

## **RoadAID**

Longterm internship Project Submitted

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

*Of*

## **BACHELOR OF TECHNOLOGY**

By

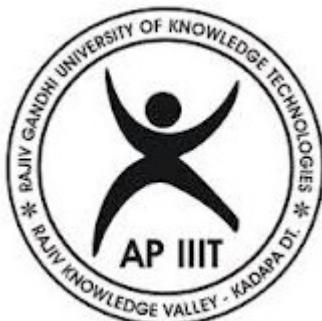
**K. Srujana Sree**

**Roll No: R170001**

Under the supervision of

**A. Mahendra**

**(Assistant Professor)**



**Department of Computer Science and Engineering**

**Rajiv Gandhi University of Knowledge Technologies, RK Valley**

**Idupulapaya, Kadapa(Dist), Andhra Pradesh**



**Rajiv Gandhi University of Knowledge Technologies, RK Valley**  
Idupulapaya, Kadapa (Dist), Andhra Pradesh, 516330

---

## CERTIFICATE

This is to certify that the project work titled "**RoadAID**" is a long internship submitted by **K. Srujana Sree (R170001)** in the department of Computer Science and Engineering in partial fulfillment of requirements for the award of degree of Bachelor of Technology for the year 2022-2023 carried out the work under the supervision

Internal Guide

Mr. MAHENDRA

**(Assistant Professor)**

Head Of The Department

Mr. SATYANANDARAM

**(Assistant Professor)**

Project Coordinator

M.MUNI BABU

**(Assistant Professor)**

**RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES**  
**(A.P. Government Act 18 of 2008)**  
**RGUKT-RKValley, Kadapa Dist - 516330**



---

**CERTIFICATE OF EXAMINATION**

This is to certify that the work entitled, “RoadAID” is the bonafied work of **K. Srujana Sree (R170001)**. 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.

A. Mahendra

Examiner

Project Supervisor

Project Examiner

Dept. of CSE

Lecturer Dept. of CSE

RGUKT IIIT RKValley

RGUKT IIIT RKValley



**RAJIV GANDHI UNIVERSITY OF KNOWLEDGE  
TECHNOLOGIES  
(A.P. Government Act 18 of 2008)  
RGUKT-RKValley, Kadapa Dist – 516330**

---

**DECLARATION**

I am **K.Srujana Sree (R170001)** hereby declare that the project report entitled , “RoadAID” done under the guidance of **Mr Mahendra** 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 Mahendra** , the Major Project January 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.

**K. Srujana Sree (R170001)**

**Date: 03-05-2023**

**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. Mahendra** 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.

## **CONTENTS**

<i>ABSTRACT</i> -----	7
<i>OVERVIEW</i> -----	7
<i>OBJECTIVES OF ROADAIID</i> -----	8
<i>Technologies Used in RoadAID</i> -----	10
<i>TESTING ROADAIID</i> -----	14
<i>TASKS</i> -----	13
<i>My contributions</i> -----	14
<i>ANGULAR</i> -----	16
<i>INTRODUCTION TO ANGULAR</i> -----	18
<i>FEATURES OF ANGULAR</i> -----	19
<i>ANGULAR ARCHITECTURE</i> -----	20
<i>ADVANTAGES OF ANGULAR</i> -----	20
<i>LIMITATIONS OF ANGULAR</i> -----	21
<i>CONCLUSION</i> -----	22

## **ABSTRACT**

### **RoadAID - Real Time O&M Monitoring Tool**

- 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.

## **OVERVIEW**

### **RoadAID**

- RoadAID is an easy to adopt software platform that uses latest advances in mobile and web technologies to simplify 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.

- **Incident Management**

RoadAID allows its users to record, assign and resolve all events and incidents that occurred on the road.

- **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

- **Front-End Technologies used :**

- Angular Framework – RoadAID uses Angular, a platform and framework for building single-page client applications using HTML and TypeScript. Angular is written in TypeScript. It implements core and optional functionality as a set of TypeScript libraries that you import into your applications.
- HTML5 - RoadAID uses Hyper Text Markup Language 5 for structuring the page and the presentation.
- CSS and SCSS – RoadAID uses CSS as a styling language that lets us create, design, and style various web pages. SCSS is a special file type in a SASS program we need to write which can also be used for RoadAID styling.
- TypeScript – We use Typescript in RoadAID, it is strongly typed and rigid language, gives better tooling at any scale.

