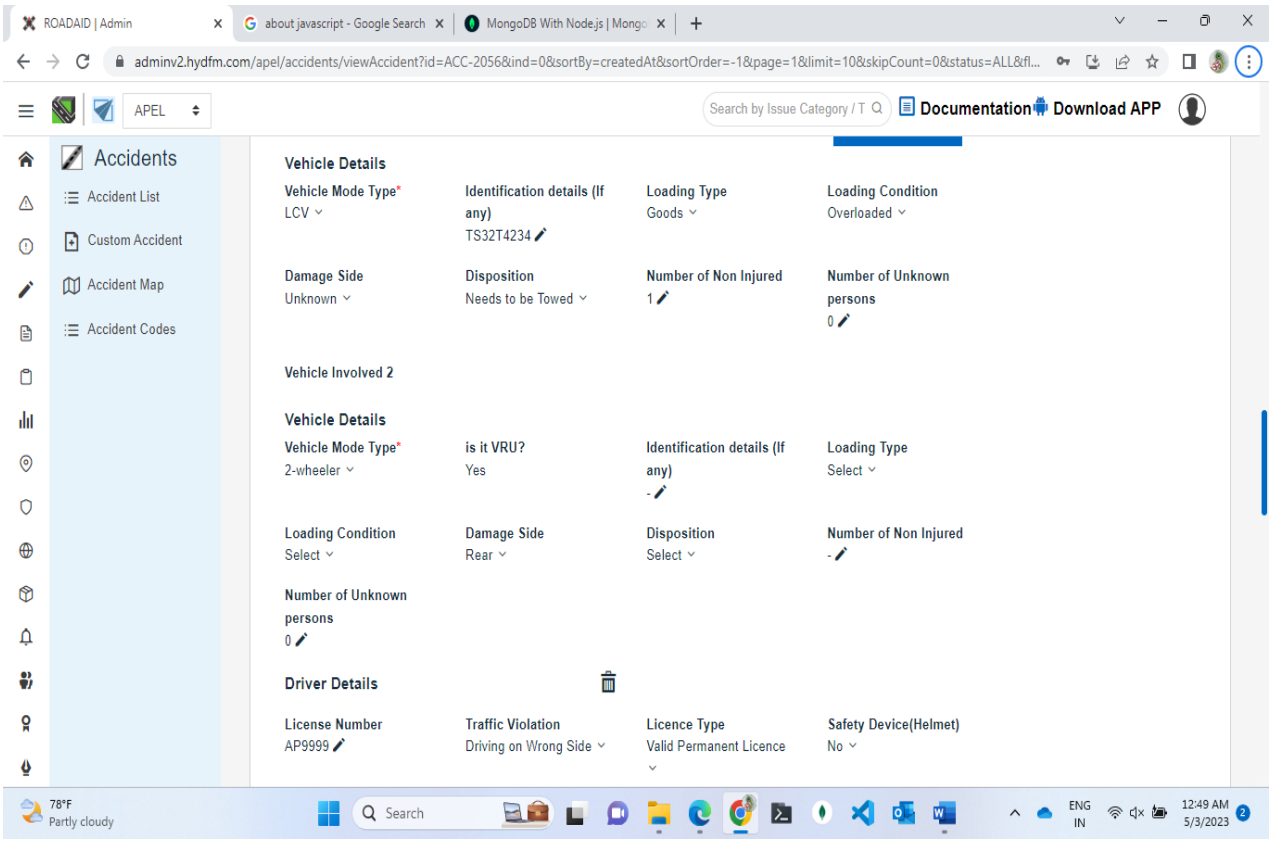
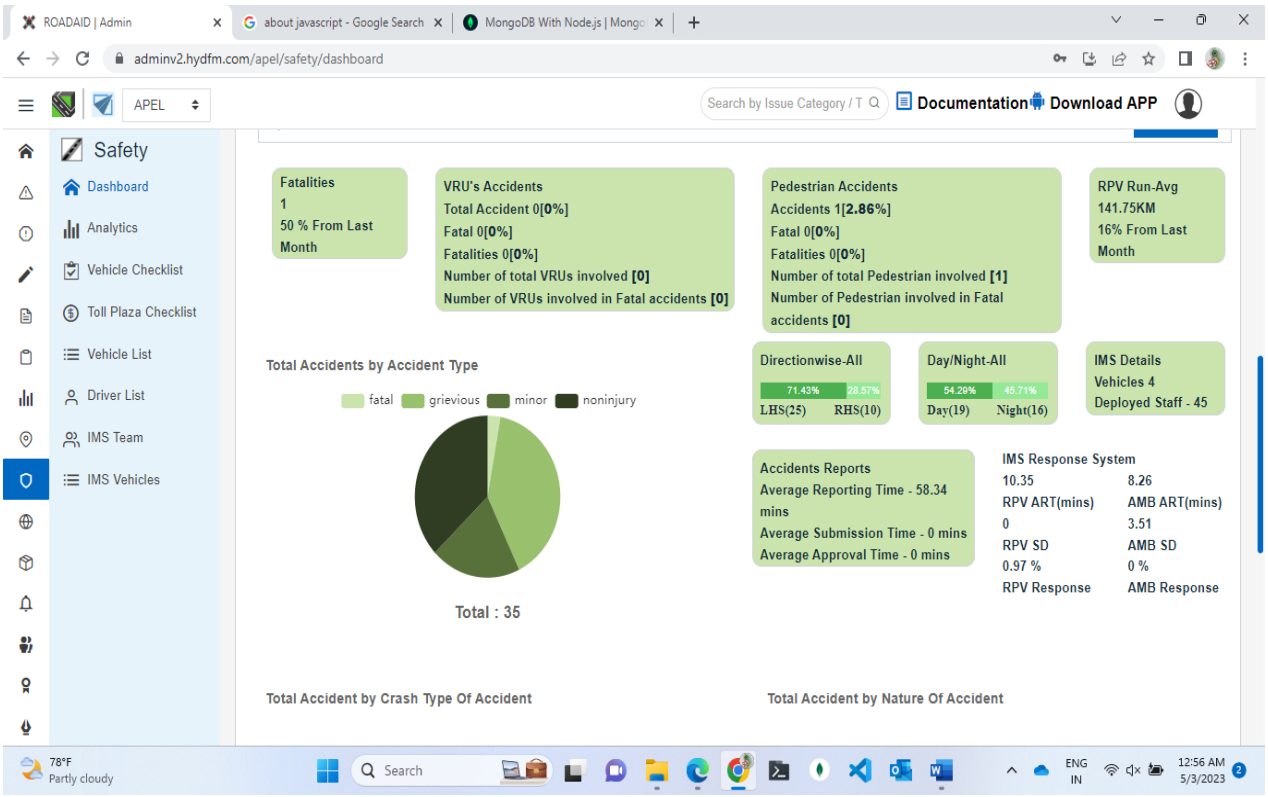


I created this whole component (SAFETY DASHBOARD) in website.

