

ROAD AID

Long term internship Project Submitted

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

of

BACHELOR OF TECHNOLOGY

By

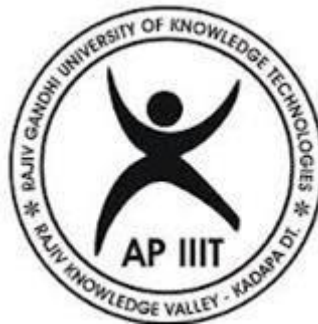
M. Sowmya Sree

Roll No: R170745

Under the supervision of

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CERTIFICATE

This is to certify that the project work titled “**ROAD AID**” is a long internship submitted by **M.Sowmya Sree (R170745)** 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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RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES

(A.P. Government Act 18 of 2008)

RGUKT-RK Valley, Kadapa District – 516330.

CERTIFICATE OF EXAMINATION

This is to certify that the work entitled, "ROAD AID" is the bonafied work of **M.Sowmya Sree (R170745)**. 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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RGUKT-RK Valley, Kadapa District – 516330.

DECLARATION

I am **M. Sowmya Sree (R170745)** 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.

M. Sowmya Sree (R170745)

Date: 26-01-2023.

Place: RK Valley.

ACKNOWLEDGEMENT

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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.

CONTENTS

| | |
|---|----|
| 1. Abstract | 7 |
| 2. Overview | 7 |
| 3. Objectives of RoadAid | 8 |
| 4. Technologies used in RoadAid | 11 |
| 5. Working of RoadAid | 16 |
| 6. Few contributions I've made in RoadAid | 21 |
| 7. Testing of RoadAid | 28 |
| 8. References | 30 |
| 9. Conclusion | 31 |

ABSTRACT

RoadAID - Real Time Operations and Maintenance Monitoring Tool

- 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.

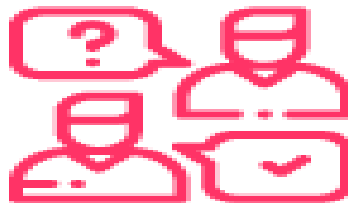
OBJECTIVES OF ROAD AID

- **Asset Data Management: -**



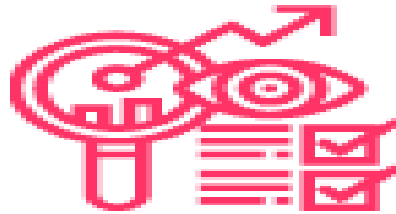
RoadAID users can view detailed location, physical condition and operational information of your highway in a single, secure data repository. Visualize your data to determine the most effective asset maintenance strategies. Track conditions of multiple asset types including roads, bridges, signs, signals,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



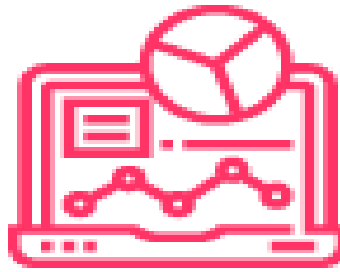
Aside from usual monitoring RoadAID provides tracking, reporting and fault management through a location-based user interface, one can use the platform to schedule and track site inspections and generate IC reports as per NHAH guidelines. We can assign IC report to issue or incident while creating an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

- **Incident Management**



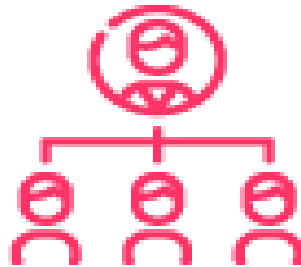
RoadAID allows its users to record, assign and resolve all the issues and incidents that occurred on the road. And also about accidents that are taken place on the highways. It takes certain measures to help the people in a most effective way and in efficient way.

- **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 ROAD AID

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 Framework:-**

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:-**

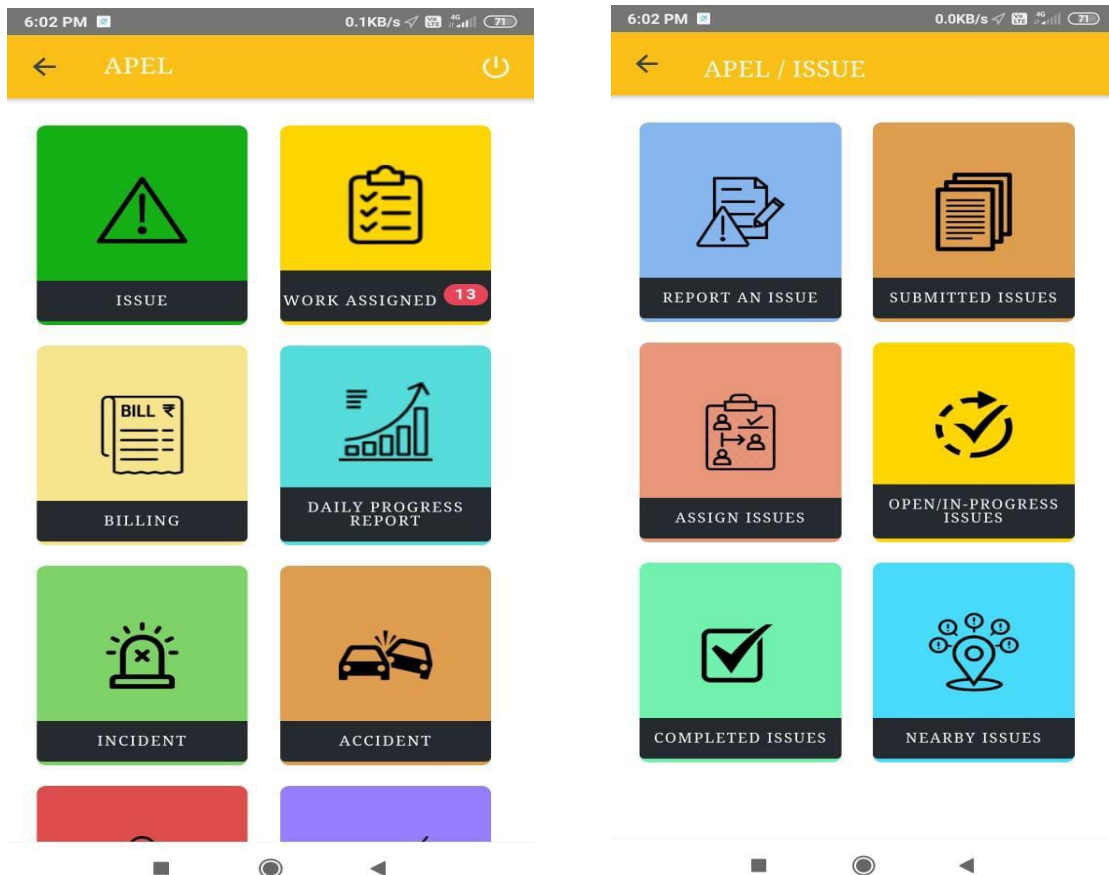
RoadAID uses MongoDB in its backend development. It is a document database we use to build highly available and scalable applications, with flexible schema approach. It stores data in a type of JSON format called BSON. A record in MongoDB is a document, which is a data structure composed of key value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