- **Back-End Technologies used :**

- MERN Stack – RoadAID uses MERN Stack for its backend development, we, in RoadAID use MongoDB and NodeJS

especially. The reason for using is, we develop apps and web using Javascript only.

- MongoDB – RoadAID uses MongoDB in its backend development. It is a document database we sue to build highly
- available and scalable applications, with flexible schema approach.
- NodeJS – RoadAID uses NodeJs for its server side programming, back-end API services.

## **TESTING ROADAID**

RoadAID is tested manually after its development, each feature is tested individually.

- 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.

## **LEARNINGS**

- 1 Week : HTML, CSS
- 3 Weeks : JavaScript
- 1 week : ES 6
- 2 weeks : Angular FrameWork

## **TASKS**

- Built a website using angular frameWork.
- Website includes login page, forget page, registration page

## Few Contributions I've Made in RoadAID :

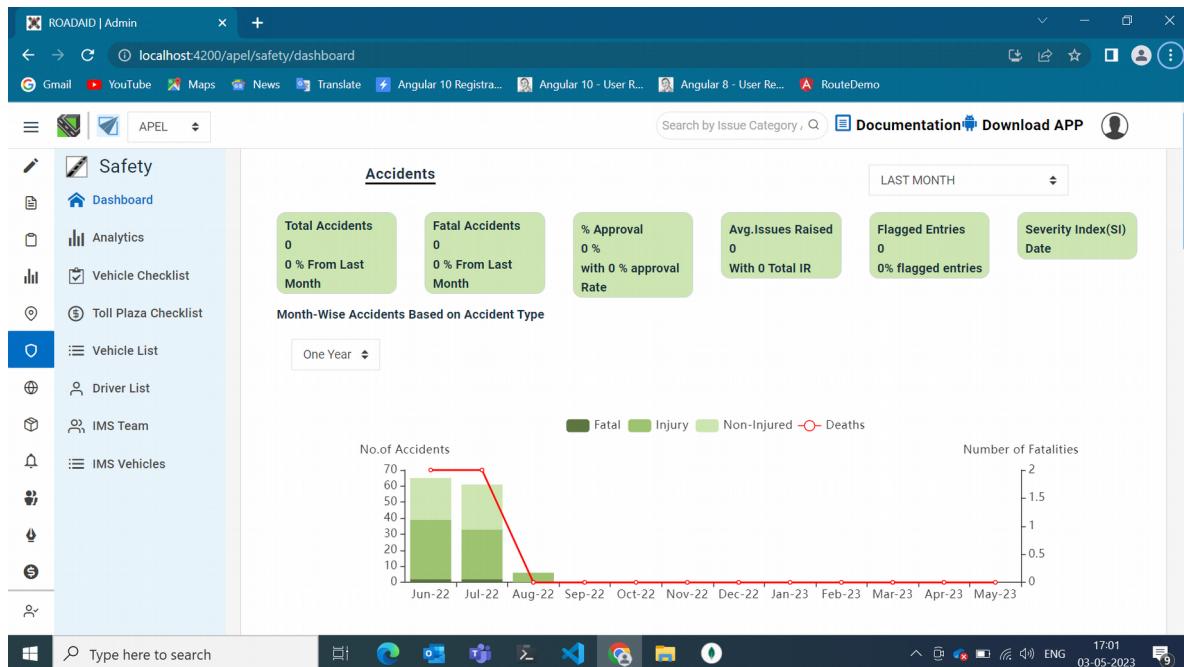
1. Changed the expected date of completion field from past date to future date of before assigning the user to the problem.

The screenshot shows the 'Accidents' section of the RoadAID Admin interface. On the left, there's a sidebar with icons for Accidents, Custom Accident, Accident Map, and Accident Codes. The main area has tabs for Overview, Details, Section, Location, Comments, and History. The Details tab is active, showing basic details like Accident ID (APEL-1614-Gd3V7), Status (ON-GOING), Chainage (192), and Date and Time created (26-Aug-22, 11:00:31). It also shows Person Details (Reportee: Lakshmi Priya), Safety Co-ordinator (Site: Not Assigned), and nearby locations (Toll Plaza: TP-1, FIR: Select, Police Station: Select). There's an 'Upload Image' section with a 'Choose Files' button and an 'Upload' button.