In Safety dashboard module we display the analytics of the accidents, Average issues raised, History of Updates in accidents. All these issues and accidents analytics we displayed using Pie chart, Bar charts, Line graphs etc.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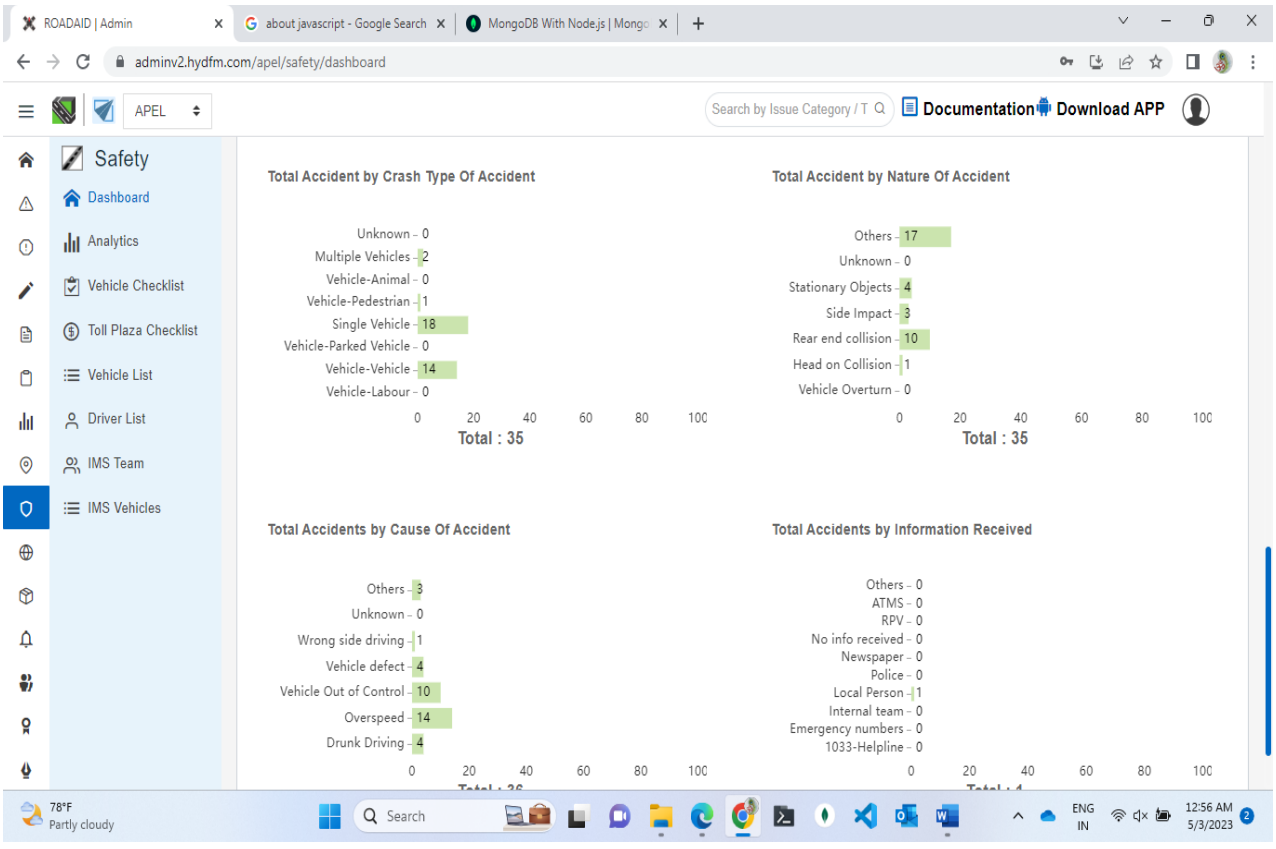
Safety
Dashboard
Analytics
Vehicle Checklist
Toll Plaza Checklist
Vehicle List
Driver List
IMS Team
IMS Vehicles
Fatalities
1
50 % From Last Month
VRU's Accidents
Total Accident 0[0%]
Fatal 0[0%]
Fatalities 0[0%]
Number of total VRUs involved [0]
Number of VRUs involved in Fatal accidents [0]
Pedestrian Accidents
Accidents 1[2.86%]
Fatal 0[0%]
Fatalities 0[0%]
Number of total Pedestrian involved [1]
Number of Pedestrian involved in Fatal accidents [0]
RPV Run-Avg
141.75KM
16% From Last Month
Total Accidents by Accident Type
fatal
grievious
minor
noninjury
Total : 35
Directionwise-All
71.43%
28.57%
LHS(25)
RHS(10)
Day/Night-All
54.29%
45.71%
Day(19)
Night(16)
IMS Details
Vehicles 4
Deployed Staff - 45
Accidents Reports
Average Reporting Time - 58.34 mins
Average Submission Time - 0 mins
Average Approval Time - 0 mins
IMS Response System
10.35
RPV ART(mins)
8.26
AMB ART(mins)
0
RPV SD
3.51
AMB SD
0.97 %
RPV Response
0 %
AMB Response
Total Accident by Crash Type Of Accident
Total Accident by Nature Of Accident
78°F
Partly cloudy
