RoadAID

Long term internship Project Submitted

In partial fulfilment of the requirements for the award of the degree

of

BACHELOR OF TECHNOLOGY

By

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CERTIFICATE

This is to certify that the project work titled "**RoadAID**" is a long internship submitted by **D. Rosemary (R170024)** in the department of Computer Science and Engineering in partial fulfilment of requirements for the award of degree of Bachelor of Technology for the year 2022-2023 carried out the work under the supervision.

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(A.P. Government Act 18 of 2008)

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CERTIFICATE OF EXAMINATION

This is to certify that the work entitled, "RoadAID" is the bonafied work of **D. Rosemary (R170024)** . Here by accord our approval of it as a study carried out and presented in a manner required for its acceptance Major of Bachelor of Technology for which it has been submitted. This approval does not necessarily endorse or accept every statement made, opinion expressed, or conclusion drawn, as a recorded in this thesis. It only signifies the acceptance of this thesis for the purpose for which it has been submitted.

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DECLARATION

I am **D. Rose Mary (R170024)** hereby declare that the project report entitles, "RoadAID" done under the guidance of **Mr. Linga Murthy** is submitted for major project of **Bachelor of Technology** in **Computer Science and Engineering**, is an authentic record of our own work carried out under the supervision of **Mr. Linga Murthy** , the Major Project December 2022 - April 2023 at RGUKT – RK Valley.

We also declare that this project is a result of our own effort and has not been copied or imitated from any source. Citations from any websites are mentioned in the references.

The results embodied in this project report have not been submitted to any other university or institute for the award of any degree or diploma.

D. Rose Mary (R170024)
Date: 26-01-2023.
Place: RK Valley.

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. We are extremely grateful to our respected Director, **Prof. K. Sandhya Rani** Mam for fostering an excellent academic climate in our institution. We also express my sincere gratitude to our respected Head of the Department **Mr.Satyanandaram** Sir for his encouragement, overall guidance in viewing this project a good asset and effort in bringing out this project. We would like to convey thanks to my project guide **Mr.LingaMurthy** Sir for his 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 for the completion of project work. I express my profound gratitude to all our friends and family members for their encouragement.

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ABSTRACT

RoadAID - Real Time Operations and Maintenance Monitoring Toll

- RoadAID is a centralized platform which allows O&M Team and Managers to real-time report and monitor O&M activities.
- RoadAID app allows site team to report pavement defects, incidents and accidents, issues with road assets, etc.
- Site teams can upload all O&M DPRs (Daily Progress Reports).
- RoadAid app allows the site team to manage the Road Assets.

OVERVIEW

RoadAID

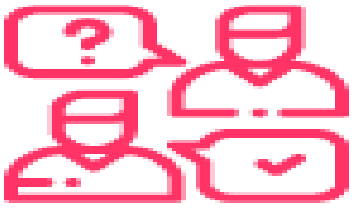
- RoadAID is an easy to adopt platform that uses latest advances in mobile and web technologies to bring transparency and rapid reporting in Highway Operations and Asset Management.
- RoadAID simplifies the recording and analysis of daily and routine maintenance in Highway Operation. RoadAID is designed as a cloud solution to make it easier to share and access data from your office, home or in the field.

OBJECTIVES OF ROADAID

- **Asset Data Management :-**

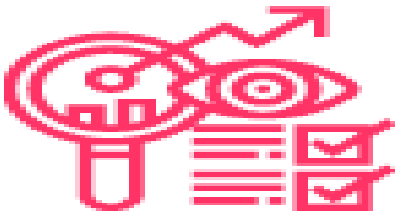
RoadAID users can view detailed location, physical condition and operational information of your highway in a single, secure data repository. Visualize your data to determine the most effective asset maintenance strategies. Track conditions of multiple asset types including roads, bridges, signs, signals, lights etc.

- **Communications Management**



RoadAID allows the communication flow between Site Office/Head Office and Field Engineers, Supervisors and Operators. Field staff can view current task lists, update asset data and complete maintenance activities and inspections using the platform.

- **Audit and Inspection Management**



Aside from usual monitoring RoadAID provides tracking, reporting and fault management through a location-based user interface, one can use the platform to schedule and track site inspections and generate IC reports as per NHAI guidelines. We can assign IC report to issue or incident while creating an issue or while creating incident. Inspection Team manages everything.

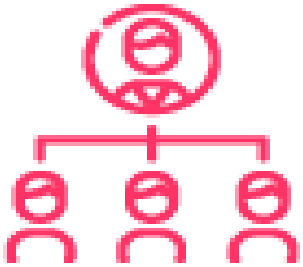
- **Incident Management**

RoadAID allows its users to record, assign and resolve all the issues and incidents that occurred on the road. And also about accidents that are taken place on the highways. It takes certain measures to help the people in a most effective way and in efficient way.

- **Advanced Reporting**

RoadAID's reporting and analytical tools allow users to easily generate standard, custom, ad-hoc reports and charts for your network condition and needs. RoadAID platform is flexible to configure around your existing business processes. If necessary, our development team are on hand to customize new functionality or expand existing elements to support individual organizational requirements.

- **Work Order Management**



RoadAID with Work Order Management, an organization can track all work and understand what is behind schedule and why. One can plan different tasks and actions to be performed on the road, view and monitor resource availability, prioritize tasks and effectively schedule resources for maintenance activities.

TECHNOLOGIES USED IN ROADAID

RoadAID web platform contains:-

1. Front-End
2. Back-End

1.Front-End Technologies used :-

- **Ionic Framework:-**

  RoadAID uses Ionic Framework, Ionic is an open-source UI toolkit for building performant, high-quality hybrid mobile apps using web technologies - HTML, CSS, and JavaScript - with integrations for popular frameworks like Angular. Ionic is written in TypeScript. It implements core and optional functionality as a set of TypeScript libraries that you import into your applications. It provides tools and services for building Mobile UI with native look and feel. Ionic framework needs native wrapper to be able to run on mobile devices like Cordova, Capacitor. Ionic is using AngularJS MVC architecture for building rich single page applications optimized for mobile devices. The apps are built in a very clean and modular way, so it is very maintainable and easy to update.

