A MAJOR PROJECT REPORT ON

Management Information System

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

Bachelor of Technology
IN
COMPUTER SCIENCE AND ENGINEERING

Submitted by

P. ANOOSHA(R170356)

Under the guidance of

Ms. E. SUSMITHA
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.

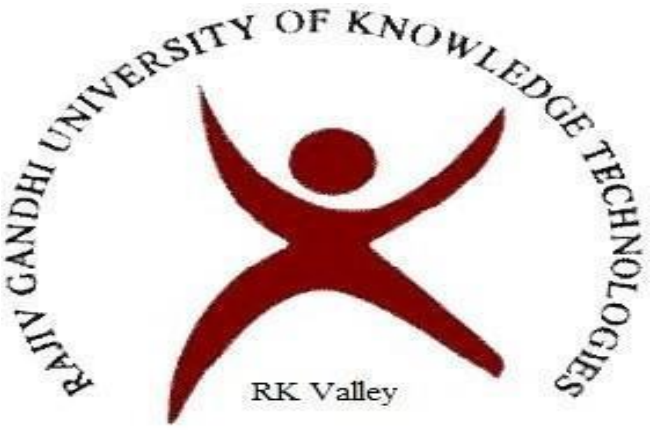
I am extremely grateful to our respected Director, Prof. K. SANDHYA RANI for fostering an excellent academic climate in our institution.

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 "**Management Information System**" submitted by P. Anoosha(R170356) 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

P. ANOOSHA

R170356

Table of Contents

ACKNOWLEDGEMENT 2

CERTIFICATE 3

DECLARATION 4

ABSTRACT 6

1.INTRODUCTION 7

1.1 Purpose

1.2 Features

2.REQUIREMNT ANALYSIS 8

2.1 Requirement Specification.

2.1.1 Functional Requirements.

2.1.2 Hardware Requirements.

2.1.3 Software Requirements.

2.1.4 Technologies used.

3.SOFTWARE ENVIRONMENT 11

4.IMPLEMENTATION 12

4.1 Graphical user interface.

4.2 Sample Screenshots.

5.Testing 21

5.1 Unit Testing.

5.2 Integration Testing.

6.Conclusion and Future scope. 23

6.1 Conclusion.

6.2 References.

ABSTRACT

A Management Information System (MIS) is a systematic organization and presentation of information that is generally required by the management of an organization for taking better decisions for the organization. The concept of a management information system enlarges the scope of information processing to encompass not only applications for transactions and operations, but also applications that support administrative and management functions, support organizational communications and coordination, and add value to products and services. My project is majorly focuses about Toll management system and it is the most important part of a Highway Project.

So, Here in Cube highways provides a complete software system for road management and MIS project is a part of it. It invests in road and highway projects along with other select infrastructure sectors in India. This project provides a website for detail analytics, management operations, Revenue, ERP traffic details.

Tools and Technologies:

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

1.INTRODUCTION

Management Information Systems (MIS) is the study of people, technology, organizations, and the relationships among them. MIS professionals help firms realize maximum benefit from investment in personnel, equipment, and business processes. Management Information system is an information system used for decision-making, and for the coordination, control, analysis, and visualization of information in an organization.

1.1 PURPOSE

This website is used to know the information about daily generated toll amount from the roads through different payment methods. It calculates amount daily, monthly and yearly. It shows data in charts too. It is used to know the traffic and revenue generated from a road.

It shows information about nearly 20 plazas. Based on that statistics and information management could get to know whether it is profitable or not.

1.2 FEATURES

This website is used to provide the information about traffic and revenue of a plaza. It also shows process of payments of toll. It shows financial reports too. It shows the data in different methods based on the need of the management.

MIS website shows number of vehicles passed through a plaza. It also shows collected toll amount whether it is through cash or fastag or through any UPI app. It shows system reports like blank and N/A reports, avc accuracy and wim variance etc. Different plazas have different ERP rates, so based on that calculations would be different. It also shows ERP traffic, Revenue correction Delta reports and Bluesheet FY reports. It also shows penalty amount collected for overload traffic.

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).

STUDIO 3T

Studio 3T provides a graphical user interface (GUI) and Integrated development environment (IDE) for accessing and modifying Mongo DB databases and their documents. With Studio 3T, you have an intuitive, user-friendly tool that lets you take full advantage of MongoDB's document management capabilities.