Search
ENG
IN
12:56 AM
5/3/2023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Download APP
Safety
Dashboard
Analytics
Vehicle Checklist
Toll Plaza Checklist
Vehicle List
Driver List
IMS Team
IMS Vehicles
Total Accident by Crash Type Of Accident
Unknown - 0
Multiple Vehicles - 2
Vehicle-Animal - 0
Vehicle-Pedestrian - 1
Single Vehicle - 18
Vehicle-Parked Vehicle - 0
Vehicle-Vehicle - 14
Vehicle-Labour - 0
0 20 40 60 80 100
Total : 35
Total Accident by Nature Of Accident
Others - 17
Unknown - 0
Stationary Objects - 4
Side Impact - 3
Rear end collision - 10
Head on Collision - 1
Vehicle Overturn - 0
0 20 40 60 80 100
Total : 35
Total Accidents by Cause Of Accident
Others - 3
Unknown - 0
Wrong side driving - 1
Vehicle defect - 4
Vehicle Out of Control - 10
Overspeed - 14
Drunk Driving - 4
0 20 40 60 80 100
Total Accidents by Information Received
Others - 0
ATMS - 0
RPV - 0
No info received - 0
Newspaper - 0
Police - 0
Local Person - 1
Internal team - 0
Emergency numbers - 0
1033-Helpline - 0
0 20 40 60 80 100
78°F
Partly cloudy
Search
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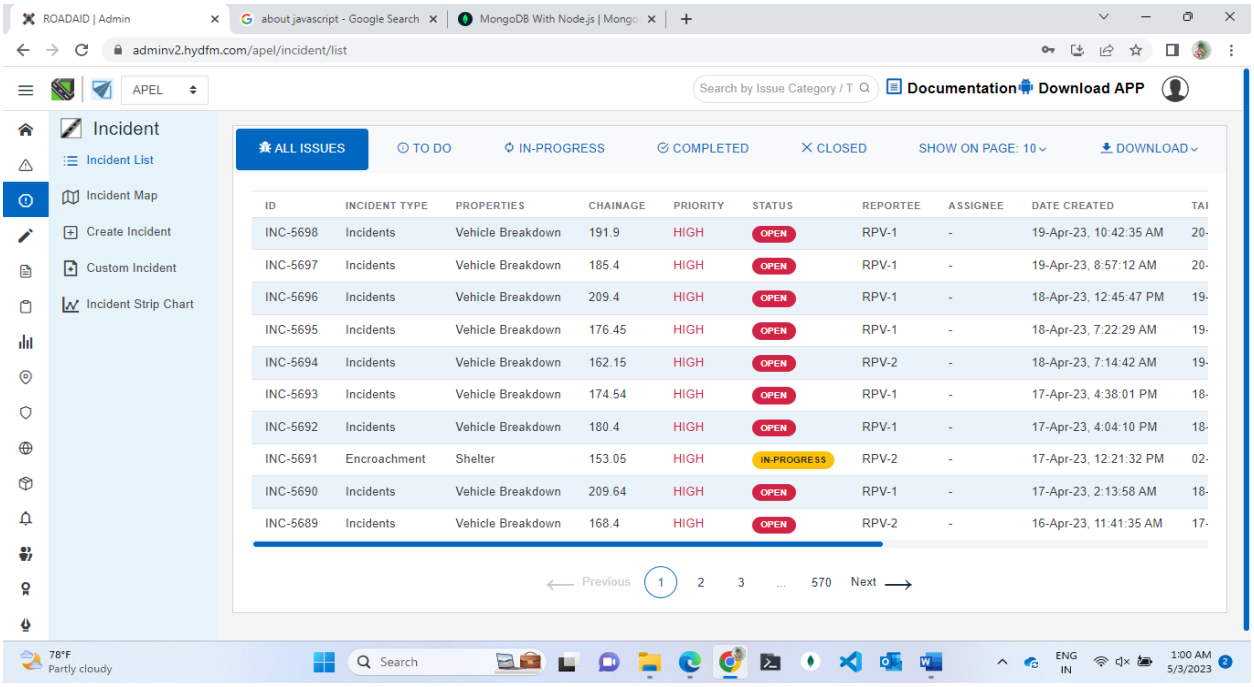
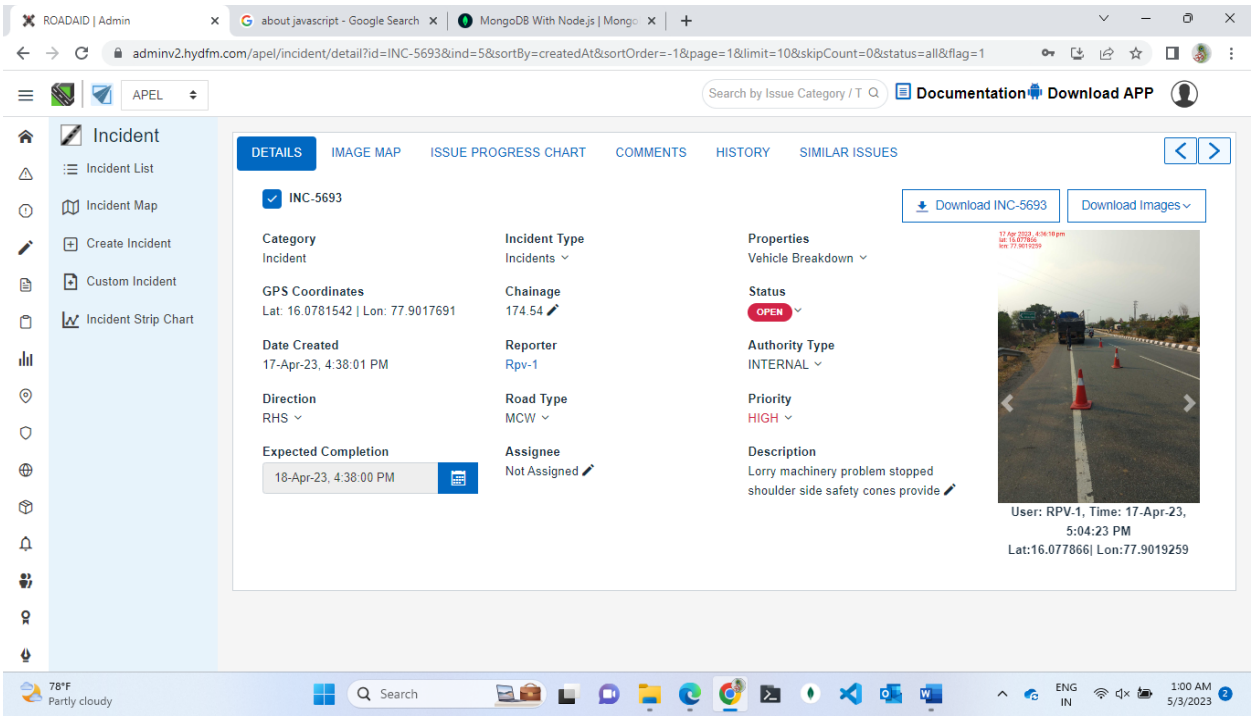
In INCIDENTS COMPONENT we are displaying all the incidents thar are occurred. we created a new module for incidents. In this incidents module 4 components are available.