- **HTML5:-**

RoadAID uses Hyper Text Markup Language (html) 5 for structuring the page and the presentation. It describes the structure of a page, and it consists of a series of elements. Elements tell you how to display the content.

- **CSS and SCSS:-**

RoadAID uses CSS as a styling language that lets us create, design, and style various web pages. With the native look and feel, these CSS components offer almost all elements that a mobile application need. The components' default styling can be easily overridden to accommodate your own designs. SCSS is a special file type in a SASS program we need to write which can also be used for RoadAID styling. Sass is the most mature, stable, and powerful professional grade CSS extension language in the world. Sass is a stylesheet language that's compiled to CSS. It allows you to use variables, nested rules, mixins, functions, and more, all with a fully CSS-compatible syntax. Sass helps keep large stylesheets well-organized and makes it easy to share design within and across projects. The SCSS syntax (.scss) is used most. It's a superset of CSS, which means all valid CSS is also valid SCSS.

- **TypeScript:-**

We use Typescript in RoadAid, it is strongly typed and rigid language, gives better tooling at any scale. TypeScript is a syntactic superset of JavaScript which adds static typing. This basically means that TypeScript adds syntax on top of JavaScript, allowing developers to add types. TypeScript uses compile time type checking. Which means it checks if the specified types match before running the code, not while running the code.

- **Angular**:-

Angular is an open-source, JavaScript framework written in TypeScript. As a platform, Angular includes A component-based framework for building scalable web applications, collection of well-integrated libraries that cover a wide variety of features, including routing, forms management, client-server communication, and more. And suite of developer tools to help you develop, build, test, and update your code. Angular is a powerful tool for building dynamic HTML pages that communicate with a back-end server.

- **Cordova:-**

"Apache Cordova is an open-source mobile development framework. It allows you to use standard web technologies such as HTML5, CSS3, and JavaScript for cross platform development, avoiding each mobile platform native development language. Applications execute within wrappers targeted to each platform and rely on standards-compliant API bindings to access each device's sensors, data, and network status." Apache Cordova plugins offer API needed for using native device functions with JavaScript code.

2.Back-End Technologies used :-

- **MEAN Stack:-**

RoadAID uses MEAN Stack for its backend development. The MEAN stack is a JavaScript-based framework for developing web applications. MEAN is named after MongoDB, Express, Angular, and Node, the four key technologies that make up the layers of the stack. All the MEAN stack components are open source in nature and therefore allow a generous, free-of-charge opportunity for developers. The reason

for using is, we develop apps and web using JavaScript only. we, in RoadAID use MongoDB and NodeJS especially.

- **MongoDB:-**

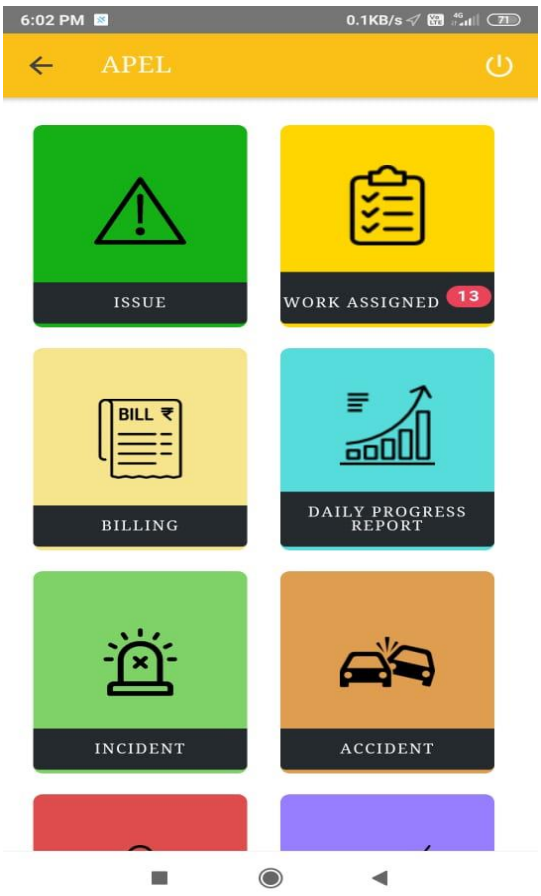
RoadAID uses MongoDB in its backend development. It is a document database we use to build highly available and scalable applications, with flexible schema approach. It stores data in a type of JSON format called BSON. A record in MongoDB is a document, which is a data structure composed of key value pairs like the structure of JSON objects.

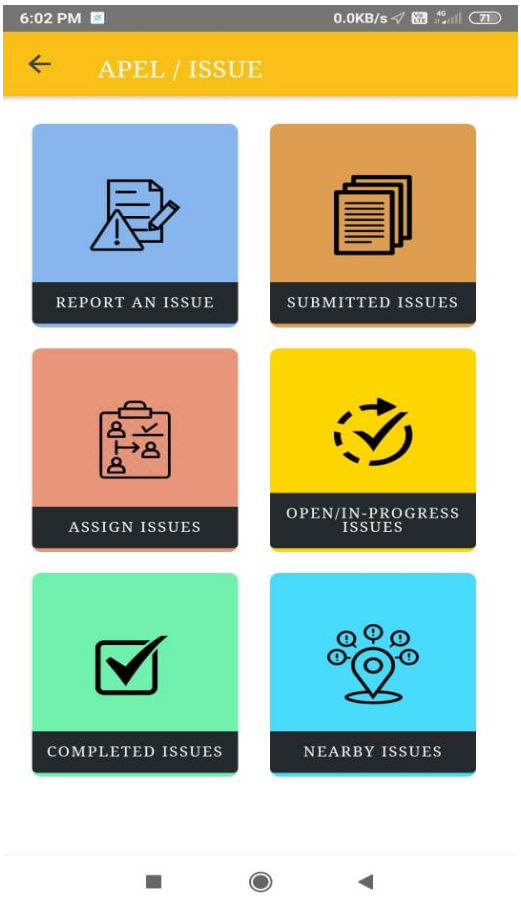
- **NodeJS :-**

RoadAID uses NodeJS for its server-side programming, back-end API services. It is an open-source, cross-platform JavaScript runtime environment and library for running web applications outside the client's browser. Node.js allows you to run JavaScript on the server.