- **NodeJS :-**

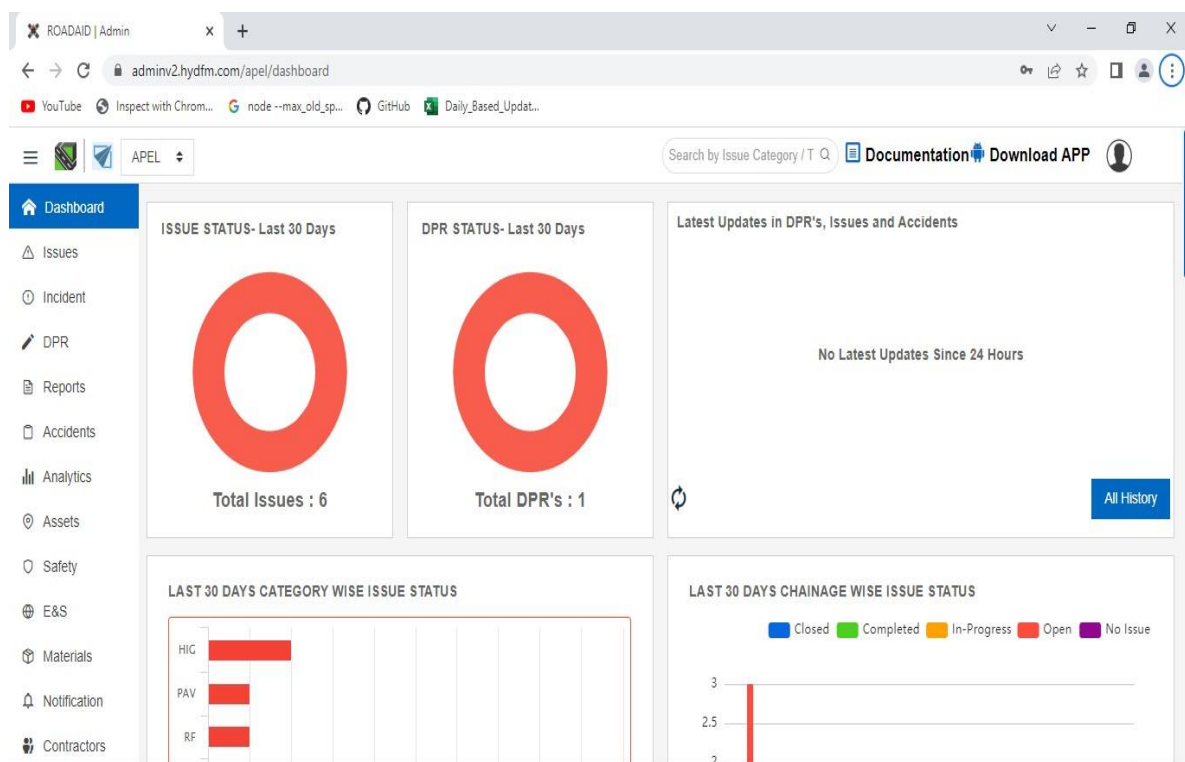
RoadAID uses NodeJS for its server-side programming, back-end API services. It is an open-source, cross-platform JavaScript runtime environment and library for running web applications outside the client's browser. Node.js allows you to run JavaScript on the server.

WORKING OF ROAD AID

- 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.