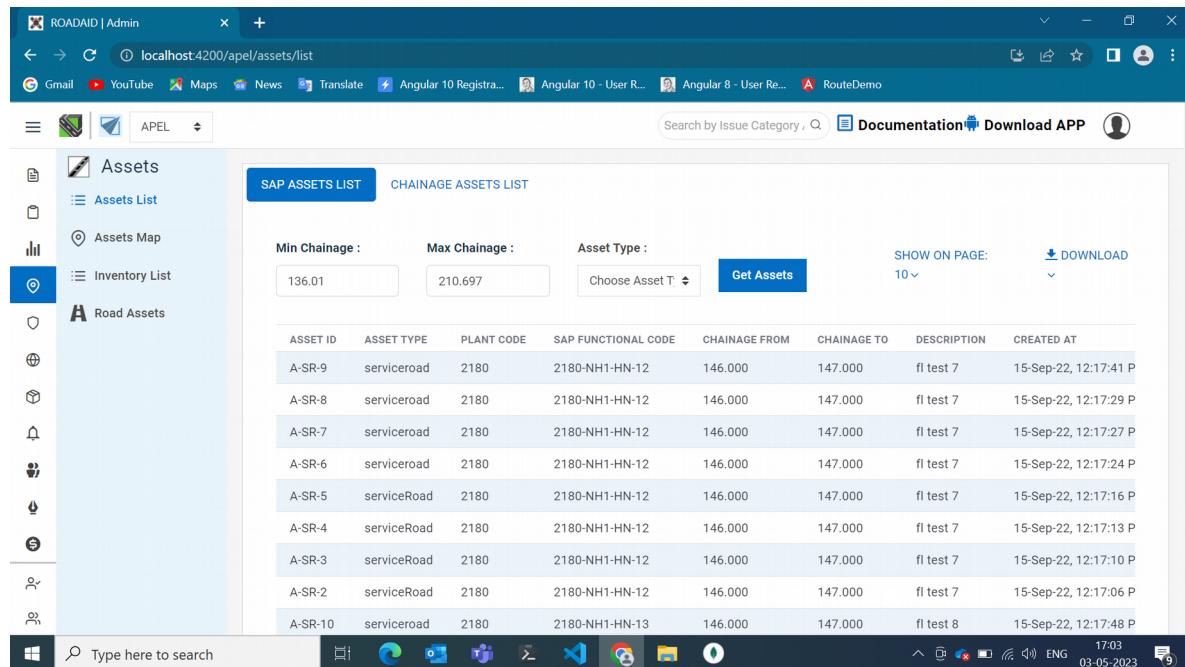
2. Built a complete page of issues map. Separated from incidents from accidents.

The screenshot shows the 'Incident' section of the RoadAID Admin interface. The sidebar includes links for Dashboard, Issues, Incident (selected), DPR, Reports, Accidents, Analytics, Assets, Safety, E&S, Materials, Notifications, and Contractors. The main area displays a map of a region with various roads and towns labeled. A legend on the left indicates incident types: OPEN (blue), IN-PROGRESS (orange), COMPLETED (green), CLOSED (grey), and NO-ISSUE (yellow). The map shows several roads with route numbers like 21, 22, 44, 45, 86, and 43. Towns visible include Bhilai, Durg, Bilaspur, and many smaller villages in Hindi script.

3. Inserted a pie and barchart in the safety dashboard. Changed the donut chart to pie chart.



4. Created the sap assets list.



## **ANGULAR**

Angular is an open-source, framework written in TypeScript. Google maintains it, and its primary purpose is to develop single-page applications. As a framework, Angular has clear advantages while also providing a standard structure for developers to work with. It enables users to create large applications in a maintainable manner.

Frameworks in general boost web development efficiency and performance by providing a consistent structure so that developers don't have to keep rebuilding code from scratch. Frameworks are time savers that offer developers a host of extra features that can be added to software without requiring extra effort.

