DOCUMENTATION ON

DRIVING LICENSE CONTROLLED SMART VEHICLE

Submitted By,

Name	Employee ID
Banapili Saikumar	5466
Nayana S M	5413
Shruthi D	5420
Sindhu H	5423
Varshitha J	5425

TABLE OF CONTENT

Page No.

INTRODUCTION

A Smart Vehicle system is an electrical device that enhances automobile safety and practice of designing vehicles, construction, equipment, and regulation to minimize the occurrence and consequences of traffic collisions. Road traffic safety more broadly includes roadway design. One of the first formal academic studies into improving vehicle safety was by Cornell Aeronautical Laboratory of Buffalo, New York. The main conclusion of their extensive report is the crucial importance of seat belts and pedal dashboards. However, the primary vector of traffic-related deaths and injuries is the disproportionate mass and velocity of an automobile compared to that of the predominant victim, the pedestrian. In India pedestrian is injured by an automobile every two minutes and are 3 times more likely than the occupants of a vehicle to be killed in an automobile crash per outing.

In India, a driving license is an official document that authorizes its holder to operate various types of motor vehicle on highways and some other roads to which the public has access. In various Indian states, they are administered by the Regional Transport Authorities/Offices (RTA/RTO). A driving license is required in India by any person driving a vehicle on any highway or other road. Motor Vehicle Act sets limits on the minimum age for vehicle operation ranging from 16 to 20, depending on specific circumstances. The Regional Transport Office or District Transport Office or Regional Transport Authority (RTO/DTO/RTA) is the organization of the Indian government responsible for maintaining a database of drivers and a database of vehicles for various states of India. The RTO issues driving licenses, organizes collection of vehicle excise duty (also known as road tax and road fund licenses) and sells personalized registrations.

PROBLEM STATEMENT - Driving license controlled smart vehicle

Challenge description with context - As per RTO rule, driving a vehicle without license is an offense and manually it is very difficult to check everyone who is not holding license and driving vehicle. Every year around 5, 00,000 accidents happen, leaving some 1,50,000 people dead. "More people have died in road accidents than in all the wars India has fought," and it is scary to drive on the roads when nobody observes traffic rules. Access to the vehicle must be prevented for the person who is not holding a driving license.

Exact Problem - Road accidents due to ineligible drivers can be reduced and safety can be increased by preventing unauthorized access to vehicle from a person who is not having license

and other than actual user of that vehicle. RTO has simplified process detect identity of a person by biometric data available with license and linked at central server of RTO.

Users – State Govt. RTO office, Traffic Police & Citizens

Expected Outcomes - Deaths due to Road accidents can be reduced by preventing access to vehicle from a person without license and other than actual user of that vehicle. The complexity of detecting persons without license by RTO can be simplified. State Govt. RTO office, Traffic Police & Citizens can benefit with this system.

REQUIREMENTS

Spring Boot: Spring Boot is a project that is built on the top of the Spring Framework. It provides an easier and faster way to set up, configure, and run both simple and web-based applications. It is a Spring module that provides the RAD **(***Rapid Application Development***)** feature to the Spring Framework. It is used to create a stand-alone Spring-based application that you can just run because it needs minimal Spring configuration.

Spring MVC: A Spring MVC is a Java framework which is used to build web applications. It follows the Model-View-Controller design pattern. It implements all the basic features of a core spring framework like Inversion of Control and Dependency Injection. A Spring MVC provides an elegant solution to use MVC in spring framework with the help of Dispatcher Servlet**.** Here, Dispatcher Servlet is a class that receives the incoming request and maps it to the right resource such as controllers, models, and views.

Spring Security: Spring Security is a framework which provides various security features like authentication and authorization to create secure Java Enterprise Applications.

Mock MVC: Mock MVC is a Spring Boot test tool class that lets you test controllers without needing to start an HTTP server. In these tests the application context is loaded, and you can test the web layer as if it's receiving the requests from the HTTP server without the hustle of starting it.