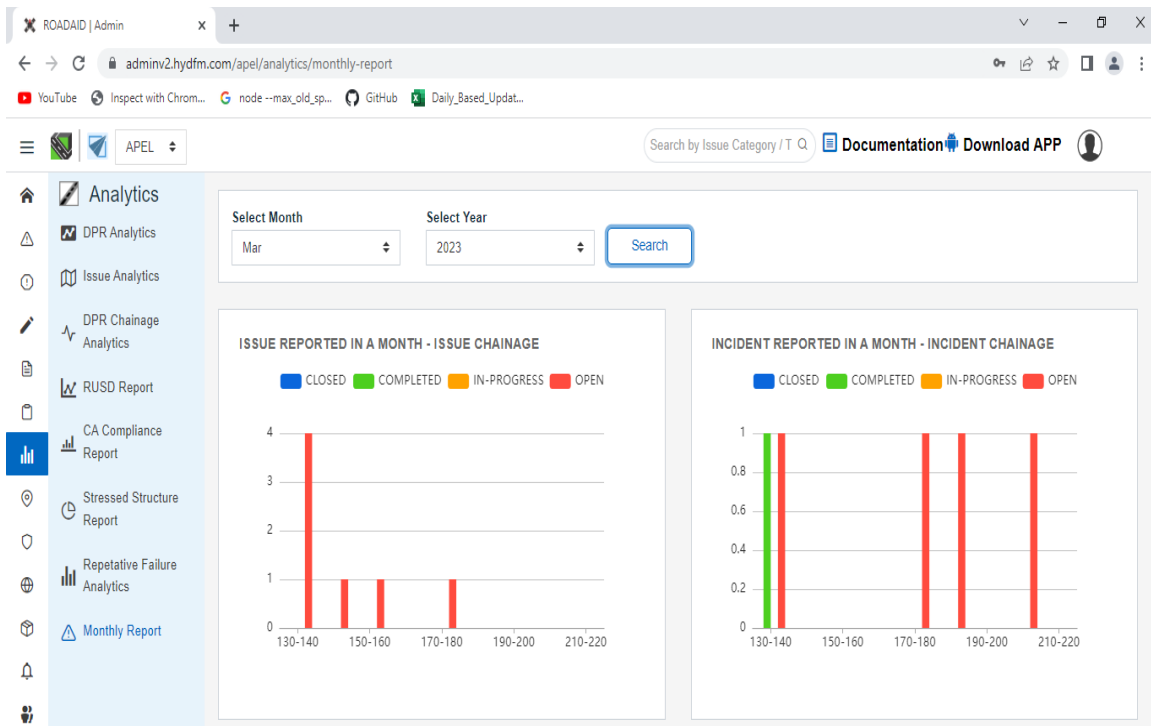
- Users can filter out the data as they need according to their requirements, RoadAID gives full flexibility to do so. It allows the user to search the required data.

| APEL / Reported Issues | | | |
|------------------------|----------------------|--------|---------------|
| ID | Issue Name | Status | Created At |
| PAV-3091 | Pot hole | OPEN | 03-Feb-2023 ✓ |
| RF-1456 | Sign Board | OPEN | 03-Feb-2023 ✓ |
| HW-1374 | Bus Bay | OPEN | 24-Jan-2023 ✓ |
| ST-139 | Minor Bridges | OPEN | 12-Jan-2023 ✓ |
| TP-19 | TMS Components | OPEN | 12-Jan-2023 ✓ |
| RF-1455 | Pedestrian Guardrail | OPEN | 12-Jan-2023 ✓ |
| TP-18 | Admin Building | OPEN | 12-Jan-2023 ✓ |
| ST-137 | Miscellaneous | OPEN | 12-Jan-2023 ✓ |
| ST-136 | Major Bridges | OPEN | 12-Jan-2023 ✓ |
| HW-1372 | Bus Bay | OPEN | 12-Jan-2023 ✓ |
| HW-1371 | Bus Bay | OPEN | 12-Jan-2023 ✓ |

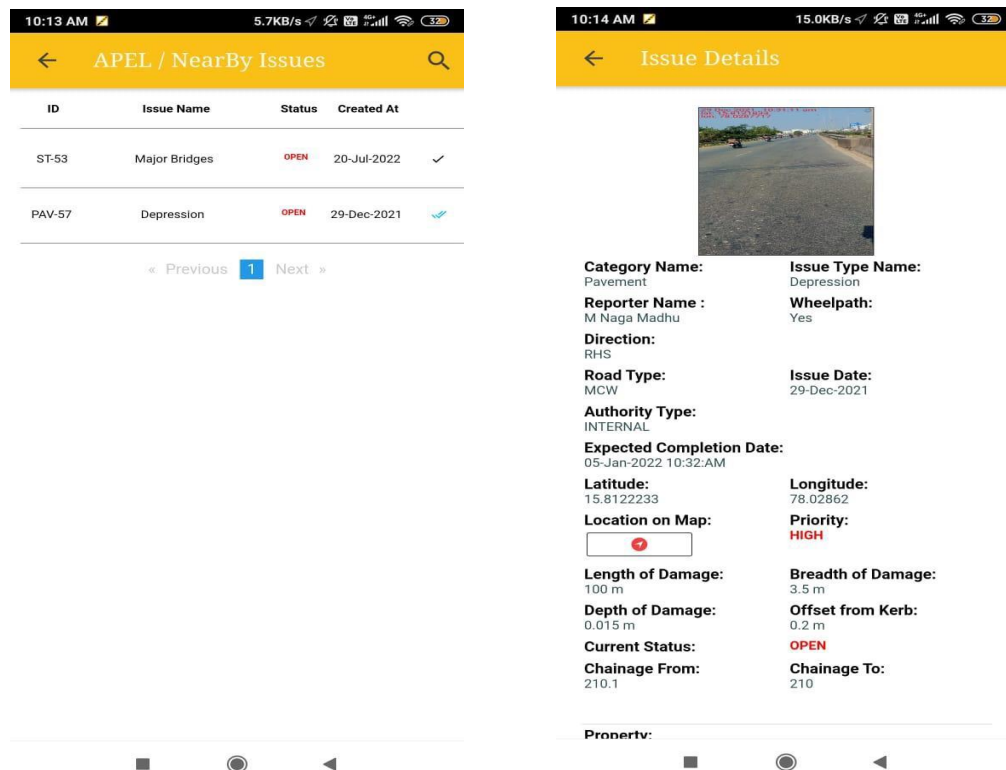
| APEL / COMPLETED ISSUES | | | |
|-------------------------|------------|-----------|---------------|
| ID | Issue Name | Status | Created At |
| INC-6 | Incidents | COMPLETED | 16-Apr-2019 ✓ |
| INC-204 | Incidents | COMPLETED | 16-Aug-2019 ✓ |
| INC-203 | Incidents | COMPLETED | 16-Aug-2019 ✓ |
| INC-205 | Incidents | COMPLETED | 17-Aug-2019 ✓ |
| INC-207 | Incidents | COMPLETED | 19-Aug-2019 ✓ |
| INC-213 | Incidents | COMPLETED | 24-Aug-2019 ✓ |
| INC-208 | Incidents | COMPLETED | 20-Aug-2019 ✓ |
| INC-210 | Incidents | COMPLETED | 22-Aug-2019 ✓ |
| INC-211 | Incidents | COMPLETED | 23-Aug-2019 ✓ |
| INC-206 | Incidents | COMPLETED | 18-Aug-2019 ✓ |