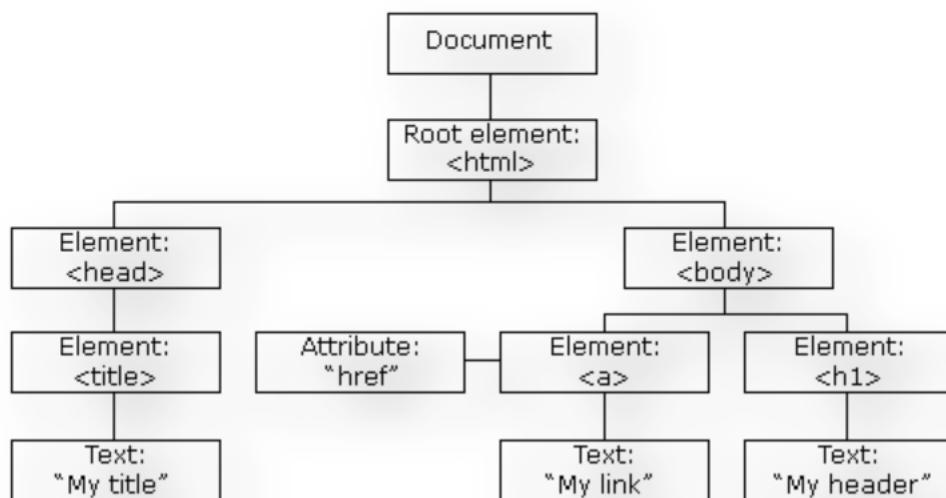
JavaScript is the most commonly used client-side scripting language. It is written into HTML documents to enable interactions with web pages in many unique ways. As a relatively easy-to-learn language with pervasive support, it is well-suited to develop modern applications.

These days, we have a variety of frameworks and libraries designed to provide alternative solutions. With respect to front-end web development, Angular addresses many, if not all, of the issues developers face when using JavaScript on its own.

## Features of Angular

### **1. Document Object Model**

DOM (Document Object Model) treats an XML or HTML document as a tree structure in which each node represents a part of the document.



Angular uses regular DOM. Consider that ten updates are made on the same HTML page. Instead of updating the ones that were already updated, Angular will update the entire tree structure of HTML.

### **2. TypeScript**

TypeScript defines a set of types to JavaScript, which helps users write JavaScript code that is easier to understand. All of the TypeScript code compiles with JavaScript and can run smoothly on any platform. TypeScript is not compulsory for developing an Angular application. However, it is highly

recommended as it offers better syntactic structure-while making the codebase easier to understand and maintain.

### **3. Data Binding**

Data Binding is a process that enables users to manipulate web page elements through a web browser. It employs dynamic HTML and does not require complex scripting or programming. Data binding is used in web pages that include interactive components, such as calculators, tutorials, forums, and games. It also enables a better incremental display of a web page when pages contain a large amount of data.

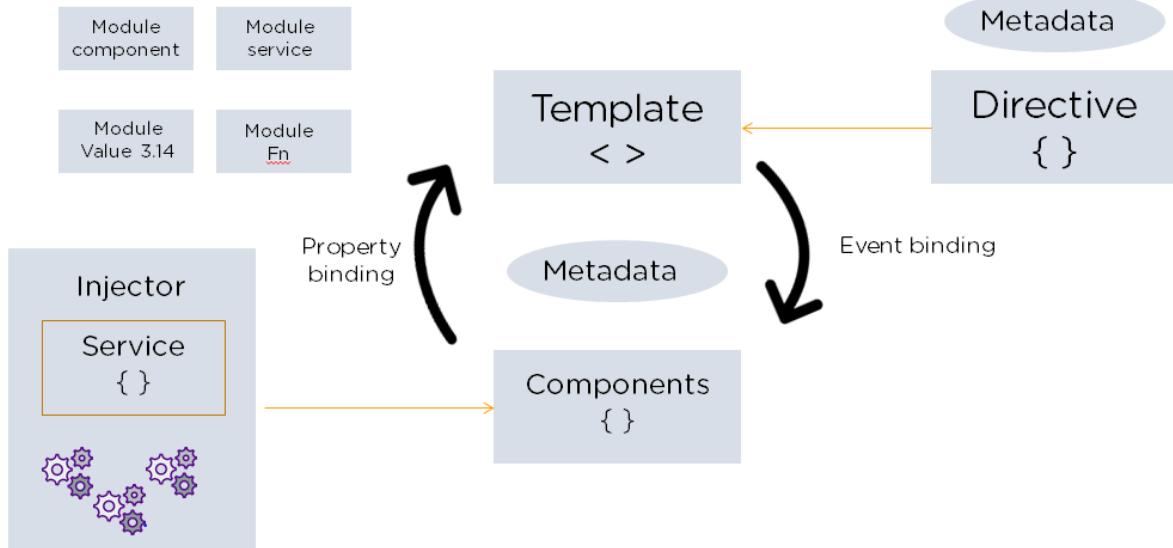
Angular uses the two-way binding. The model state reflects any changes made in the corresponding UI elements. Conversely, the UI state reflects any changes in the model state. This feature enables the framework to connect the DOM to the model data through the controller.