➢ I created INCIDENTS LIST and DETAILS components

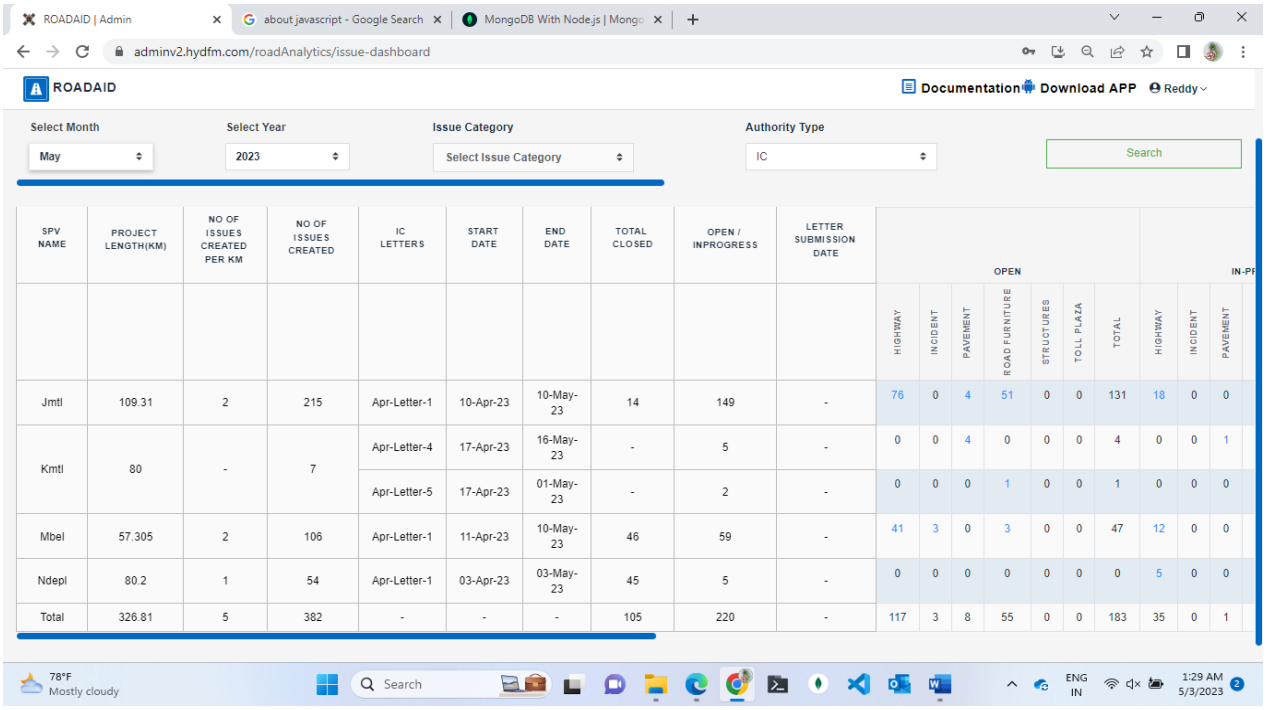


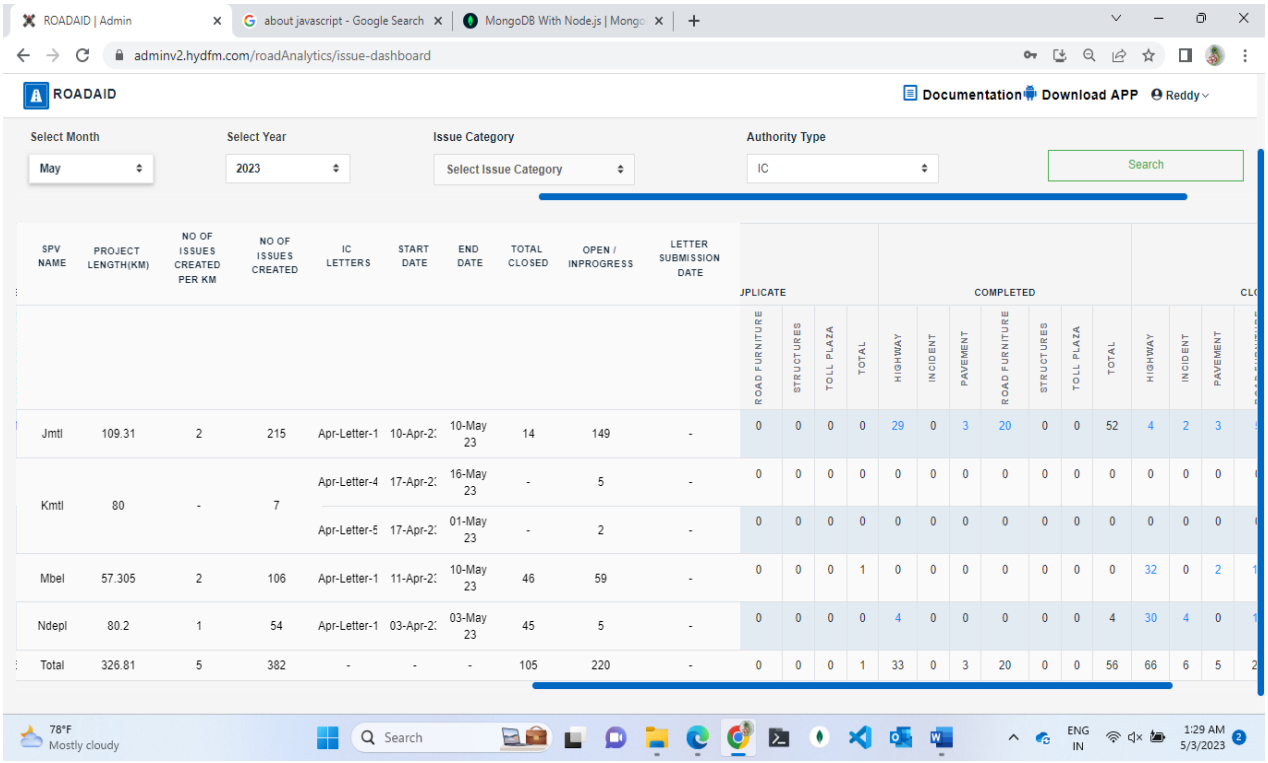


ISSUE DASHBOARD

➢ SUMMARY OF ISSUE DASHBOARD OF ALL SPVS.

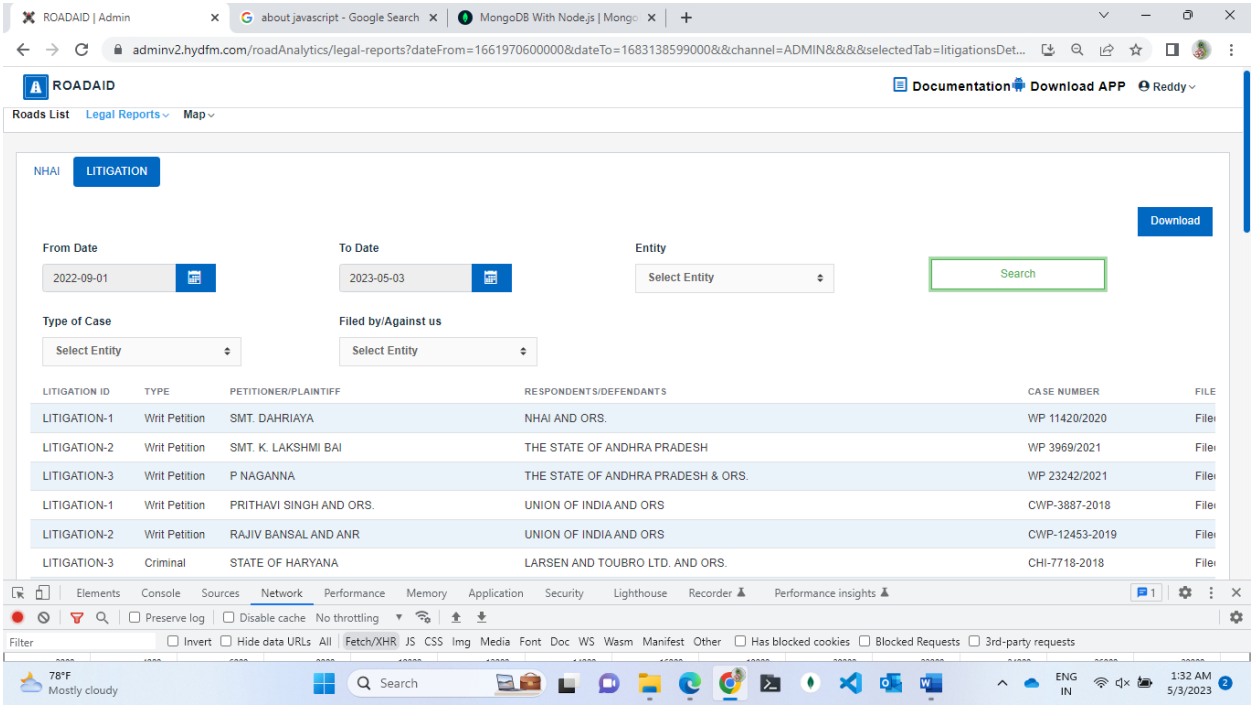
➢ Created a table for the summary.