Maven: Spring boot maven will provide support in maven of Apache; it allows us to package the executable JAR or archives of WAR. It manages the dependency of the project automatically; we have no need to download the dependency of the project while developing the maven project. Using spring boot maven project we can run our application locally, also we can build the project EAR, JAR or WAR file. We can create a new maven project using the spring tool suite or we can also create using eclipse, STS is a very useful tool used for maven project development.

Oracle Database: Oracle database is a relational database management system. It is also called **Oracle DB**, or simply **Oracle**. It is produced and marketed by **Oracle Corporation**. It was created in **1977** by **Lawrence Ellison** and other engineers. It is one of the most popular relational database engines in the IT market for storing, organizing, and retrieving data.

Tomcat: It is an open-source Java servlet container that implements many Java Enterprise Specs such as the Websites API, Java-Server Pages and finally, the Java Servlet. The complete name of Tomcat is "Apache Tomcat" it was developed in an open, participatory environment and released in 1998 for the very first time. It began as the reference implementation for the very first Java-Server Pages and the Java Servlet API.

STS: The STS (Spring Tool Suite) is an official IDE provided by the Spring foundation. We can use it to create spring applications. It is similar to the eclipse, if you are familiar with the eclipse then you will find it very easy to use.

HTML: HTML is an acronym which stands for Hyper Text Markup Language which is used for creating web pages and web applications.

CSS: Cascading Style Sheets is a simple design language intended to simplify the process of making web pages presentable. CSS handles the look and feel part of a web page. Using CSS, you can control the color of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colors are used, layout designs, variations in display for different devices and screen sizes as well as a variety of other effects.

Bootstrap: Bootstrap is a free front-end framework for faster and easier web development. Bootstrap includes HTML and CSS based design templates for typography, forms, buttons, tables, navigation, modals, image carousels and many others, as well as optional JavaScript plugins.

JIRA: JIRA is an Incident Management Tool used for Project Management, Bug Tracking, Issue Tracking and Workflow. JIRA is based on the following three concepts – Project, Issue and Workflow.

Jenkins: Jenkin is a tool that is used for automation, and it is an open-source server that allows all the developers to build, test and deploy software. It works or runs on java as it is written in java. By using Jenkins, we can make a continuous integration of projects(jobs) or end-to-endpoint automation.