### **4. Testing**

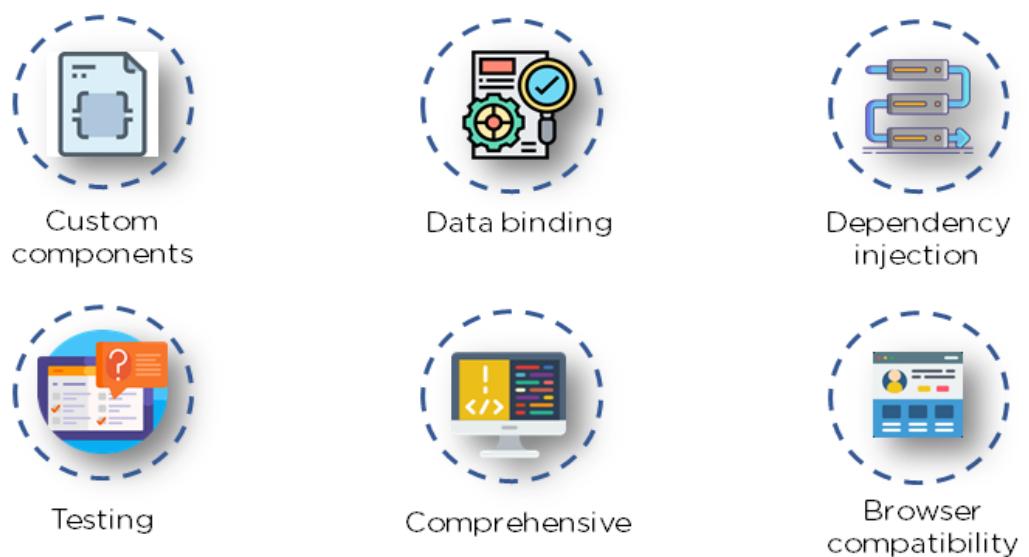
Angular uses the Jasmine testing framework. The Jasmine framework provides multiple functionalities to write different kinds of test cases. Karma is the task-runner for the tests that uses a configuration file to set the start-up, reporters, and testing framework.

Now that you're familiar with Angular's basic features, you need to understand its architecture if you want to work with Angular daily. You can also expand your Angular knowledge by taking the Angular certification Training Course and learning concepts such as TypeScript, Bootstrap Grid System, dependency injections, SPA, forms, pipes, promises, observables, and Angular class testing.

## Angular Architecture



## Advantages of Angular



## **1. Custom Components**

Angular enables users to build their own components that can pack functionality along with rendering logic into reusable pieces. It also plays well with web components.

## **2. Data Binding**

Angular enables users to effortlessly move data from JavaScript code to the view, and react to user events without having to write any code manually.

## **3. Dependency Injection**

Angular enables users to write modular services and inject them wherever they are needed. This improves the testability and reusability of the same services.

## **4. Testing**

Tests are first-class tools, and Angular has been built from the ground up with testability in mind. You will have the ability to test every part of your application—which is highly recommended.

## **5. Comprehensive**

Angular is a full-fledged framework and provides out-of-the-box solutions for server communication, routing within your application, and more.

## **6. Browser Compatibility**

Angular is cross-platform and compatible with multiple browsers. An Angular application can typically run on all browsers (Eg: Chrome, Firefox) and OSes, such as Windows, macOS, and Linux.

## **Limitations of Angular**

### **1. Steep Learning Curve**

The basic components of Angular that all users should know include directives, modules, decorators, components, services, dependency injection, pipes, and templates. More advanced topics include change detection, zones, AoT compilation, and Rx.js. For beginners, Angular 4 may be challenging to learn because it is a complete framework.

### **2. Limited SEO Options**

Angular offers limited SEO options and poor accessibility to search engine crawlers.

### **3. Migration**

One of the reasons why companies do not frequently use Angular is the difficulty in porting legacy js/jquery-based code to angular style architecture. Also, each new release can be troublesome to upgrade, and several of them are not backward-compatible.

### **4. Verbose and Complex**

A common issue in the Angular community is the verbosity of the framework. It is also fairly complex compared to other front-end tools.

## **CONCLUSION**

RoadAID is continuously evolving for the betterment of highway safety and management. We develop and deploy 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.