Vehicle Parking App - V1

Author

Name: Ayush Kumar Jha
Roll Number: 22f3000846
Student Email: 22f3000846@ds.study.iitm.ac.in

I am a 3rd-year Computer Science student. I'm also pursuing a B.S. in Data Science from IIT Madras and currently at the Diploma level. I'm passionate about technology and aim to join a top tech company where I can apply my skills, gain hands-on experience, and keep growing. Grateful to all who supported me on this journey.

Description
This project implements a multi-user vehicle parking management system for 4-wheelers, supporting both admin and user roles. The app allows admins to manage parking lots and spots, while users can book, occupy, and release parking spots, with all actions tracked and summarized.

Technologies Used
Flask (Web framework)
Flask-SQLAlchemy (ORM for SQLite)
Jinja2 (Templating engine)
Bootstrap (Frontend styling)
SQLite (Database)
Matplotlib (For summary charts)

Purpose:
Flask provides a lightweight backend, SQLAlchemy simplifies database operations, Jinja2 enables dynamic HTML rendering, Bootstrap ensures responsive UI, and SQLite offers a simple, file-based database suitable for local demos. Matplotlib is used for generating visual summaries.

DB Schema Design
User:
id (PK, int)
email (unique, string, not null)
password (string, not null)
name (string, not null)
address (string)
pincode (string)
role (string, default 'user')

ParkingLot:
id (PK, int)
name (string)
address (string)
pincode (string)
price_per_hour (float)
max_spots (int)

ParkingSpot:
id (PK, int)
lot_id (FK, int)
status (string, default 'A')

Reservation:
id (PK, int)
spot_id (FK, int)
user_id (FK, int)
vehicle_number (string, not null)
start_time (datetime)
end_time (datetime, nullable)
cost (float, nullable)

Architecture and Features
The project follows MVC architecture
Controllers: All business logic and route handling are in the controller directory (routes.py, auth_routes.py).
Models: Database models are defined in models.py.
Templates: All HTML templates are in the templates directory.
Static files: CSS and images are in the static directory.

Features Implemented:
Role-based authentication and dashboards
Admin management of lots and spots
User reservation, occupancy, and release of spots
Parking history and summary charts
Cost calculation based on parking duration
Responsive UI with Bootstrap
Search functionality for lots

Video
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