DESIGNING

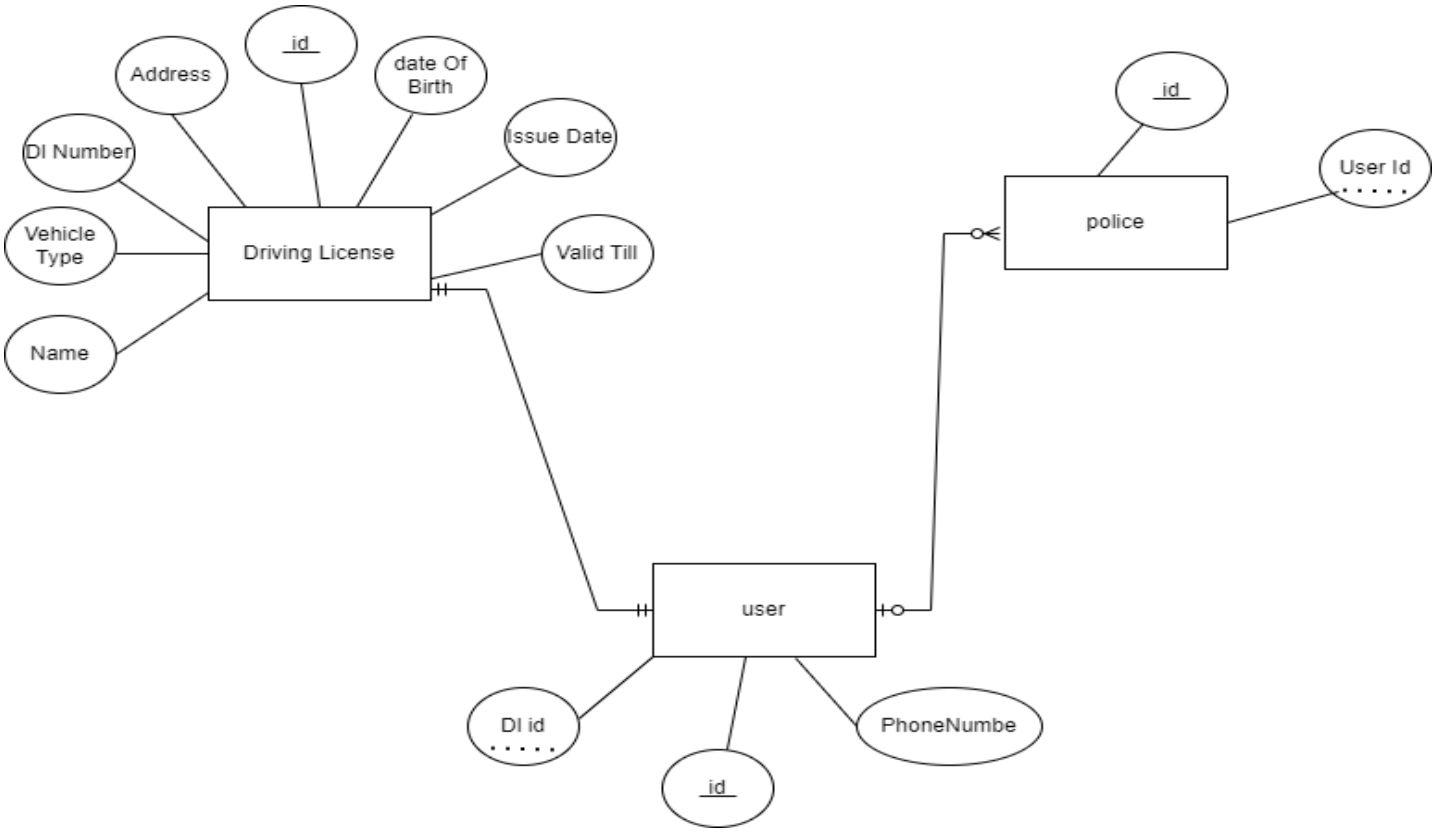


Figure 01: E R Diagram

WORKING PROCEDURE

Preventing unauthorized access to vehicle from a person who is not having license and other than actual user of that vehicle is the main objective of the project. If an accident happens the police can easily detect the identity of the user.

RTO officer has the authority to issue Driving License to users. A driving license is an official document that authorizes its holder to operate various types of motor vehicle.

- Initially the RTO Officer must login with his credentials.
- Next, he is directed to adding DL page where he can add driving license of multiple users. He has the authority to update the DL information of the users if necessary.

A Smart Vehicle system is a device that enhances automobile safety.

- Initially the user must reg to the vehicle with his valid dl provided by RTO Officer and through his biometric. Here the biometric is considered as Password.
- Initially the user must login with his valid mobile number.
- If the user provides an invalid mobile number, it displays a message “DL is not issued for this number”.
- If the mobile number and DL are valid, the user will receive the OTP.
- In case if the user enters invalid OTP, it displays an alert message of “Invalid OTP”.
- If the user enters valid OTP, the user is allowed to select the type of vehicle.
- Then the user get an access to drive the vehicle.

If an accident happens the police can easily detect the identity of the user who is driving the vehicle through biometric data. In real time a sensor gets activated if an accident occurs. For implementation purpose accident button is provided which displays the user identity.

This project runs on Tomcat Server. The required information regarding the admin (RTO Officer) and the user is stored in H2 Database.

