Infosys Springboard Virtual Internship 6.0 Completion Report

Batch 05

Start date:13-October-2025

Name: Keerthanraj B

Internship Duration: 8 Weeks

1. Project Title

<u>NeuroFleetX — AI-Driven Urban Mobility Optimization System</u>

2. Project Objective

The primary objective of *NeuroFleetX* is to design and build a **real-time fleet management and optimization system** capable of handling vehicle tracking, driver workflows, dispatcher operations, and intelligent trip assignment. The goal was to simulate how modern mobility companies such as Uber, Rapido, Dunzo, and transport agencies manage their vehicles efficiently.

This project aims to solve real-world operational challenges such as:

- Lack of centralized fleet visibility

- Manual and inefficient trip assignments

- Communication delays between drivers and dispatchers

- Absence of performance analytics and system health insights

The system is designed to enable organizations to reduce operational costs, improve fleet utilization, and deliver a more reliable urban mobility ecosystem.

3. Project description in detail

NeuroFleetX is a **full-stack fleet optimization platform** consisting of three role-based portals: **Admin**, **Dispatcher**, and **Driver**. Each interface provides tools tailored to real mobility operations.

Admin Portal

The Admin dashboard allows system administrators to configure and monitor the fleet. They can:

- Register vehicles and maintain their details

- Add drivers and assign them to vehicles

- Track overall system health

- View performance analytics such as total trips, driver availability, and vehicle status distribution

The Admin dashboard is the backbone of the system ensuring proper configuration and management of fleet resources.

Dispatcher Portal

The Dispatcher plays a central role in operational coordination:

- Monitors **live vehicle locations** through an interactive map

- Creates and manages trips

- Assigns the best driver/vehicle combination for each task

- Tracks driver activity, trip progress, and fleet availability

The map updates live through WebSocket communication, enabling dispatchers to respond instantly to changes in fleet status.

Driver Portal

The Driver dashboard is clean and minimal:

- Displays assigned vehicle and trip details

- Updates trip status (Start → In Progress → Completed)

- Shows trip history for record keeping

- Reflects real-time availability (Available, Busy, Offline)

This ensures drivers always know their duties without confusion.

Technologies Used

- **Frontend:** React.js

- **Backend:** Spring Boot (Java)

- **Database:** MongoDB

- **Real-Time Updates:** WebSocket

- **Maps:** Leaflet + OpenStreetMap

- **AI Logic:** Rule-based trip optimization algorithm

By combining these technologies, the system achieves high interactivity, scalability, and real-time responsiveness.

Real-World Relevance

In real urban fleet scenarios, coordination between drivers, dispatchers, and admins is crucial. NeuroFleetX models these challenges realistically:

- Helps reduce fuel wastage through optimized trip assignments

- Improves customer service with quicker dispatch decisions

- Enhances safety through continuous vehicle monitoring

- Supports maintenance planning with telemetry and usage history

This project demonstrates how technology can transform transportation and logistics into highly efficient systems.

4. Timeline Overview

Week	Activities Planned	Activities Completed
Week 1	Requirement study, technology stack selection, wireframe design	System architecture finalized, project setup, basic UI skeleton created
Week 2	Implement user authentication and role-based routing	Login, signup, and session management completed; MongoDB schemas designed
Week 3	Vehicle and driver modules	Vehicle CRUD, driver registration, driver assignments completed
Week 4	Dispatcher dashboard and trip module	Trip creation, trip list, and dispatcher UI integrated
Week 5	Implement live map and WebSocket updates	Real-time fleet map with markers; live status update pipeline
Week 6	AI-based auto-assign engine, analytics dashboard	Auto-assign logic integrated; charts for driver/vehicle status added
Week 7	Driver dashboard and trip history	Driver interface polished; trip life cycle implemented
Week 8	Final testing, bug fixing, documentation	Completed report, screenshots, and final deployment test

5a. Key Milestones

Milestone	Description	Date Achieved
Project Kickoff	Requirement gathering and architecture discussion	Week 1
Prototype/First Draft	Basic UI + authentication + initial modules	Week 3
Mid-Term Review	Dispatcher map, trip workflow, vehicle/driver system	Week 5
Final Submission	Fully functional system with analytics	Week 8
Presentation	Demonstration of NeuroFleetX with live features	Week 8

5b. Project execution details

The project was executed using an iterative, week-by-week development cycle.