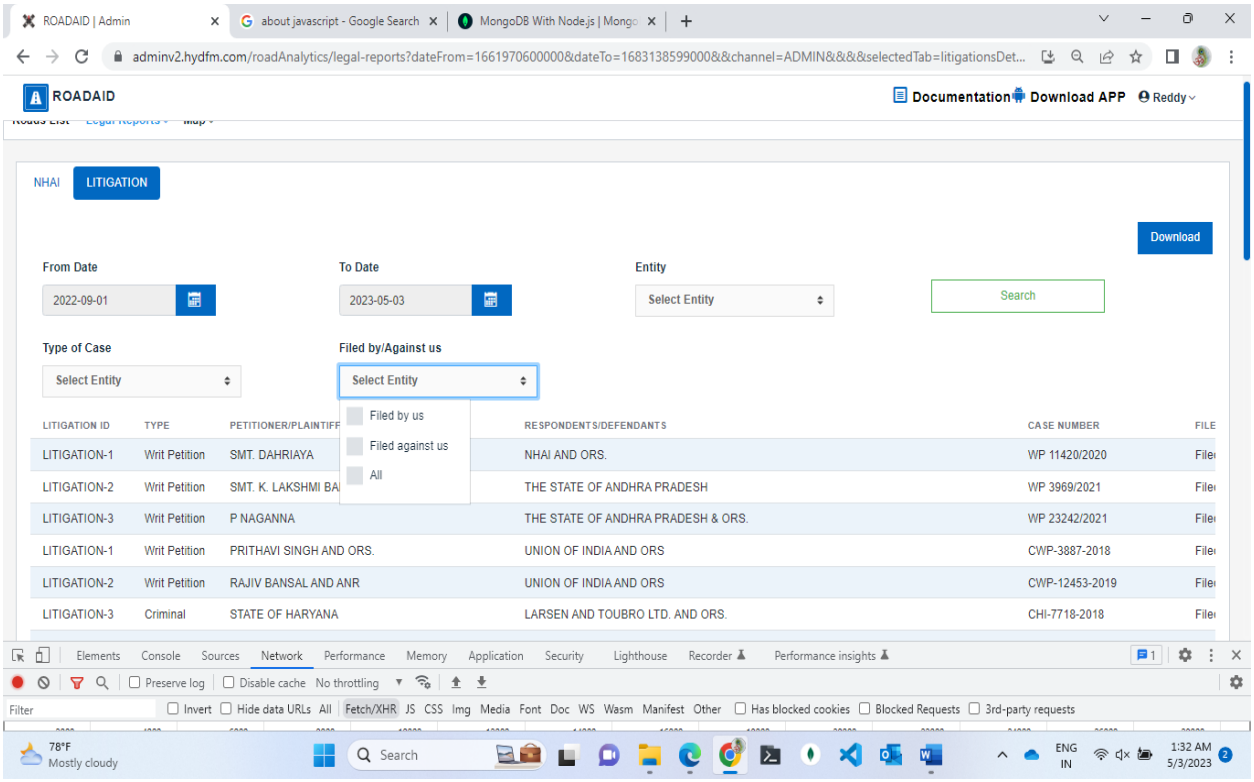




LITIGATION MODULE

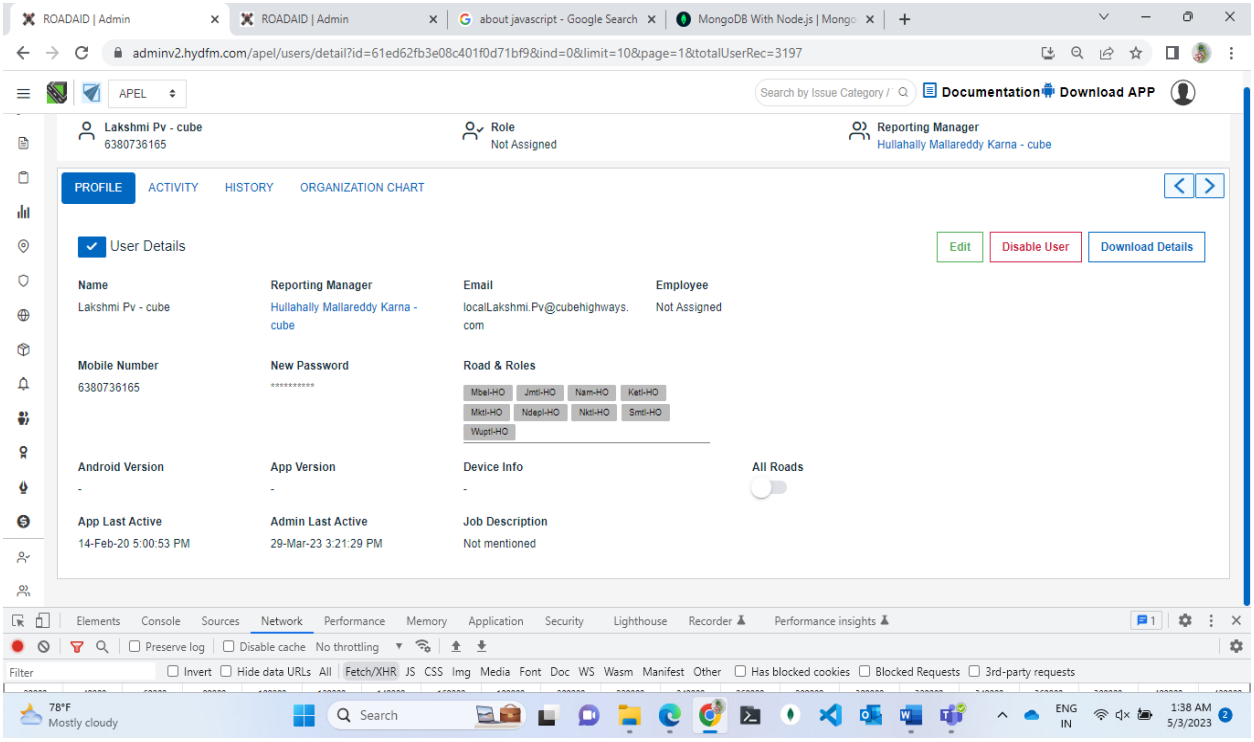
- Added Ligation module. It consists of all the litigations list created.
- It has Date to Date from and some specifications.

