

System Design & Functional Documentation

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Project Title: Vehicle Rental System (Pathek)

1. System Overview

Pathek is a strong web-based vehicle rental application that was developed with the help of PHP (MVC architecture), MySQL, and Bootstrap 5. The system allows a peer to peer vehicle rental market place in which:

- Renters are able to window shop, search and make vehicle (car, bikes, scooters) reservations.
- Owners will have the ability to book cars, manage the bookings, and earn income.
- Admins manage the ecosystem, such as listing and user verification.

This paper identifies the basic functional flows of the system, CRUD operations, and technical logic that illustrates the overall implementation of the project.

2. Design & Structure

2.1 Styling & UI/UX

The application follows a contemporary and professional style that aims at developing trust and clarity and is called Pathek Green.

- **Color Palette**

Primary Brand Color:

#2E6F40 (Forest Green)

Used for Buttons, branding elements, and primary actions.

- Secondary Colors:

White and F8F9FA (Light Gray).

For clean readable backgrounds.

- Accent Color:

#FFC107 (Amber)

Leveraged to use warnings and high-state indicators.

- **Typography**
Font Family: Outfit, sans-serif (Google Fonts).
- **Framework**
Bootstrap 5
Applied to responsive grid layouts, modals, forms & reusable UI components.

2.2 Key System Pages

The system is divided into various well-maintained functional pages:

Public Views

- Home
- Browse Vehicles
- Contact Us

Renter Views

- My Bookings
- Wishlist
- Profile

Owner Views

- Owner Dashboard and all the same services as a renter

Admin Views

- Admin Dashboard
- Operations
- Management
- Systems
- Profile

3. Core Functional Flows & Logic

3.1 Authentication & Security Flow

The system follows a secure authentication system through session handling and email based OTP verification.

- User Registers (Create)
- Registration form is submitted including (Name, Email, Password, Role).
- Password is safely hashed with passwordhash ()�

- An OTP of 6 digits is generated and is secure.
- A pending user record is established in the database.
- OTP is sent through email.

Data Flow:

Controller → EasyMailer → SMTP Server → User Inbox

OTP Verification (Logic)

The user enters the received OTP and the system compares the input with the OTP hash stored against the session.

On success, the status of the user is changed to active and initialization of the user session is complete.

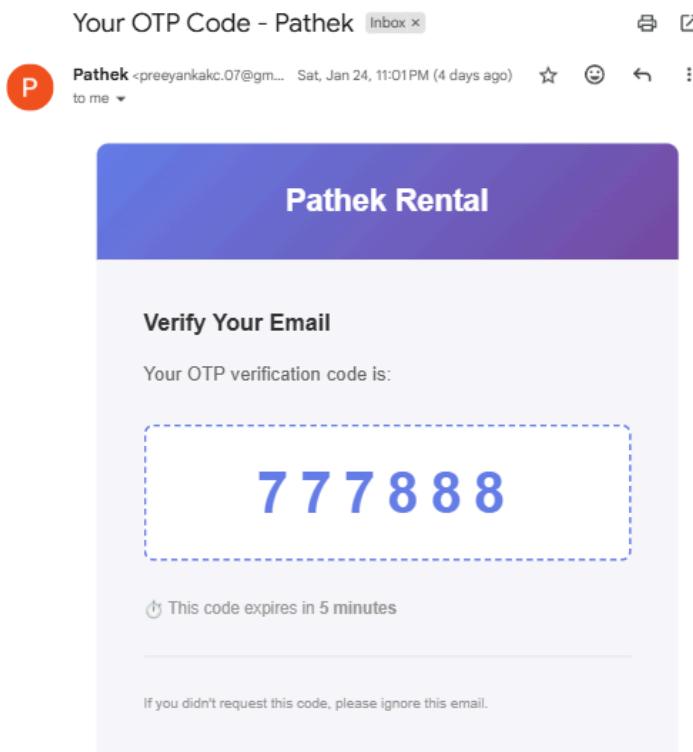


Figure 1: OTP sent successfully to the user's email address

3.2 Vehicle Management (Owner CRUD)

Owners operate their vehicle list using a special dashboard.

