

DSE205/03 Advanced Web Development

Design, Develop, Implement & Document Used Car Sales Portal

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Contents

| No | Description |
|----|---------------------------|
| 1. | Introduction |
| 2. | Development Tools |
| 3. | Application Block Diagram |
| 4. | Role-Based Access |
| 5. | CRUD Functionalities |
| 6. | Application Pages |
| 7. | Project Limitations |
| 8. | Future Improvements |
| 9. | Conclusion |

1 Introduction

AutoXpress Pvt Ltd has approached us to develop a Used Car Sales portal using the Spring Framework where users can:

- Users will be able to register on the portal using the Registration Page.
- Users can search for cars using filters such as Make, Model, Registration, and Price Range.
- After searching, users will be able to view detailed information about the cars.
- The portal will allow users to log in and post a car for sale.



1 Introduction

Project Mission & Goal

Users should be able to perform:

1. Register in the Portal
2. Login to the Portal
3. Post a Car for Sale along with Picture
upload
4. Deactivate an Existing car sale
5. Update their Profile after logging in
6. Book an appointment for test drive

Admins should be able to perform:

1. Register in the Portal
2. Login to the Portal
3. Mark a User as Administrator
4. Activate (Mark as Sold) / Deactivate a Car Post
5. Update their Profile
6. Approve the Car Post if bidding price is right
7. Approve or Deny the users appointment

1 Introduction

Project Mission & Goal

Both Role should be able to perform:

1. Visit Home Page
2. View Car Listing
3. Search for a Car by Make, Model, Registration Year & Price
4. Visit About Us Page
5. Visit Contact Us Page

2 Development Tools

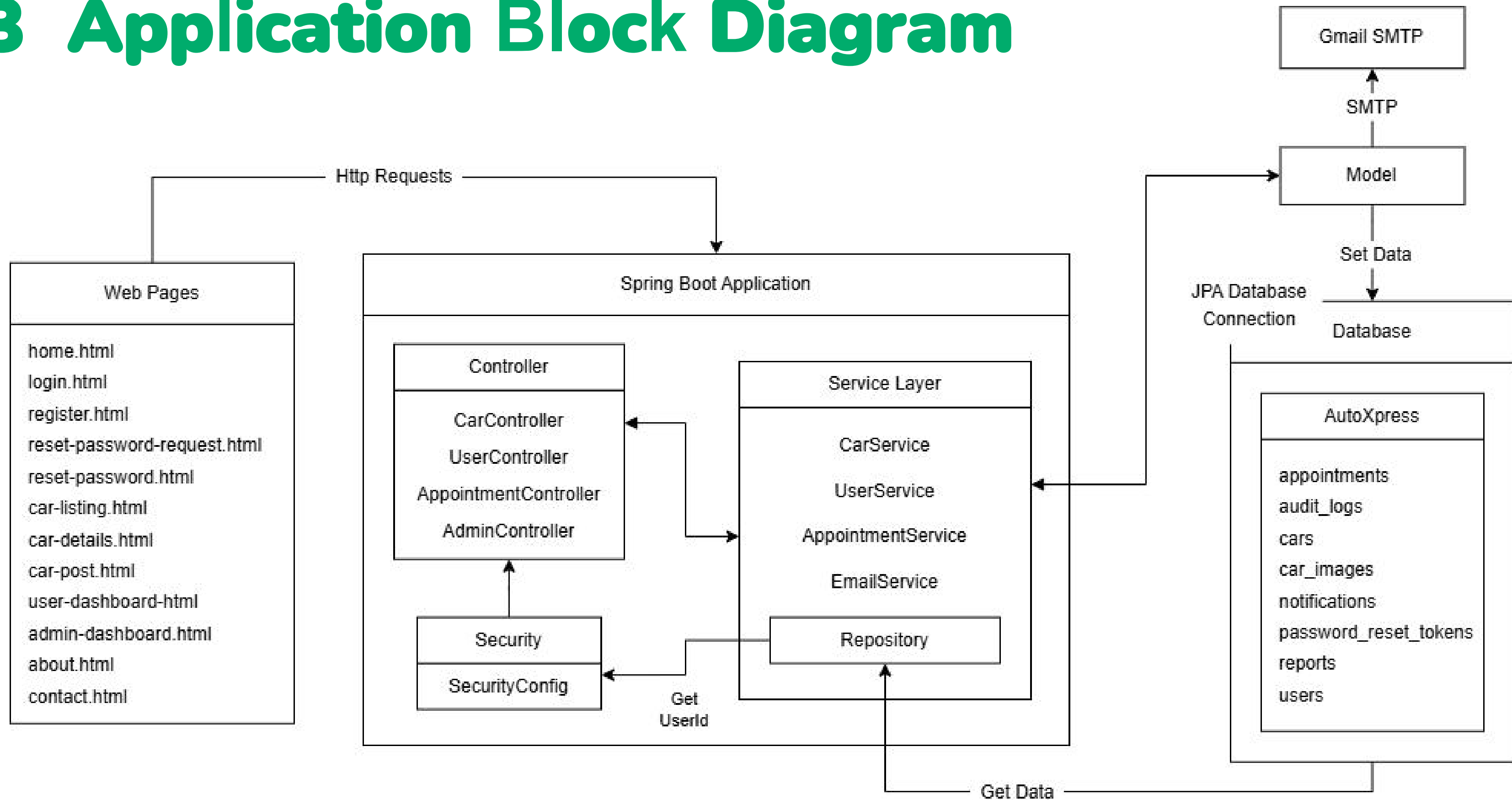
- IDE : Eclipse Spring Tool Workspace v-4.30 RELEASE
- Language & Java Version : Java SE JDK 17
- Build Tool : Maven
- LocalHost Server : XAMPP v 3.3.0 (Apache, MySQL, Tomcat)
- WPS Office (Word, Presentation Slide)