| APEL / Submitted Issues | | | |
|-------------------------|------------------|-------------|---------------|
| ID | Issue Name | Status | Created At |
| ST-145 | Foundation | OPEN | 08-Feb-2023 ✓ |
| RF-1458 | Sign Board | IN-PROGRESS | 08-Feb-2023 ✓ |
| PAV-3097 | Rutting | NO-ISSUE | 08-Feb-2023 ✓ |
| PAV-3098 | Alligator cracks | OPEN | 08-Feb-2023 ✓ |
| PAV-3091 | Pot hole | OPEN | 03-Feb-2023 ✓ |
| RF-1456 | Sign Board | OPEN | 03-Feb-2023 ✓ |
| ST-141 | Underpass | OPEN | 01-Feb-2023 ✓ |
| PAV-3090 | Rutting | IN-PROGRESS | 30-Jan-2023 ✓ |
| PAV-3083 | Alligator cracks | OPEN | 14-Dec-2022 ✓ |
| PAV-3075 | Alligator cracks | OPEN | 14-Dec-2022 ✓ |
| PAV-3073 | Alligator cracks | OPEN | 14-Dec-2022 ✓ |

- 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.

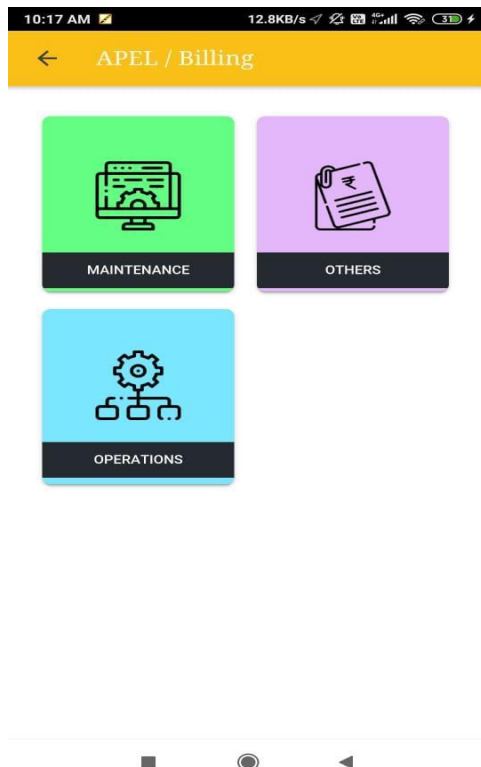


- RoadAID provides users to view all Near By issues reported within the 50 meters range. And it gives the details about the particular issue like about its category, issue type and reporter name that is who reported that particular issue.



- 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, SPVFinance, SPV Head,

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

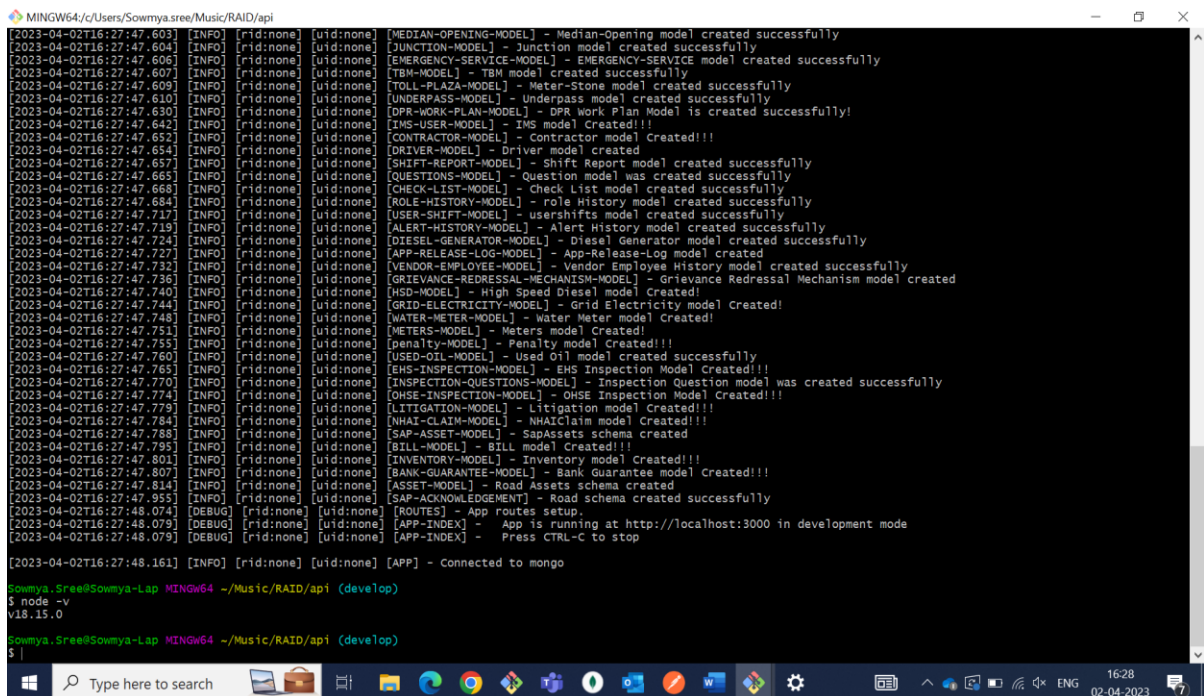


The screenshot shows the 'APEL / Routine Maintenance' app interface. The header is orange with a back arrow, the text 'APEL / Routine Maintenance...', a search icon, and a plus icon. Below the header is a table with two columns: 'Bill Code' and 'Reporter Name'. The table contains 10 rows of data. At the bottom, there is a pagination bar with the text '« Previous 1 2 3 ... 8 Next »'.