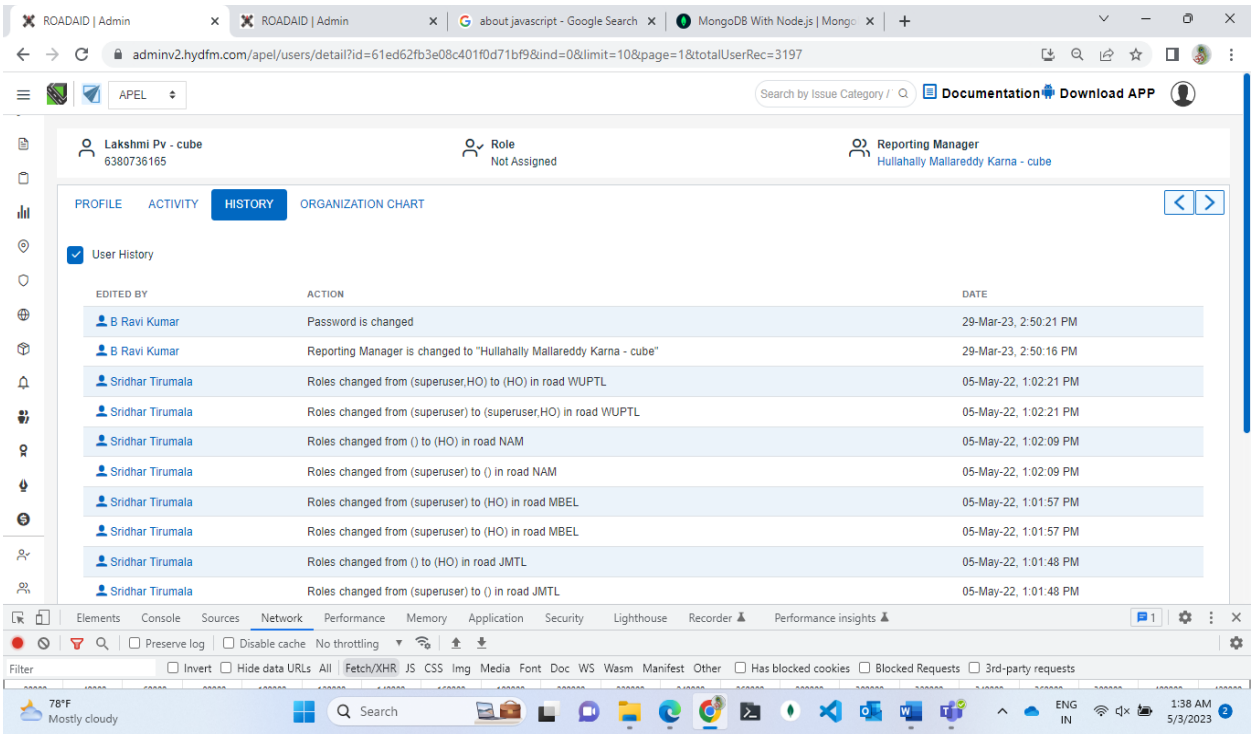


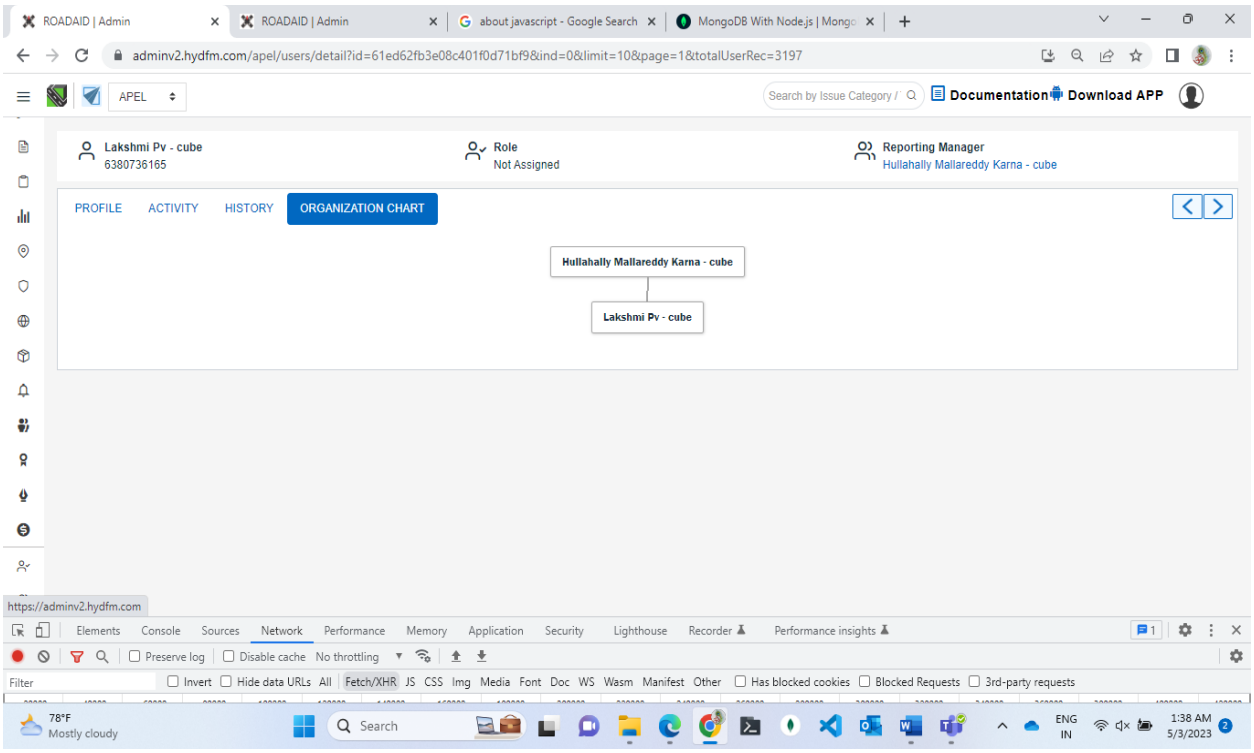


USERS MODULE

1. Added user details page for all the users.
2. user details consist of what are the roads and roles accessible by user, history of the user and organisation chart.