2 Development Tools

- Frameworks : Spring Boot Framework, Bootstrap, JQuery, Fontawesome
- Dependency : Spring Web, Spring Security, Thymeleaf, Data JPA, MySQL Connector J, Starter Mail, Hibernate-validator (Bean), Lombok, common-fileupload, Spring Test, Spring Security Test, Junit Testing, Mockito


3 Application Block Diagram





4 Role Based Access


Public Role Header


AutoXpress


Home

Car Listing

About Us

Contact Us

Login

Register

User Role Header

AutoXpress

Home

Car Listing

Car Post

About Us

Contact Us

My Profile


Logout

Admin Role Header


AutoXpress


Home

Car Listing

Car Post

About Us

Contact Us


Admin Dashboard

Logout

4 Role Based Access

Public Role Car Detail Page

AutoXpress


Home
Car Listing
About Us
Contact Us
Login
Register

Car Details



Toyota Camry

Year: 2019**Price:** \$25000.0**Mileage:** 40000 miles**Fuel Type:** HYBRID**Transmission:** AUTOMATIC**Status:** ACTIVE**Posted By:** Wen Ping

Please [log in](#) to book a test drive or report this car.



4 Role Based Access

User Role Car Detail Page

AutoXpress

Home

Car Listing

Car Post


About Us

Contact Us

My Profile

Logout

Car Details



Toyota Camry

Year: 2019

Price: \$25000.0

Mileage: 40000 miles

Fuel Type: HYBRID

Transmission: AUTOMATIC

Status: ACTIVE

Posted By: Wen Ping

Actions

Book a Test Drive

Appointment Date

mm/dd/yyyy --:-- --

Book Appointment

Report This Car

Reason

Select a reason

Description

Submit Report

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4 Role Based Access

Admin Role Car Detail Page

AutoXpress



Home



Car Listing



Car Post



About Us



Contact Us



Admin Dashboard



Logout

Car Details



Toyota Camry

Year: 2019**Price:** \$25000.0**Mileage:** 40000 miles**Fuel Type:** HYBRID**Transmission:** AUTOMATIC**Status:** ACTIVE**Posted By:** Wen Ping

5 CRUD Functionalities

CRUD - Create

1. Register in the portal (adds user to database).
2. Post a car for sale with picture upload (supports up to 5 images)
3. Book a test drive appointment.
4. Report a car (additional feature for flagging issues)

5 CRUD Functionalities

CRUD - Read

1. Login with a registered account.
2. Visit car listings and filter by Make, Model, Registration Year, and Price Range.
3. View lists of cars, appointments, and reports (admin-specific).
4. View list of notifications (additional feature, user).