| Bill Code | Reporter Name |
|-----------|---------------------|
| BILL-215 | B Ravi Kumar-vendor |
| BILL-214 | B Ravi Kumar-vendor |
| BILL-213 | B Ravi Kumar-vendor |
| BILL-207 | Reeta |
| BILL-189 | Sowmya Sree-vendor |
| BILL-183 | Reeta |
| BILL-181 | Reeta |
| BILL-180 | B Ravi Kumar-vendor |
| BILL-178 | Sreedevi-vendor |
| BILL-174 | Reeta |

FEW CONTRIBUTIONS MADE IN ROADAID

1. In ROADAID, Previously we had used node version v12.5.0, I had Upgraded the latest version of node i.e., v18.15.0

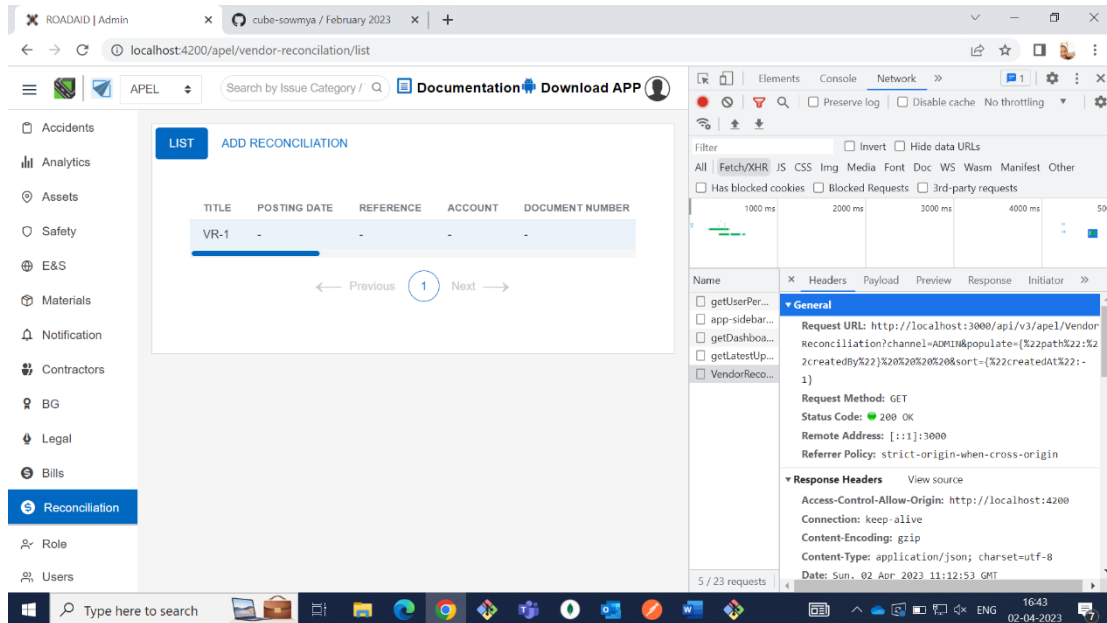


```
MINGW64: c:/Users/Sowmya.sree/Music/RAID/api
[2023-04-02T16:27:47.603] [INFO] [rid:none] [uid:none] [MEDIAN-OPENING-MODEL] - Median-Opening model created successfully
[2023-04-02T16:27:47.604] [INFO] [rid:none] [uid:none] [JUNCTION-MODEL] - Junction model created successfully
[2023-04-02T16:27:47.606] [INFO] [rid:none] [uid:none] [EMERGENCY-SERVICE-MODEL] - EMERGENCY-SERVICE model created successfully
[2023-04-02T16:27:47.607] [INFO] [rid:none] [uid:none] [TBM-MODEL] - TBM model created successfully
[2023-04-02T16:27:47.609] [INFO] [rid:none] [uid:none] [TOLL-PLAZA-MODEL] - Meter-Stone model created successfully
[2023-04-02T16:27:47.610] [INFO] [rid:none] [uid:none] [UNDERPASS-MODEL] - Underpass model created successfully
[2023-04-02T16:27:47.630] [INFO] [rid:none] [uid:none] [DPR-WORK-PLAN-MODEL] - DPR Work Plan Model is created successfully!
[2023-04-02T16:27:47.642] [INFO] [rid:none] [uid:none] [IMS-USER-MODEL] - IMS model Created!!!
[2023-04-02T16:27:47.652] [INFO] [rid:none] [uid:none] [CONTRACTOR-MODEL] - Contractor model Created!!!
[2023-04-02T16:27:47.654] [INFO] [rid:none] [uid:none] [DRIVER-MODEL] - Driver model created
[2023-04-02T16:27:47.657] [INFO] [rid:none] [uid:none] [SHIFT-REPORT-MODEL] - Shift Report model created successfully
[2023-04-02T16:27:47.665] [INFO] [rid:none] [uid:none] [QUESTIONS-MODEL] - Question model was created successfully
[2023-04-02T16:27:47.668] [INFO] [rid:none] [uid:none] [CHECK-LIST-MODEL] - Check List model created successfully
[2023-04-02T16:27:47.684] [INFO] [rid:none] [uid:none] [ROLE-HISTORY-MODEL] - role History model created successfully
[2023-04-02T16:27:47.717] [INFO] [rid:none] [uid:none] [USER-SHIFT-MODEL] - usershifts model created successfully
[2023-04-02T16:27:47.719] [INFO] [rid:none] [uid:none] [ALERT-HISTORY-MODEL] - Alert History model created successfully
[2023-04-02T16:27:47.724] [INFO] [rid:none] [uid:none] [DIESEL-GENERATOR-MODEL] - Diesel Generator model created successfully
[2023-04-02T16:27:47.727] [INFO] [rid:none] [uid:none] [APP-RELEASE-LOG-MODEL] - App-Release-Log model created
[2023-04-02T16:27:47.732] [INFO] [rid:none] [uid:none] [VENDOR-EMPLOYEE-MODEL] - Vendor Employee History model created successfully
[2023-04-02T16:27:47.736] [INFO] [rid:none] [uid:none] [GRIEVANCE-REDRESSAL-MECHANISM-MODEL] - Grievance Redressal Mechanism model created
[2023-04-02T16:27:47.740] [INFO] [rid:none] [uid:none] [HSD-MODEL] - High Speed Diesel model Created!
[2023-04-02T16:27:47.744] [INFO] [rid:none] [uid:none] [GRID-ELECTRICITY-MODEL] - Grid Electricity model Created!
[2023-04-02T16:27:47.748] [INFO] [rid:none] [uid:none] [WATER-METER-MODEL] - Water Meter model Created!
[2023-04-02T16:27:47.751] [INFO] [rid:none] [uid:none] [METERS-MODEL] - Meters model Created!
[2023-04-02T16:27:47.755] [INFO] [rid:none] [uid:none] [PENALTY-MODEL] - Penalty model Created!!!
[2023-04-02T16:27:47.760] [INFO] [rid:none] [uid:none] [USED-OIL-MODEL] - Used oil model created successfully
[2023-04-02T16:27:47.765] [INFO] [rid:none] [uid:none] [EHS-INSPECTION-MODEL] - EHS Inspection Model Created!!!
[2023-04-02T16:27:47.770] [INFO] [rid:none] [uid:none] [INSPECTION-QUESTIONS-MODEL] - Inspection Question model was created successfully
[2023-04-02T16:27:47.774] [INFO] [rid:none] [uid:none] [OHSE-INSPECTION-MODEL] - OHSE Inspection Model Created!!!
[2023-04-02T16:27:47.779] [INFO] [rid:none] [uid:none] [LITIGATION-MODEL] - Litigation model Created!!!
[2023-04-02T16:27:47.784] [INFO] [rid:none] [uid:none] [NHAI-CLAIM-MODEL] - NHAIclaim model Created!!!
[2023-04-02T16:27:47.788] [INFO] [rid:none] [uid:none] [SAP-ASSET-MODEL] - SapAssets schema created
[2023-04-02T16:27:47.795] [INFO] [rid:none] [uid:none] [BILL-MODEL] - BILL model Created!!!
[2023-04-02T16:27:47.801] [INFO] [rid:none] [uid:none] [INVENTORY-MODEL] - Inventory model Created!!!
[2023-04-02T16:27:47.807] [INFO] [rid:none] [uid:none] [BANK-GUARANTEE-MODEL] - Bank Guarantee model Created!!!
[2023-04-02T16:27:47.814] [INFO] [rid:none] [uid:none] [ASSET-MODEL] - Road Assets schema created
[2023-04-02T16:27:47.955] [INFO] [rid:none] [uid:none] [SAP-ACKNOWLEDGEMENT] - Road schema created successfully
[2023-04-02T16:27:48.074] [DEBUG] [rid:none] [uid:none] [ROUTES] - App routes setup.
[2023-04-02T16:27:48.079] [DEBUG] [rid:none] [uid:none] [APP-INDEX] - App is running at http://localhost:3000 in development mode
[2023-04-02T16:27:48.079] [DEBUG] [rid:none] [uid:none] [APP-INDEX] - Press CTRL-C to stop
[2023-04-02T16:27:48.161] [INFO] [rid:none] [uid:none] [APP] - Connected to mongo

Sowmya.Sree@Sowmya-Lap MINGW64 ~/Music/RAID/api (develop)
$ node -v
v18.15.0

Sowmya.Sree@Sowmya-Lap MINGW64 ~/Music/RAID/api (develop)
$ |
```