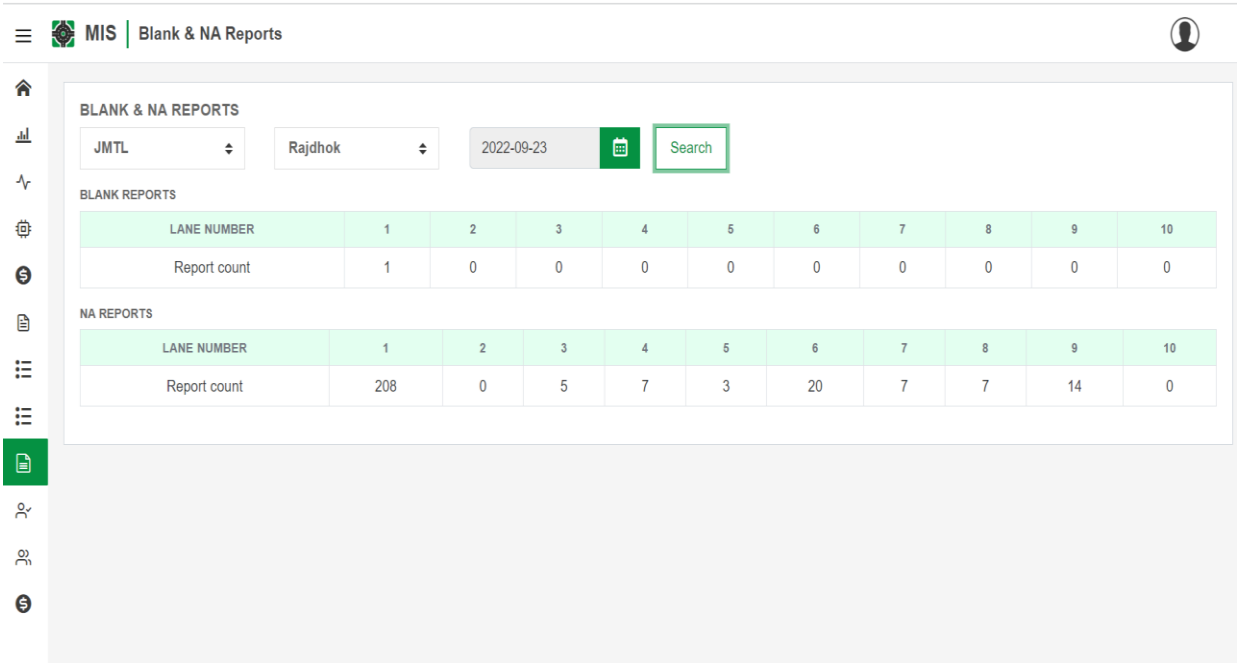
4. IMPLEMENTATION

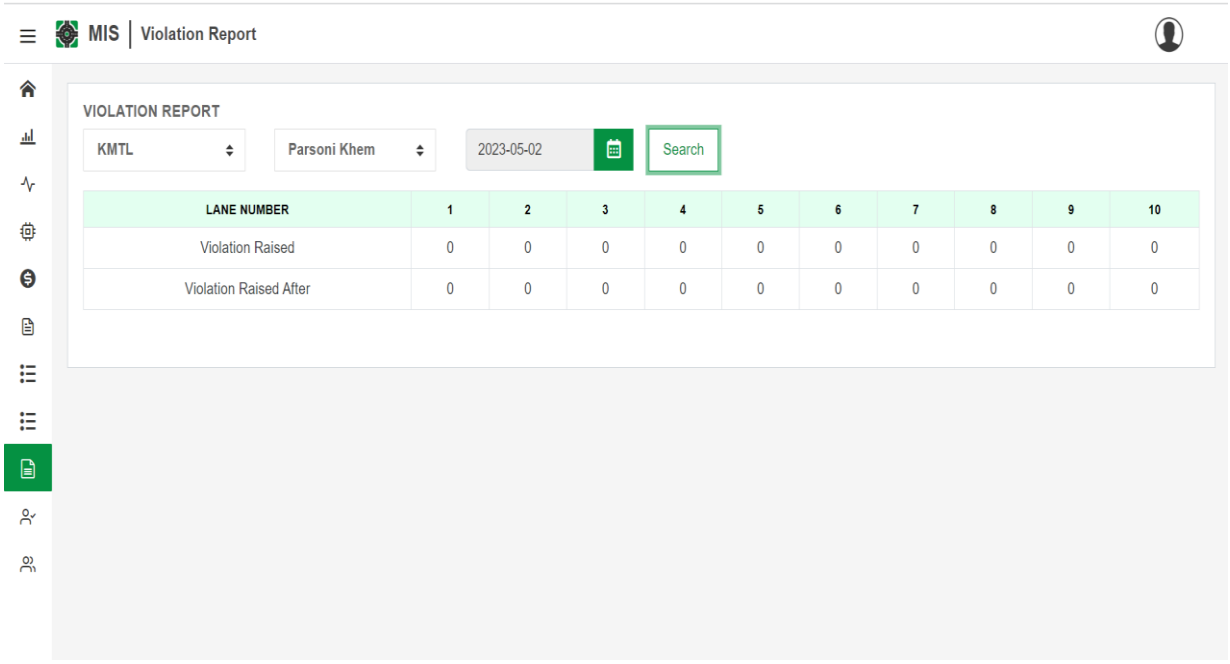
4.1 Graphical user interface

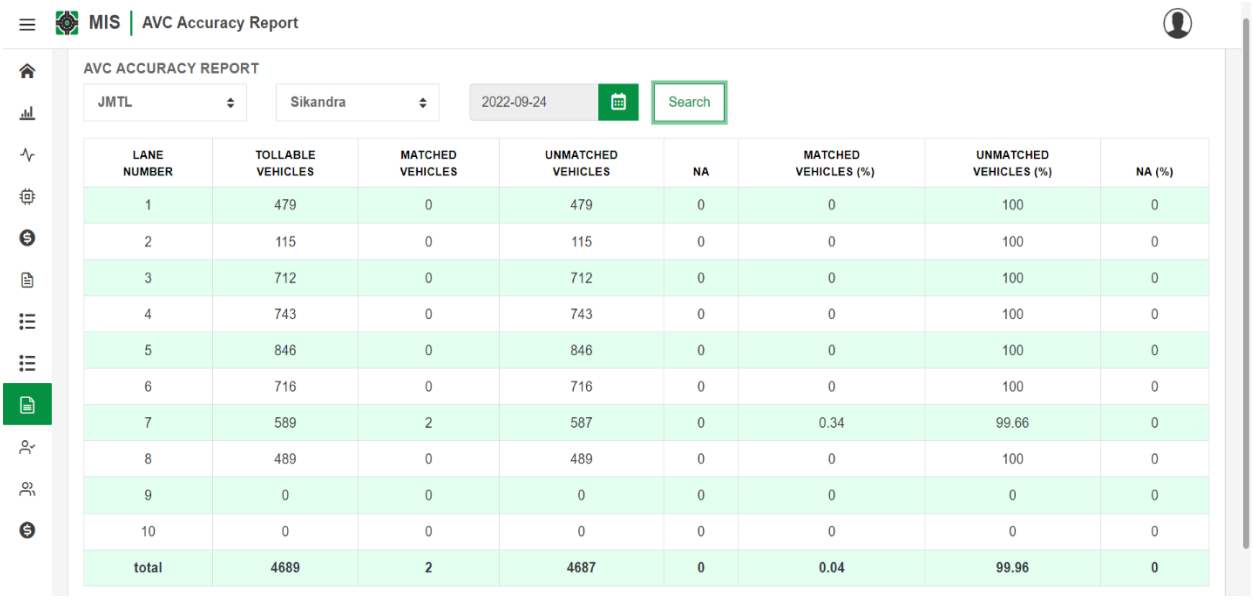
The user interface is kept simple and understandable. The user need not take any additional effort to understand the functionality and navigation in the application. The UI designing should be easily understandable and should know where the input is given. Hints are given to help the user in giving the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