5 CRUD Functionalities

CRUD - Update

1. Update user profile details.
2. Cancel test drive appointments.
3. Promote/demote users (admin-only).
4. Mark car posts as sold or deactivate them.
5. Approve car posts based on bidding price (admin-only).

5 CRUD Functionalities


CRUD - Delete


1. Clear notifications (extra feature)
2. Remove car posts (admin-only).
3. Remove users (admin-only).


6 Application Pages


1. Home Page


AutoXpress



Home


Car Listing


About Us


Contact Us


Login


Register

Welcome to AutoXpress

Your trusted platform for buying and selling used cars with ease and confidence.

Browse Cars

Find Your Dream Car

Search through thousands of used cars with advanced filters to find the perfect match.

Sell with Ease

List your car with up to 5 high-quality images and reach potential buyers quickly.

Secure Transactions

Our platform ensures safe and transparent bidding and test drive processes.

6 Application Pages

2. Login Page

Login

Username

Password

Login

[Forgot Password?](#)

Don't have an account? [Register](#)

6 Application Pages

3. Register Page

Register

Username

Email

Password

Register

Already have an account? [Log in](#)

6 Application Pages

4. Forget Password Page

Password Reset Request

Email Address

Request Password Reset

Remembered your password? [Log in](#)

Don't have an account? [Register](#)



6 Application Pages

5. Reset Password Page

Reset Password

New Password

Confirm New Password

Reset Password

Remembered your password? [Log in](#)

Don't have an account? [Register](#)