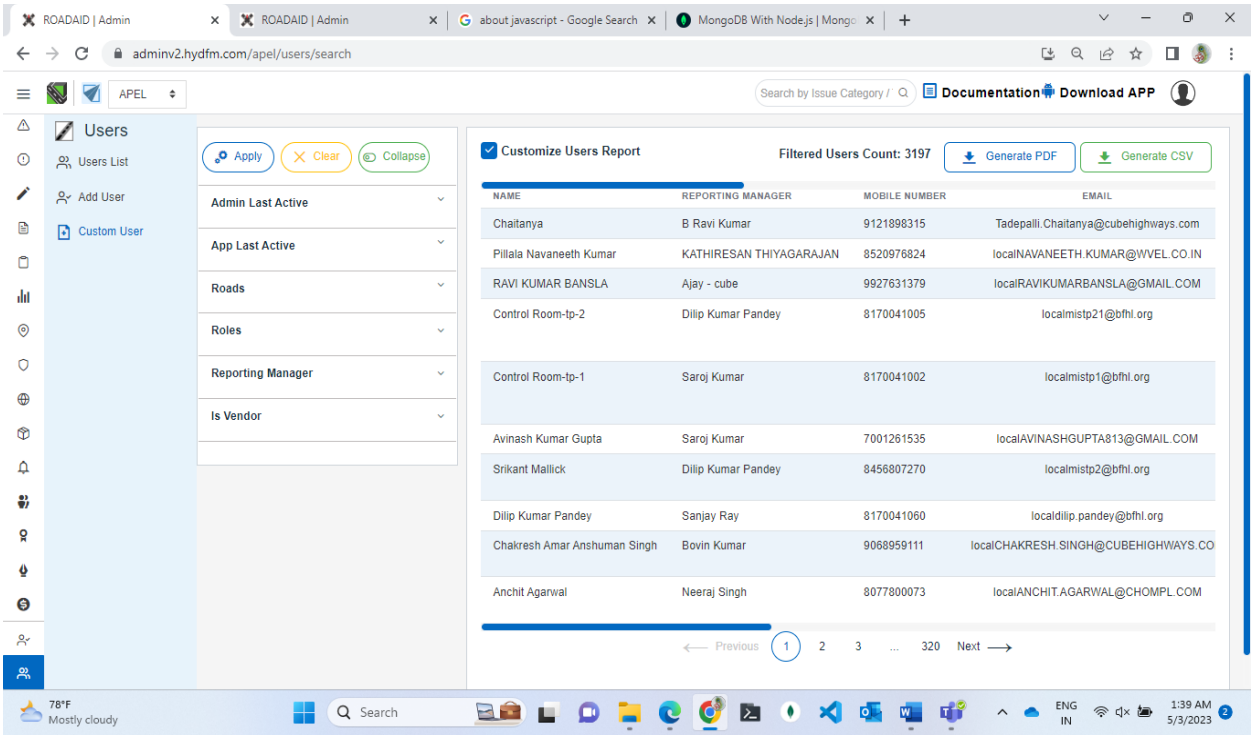


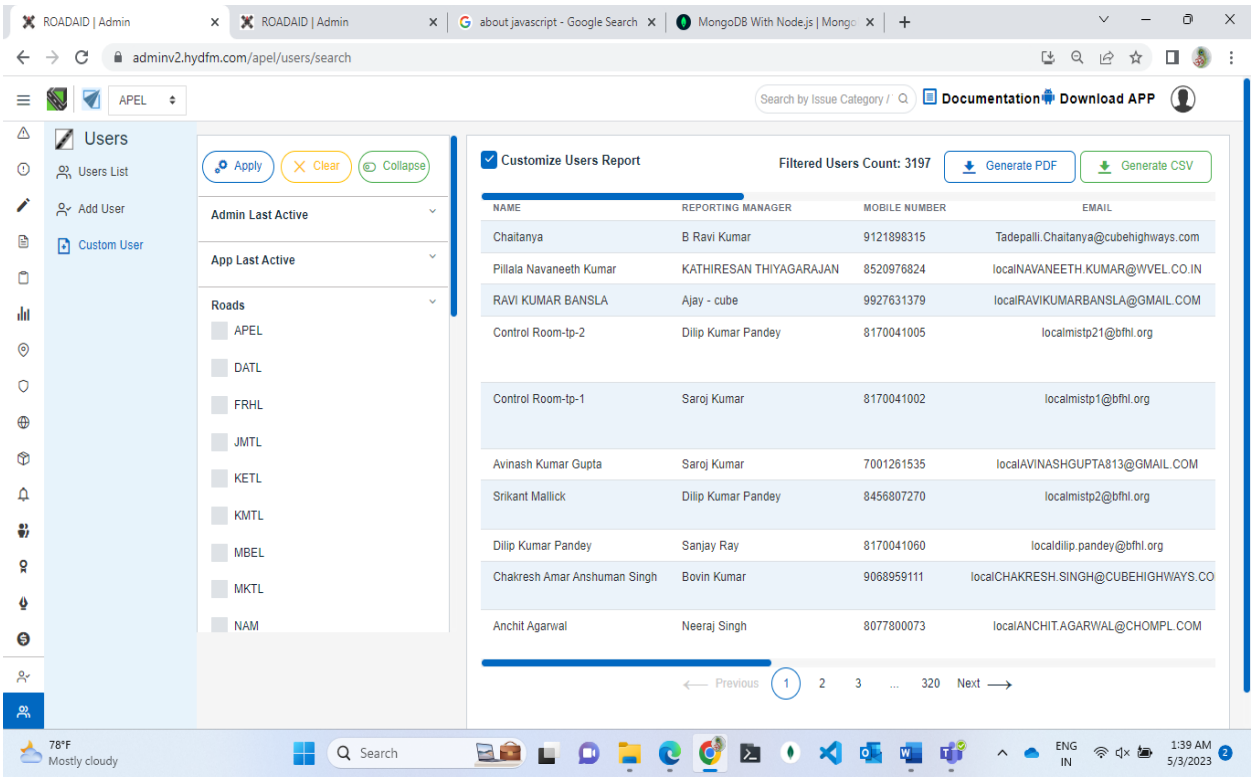




CUSTOM USER

1. Custom user page consists of data based on the filters applied.

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Users List
Add User
Custom User
Apply
Clear
Collapse
Admin Last Active
App Last Active
Roads
APEL
DATL
FRHL
JMTL
KETL
KMTL
MBEL
MKTL
NAM
Customize Users Report
Filtered Users Count: 3197
Generate PDF
Generate CSV
NAME
REPORTING MANAGER
MOBILE NUMBER
EMAIL
Chaitanya
B Ravi Kumar
9121898315
Tadepalli.Chaitanya@cubehighways.com
Pillala Navaneeth Kumar
KATHIRESAN THIYAGARAJAN
8520976824
localNAVANEETH.KUMAR@WVEL.CO.IN
RAVI KUMAR BANSLA
Ajay - cube
9927631379
localRAVIKUMARBANSLA@GMAIL.COM
Control Room-tp-2
Dilip Kumar Pandey
8170041005
localmistp21@bfhl.org
Control Room-tp-1
Saroj Kumar
8170041002
localmistp1@bfhl.org
Avinash Kumar Gupta
Saroj Kumar
7001261535
localAVINASHGUPTA813@GMAIL.COM
Srikant Mallick
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8456807270
localmistp2@bfhl.org
Dilip Kumar Pandey
Sanjay Ray
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localdilip.pandey@bfhl.org
Chakresh Amar Anshuman Singh
Bovin Kumar
9068959111
localCHAKRESH.SINGH@CUBEHIGHWAYS.CO
Anchit Agarwal
Neeraj Singh
8077800073
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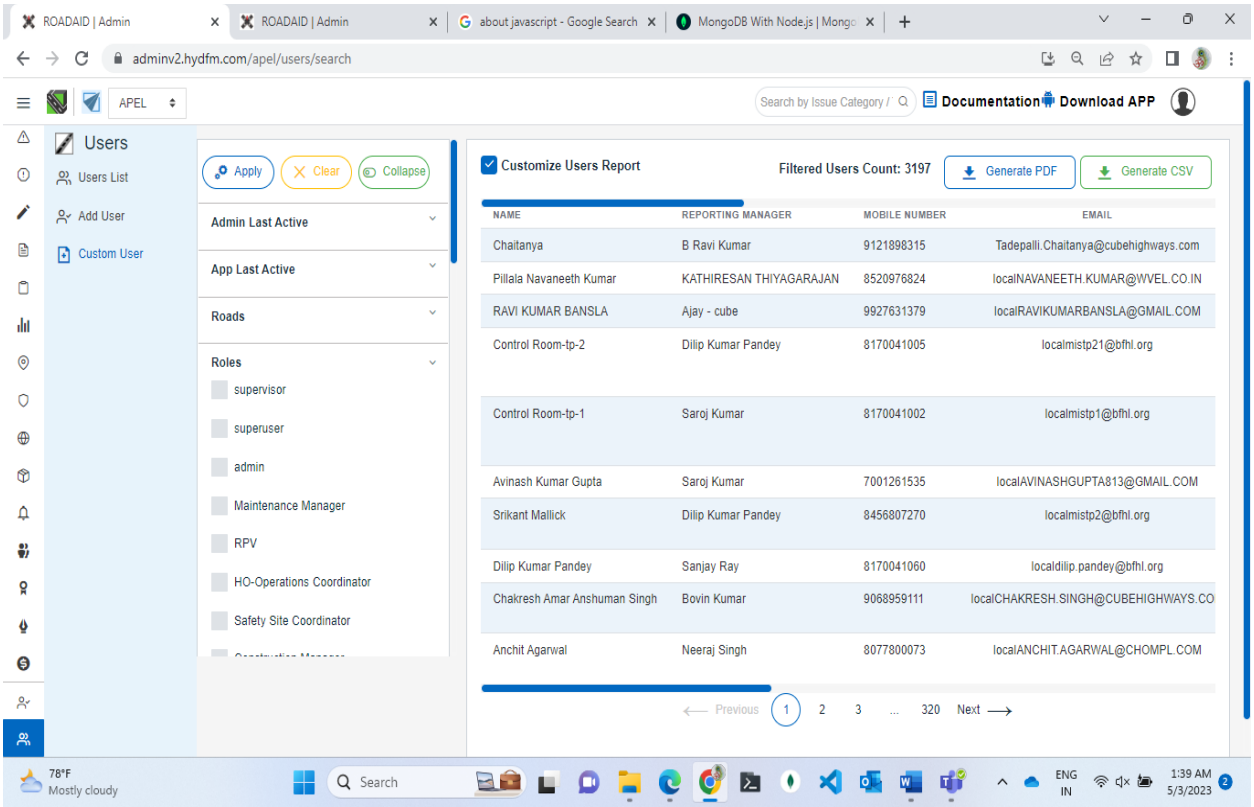
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RPV
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Chakresh Amar Anshuman Singh
Bovin Kumar
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Previous
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Mostly cloudy
Search
ENG
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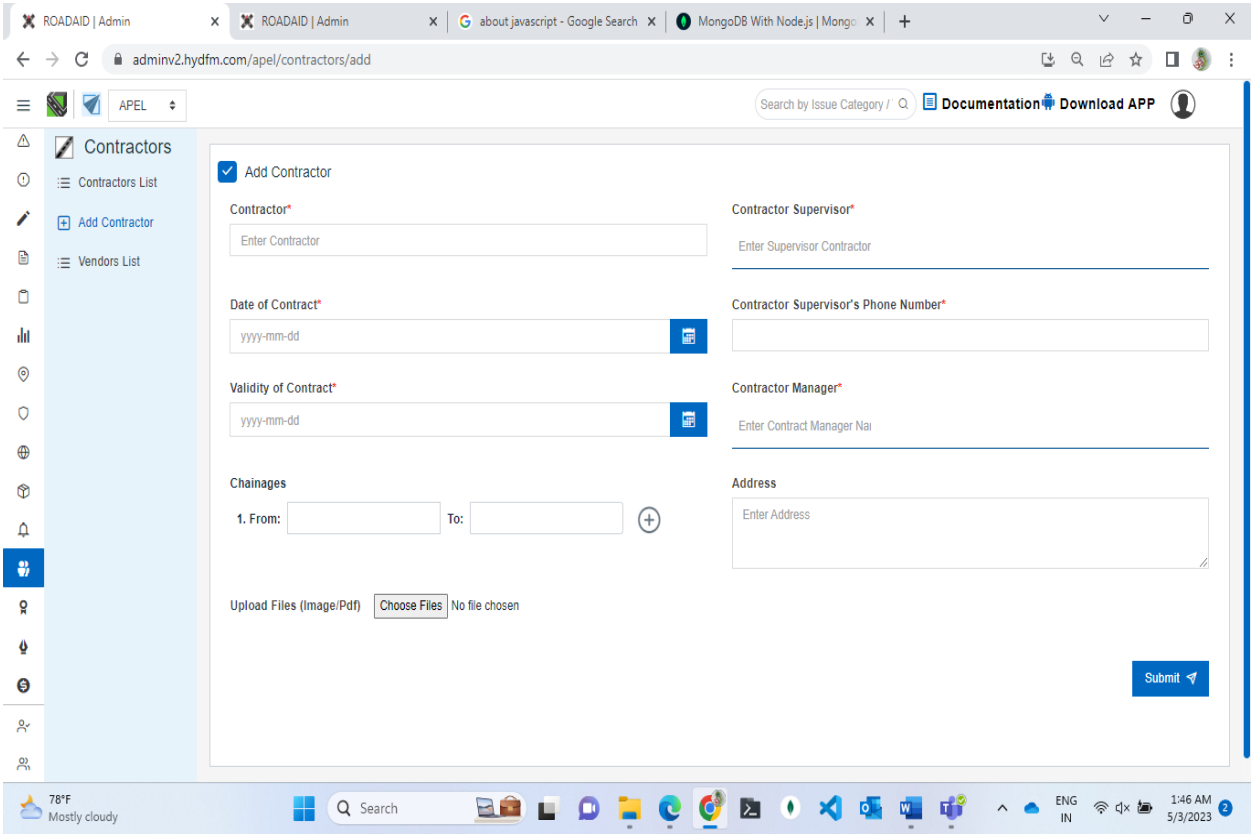
1:39 AM
5/3/2023

ADD CONTRACTOR

1. Added contractor form page in the module.



5.Testing

System tests are designed to validate a fully developed system to assure that it meets its requirements. The test cases are therefore designed solely based on the SRS document.
(OR)

System testing is nothing but how the customer is going to start using your application and checking whether everything is up to the mark and meeting the needs of the customer.

5.1 Unit Testing:

Unit testing, a testing technique using which individual modules are tested to determine if there are any issues by the developer himself. It is concerned with functional correctness of the standalone modules. Reduces Defects in the Newly developed features or reduces bugs when changing the existing functionality.

Improves design and allows better refactoring of code. Unit Tests, when integrated with build gives the quality of the build as well. It is the first level of functional testing. Below are the test cases on the individual modules of the designed website. The functionality of each module has been checked by the developer of the module.