4.2 Logic & Sample Screenshots

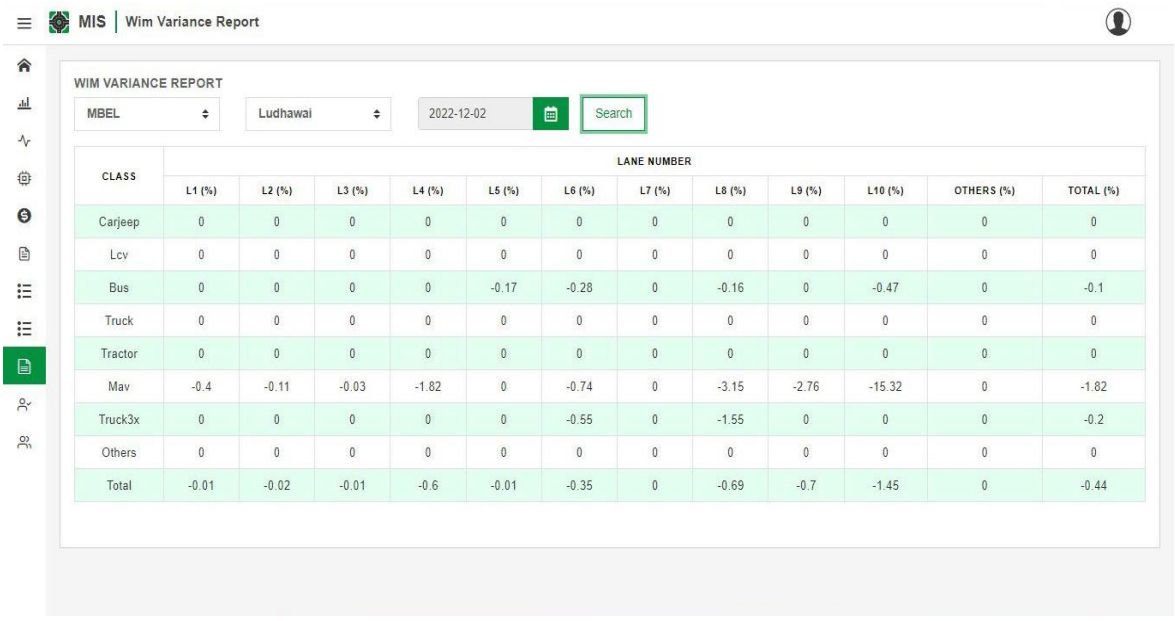
I created the whole system reports module. It consists of four components namely Blank and N/A reports, Wim Variance, AVC Accuracy and Violation reports. Blank and N/A reports show count of vehicles which payment method is Blank and N/A. AVC Accuracy show count of toll able vehicles and non-toll able vehicles. Violation report show the count of vehicles whose weight is overloaded. Wim Variance report show the count of different types of vehicles separated by lane wise according to wim variance calculations. I displayed that information in a tabular format. The header bar contains component name. The top of the page consists of roads list and plazas list dropdown boxes. We can search the reports on any date.


MIS | Blank & NA Reports
BLANK & NA REPORTS
JMTL
Rajdhok
2022-09-23
Search
BLANK REPORTS
LANE NUMBER 1 2 3 4 5 6 7 8 9 10
Report count 1 0 0 0 0 0 0 0 0 0
NA REPORTS
LANE NUMBER 1 2 3 4 5 6 7 8 9 10
Report count 208 0 5 7 3 20 7 7 14 0


MIS | Violation Report
VIOLATION REPORT
KMTL
Parsoni Khem
2023-05-02
Search
LANE NUMBER 1 2 3 4 5 6 7 8 9 10
Violation Raised 0 0 0 0 0 0 0 0 0 0
Violation Raised After 0 0 0 0 0 0 0 0 0 0