Datasource.url= jdbc:oracle:thin:@192.168.102.39:1521/xe

Username: team1

Password: team1

URL of the home page: http://localhost:8080/home

Scrum:

Scrum is a process framework used to manage product development and other knowledge work. Scrum is empirical in that it provides a means for teams to establish a hypothesis of how they think something works, try it out, reflect on the experience, and make the appropriate adjustments.

Principles of Scrum:

Transparency

The team must work in an environment where everyone is aware of what issues other team members are running into. Teams surface issues within the organization, often ones that have been there for a long time, that get in the way of the team's success.

Inspection

Frequent inspection points built into the framework to allow the team an opportunity to reflect on how the process works. These inspection points include the Daily Scrum meeting and the Sprint Review Meeting.

Adaptation

The team constantly investigates how things are going and revises those items that do not seem to make sense.

Sprint Planning:

A team starts out a Sprint with a discussion to determine which items from the product backlog they will work on during the Sprint. The end result of Sprint Planning is the Sprint Backlog.

Sprint Planning typically occurs in two parts. In the first part, the product owner and the rest of the team agree on which product backlog items will be included in the Sprint.

In the Second Part of Sprint Planning, the team determines how they will successfully deliver the identified product backlog items as part of the potentially shippable product increment. The team may identify specific tasks necessary to make that happen if that is one of their practices. The product backlog items identified for delivery and tasks if applicable make up the Sprint Backlog.

Once the team and product owner establish the scope of the Sprint as described by the product backlog items no more items can be added to the Sprint Backlog.

Roles:

The Product Owner

The product owner is a role team responsible for managing the product backlog to achieve the desired outcome that the team seeks to accomplish.
The product owner role exists in Scrum to address challenges that product development teams had with multiple, conflicting direction or no direction at all with respect to what to build.

The Scrum Master

The scrum master is the team role responsible for ensuring the team lives agile values and principles and follows the processes and practices that the team agreed they would use.

The Development Team

The development team consists of the people who deliver the product increment inside Sprint. The main responsibility of the development team is to deliver the increment that delivers value to every Sprint.

USER STORY:

1. As an RTO Officer I want to provide the DL information, so that I can monitor and update the DL information of multiple users.

2. As a User I want to get access to drive the vehicle.

3. As a Police I want to get the user identity if accident occurs.

ACCEPTANCE CRITERIA:

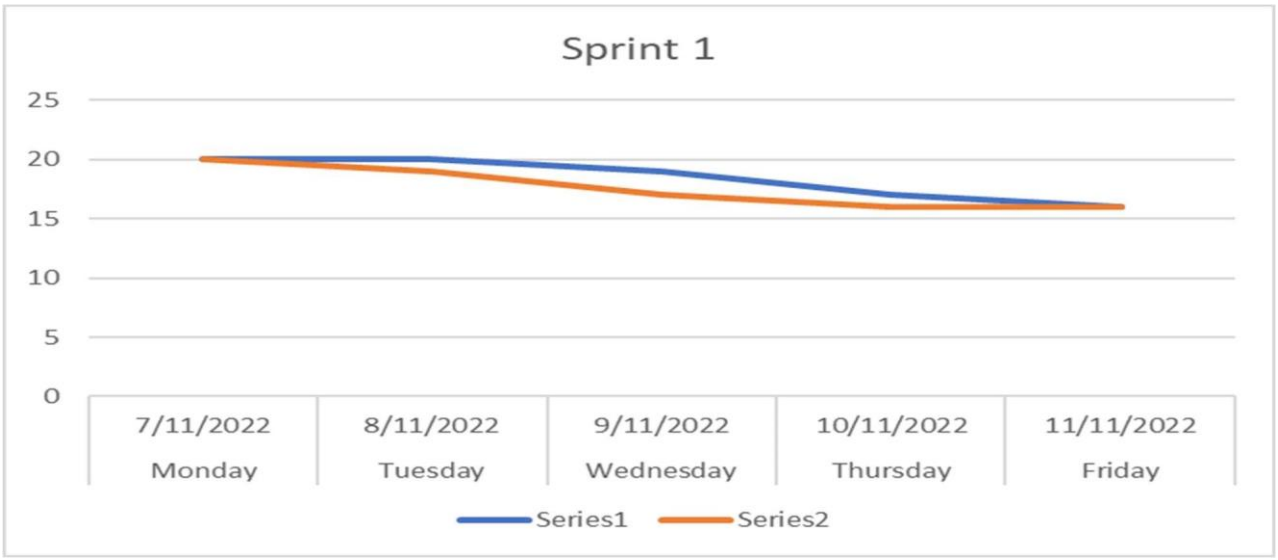
RTO Officer can have responsive dashboard where he can modify Driving License of multiple users.