We followed a structured approach:

Planning Phase

- Analyzed real-world fleet management systems

- Identified core user roles and features

- Created low-fidelity sketches of each dashboard

Development Phase

- Developed modules in parallel: admin, dispatcher, driver

- Integrated front-end and backend APIs

- Implemented WebSocket for live vehicle updates

- Finalized trip assignment logic

Testing Phase

- Ensured role-based access security

- Simulated driver behaviors

- Stress-tested map rendering and real-time updates

- Verified data integrity in MongoDB

Deployment / Documentation

- Collected screenshots

- Prepared report and final demonstration

This approach ensured a smooth development cycle with continuous improvement.

6. Snapshots / Screenshots
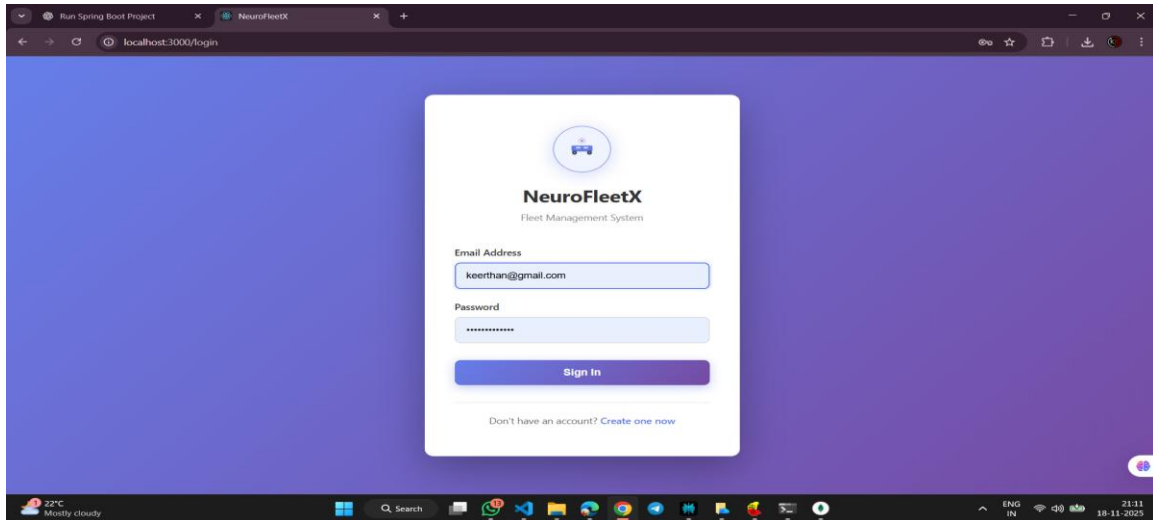
Figure 1: Login Page
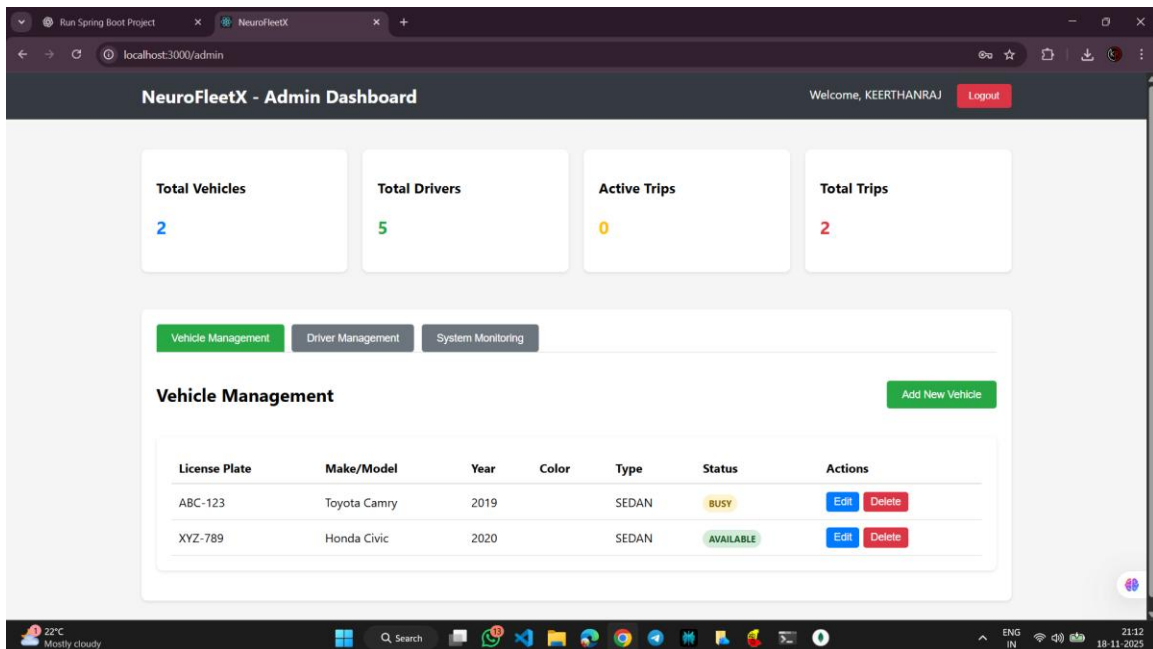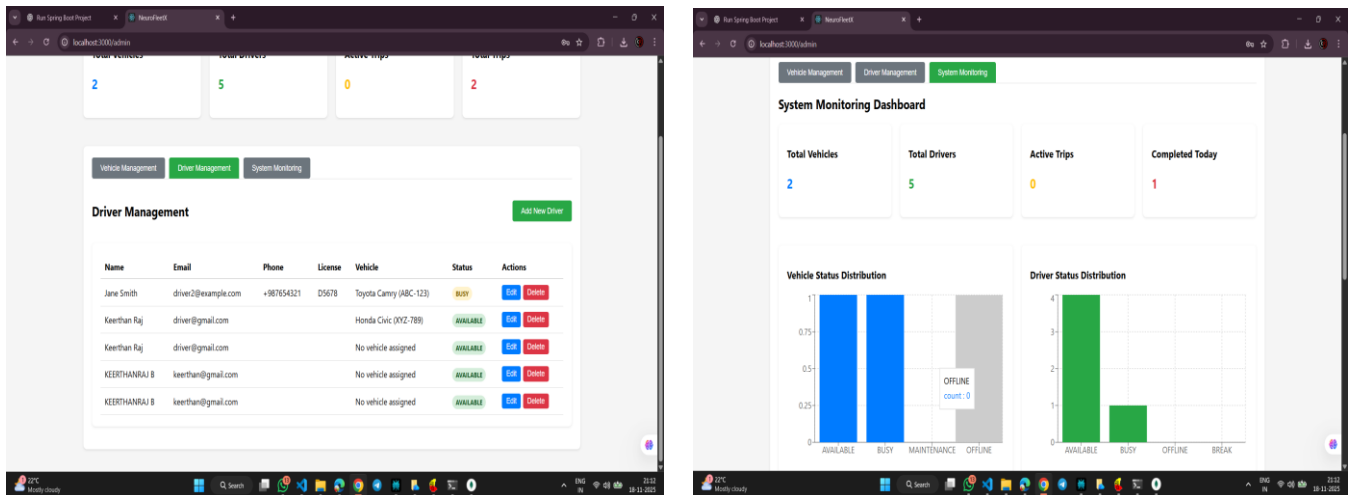