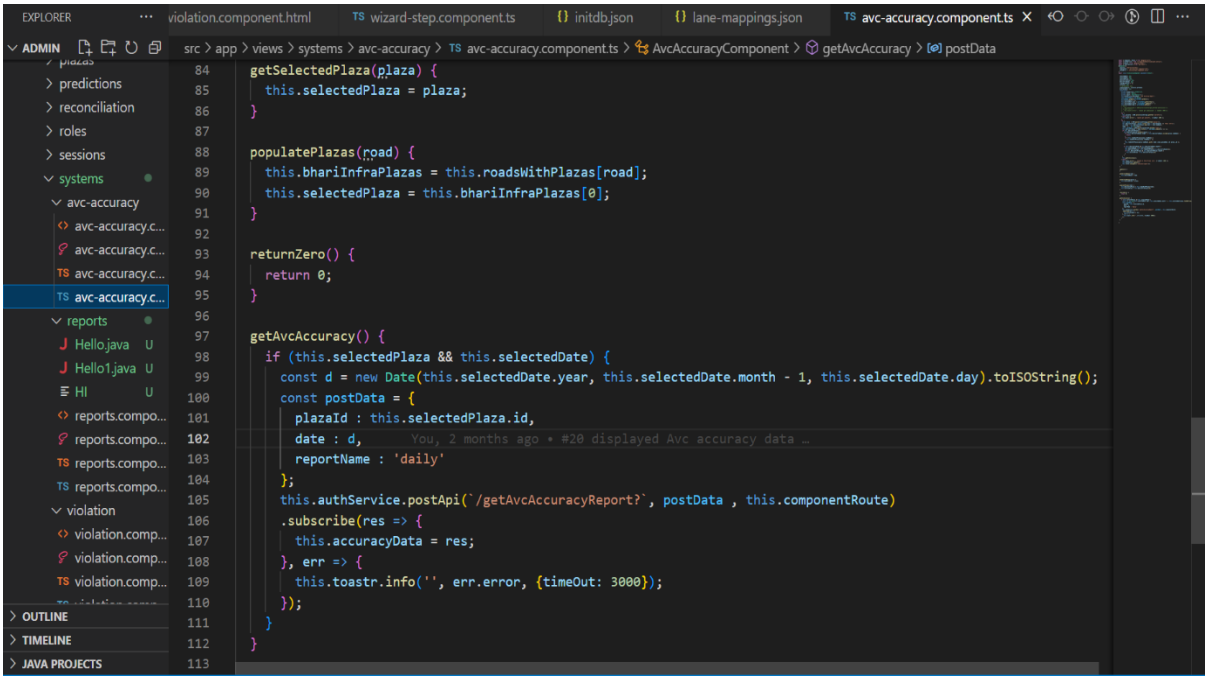


LANE NUMBER	TOLLABLE VEHICLES	MATCHED VEHICLES	UNMATCHED VEHICLES	NA	MATCHED VEHICLES (%)	UNMATCHED VEHICLES (%)	NA (%)
1	479	0	479	0	0	100	0
2	115	0	115	0	0	100	0
3	712	0	712	0	0	100	0
4	743	0	743	0	0	100	0
5	846	0	846	0	0	100	0
6	716	0	716	0	0	100	0
7	589	2	587	0	0.34	99.66	0
8	489	0	489	0	0	100	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
total	**4689**	**2**	**4687**	**0**	**0.04**	**99.96**	**0**



CLASS	LANE NUMBER											
	L1 (%)	L2 (%)	L3 (%)	L4 (%)	L5 (%)	L6 (%)	L7 (%)	L8 (%)	L9 (%)	L10 (%)	OTHERS (%)	TOTAL (%)
Carjeep	0	0	0	0	0	0	0	0	0	0	0	0
Lcv	0	0	0	0	0	0	0	0	0	0	0	0
Bus	0	0	0	0	-0.17	-0.28	0	-0.16	0	-0.47	0	-0.1
Truck	0	0	0	0	0	0	0	0	0	0	0	0
Tractor	0	0	0	0	0	0	0	0	0	0	0	0
Mav	-0.4	-0.11	-0.03	-1.82	0	-0.74	0	-3.15	-2.76	-15.32	0	-1.82
Truck3x	0	0	0	0	0	-0.55	0	-1.55	0	0	0	-0.2
Others	0	0	0	0	0	0	0	0	0	0	0	0
Total	-0.01	-0.02	-0.01	-0.6	-0.01	-0.35	0	-0.69	-0.7	-1.45	0	-0.44

```
try {
  const plazas = JSON.parse(localStorage.getItem('plazas'));
  this.bhariInfraPlazas = plazas.filter(item => item.tmsVendor === 'Bhari Infra');
  let roads = this.bhariInfraPlazas.map(item => item.roadName);
  roads = [... new Set(roads)];
  const userRoads = JSON.parse(localStorage.getItem('roads'));
  this.bhariInfraRoads = roads.filter(x => userRoads.indexOf(x) !== -1);
  if (this.bhariInfraPlazas) {
    this.bhariInfraPlazas.forEach((plaza) => {
      if (!this.bhariInfraRoads.length || !this.bhariInfraRoads.includes(plaza.roadName)) {
        return;
      }
      if (!this.roadsWithPlazas[plaza.roadName]) {
        this.roadsWithPlazas[plaza.roadName] = [];
      }
      this.roadsWithPlazas[plaza.roadName].push({ name: plaza.plazaName, id: plaza._id });
    });

    if (this.bhariInfraRoads && this.bhariInfraRoads.length) {
      this.selectedRoad = this.bhariInfraRoads[0];
      this.bhariInfraPlazas = this.roadsWithPlazas[this.bhariInfraRoads[0]];
      if (this.bhariInfraPlazas && this.bhariInfraPlazas.length) {
        this.selectedPlaza = this.bhariInfraPlazas[0];
      }
    }
  }
  this.getAvcAccuracy();
} catch {
  this.toastr.error('', 'Unable to fetch Plaza List', { timeOut:
  this.authService.signout();
```