5.2 Integration Testing:

Integration testing is the second level of the software testing process comes after unit testing. In this testing, units or individual components of the software are tested in a group. The focus of the integration testing level is to expose defects at the time of interaction between integrated components or units. Unit testing uses modules for testing purpose, and these modules are combined and tested in integration testing. The goal of integration testing is to check the correctness of communication among all the modules. It includes four types of approaches.

A typical software project consists of multiple software modules, coded by different programmers. The purpose of this level of testing is to expose defects in the interaction between these software modules when they are integrated.
Integration testing includes various approaches like

1. Big bang approach

2. Top-down approach

3.Bottom-up approach

4.Sandwiched Integration testing.

7. Conclusion and References

6.1 Conclusion

Road should be viewed as an important national assets. Like any other assets, road must be regularly maintained to keep them serviceable.

The primary goal of highway maintenance is maintaining the roads in a circumstance that turns to a good service and maximum safety to the travelling highway users. The aim of this software is to investigate on how to improve road maintenance management system in order to reduce time and cost.

maintenance is always a must for any structure in order to maintain its serviceability and to prevent deterioration that may shorten the service life. Maintenance works are not given the attention it should have a budget allocated for maintenance work in which seldom become a prior consideration. However, it is a fact that maintenance is the most important and the activity to be carried out to prolong or at least maintain serviceability of structure until the end of its service life.

This software shows the whole information about all the activities such as accidents, incidents, issues, pavements, assets, bills etc... using this software we can have the data about all roads which will be useful by the government. This company is responsible for the whole road including the potholes or any damages in the road street lights etc...

This software provides websites not only for the maintenance of roads and also, we develop websites and applications for the construction of roads too. Construction plays an important role in the present society. In websites we display information about the raw materials and about construction stuff.

6.2 References

For adding this features(tasks) in the project, I had referred the following

https://angular.io/tutorial

https://www.geeksforgeeks.org/angular-8-introduction/

https://stackblitz.com/angular/

https://www.javatpoint.com/angular-8

https://stackoverflow.com/