User should login using mobile number to drive a vehicle only if he/she has a valid driving license.

Police get the user identity only if an accident occurs.

BURNDOWN CHART

Sprint 1:



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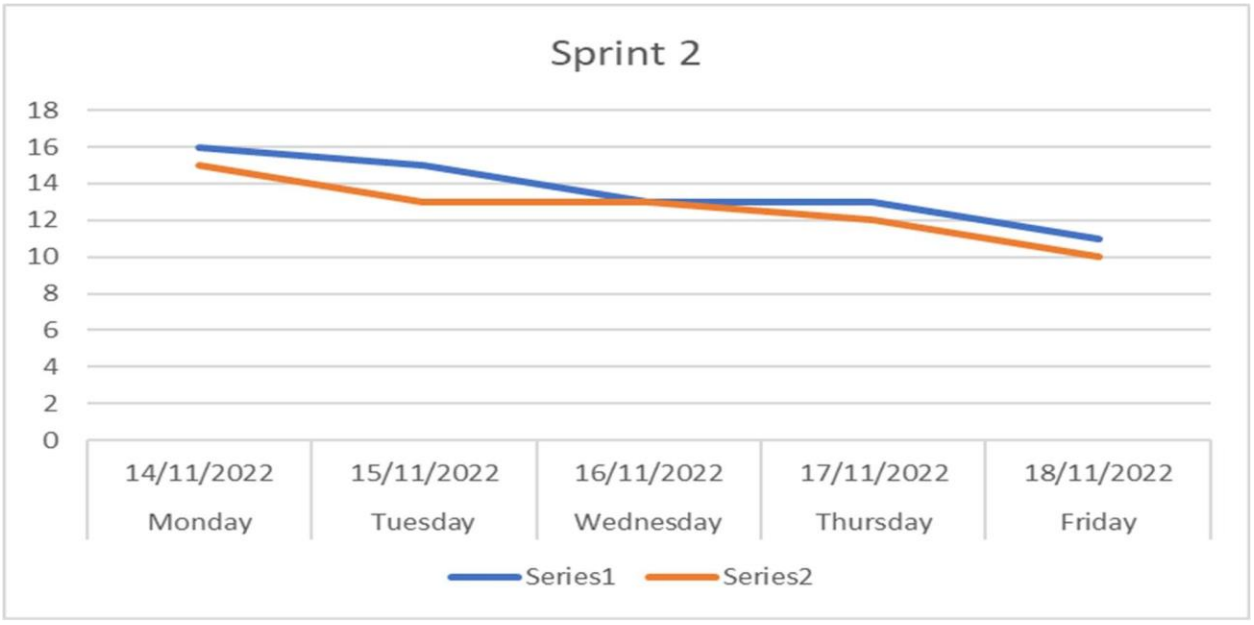