2. Added new collection i.e., Vendor Reconciliation Module in API



3. In RoadAid In RoadAid we have Modules like Litigation, Nhai-Claims and Bills, Users of ROAD AID. So I added Custom Routes to get reports and details of all modules i.e., `getAllLitigations`, `getAllNhaisClaims`, `getAllBillReports` and `getUser`

The screenshot displays the ROADAI Admin interface. The left sidebar contains a 'Users' section with options for 'Users List' and 'Add User'. The main content area shows the profile of 'Sowmya Sree' (ID: 9515920262). The profile includes fields for Name, Reportin g Manager, Email, Employee ID, Employee Mobile Number, and Employee Email. A network tab on the right shows a GET request to the user details API endpoint.

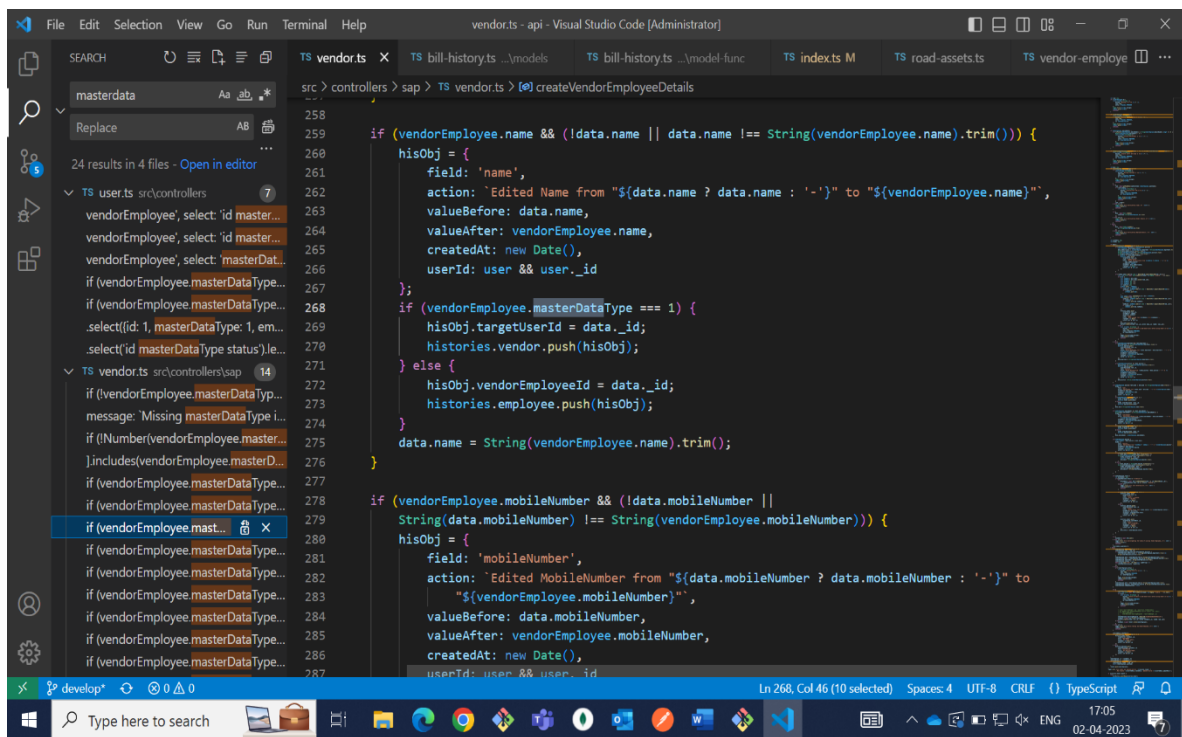
| Name | Reportin g Manager | Email | Employee ID | Employee Mobile Number | Employee Email |
|-------------|--------------------|------------------------------|-------------|------------------------|-----------------------------|
| Sowmya Sree | Ajay - cube | Sowmya.Sree@cubehighways.com | 22100049 | 9989497681 | VENKAT ESHMUR AKALAK LIPPAM |