Figure 2: Admin Dashboard
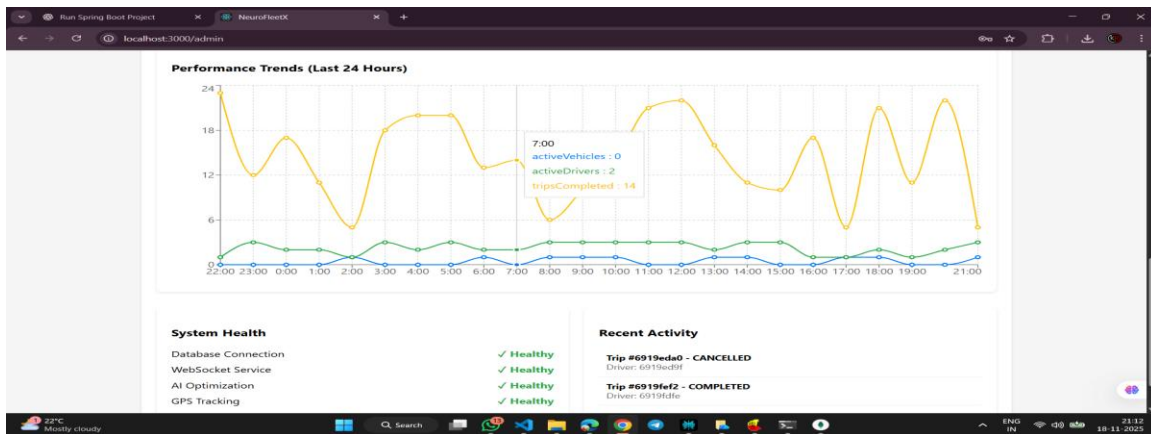
Figure 3: Admin Dashboard-Driver Management