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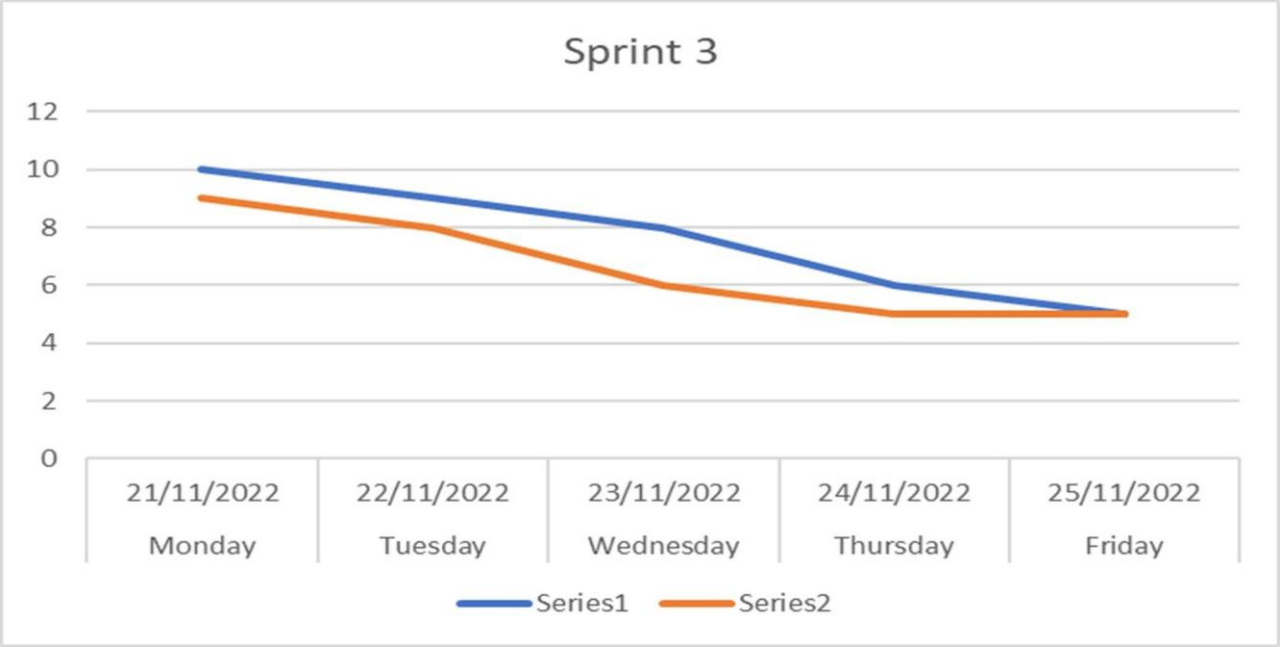
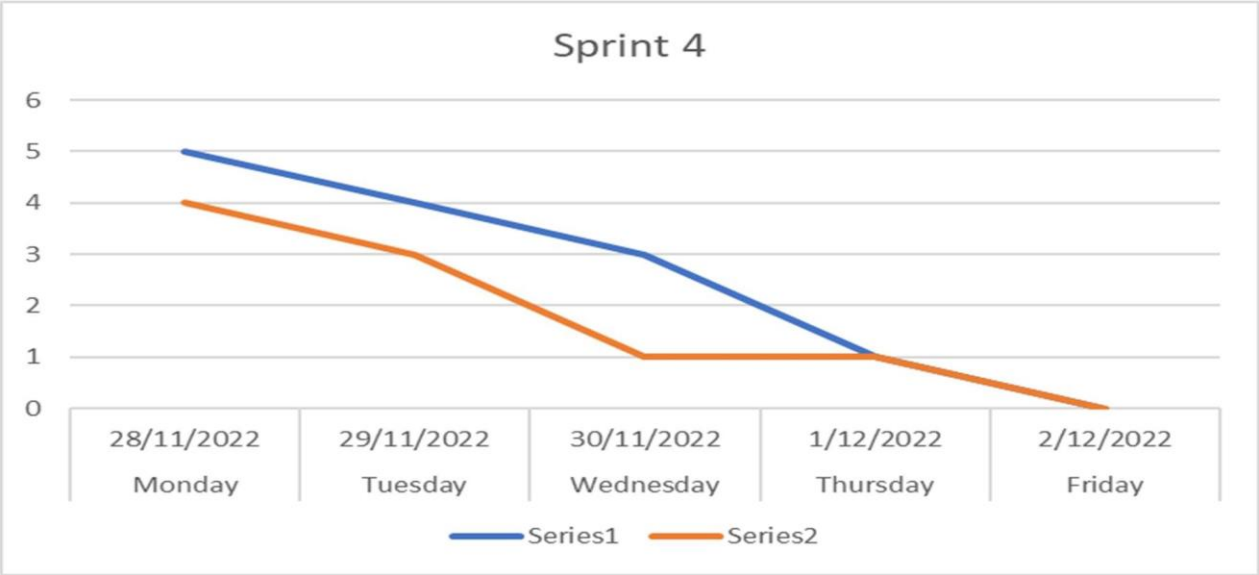