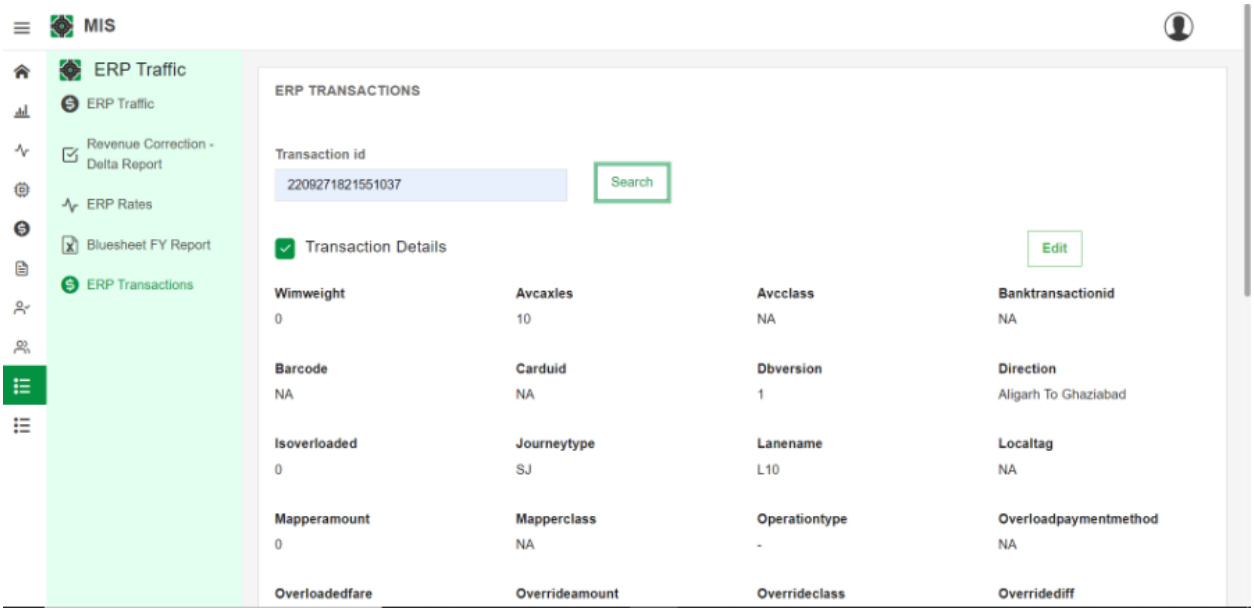


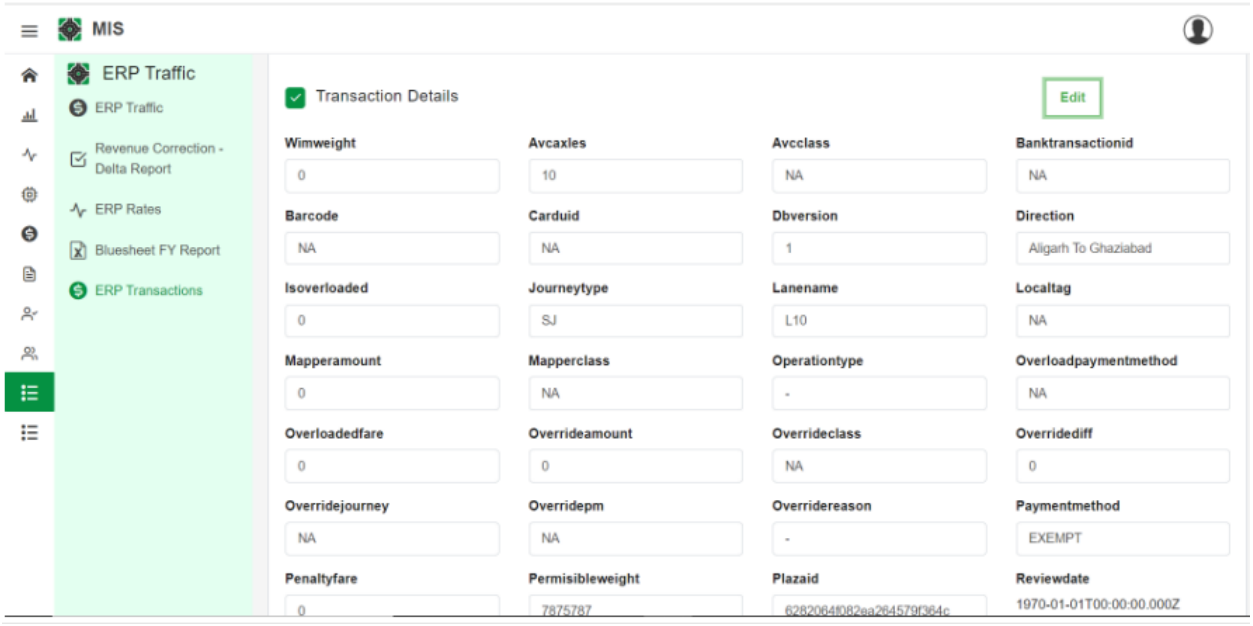
```
getSelectedPlaza(plaza) {
  this.selectedPlaza = plaza;
}

populatePlazas(road) {
  this.bhariInfraPlazas = this.roadsWithPlazas[road];
  this.selectedPlaza = this.bhariInfraPlazas[0];
}

returnZero() {
  return 0;
}

getAvcAccuracy() {
  if (this.selectedPlaza && this.selectedDate) {
    const d = new Date(this.selectedDate.year, this.selectedDate.month - 1, this.selectedDate.day).toISOString();
    const postData = {
      plazaId : this.selectedPlaza.id,
      date : d,
      reportName : 'daily'
    };
    this.authService.postApi(`/getAvcAccuracyReport?`, postData , this.componentRoute)
    .subscribe(res => {
      this.accuracyData = res;
    }, err => {
      this.toastr.info('', err.error, {timeOut: 3000});
    });
  }
}
```

➢ The above screenshots show the code for retrieving roads and plaza details from the database and getting information regarding accuracy reports. It is in the JavaScript language.

TRANSACTION PAGE:

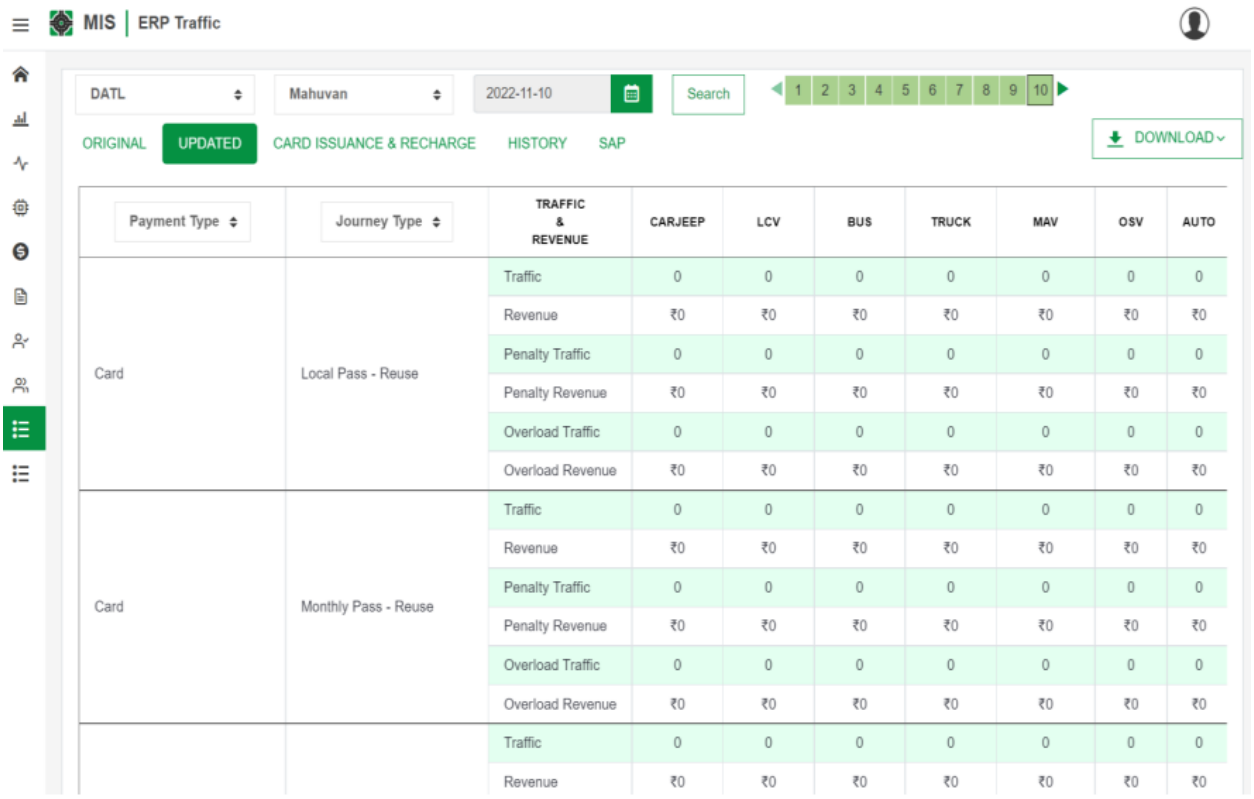
When we search for a transaction based on its unique id different transaction details would be displayed. We can also edit it by clicking on the edit button and save it. After successful editing a toaster message would be displayed.





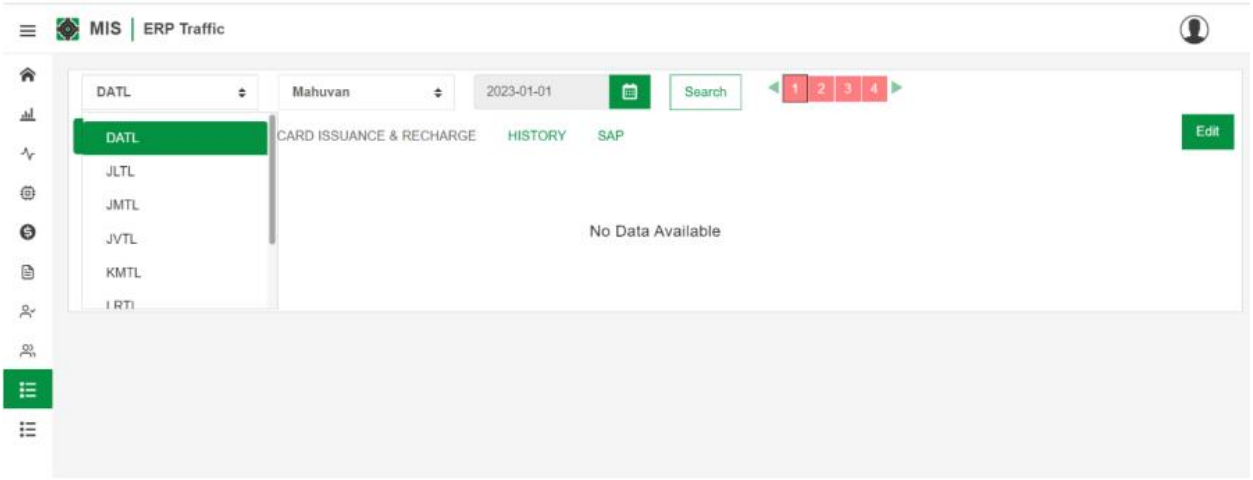
ERP TRAFFIC PAGE:

Here I reduced the size of this page by moving elements and resizing them. I created a horizontal date bar with side buttons for moving to next date items. By clicking on a particular date, it will show ERP traffic details of that date. If we do any changes in those details, then the colour of that date cell will be changed. If data is not available on that date, then that colour will be different. If we are at the starting ten days, then previous scroll button will be displayed in light colour, and it won't be abled. In the similar way for the end ten days i.e., for 21-30 date bar next scroll button will be displayed in light colour and when we place cursor on that button, hand cursor won't be shown.