Figure 4: Performance Statistics

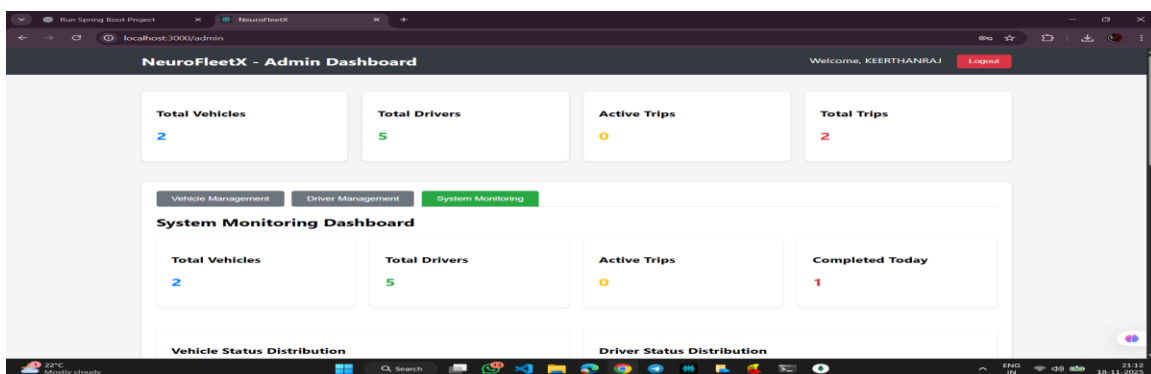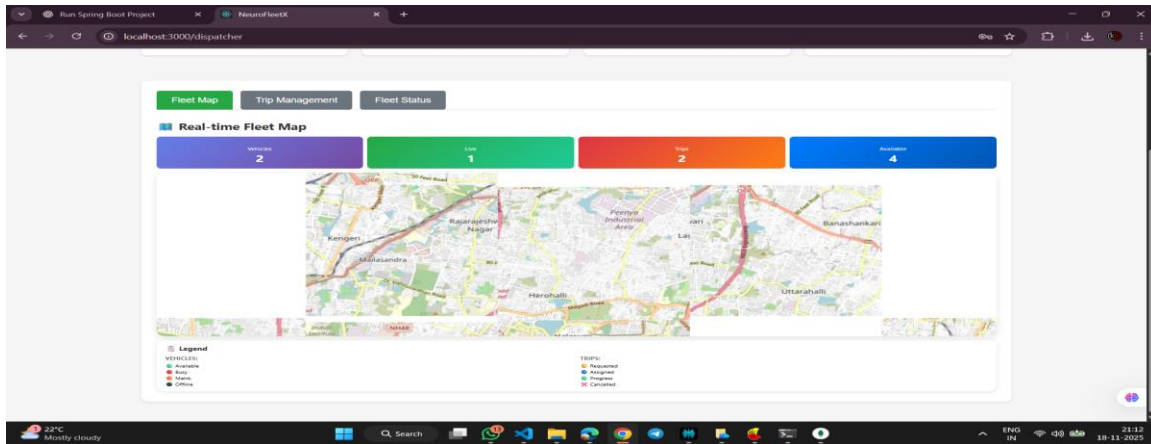

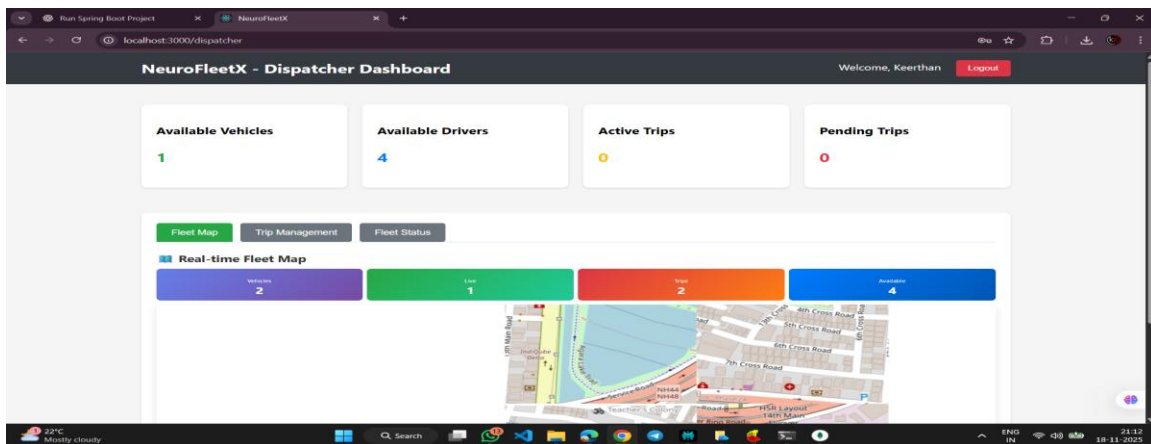Figure 5: System Monitoring Dashboard