6 Application Pages

6. Car Catalog Page

AutoXpress

Home

Car Listing

About Us

Contact Us

Login

Register

Car Listings

Filter Cars

Make

Model

Year

Min Price

Max Price

Max Mileage

Fuel Type


Any

Transmission

Any

Clear

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Toyota Camry


Price: \$25000

Mileage: 40000 miles

Fuel Type: HYBRID

Transmission: AUTOMATIC

View Details



Honda Civic


Price: \$100000

Mileage: 40000 miles

Fuel Type: DIESEL

Transmission: MANUAL

View Details



BMW x5

Price: \$300000

Mileage: 35000 miles

Fuel Type: PETROL

Transmission: AUTOMATIC

View Details

● ● ●

6 Application Pages

7. Car Detail Page

AutoXpress

Home

Car Listing

Car Post


About Us

Contact Us

My Profile

Logout

Car Details



Toyota Camry

Year: 2019

Price: \$25000.0

Mileage: 40000 miles

Fuel Type: HYBRID

Transmission: AUTOMATIC

Status: ACTIVE

Posted By: Wen Ping

Actions

Book a Test Drive

Appointment Date

mm/dd/yyyy --:-- --

Book Appointment

Report This Car

Reason

Select a reason

Description

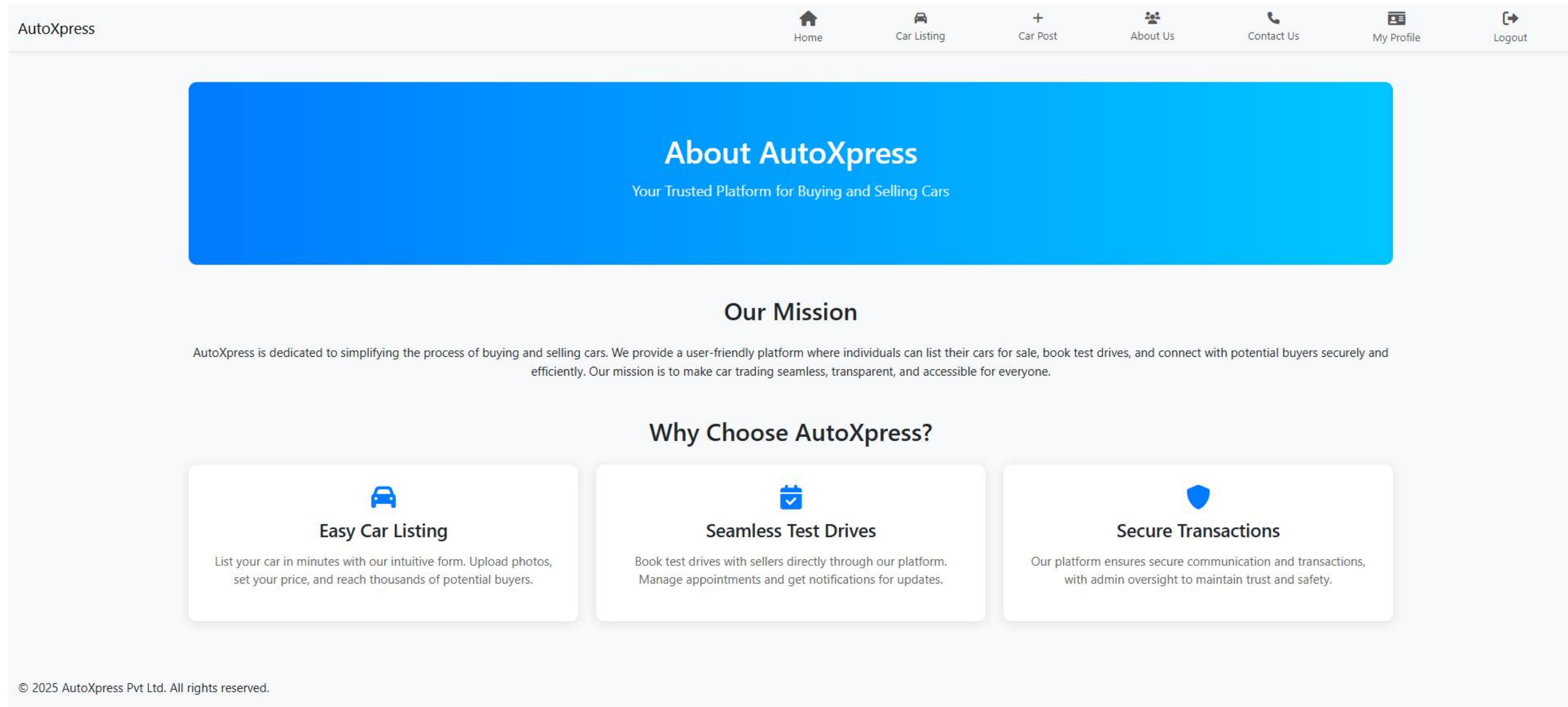
Submit Report

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6 Application Pages


8. About Us Page





6 Application Pages


9. Contact Us Page


AutoXpress


Home


Car Listing

Car Post

About Us

Contact Us


My Profile


Logout


Contact Us

We're Here to Help You with Your Car Trading Needs

Get in Touch

 Email: support@autoxpress.com

 Phone: +1 (555) 123-4567

 Address: 123 Auto Lane, Car City, CA 90210

Send Us a Message

Name

Email

Subject

Message

Send Message

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6 Application Pages

10. Profile Page

AutoXpress

Home

Car Listing

Car Post

About Us

Contact Us

My Profile

Logout

User Dashboard

Profile Update

Posted Cars

Booked Appointments

Notifications

Profile Update

Username

Wen Ping

Email

flazeping@gmail.com

Update Profile



6 Application Pages

11. Car Posting Page

AutoXpress

Home

Car Listing

Car Post

About Us

Contact Us

My Profile

Logout

Post a Car for Sale

Make *

Model *

Registration Year *

Price (\$) *

Mileage (miles, optional)

Fuel Type (optional)

Select Fuel Type

Transmission (optional)

Select Transmission

Images (1-5, each <10MB) *

Choose Files

No file chosen

Upload 1 to 5 images in any image format.