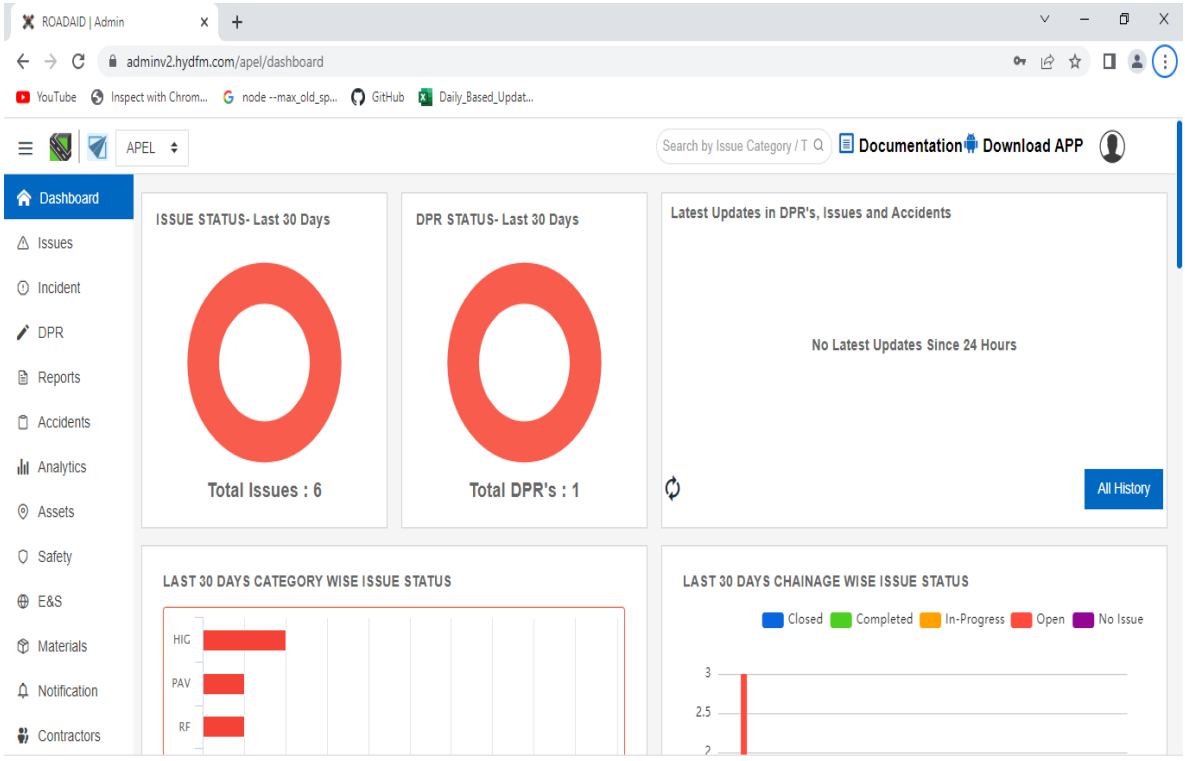
WORKING OF ROADAID

- We in RoadAid allows Users or site workers to use fully customisable application to report and view all issues, incidents and accidents in a detailed way. It gives all the necessary information Required for further processing or for taking necessary actions.