Figure 6: Live fleet map tracking

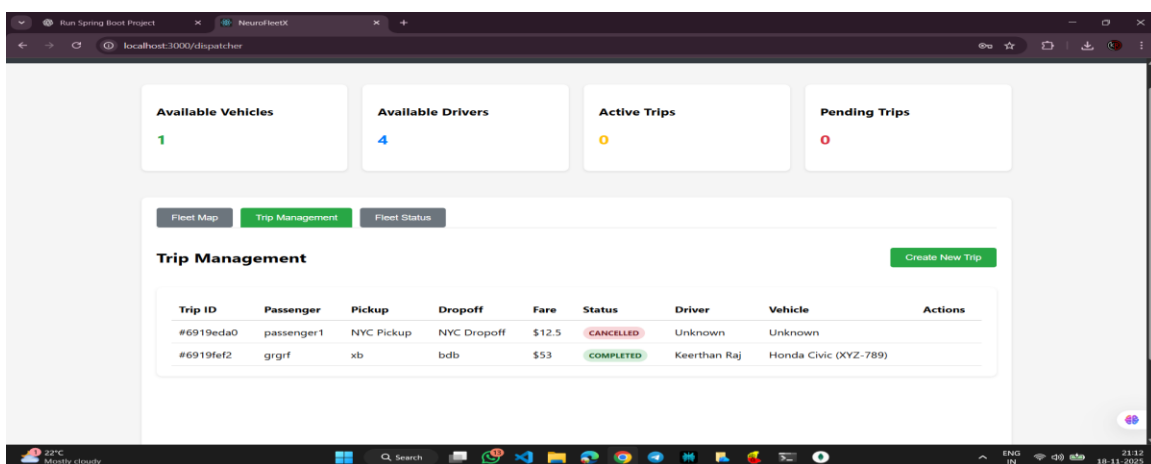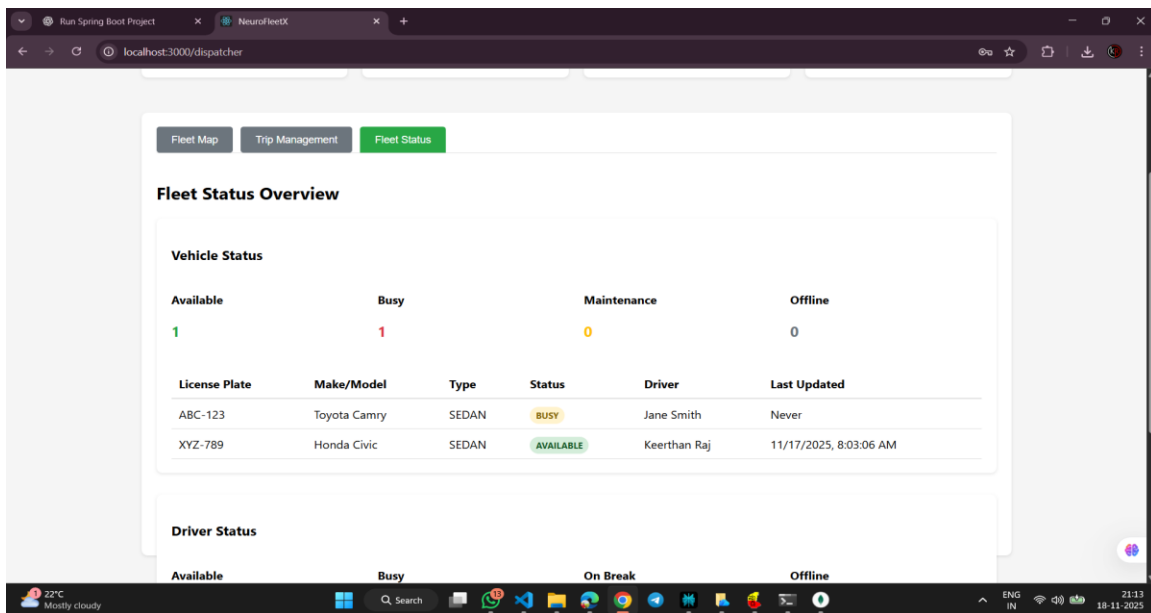Figure 7:Dispatcher dashboard view

