Automated Parking System

Project Purpose:

Given the current difficulty in parking due to heavy congestion and the challenge of finding available parking spaces, along with outdated car systems that do not guide drivers on proper parking and the constant illumination in enclosed parking spaces consuming significant electricity and energy, this project aims to address these issues.

Project Concept:

The project is based on the idea of verifying whether the driver is a registered member of our garage. If the driver is a member, they have a designated spot in the tower that no one else can use during their subscription period. Below is a detailed explanation of the project:

License Plate Detection:

- The system uses a model to detect the license plate and extract the license plate number.

- It checks whether the license plate number is in the database as a subscribed client.

Client Scenarios:

- Non-Subscribed Clients:

- If the license plate number is not found in the database, the system considers the driver as a regular client.

- The system checks for available spots in the garage.

- The entrance screen displays the number of available spots and their locations.

- If a spot is available, the gate opens automatically for the driver to park.

- If no spot is available, the gate remains closed.

- Every regular client's license plate number is recorded in the database upon entry.

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- Subscribed Clients:

- If the license plate number is found in the database, the system considers the driver as a subscribed client with a designated parking spot.

- The gate opens automatically for the client to proceed to the tower.

Benefits for Regular Clients:

1. Welcome Screen:

- Displays the number of occupied and available spots.

2. Smart Street Light:

- Utilizes technology to save energy and enhance user comfort, providing an enjoyable experience to encourage repeat visits.

- Saves energy by turning off all lights during the day and using sensors at night to detect cars or people, illuminating only the area around them with LEDs.

3. Park Assist:

- Ensures user safety with sensors assisting in parking:

- Scenario 1: Green LED lights up if the parking spot is available.

- Scenario 2: Red LED blinks, and a buzzer sounds at 1300 Hz when the client is parking.

- Scenario 3: Red LED stays solid, and the buzzer stops when the car is parked correctly.

- Scenario 4: Red LED blinks, and a buzzer sounds at 2000 Hz as a warning if the car gets too close to the curb.

Benefits for Subscribed Clients:

- Focuses on car safety, preventing collisions.

- Utilizes a Rotary Parking Tower with pre-reserved spots for subscribed clients.

- When the subscribed client approaches the gate, the system detects their membership, opens the gate, and sends a signal to the tower to bring down the designated spot.

- Upon reaching the tower, the client finds their spot ready for parking.

- A screen displays instructions: "Park car press #" and "Back car press *".

- To park, the client presses "#".

- To retrieve the car, the client presses "*".

- The system prompts the client to enter a random key, ensuring they are the car owner before retrieval.

Subscription:

- Clients subscribe through the website, where their designated parking spot is displayed.

- Subscription types include monthly, weekly, or partial day, with expiration dates shown on the site.

- Regular clients can reserve a spot for a specific hour through the website to ensure availability upon arrival.

Payment Methods:

- Subscribed Clients: Pay during website subscription via credit card or electronic wallets such as InstaPay, Vodafone Cash, Amazon Pay, PayPal, etc.

- Regular Clients: The license plate number is recorded at entry, along with the entry time. Upon exit, a camera detects the license plate, calculates the duration of the stay, and computes the charge based on the hourly rate displayed on the website. A QR code is provided for scanning, which opens a page with the total amount and payment methods.