4. In ROADAI, for Bills Module added Custom Route to get bill reports in reports page in API.

The screenshot displays the ROADAI Admin interface. The left sidebar contains a 'Bills Report' section. The main content area shows a table of bills. A network tab on the right shows a POST request to the bills report API endpoint.

| NAME OF ENTITY | NAME OF THE BENEFICIARY | TITLE | BILL TYPE | SUB BILL TYPE |
|----------------|--|----------|-------------|----------------------|
| APEL | Andhra Pradesh Expressway Limited (APEL) | BILL-215 | Maintenance | Routine Maintenance |
| APEL | Andhra Pradesh Expressway Limited (APEL) | BILL-214 | Maintenance | Routine Maintenance |
| APEL | Andhra Pradesh Expressway Limited (APEL) | BILL-213 | Maintenance | Routine Maintenance |
| APEL | Andhra Pradesh Expressway Limited (APEL) | BILL-212 | Maintenance | Periodic Maintenance |
| APEL | Andhra Pradesh Expressway Limited (APEL) | BILL-211 | Others | Others |
| APEL | Andhra Pradesh Expressway Limited (APEL) | BILL-210 | Others | Others |
| APEL | Andhra Pradesh Expressway Limited (APEL) | BILL-209 | Others | Others |

5. In SAP Vendor Employee Module, Added histories for sap vendor employee according to master data type (if master data type = 1 => vendor & if its 2 => employee)



```
src > controllers > sap > vendor.ts > createVendorEmployeeDetails
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if (vendorEmployee.name && (!data.name || data.name !== String(vendorEmployee.name).trim())) {
  hisObj = {
    field: 'name',
    action: 'Edited Name from "${data.name ? data.name : '-'}' to "${vendorEmployee.name}"',
    valueBefore: data.name,
    valueAfter: vendorEmployee.name,
    createdAt: new Date(),
    userId: user && user_id
  };
  if (vendorEmployee.masterDataType === 1) {
    hisObj.targetUserId = data_id;
    histories.vendor.push(hisObj);
  } else {
    hisObj.vendorEmployeeId = data_id;
    histories.employee.push(hisObj);
  }
  data.name = String(vendorEmployee.name).trim();
}

if (vendorEmployee.mobileNumber && (!data.mobileNumber ||
String(data.mobileNumber) !== String(vendorEmployee.mobileNumber))) {
  hisObj = {
    field: 'mobileNumber',
    action: 'Edited MobileNumber from "${data.mobileNumber ? data.mobileNumber : '-'}' to
"${vendorEmployee.mobileNumber}"',
    valueBefore: data.mobileNumber,
    valueAfter: vendorEmployee.mobileNumber,
    createdAt: new Date(),
    userId: user && user_id
  };
  if (vendorEmployee.masterDataType === 1) {
    hisObj.targetUserId = data_id;
    histories.vendor.push(hisObj);
  } else {
    hisObj.vendorEmployeeId = data_id;
    histories.employee.push(hisObj);
  }
  data.mobileNumber = String(vendorEmployee.mobileNumber).trim();
}
```