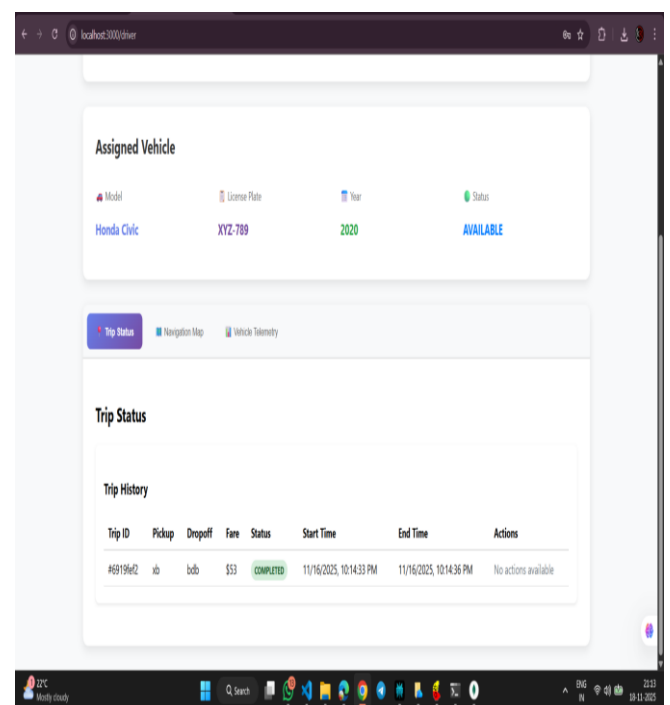Figure 8:Trip management interface
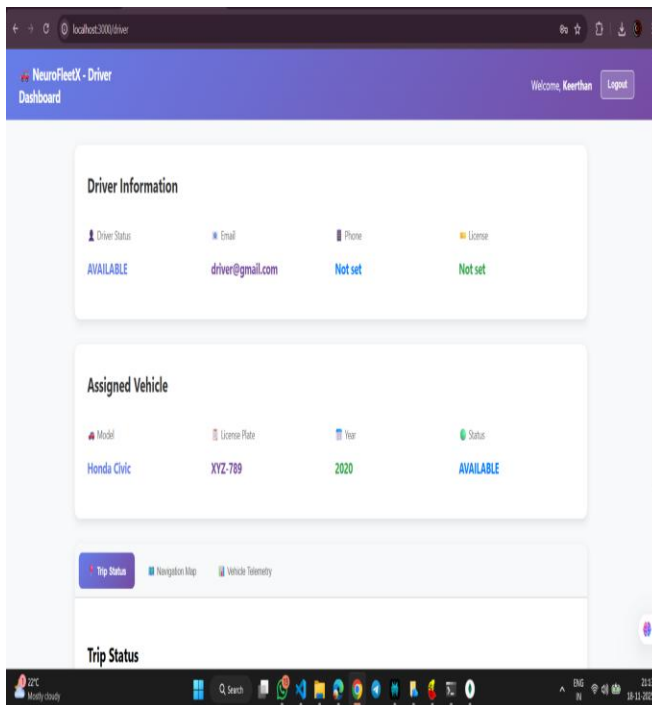
Figure 9:: Fleet status overview

Figure 10:Driver dashboard with assigned vehicle

7. Challenges Faced.

1. Real-Time WebSocket Integration

Sending live location updates from drivers to dispatchers required stable WebSocket connections. Managing frequent updates without performance drops was a technical challenge.

2. Map Rendering Performance

When multiple markers were updated continuously, the map initially lagged. This was solved by optimizing render frequency and marker updates.

3. Role-Based Routing & Security

Ensuring that Admin, Dispatcher, and Driver dashboards were isolated required proper backend validation and frontend guards.

4. Trip Synchronization Across Roles

Trip events needed to update across Admin, Dispatcher, and Driver portals instantly. We used a combination of REST APIs + WebSocket notifications to fix this.

5. Coordinating Database Models

MongoDB schemas had to be carefully designed so trip, driver, and vehicle data remained consistent.

8. Learnings & Skills Acquired
Technical Skills

- Full-stack development with React & Spring Boot

- MongoDB schema design

- WebSocket real-time communication

- Map integration (Leaflet + OpenStreetMap)

- Data visualization with charts

- Authentication and authorization systems

Soft Skills

- Time management and project planning

- Problem solving during real-time system bugs

- Clear documentation practices

- Understanding industry-level mobility operations

9. Testimonials from team

Working on NeuroFleetX helped me understand how real fleet and mobility companies operate behind the scenes. Implementing live tracking, trip workflows, and dashboards gave me practical experience that goes beyond classroom learning. This internship strengthened my confidence in full-stack development and made me more prepared for industry projects."

10. Conclusion

The NeuroFleetX project has been a highly enriching learning experience. It allowed me to apply core technical concepts such as APIs, databases, real-time communication, and user interface design while gaining insight into real-world transportation systems.

The project aligns perfectly with my academic interest in software engineering and boosts my career goal of becoming a full-stack developer capable of building intelligent, scalable applications.

11. Acknowledgements

I would like to thank **Infosys Springboard** for offering this structured and impactful virtual internship program. The learning modules, practical tasks, and hands-on assignments helped shape this project successfully. I also appreciate guidance from mentors, peers, and the community who contributed towards completing this internship.