MAD 1 Project: Vehicle Parking Application

Author

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I'm Tushar, a Diploma student in the IIT Madras BS Degree Program in Data Science and Programming.

Description

This project is a web-based Vehicle Parking Management System that allows users to reserve, release, and view parking slots in real-time. Admins can manage lots, monitor usage, and track user activity.

AI/LLM Used: 20% usage of chatgpt for assistance in Bug fixex, errors in routes and summary charts.

Technologies used

- Flask (core framework)
- Flask-SQLAlchemy (ORM for database models)
- SQLite (database)
- Jinja2 (templating engine)
- Matplotlib (for generating charts)
- Bootstrap 5 (for UI styling)

Purpose of technologies:

- Flask provided lightweight routing and view function support.

- SQLAlchemy simplified model relationships and queries.

- Matplotlib was used to visually summarize parking data.

- Bootstrap enabled responsive and clean UI layout.
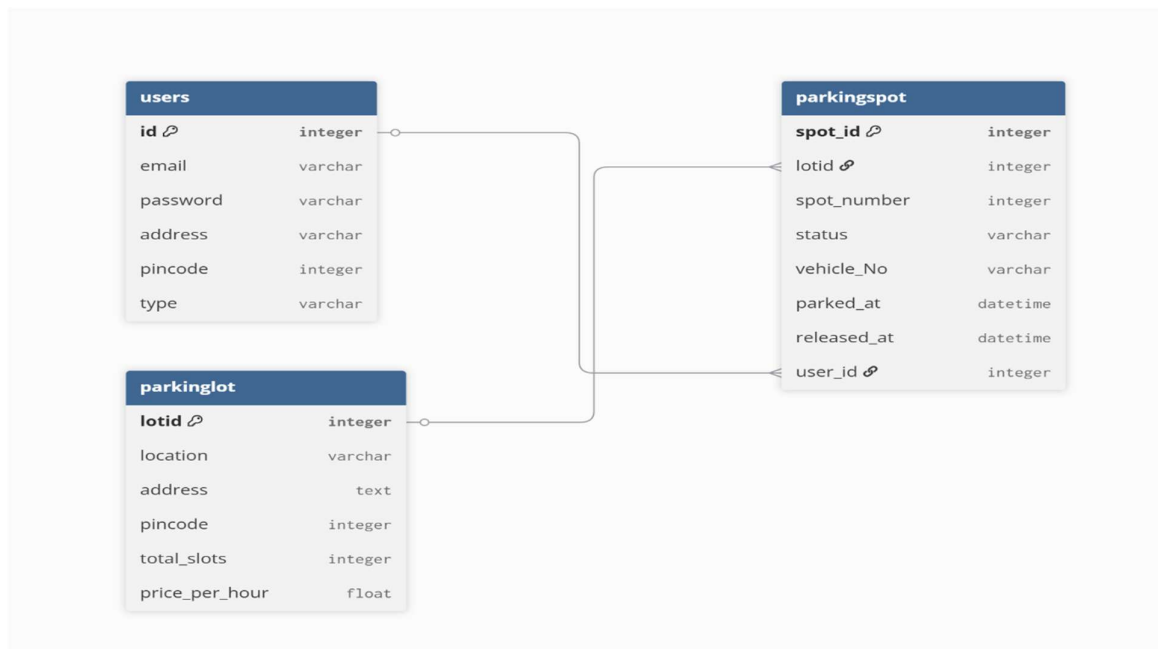
Architecture and Features

The project is built using MVC-style separation:

- **Controllers (routes)** are in controllers.py in application folder.

- **Models** are defined in models.py in application folder using SQLAlchemy classes

- **Templates** are stored in the templates folder and rendered using Jinja2

- **Static files** like CSS and chart images are in static folder

Features Implemented:

- **User Registration/Login** (with Flask-Login)

- **Admin Dashboard**: View registered users, manage lots, view occupancy summary

- **User Panel**: Book parking slots, view their bookings, release slots

- **Pie Charts**: Matplotlib-generated visuals for admin and users

- **Slot Management**: Admin can add/edit parking lots and see spot-level status

- **Responsive UI** with Bootstrap

DB Schema Design

Reason Behind Designing:

- Parkingspot is linked to both user and lot to track usage.
- Status field ensures quick filtering and chart generation.

Video:

https://drive.google.com/file/d/1QN11ZKGxL1a2pdBx0JtZPiIu8GAp-0DL/view?usp=drivesdk