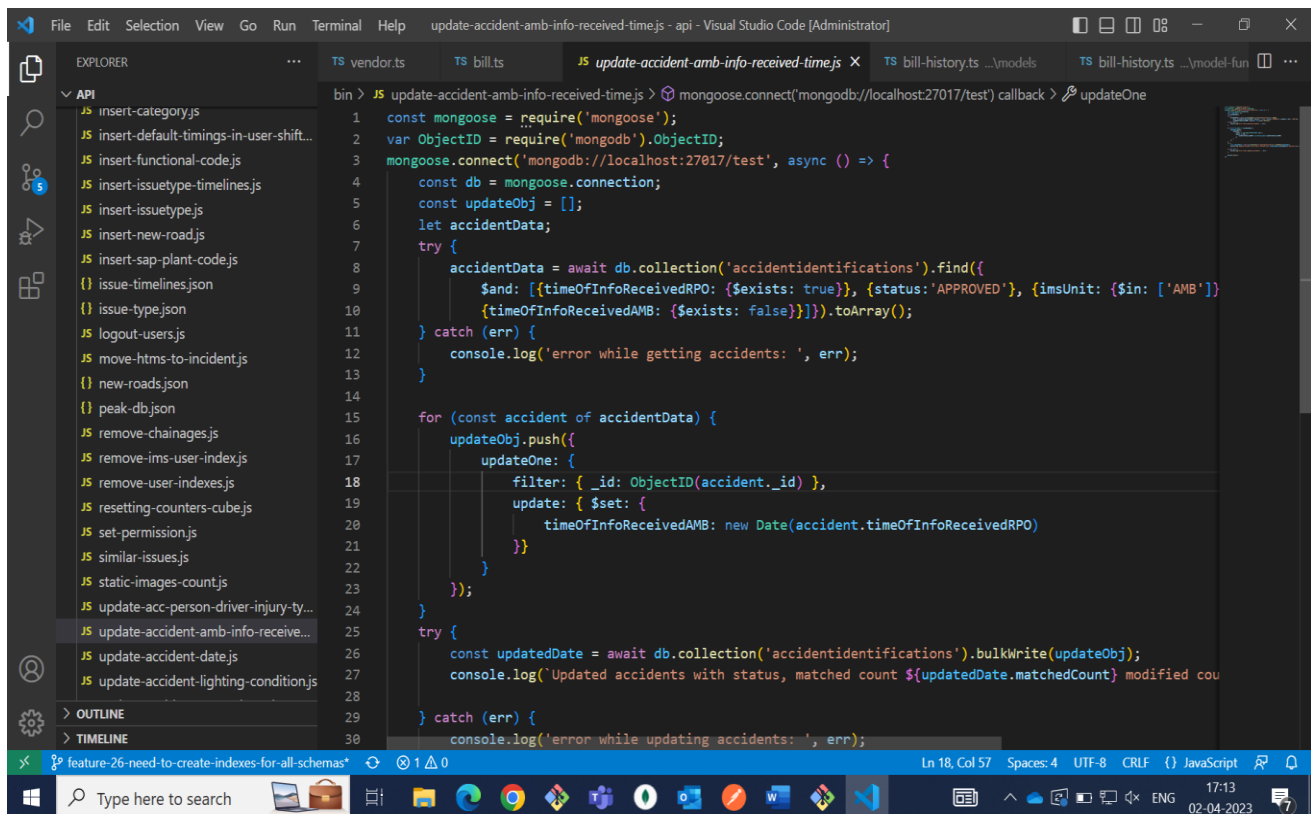

6. In Road Aid, for every Schema as index is important to find the data easily and fast to check the using the data given in the index it will search data in where it is stored i.e. MongoDB Compass and search using with the help of indexes, So I had added indexes to all schemas.

The image shows a VS Code editor window with a TypeScript file named `bill.ts` open. The file is located in the `src > models` directory. The code defines a Mongoose schema for a `Bill` model. The schema includes the following fields and methods:

- `currentInvoiceAmount`: A `Number` type with a `validate` method that checks if the value is finite and greater than or equal to 0.
- `approvedInvoiceAmount`: A `Number` type with a `validate` method that checks if the value is finite and greater than or equal to 0.
- `billStatus`: A `String` type with an `enum` of `['IN-PROGRESS', 'COMPLETED', 'DELAYED']`.
- `billSchema.index({ roadId: 1 }, { unique: true })`: An index on the `roadId` field.
- `billSchema.index({ createdAt: 1 })`: An index on the `createdAt` field.
- `billSchema.plugin(mongooseAsyncHooks)`: A plugin for asynchronous hooks.
- `billFunc(billSchema)`: A function that takes the schema as an argument.
- `const Bill = mongoose.model('bill', billSchema)`: A Mongoose model instance.
- `logger.info('BILL model Created!!!')`: A log statement.
- `export default Bill`: The default export.

The file is part of a project named `feature-26-need-to-create-indexes-for-all-schemas`. The editor shows the file explorer on the left with the `bill.ts` file selected. The status bar at the bottom indicates the file is at line 1, column 1, with 4 spaces, UTF-8 encoding, and CRLF line endings. The language is TypeScript.

7. In ROAD AID, we have Scripts which are very important whenever there is a huge change of data in data base we write scripts and write it according to requirements so, I had added Script file to update status to ongoing based on RPV & AMB Response Time.



The screenshot shows a Visual Studio Code editor window with a TypeScript file named `update-accident-amb-info-received-time.js`. The script is designed to update the status of accidents in a MongoDB database based on their response time. The code includes the following logic:

- Connects to a MongoDB instance using `mongoose.connect`.
- Defines a `callback` function that calls `updateOne`.
- Retrieves accident data from the `accidentidentifications` collection using a query that filters by `timeOfInfoReceivedRPO` and `status`.
- Iterates through the retrieved data and updates the `timeOfInfoReceivedAMB` field for each record.
- Uses `bulkWrite` to update the records in bulk.
- Logs the updated count and any errors.

```
1 const mongoose = require('mongoose');
2 var ObjectId = require('mongodb').ObjectId;
3 mongoose.connect('mongodb://localhost:27017/test', async () => {
4   const db = mongoose.connection;
5   const updateObj = [];
6   let accidentData;
7   try {
8     accidentData = await db.collection('accidentidentifications').find({
9       $and: [{timeOfInfoReceivedRPO: {$exists: true}}, {status: 'APPROVED'}, {imsUnit: {$in: ['AMB']}}
10      ].toArray();
11   } catch (err) {
12     console.log('error while getting accidents: ', err);
13   }
14   for (const accident of accidentData) {
15     updateObj.push({
16       updateOne: {
17         filter: { _id: ObjectId(accident._id) },
18         update: { $set: {
19           timeOfInfoReceivedAMB: new Date(accident.timeOfInfoReceivedRPO)
20         } }
21       }
22     });
23   }
24   try {
25     const updatedDate = await db.collection('accidentidentifications').bulkWrite(updateObj);
26     console.log('Updated accidents with status, matched count ${updatedDate.matchedCount} modified cou
27   } catch (err) {
28     console.log('error while updating accidents: ', err);
29   }
30 }
```

TESTING OF ROAD AID

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.