

Smart Parking Management System - Final Project

This project provides a smart parking management solution for colleges using Flutter (frontend) and Flask (backend), integrated with a PostgreSQL database.

Project Structure

- flutter_application_1/: Flutter mobile app for students, lecturers, and admin.
- app.py: Flask backend server (REST API).
- database.py: PostgreSQL connection and initialization.
- user_model.py: User data model.
- real_efficiency_with_params: Endpoint for evaluating efficiency with adjustable scoring.
- README.md: Project documentation.
- requirements.txt: Python dependencies.

Getting Started

1. Clone the repository

```
git clone https://github.com/shadymansour9/final_project.git
```

```
cd final_project
```

2. Backend Setup (Flask + PostgreSQL)

1. Install Python packages:

```
pip install -r requirements.txt
```

2. Make sure PostgreSQL is running and configured. Update your connection string in database.py.

3. Run the backend server:

```
python app.py
```

By default it runs on: `http://127.0.0.1:5000`

3. Frontend Setup (Flutter)

```
cd flutter_application_1
```

```
flutter pub get
```

```
flutter run
```

Simulation Tool

Inside the app, go to the Simulation Screen.

You can:

- Adjust scoring for arrival, legal cancel, illegal cancel
- Press "Run Simulation"

- Backend will calculate average grade and % of blocked users

Calculation Formula:

$$\text{Grade} = (\text{Score} / \text{Max Score}) \times 100$$

$$\text{Score} = (\text{Arrived} \times \text{pts_arrived}) + (\text{Cancelled} \times \text{pts_cancelled}) + (\text{Illegal} \times \text{pts_illegal})$$

$$\text{Max Score} = \text{Total Reservations} \times \text{pts_arrived}$$

Admin Features

- View/Edit/Delete users
- Monthly stats
- Real efficiency simulation
- Override block status

Database

Make sure you have PostgreSQL installed and a database created. You can export your existing database using:

```
pg_dump -U your_user -d parking_db > backup.sql
```

Note: Do not upload .sql or .pgdump files with sensitive info to GitHub.

Contact

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