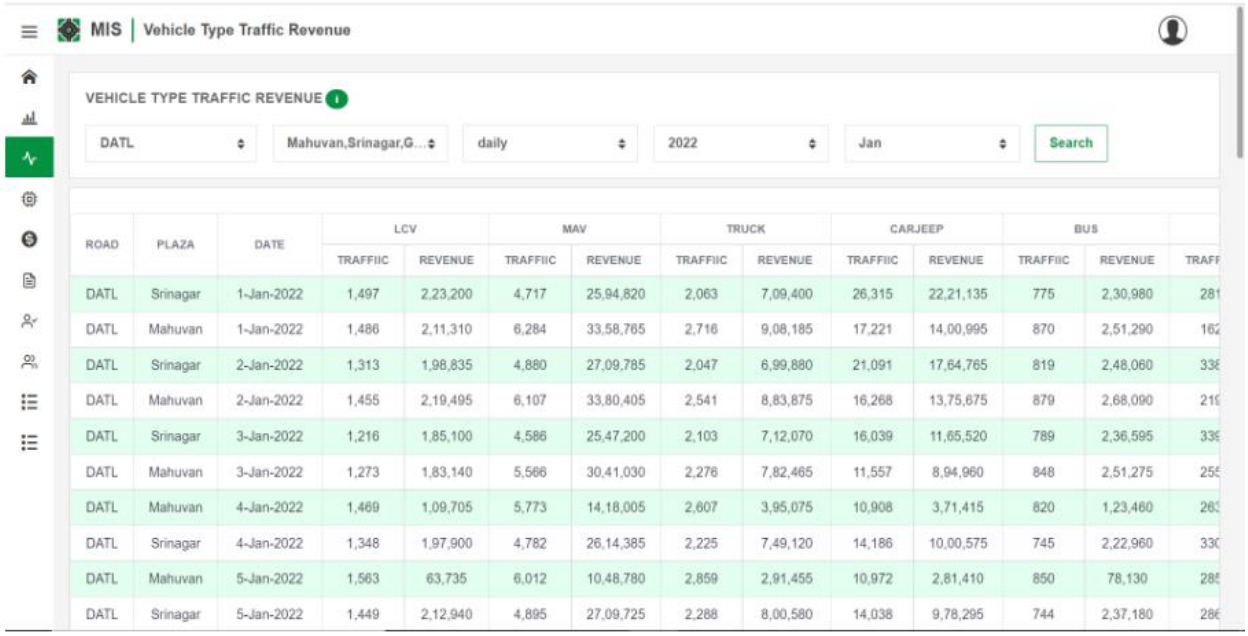


Payment Type	Journey Type	TRAFFIC & REVENUE	CARJEEP	LCV	BUS	TRUCK	MAV	OSV	AUTO
Card	Local Pass - Reuse	Traffic	0	0	0	0	0	0	0
		Revenue	₹0	₹0	₹0	₹0	₹0	₹0	₹0
		Penalty Traffic	0	0	0	0	0	0	0
		Penalty Revenue	₹0	₹0	₹0	₹0	₹0	₹0	₹0
		Overload Traffic	0	0	0	0	0	0	0
		Overload Revenue	₹0	₹0	₹0	₹0	₹0	₹0	₹0
Card	Monthly Pass - Reuse	Traffic	0	0	0	0	0	0	0
		Revenue	₹0	₹0	₹0	₹0	₹0	₹0	₹0
		Penalty Traffic	0	0	0	0	0	0	0
		Penalty Revenue	₹0	₹0	₹0	₹0	₹0	₹0	₹0
		Overload Traffic	0	0	0	0	0	0	0
		Overload Revenue	₹0	₹0	₹0	₹0	₹0	₹0	₹0
		Traffic	0	0	0	0	0	0	0
		Revenue	₹0	₹0	₹0	₹0	₹0	₹0	₹0

➢ The date bar will be displayed up to available dates only for current month. For example, today date is 5th Jan, then that bar will be displayed up to previous date only, because we don't have data for future dates. I changed the editing option should be enabled up to 3 days at the end of the month.

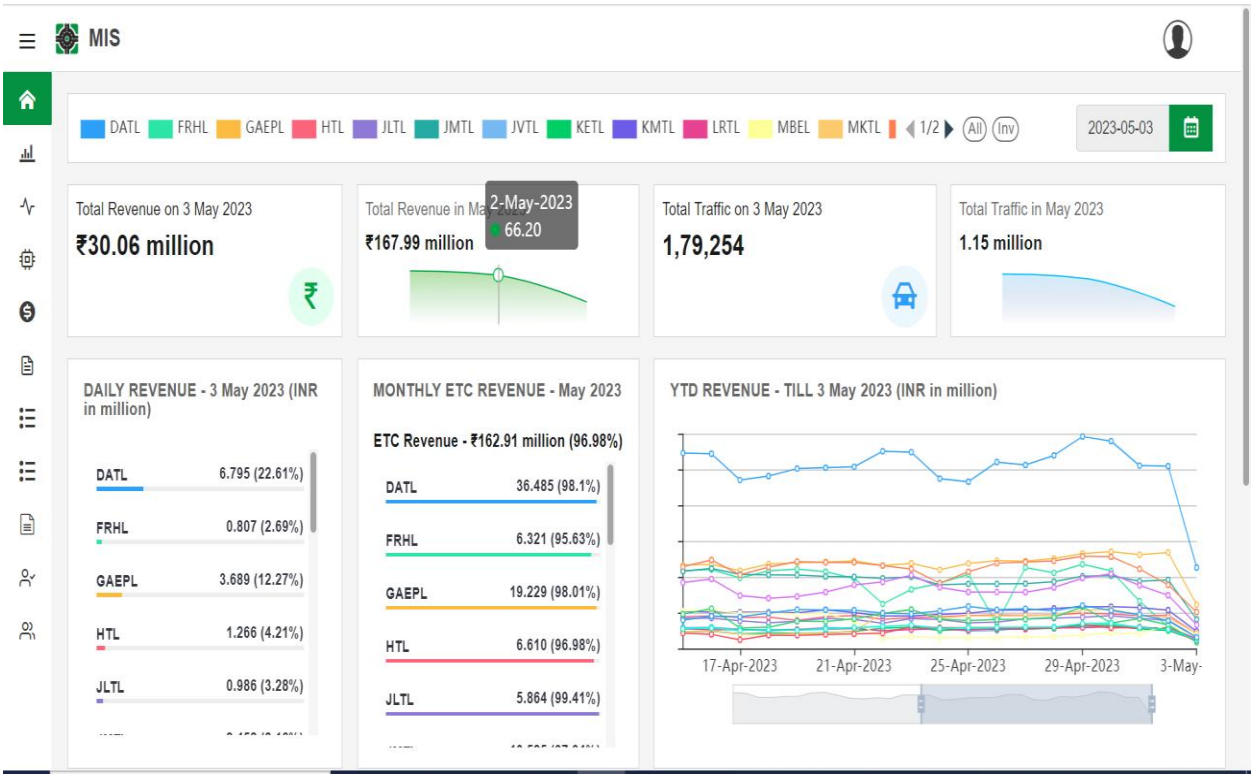


➢ I have displayed the project name and the related component name on the header of every page.