Post Car

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6 Application Pages

12. Admin Dashboard

AutoXpress

Home

Car Listing

Car Post

About Us

Contact Us

Admin Dashboard

Logout

Admin Dashboard

Profile

Manage Users

Manage Cars

Manage Appointments

Manage Reports

Admin Profile

Username

admin_user

Email

admin@example.com

Update Profile



7 Project limitations

1. **Lack of Application-Level Validation** : Models lack Jakarta Bean Validation, relying on database constraints, leading to generic error messages.
2. **No File Upload Validation** : Car posting allows unvalidated file uploads, posing security risks.
3. **No Client-Side Validation** : Server-side validation increases server load and delays error feedback.
4. **No Password Complexity Enforcement** : Weak passwords are allowed, increasing security risks.
5. **No Transactional Rollback in Tests** : Manual test data cleanup is error-prone.
6. **No Rate Limiting** : Sensitive endpoints are vulnerable to brute-force attacks.
7. **No Input Sanitization** : Risk of XSS attacks due to no modifications for potentially harmful characters inputs.
8. **Form Submission Redirects** : Redirects to default sections reduce user experience.
9. **Username Update Limitation** : Users cannot update usernames, requiring admin intervention.

8 Future Improvements

1. **Custom Validators** : Add Jakarta Bean Validation annotations to models for better error handling.
2. **File Upload Validation** : Validate file types and sizes in CarService to enhance security.
3. **Client-Side Validation** : Implement JavaScript validation for immediate feedback.
4. **Password Complexity** : Enforce strong password rules in UserService.
5. **Transactional Rollback** : Use @Transactional for JUnit tests or a separate H2 database.
6. **Rate Limiting** : Apply Bucket4j to limit requests on sensitive endpoints.
7. **Input Sanitization** : Add a filter to sanitize inputs and prevent XSS attacks.
8. **Form Submission Navigation** : Ensure redirects return to relevant sections.
9. **Username Updates** : Allow unique username updates with AJAX validation.

Challenged Faced

1. **Pagination Error Caused from Naming Error**, pagination on the user dashboard (/user/dashboard) failed , specifically errors like No property 'page' found in repositories from Model. This was caused by incorrect method names like findByCarUserPage that Spring Data JPA misinterpreted as property queries. The solution was to recheck all of the java classes variables naming and rename it.
2. **AJAX Response Mismatch**, The /admin/users/delete endpoint returned a redirect string instead of the expected JSON response, causing a mismatch with the jQuery AJAX handler in admin-dashboard.html. This led to a 400 BAD_REQUEST error as the AJAX call expected a JSON response with status and message fields. The solution was to modified to return a ResponseEntity with a JSON response aligning with the AJAX handler's expectations

Challenged Faced

3. **Feature Understanding**, when use approached with the plans for developing the feature was not described as easy to understood quickly which spend more time than expected in understanding the feature.
4. **Integration on Complexity** : Ensure seamless integration on between the various layers of the application on. For instance, configuring the Gmail SMTP for password reset require precise settings in applicaiton.properties and handling potential error handling which are demanded for careful debugging and testing.

9 Conclusion

In this project, I successfully completed a comprehensive set of tasks to develop a Used Car Sales Portal for AutoXpress Pvt Ltd, encompassing the project introduction, design and implementation of six database-integrated pages, development of eight models and five controllers, and configuration of application properties. I applied Spring Boot to create a robust Model-View-Controller (MVC) architecture, integrated form validation and data handling, and implemented role-based access control for users and administrators. Additionally, I conducted extensive JUnit testing, including functional, UI, validation, security, and database integration tests, while identifying project limitations and proposing future improvements to enhance validation, security, and user experience. This project significantly deepened my understanding of web application development and prepared me for future career opportunities in software engineering.

The End