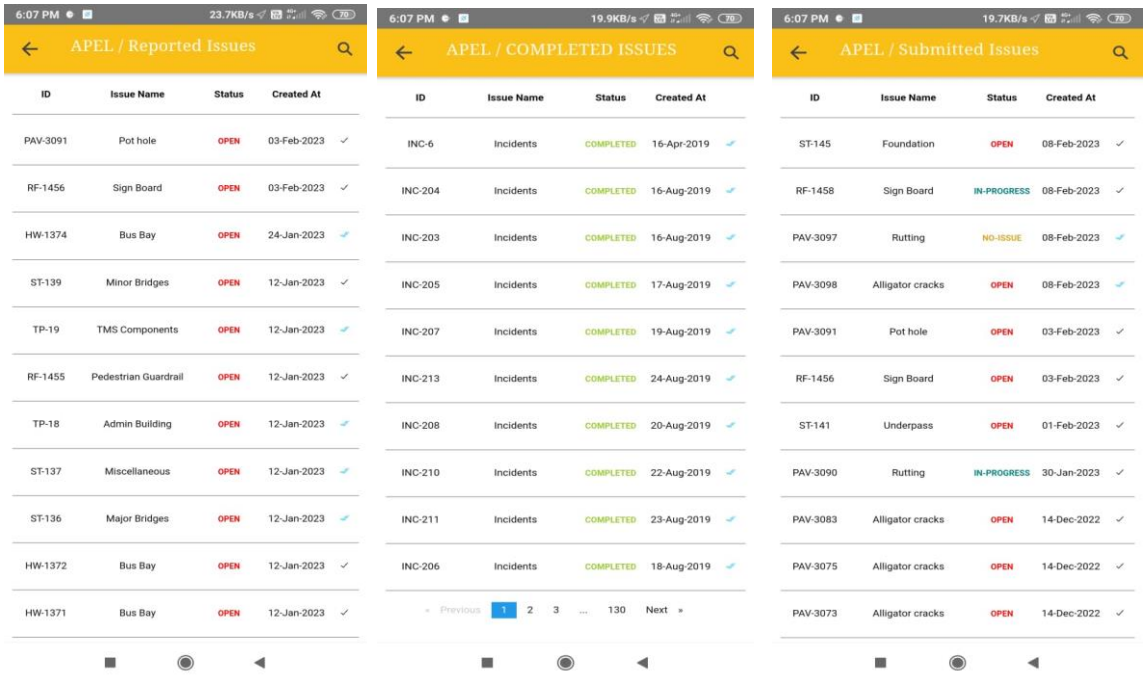




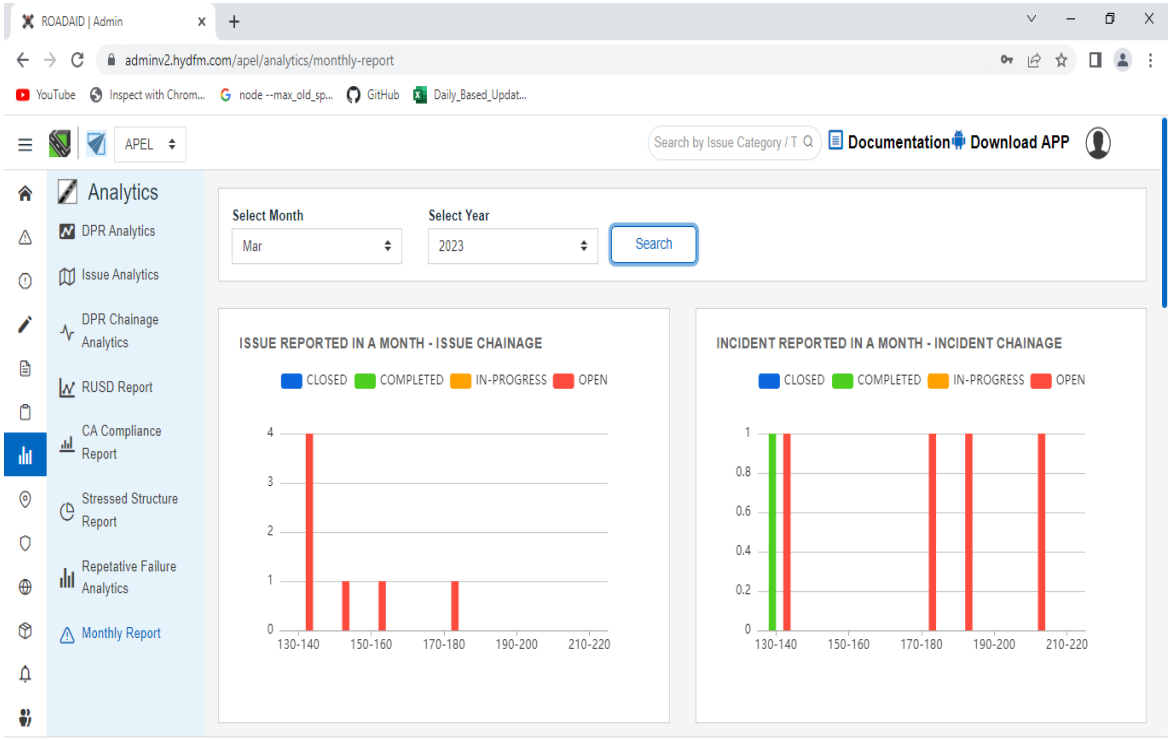
- RoadAid Users there by gets concise information of the road they choose on a web user Interface in our website like status of issues that is number of open issues, number of closed issues. And gives the DPR status. And gives the graphical representation of data about issues, incidents and about DPRs.



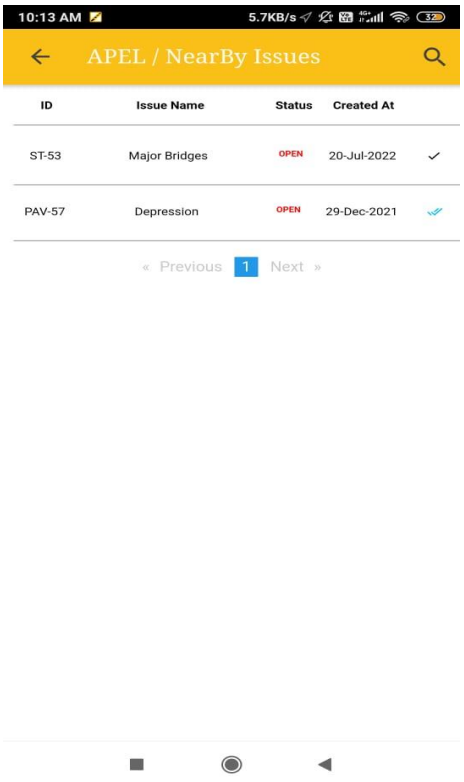
- Users can filter out the data as they need according to their requirements, RoadAID gives full flexibility to do so. It allows the user to search the required data.

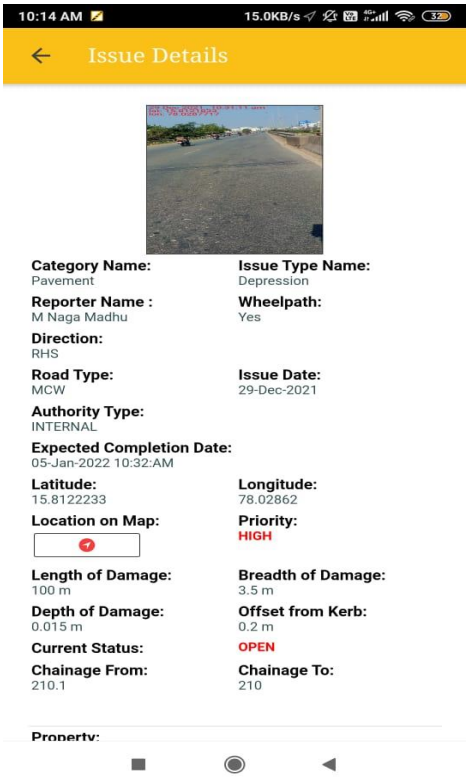


- Users can get the visual insights of their data. RoadAId provides them with visual representation of daily and monthly reports of data about issues, incidents, accidents and DPRs.



