COSMICODE INTERNSHIP - WEEK 6 REPORT

Capstone Full Stack Project

Project Title: Car Rental Web Application

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Week: 6

Technology Stack: MERN (MongoDB, Express.js, React.js, Node.js)

Deployment Platforms: Vercel (Frontend), Render (Backend)

# 1. Objective

To design and implement a full-stack Car Rental Web Application using the MERN stack. The goal was to allow users to browse, book, and manage rental cars, and to enable owners to add and manage their vehicles.

# 2. Project Description

This capstone project integrates all components of the MERN stack to create a real-world application. The system includes role-based dashboards for Users and Owners, car listing and booking functionalities, and form-based interactions with MongoDB through APIs.

# 3. Tools & Technologies

- Frontend: React.js, Tailwind CSS, React Router DOM, Axios  
- Backend: Node.js, Express.js  
- Database: MongoDB with Mongoose  
- Image Hosting: ImageKit.io  
- Authentication: JWT (JSON Web Token)  
- Deployment:  
 - Frontend: Vercel  
 - Backend: Render

# 4. Features Implemented

## Frontend

- Home page, Cars listing, Car detail view  
- Search/filter functionality  
- Login/Signup modal (role-based for User or Owner)  
- Owner Dashboard with Add Car and Manage Cars pages  
- Responsive UI with Tailwind CSS  
- Toast notifications for actions (success/error)

## Backend

- Authentication APIs: Login, Signup, Role Change  
- Car APIs: Add Car, Get Cars (user & owner), Delete Car  
- Middleware for authentication and role verification  
- Image upload to ImageKit

## Database

- User Schema: name, email, password (hashed), role  
- Car Schema: brand, model, year, fuel type, transmission, price per day, description, image URL, owner ID

# 5. Key Functionalities

- Users can register, login, browse available cars, and view car details.  
- Owners can log in, list new cars with images, and manage their fleet.  
- The system distinguishes between normal users and owners based on role.  
- Admin password (admin123) used to switch a user to owner role (for demo).

# 6. Challenges Faced

- Handling image uploads and previews in React  
- CORS configuration and token-based auth between frontend and backend  
- Designing a unified role-based login experience  
- State management for authenticated users using context

# 7. Deployment Links

- Frontend (Vercel): https://car-rental-frontend-omega-nine.vercel.app/  
- Backend (Vercel): https://car-rental-server-virid.vercel.app/  
- GitHub Repository: <https://github.com/ZainabAli11/WEBDEVWEEK6>

8. Conclusion

The Car Rental Web App successfully demonstrates full-stack development using MERN. It emphasizes role-based routing, secure authentication, file handling, and integration with external APIs and services. The project enhanced understanding of backend-frontend communication, RESTful APIs, and modern React practices.