Sprint 4:



TESTING

Test Scenario 01: Verify on entering RTO Officer username and password, the RTO Officer can login

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Navigate to http://localhost:8080/admin	Site should open	As Expected	Pass
2	Enter RTO Officer Username & Password	Credential can be entered	As Expected	Pass
3	Click Submit	RTO Officer is logged in	As Expected	Pass
4	Verify RTO Officer login with Invalid Username and Password.	RTO Officer able to Logged in	As Expected	Pass
5	Login page for both, when the field is blank and Login button is clicked.	RTO Officer able to Logged in	As Expected	Pass

Test Scenario 02: Verify the RTO Officer and Provide the Details of a Valid Driving License

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Navigate to http://localhost:8080/createdl	Site should open	As Expected	Pass
2	Enter the Fields of Driving License Details of User	Credential can be entered	As Expected	Pass
3	Verify that the RTO officer entered the data correctly by examining it.	Credential can be entered	As Expected	Pass
3	Click Save	Dl is issued to User	As Expected	Pass

Test Scenario 03:	Verify on Updating Driving License

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Navigate to http://localhost:8080/update	Site should open	As Expected	Pass
2	Modify the Fields of Driving License Details of User	Credential can be entered	As Expected	Pass
3	Verify that the RTO officer entered the data correctly by examining it.	Credential can be entered	As Expected	Pass
3	Click Save	Dl is Updated to User	As Expected	Pass

Test Scenario 04:	Verify on Dl Validity on User Login by Phone Number

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Navigate to http://localhost:8080/userlogin	Site should open	As Expected	Pass
2	Enter Phone Number	Credential can be entered	As Expected	Pass
3	Verify that the user is login only if the RTO officer gave them the DL.	Credential can be entered	As Expected	Pass
4	Click Get OTP	User is logged in	As Expected	Pass
5	Verify user login with Invalid Phone Number	User not able to Logged in	As Expected	Pass
6	Login page for both, when the field is blank and Login button is clicked.	User not able to Logged in	As Expected	Pass

Test Scenario 05:	OTP Generation and Validation

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Navigate to http://localhost:8080/GenerateOTP	Site should open	As Expected	Pass
2	OTP msg is Sent to the User Phone Number	Credential can be entered	As Expected	Pass
3	Verify The OTP entered Is Valid or Not	Credential can be entered	As Expected	Pass
3	Click Login	Login Success	As Expected	Pass

Test Scenario 06:	Vehicle Type Selection

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Navigate to http://localhost:8080/VehicleType	Site should open	As Expected	Pass
2	Getting The Types of Vehicles from Database Of Particular User By Phone Number	Data Validation	As Expected	Pass
3	Click Submit	Access To Drive	As Expected	Pass

Test Scenario 07:	Verify the Police Is getting The Accident User Identity

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Navigate to http://localhost:8080/police/dlid	Site should open	As Expected	Pass
2	Police is getting the details of User if the Accident Happens.	Credential can be Retrieved	As Expected	Pass