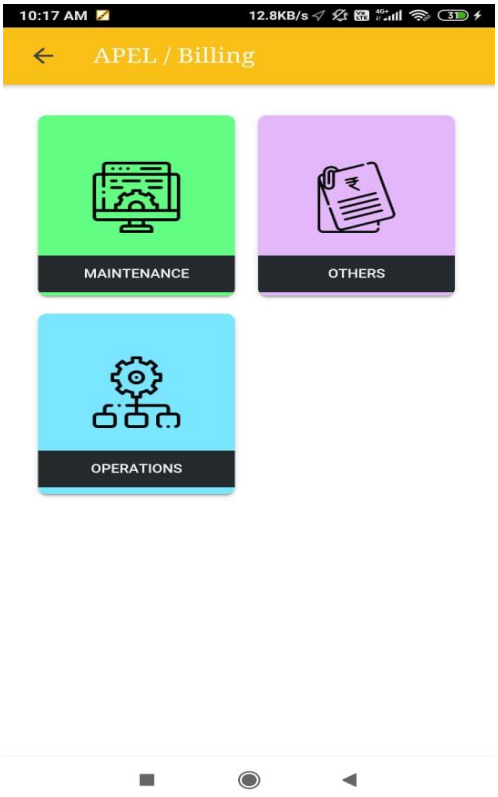
- RoadAID provides users to view all Near By issues reported with in the 50 meters range. And it gives the details about the particular issue like about its category, issue type and reporter name that is who reported that particular issue.

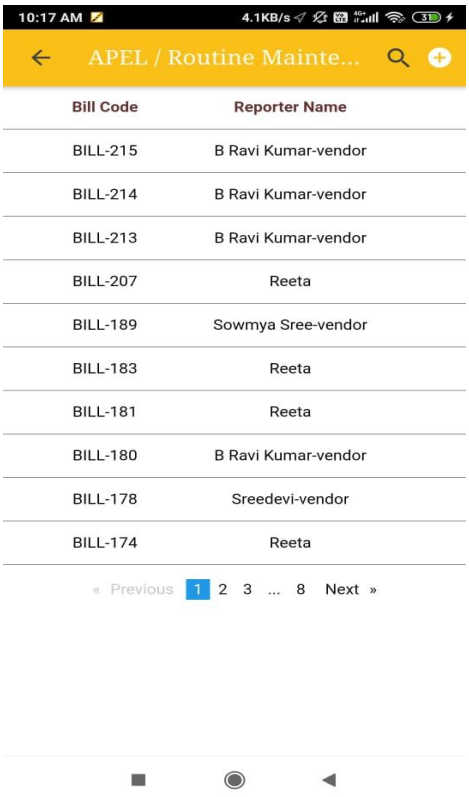




- RoadAid provides Users to Track and Manage Billing system. The billing system is subdivided into maintenance, operations and others. It includes various roles like contractor, vendor, SPV Hr, SPV finance, SPV head,

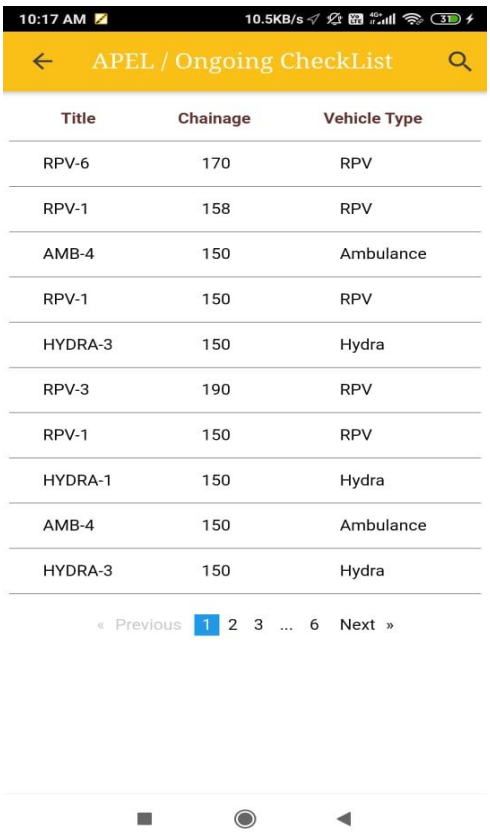
HO finance , HO Treasury. Users get notified when their bill is processed based on the role they have.