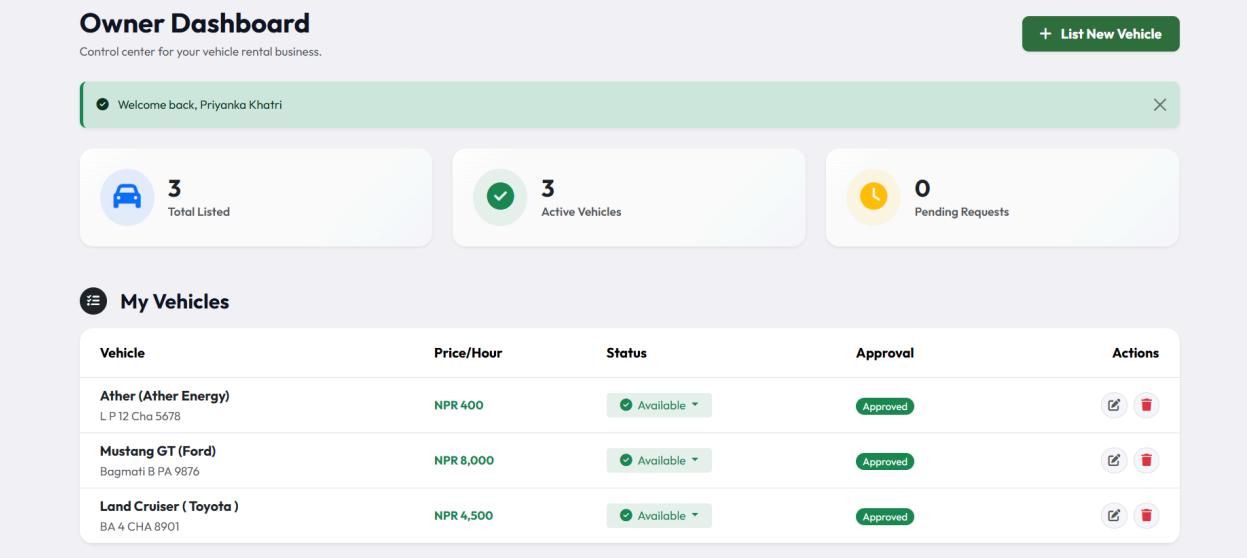
- **Listing a Vehicle (Create)**

The owner enters car information (Brand, Model, Pricing, Features) and vehicle images.

The vehicles table has the data with the approvalstatus = pending.

Listing will not be listed until the approval of the administration.

- **Inventory Management (Read / Update / Delete)**
 Read: Tabular listing of vehicles through OwnerVehicleController.
 Update: Edit form is available for updating and correcting the vehicles related details.
 Delete: Deleting Vehicles for owners and Deleting users for admin.



The screenshot shows the 'Owner Dashboard' interface. At the top, there's a green header bar with the text 'Control center for your vehicle rental business.' and a button '+ List New Vehicle'. Below the header, a welcome message 'Welcome back, Priyanka Khatri' is displayed. The dashboard features three main statistics boxes: 'Total Listed' (3 vehicles), 'Active Vehicles' (3 vehicles), and 'Pending Requests' (0). Below these, a section titled 'My Vehicles' lists three vehicles with their details:

Vehicle	Price/Hour	Status	Approval	Actions
Ather (Ather Energy) L P 12 Cha 5678	NPR 400	Available	Approved	
Mustang GT (Ford) Bagmati B PA 9876	NPR 8,000	Available	Approved	
Land Cruiser (Toyota) BA 4 CHA 8901	NPR 4,500	Available	Approved	

Figure 2: Owner's Dashboard CRUD operations

3.3 Booking System Workflow

The module is the business logic that forms the gist of the business between renters and owners.

Booking Process

- On the vehicle detail page, Renter chooses the date of booking.
- Within the database date conflicts are checked using overlap logic in the database.
- Provided this is possible, a booking record is created and its status is set to = pending.

Status Management

- The booking can be seen in the Bookings Dashboard of the owner.
- The booking can be Confirmed or rejected by the Owner.
- Renter also views the status updates in real-time in My Bookings.

Vehicle	Dates	Total Price	Owner	Status	Actions
Royal Enfield (Reborn Series) Classic 350 Bike	Jan 28 to Jan 29, 2026	NPR 1,200	Sarala Basnet 9848193160	Pending	<button>Cancel</button>

Figure 3: My Rentals booking pending Status

3.4 Admin Administration (System Control)

The control panel serves as the control centre to the system.

Major Functionalities

- Verification Queue:**
Validate and Accept the forms from owners.
- Vehicle Approval:**
Ensures that owners are following rules while listing the vehicles.
- System Statistics:**
Live number of users, vehicles, reservations, messages and requests.

Recent Vehicles				Pending Verifications		
VEHICLE DETAILS	PRICE	STATUS	ACTION	APPLICANT	SUBMITTED	REVIEW
Royal Enfield (Reborn Series) Classic 350 Owner: Sarala Basnet	NPR 600	APPROVED				
Mahindra Scorpio-N Z8L Owner: Sarala Basnet	NPR 1,800	APPROVED				

No pending verifications.

4. Technical Implementation Highlights

- **MVC Architecture:**

- Models are used to deal with database interactions.
- Logics are controlled by controllers.
- Views render HTML output.

- **Security Measures:**

- SQL Injection Prevention through statements (bind_param).
- XSS Prevention with htmlspecialchars() on user submitted data.
- Role-based access control based on middleware-style route checks.

- **Database Design:**

- Normalized schema.
- User-vehicle and user-booking foreign keys.
- The system ensures referential integrity and scalability.

5. Images References

<https://cars.usnews.com/cars-trucks/ford/mustang/photos-interior>

<https://english.onlinekhabar.com/2024-hero-xpulse-200-4v-pro.html>

<https://www.instagram.com/p/C9SL5PnKPM9/>

<https://www.icartea.com/en/wiki/toyota-land-cruiser-prado-what-makes-it-a-global-off-road-icon>

<https://www.royalenfield.com/np/en/gma/>

<https://sparkcar.org/>

6. Appendices

प्राथिक

**Fair Fares
Strong Journeys**

Discover the perfect vehicle for your journey. From luxury cars to reliable bikes, find everything you need for an unforgettable experience.

[Browse Vehicles](#) [List Your Vehicle](#)



प्राथिक

Available Vehicles

Filter Vehicles

Vehicle Type: All Types

Price Range (per hour): Min _____ Max _____

Driver Option: Any

Pickup Location: Any

Min Seats: Any

Apply Filters



Classic 350 **NPR 600 /hour**
Royal Enfield (Reborn Series) • 2024
Self-Drive [View](#) [Book Now](#)
General



Scorpio-N Z8L **NPR 1,800 /hour**
Mahindra • 2023
Driver **7** [View](#) [Book Now](#)
General



XPulse 200 4V **NPR 700 /hour**
Hero MotoCorp • 2023
Self-Drive [View](#) **Busy**
General



Scooty



Car



Car