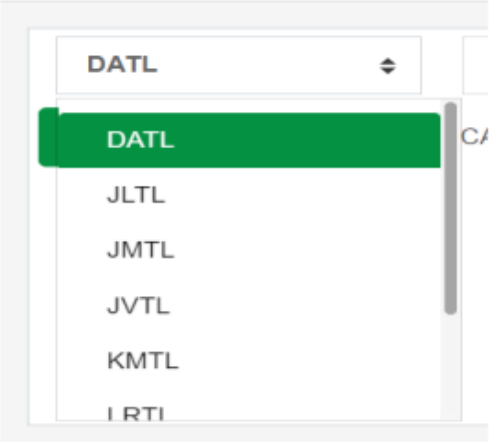


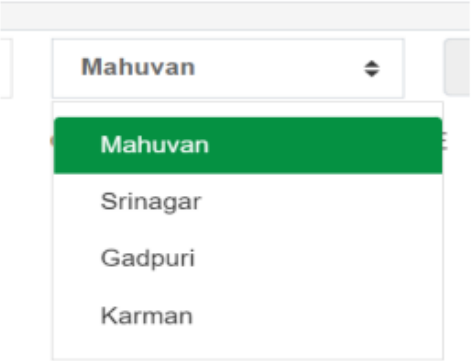
ROAD	PLAZA	DATE	LCV		MAV		TRUCK		CARJEEP		BUS		
			TRAFFIIC	REVENUE	TRAFFIIC	REVENUE	TRAFFIIC	REVENUE	TRAFFIIC	REVENUE	TRAFFIIC	REVENUE	TRAFF
DATL	Srinagar	1-Jan-2022	1,497	2,23,200	4,717	25,94,820	2,063	7,09,400	26,315	22,21,135	775	2,30,980	281
DATL	Mahuvan	1-Jan-2022	1,486	2,11,310	6,284	33,58,765	2,716	9,08,185	17,221	14,00,995	870	2,51,290	162
DATL	Srinagar	2-Jan-2022	1,313	1,98,835	4,880	27,09,785	2,047	6,99,880	21,091	17,64,765	819	2,48,060	338
DATL	Mahuvan	2-Jan-2022	1,455	2,19,495	6,107	33,80,405	2,541	8,83,875	16,268	13,75,675	879	2,68,090	219
DATL	Srinagar	3-Jan-2022	1,216	1,85,100	4,586	25,47,200	2,103	7,12,070	16,039	11,65,520	789	2,36,595	335
DATL	Mahuvan	3-Jan-2022	1,273	1,83,140	5,566	30,41,030	2,276	7,82,465	11,557	8,94,960	848	2,51,275	255
DATL	Mahuvan	4-Jan-2022	1,469	1,09,705	5,773	14,18,005	2,607	3,95,075	10,908	3,71,415	820	1,23,460	263
DATL	Srinagar	4-Jan-2022	1,348	1,97,900	4,782	26,14,385	2,225	7,49,120	14,186	10,00,575	745	2,22,960	330
DATL	Mahuvan	5-Jan-2022	1,563	63,735	6,012	10,48,780	2,859	2,91,455	10,972	2,81,410	850	78,130	285
DATL	Srinagar	5-Jan-2022	1,449	2,12,940	4,895	27,09,725	2,288	8,00,580	14,038	9,78,295	744	2,37,180	286

➢ I corrected a small logic of displaying current date on the top line chart. I changed the code in frontend logic as well as backend logic.

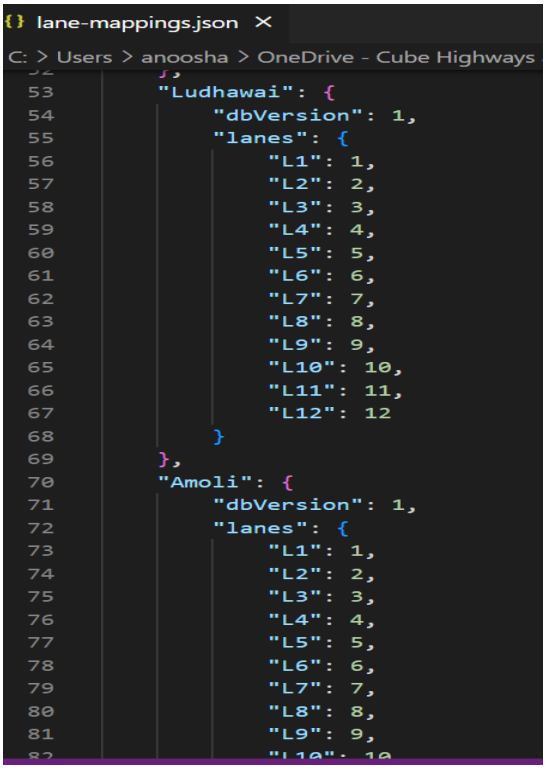


➢ I applied green theme for the selected item of dropdown list.





➢ I also worked in the backend development also. In my project total revenue is displayed in small amounts. So, I found the mistake and rectified it. Some mappings are missed, that's why revenue is displayed in a wrong way. I found all ERP mappings for shifts, lanes, vehicle type, journey type and payment method for 28 plazas. I prepared a excel sheet to enter new mappings. After that I created a JSON file to insert that into our database.



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

Management information systems (MIS) is a department within an enterprise responsible for controlling the hardware and software systems that the organization uses to make business-critical decisions. In addition to describing a department within a company, the term "MIS" can also refer to a type of computer software that is used to store, organize and analyse information.

Road should be viewed as an important national asset. 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.

A management information system (MIS) is an information system used for decision-making, and for the coordination, control, analysis, and visualization of information in an organization. The study of the management information systems involves people, processes and technology in an organizational context. In a corporate setting, the goal of using management information system is to increase the value and profits of the business.

Toll management system is the most important part of a Highway Project. This is the system that will enable the toll operating agency to efficiently and securely collect tolls from the road user. The system is a complicated mix of different hardware equipment integrated with a multi-module software, to automate and keep track of various functions of the toll collection, such as User management, Float management, Toll Collection, Cash declaration, Transaction Audit, Vehicle

Classification, ETC FASTag transaction processing, TC performance, and various other features.

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/