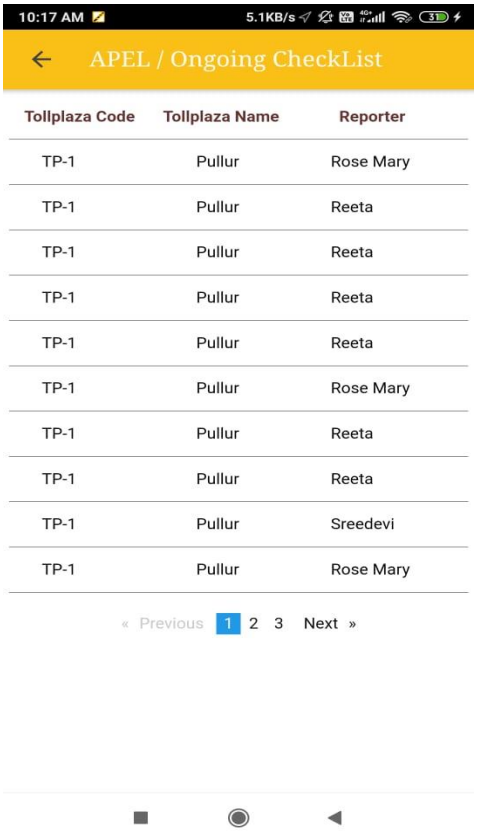




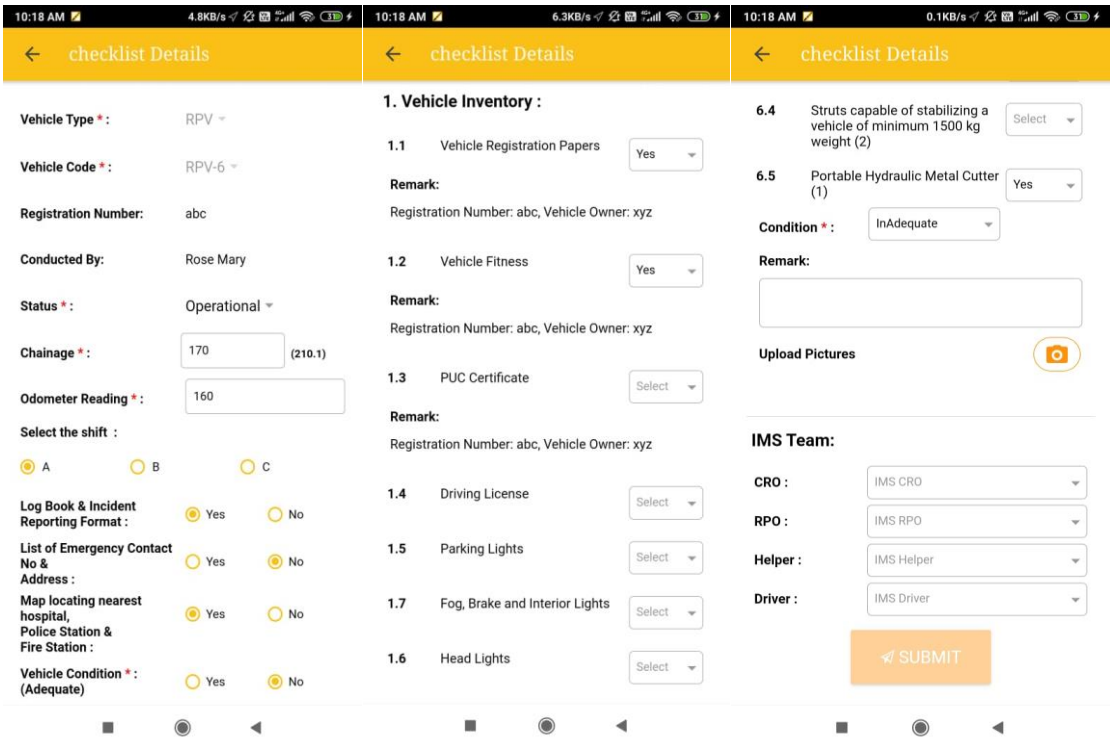
FEW CONTRIBUTIONS MADE IN ROADAID

1. In roadAid we have Safety Module, there we have checklist. In checklist we have vehicle and Toll Plaza. Before it has only form page for to create the checklist for both. But based on the business requirements I have created list page for both based on the status that is it should be ongoing. And handled it in offline conditions too.

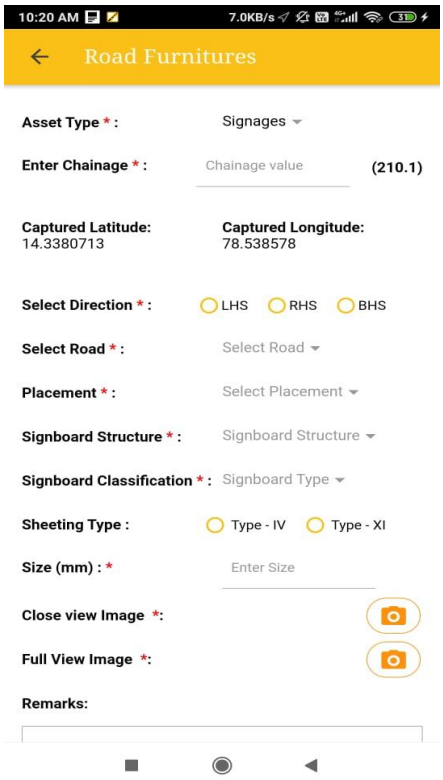


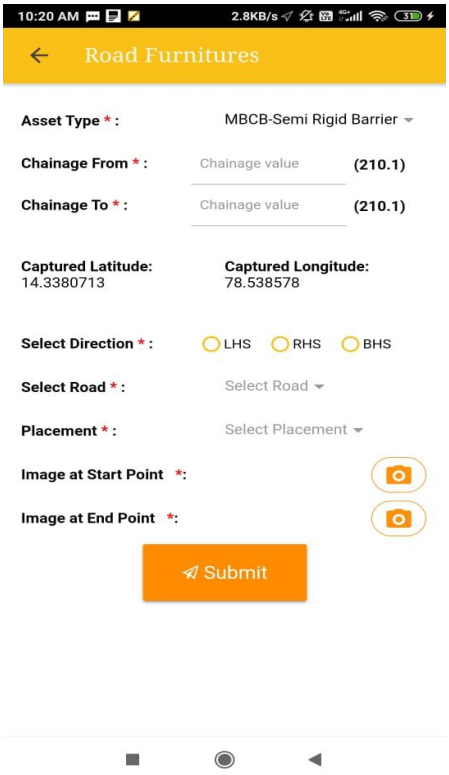


2. After creating the list pages for vehicle checklist and Toll Plaza checklist, I have created detail page with edit option. Users get the data which was provided at the time of creation in form page. And User can edit data whenever they want.

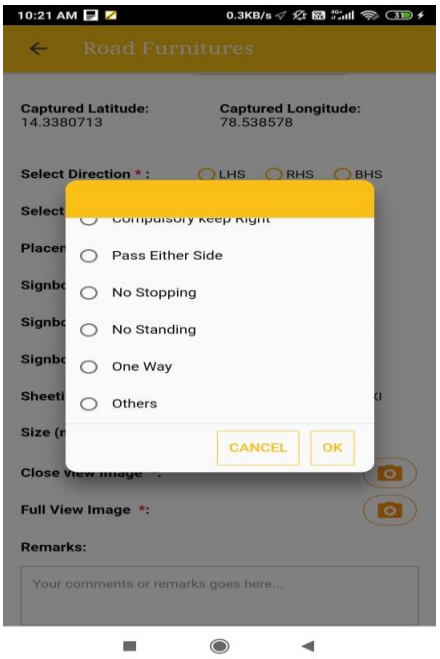


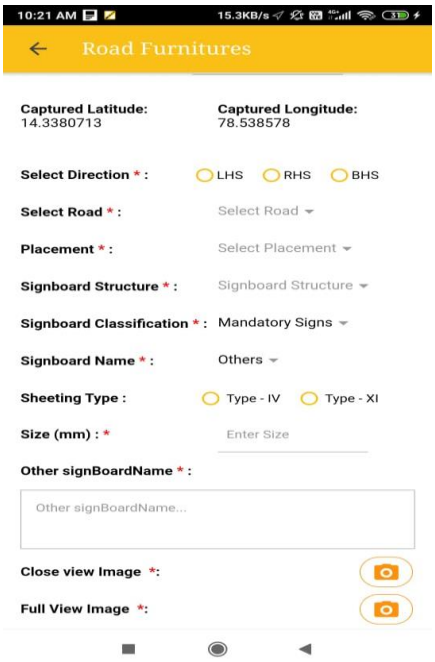
3. In RoadAid we have Inventory Module. In that we have Add Road Assets. We have different types of road Assets in highways like lights, signboards, signs etc. I have Integrated with backend for Add Road Assets Form and added Capturing Image Filed Based on the Type of Chainage we have for that Asset.



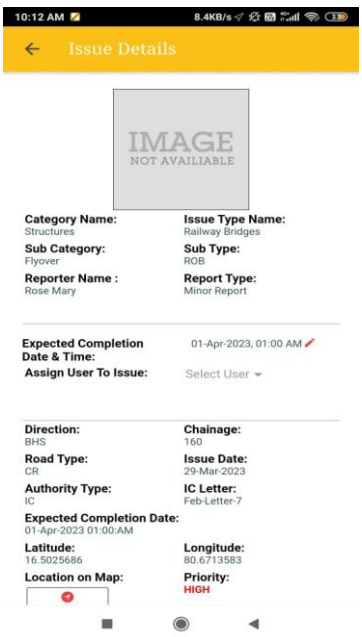


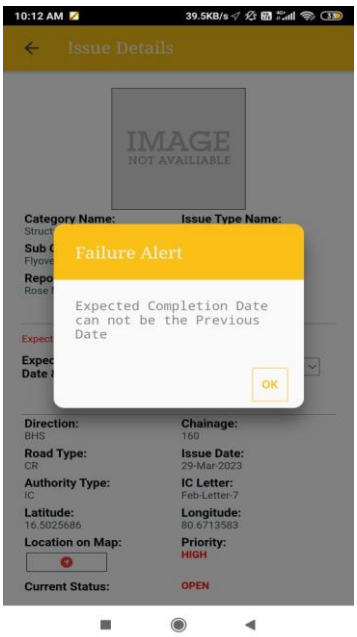
4. In Road Assets Form page, I have added others value in the Sign Board Names Dropdown with Text Box. Whenever user selects the others value in Signboard Name, others Signboard name input text box is displayed. User can enter the any other signboard name in the given input box. If user changes the signboard name in dropdown, then the other signboard name will not be displayed, and its contents will get erased.

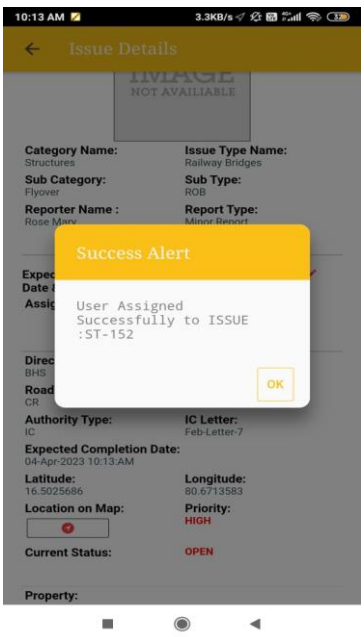




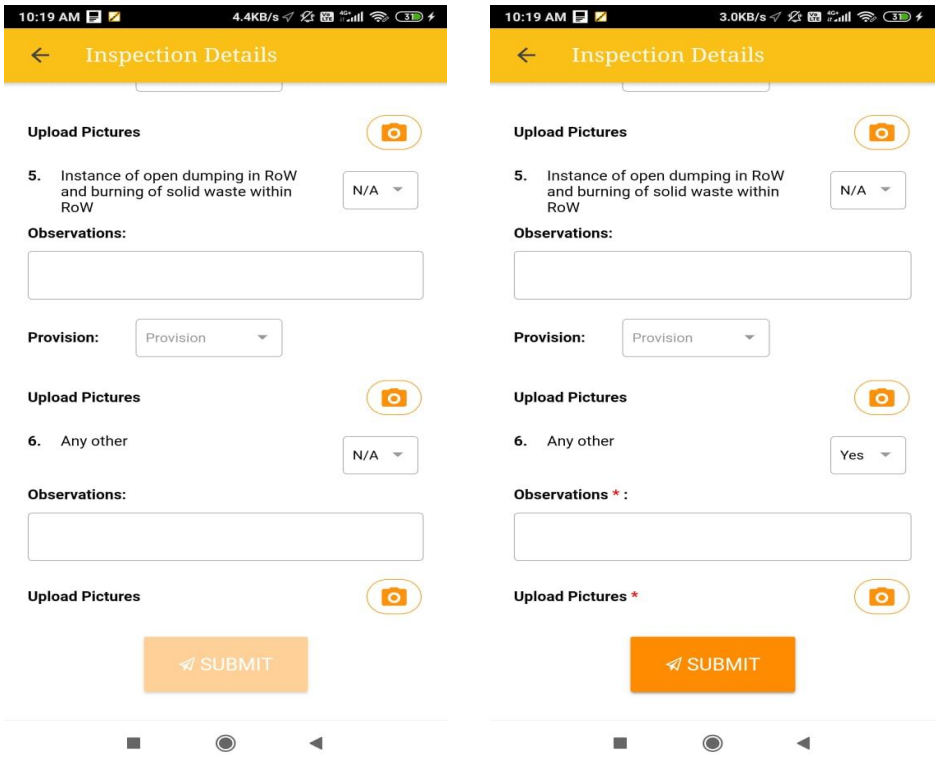
5. In issues Module we can assign an issue or incident to user based on Expected Completion Date. I have Added Condition for Assigning a user to an issue or Incident that is user can be assigned to an issue or incident if expected completion date is greater than today's date and time.



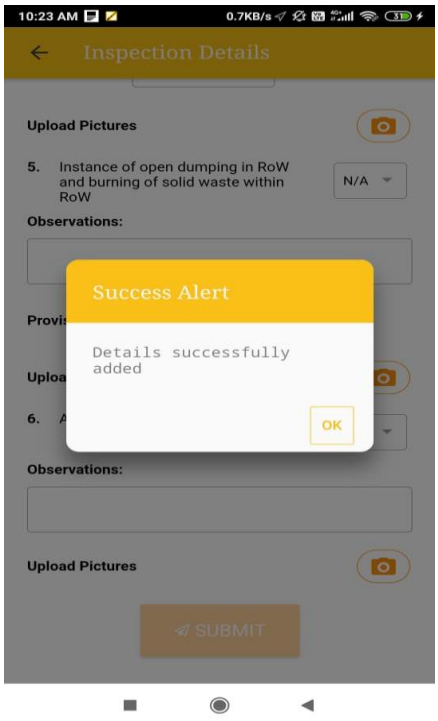




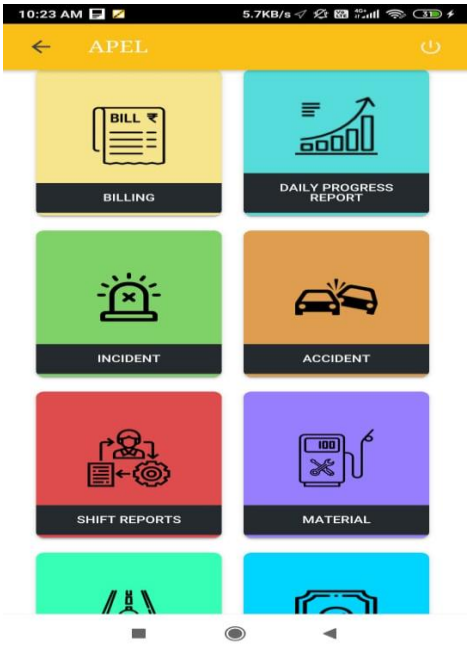
6. In RoadAid we have E&S module. In that we have inspection. I have disabled the submit button unless or until user makes changes in ongoing inspection details page. If user changes anything in that page then submit button get's enabled and then user can submit the changes.



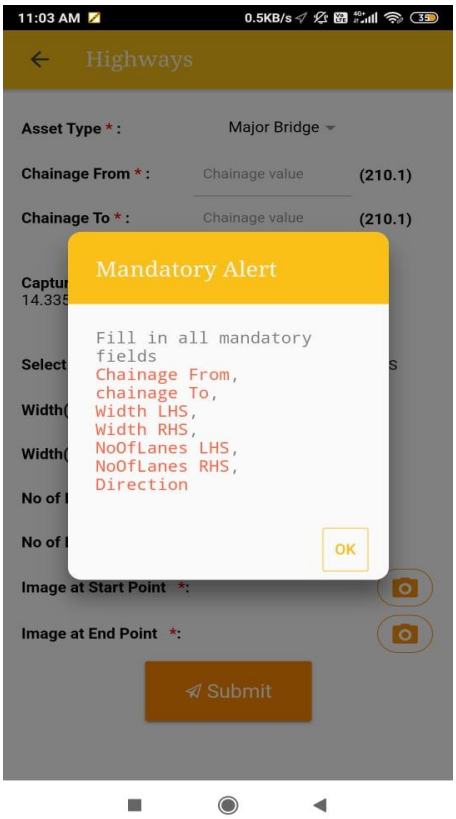
7. In inspection we have so many questions. So, as it will take little bit more time to get the data, I have Popped multiple pages when user submitted the changes that is after submitting the changes, we get the alert popover and in that we have ok button if user clicks Ok button of alert in inspection Details then it will go to E&S page as like in the below image.



8. In RoadAid, we have both incident and accident modules in Incident Tab only. But based on the business requirements I have Separated Incident Tab and accident Tab.



9. In Road Assets form page, there are some mandatory fields that need to be filled before submitting. So, I have Added Alert for the mandatory Fields in the Add Road Assets form page. If user clicks submit button without filling mandatory fields, then alert will be displayed like shown in below image.



TESTING OF ROADAID

RoadAID is tested manually after its development, each feature is tested individually. After Development we the developer who developed that feature will test it locally and then we share the feature to all of our team mates and other team mates to test it properly.

- First, we note down the requirements we have to meet.

  Ex:- Create new component 'Users' to display the data of the all site workers using RoadAID.
- As second step, we clearly design the test plan based on the requirements after development.

  Ex:- Use Manual Testing to test the features of the Users component.
- As third step we write test cases.

  Ex:- (i) Users should be displayed according to the date of the creation in the users list page.

  (ii) User details like, name, age, job description, reporting managers should be displayed according to the user and should be valid credentials.

  (iii) Users can edit the details and submit them if they are willing to.

- As fourth step we review the test cases if all of them covered broadly.
- As fifth step, we test and verify.

  Ex:- The users list is displayed when navigated to user list page – yes it works.
- As sixth step, we will check if there are any bugs, report them if there are any and fix them and the process continues until there are no bugs.
- Developer will explain the functionality or flow of that feature they have developed to the remaining members who have developed it.

REFERENCES

- https://adminv2.hydfm.com/sessions/signin
- https://www.roadaid.in/
- https://www.cubehighways.com

CONCLUSION

RoadAID :-

RoadAID is continuously evolving for the betterment of highway safety and management. We develop and Release new features which will make site operations and tasks much easier, to view, report and manage for all our users. RoadAID is now fully functional platform with great aspects of user customization, provides data security using Google cloud solutions and many other features for the user assistance.