PARKING LOT MANAGEMENT SYSTEM IN CONDOMINIUM (GROUP 5)

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Outline

- Introduction
- System Overview
- Detection
- Application
- Result

INTRODUCTION

Security vulnerabilities

Unauthorized access, increasing risks of thief and vandalism, compromising safety within the parking lot

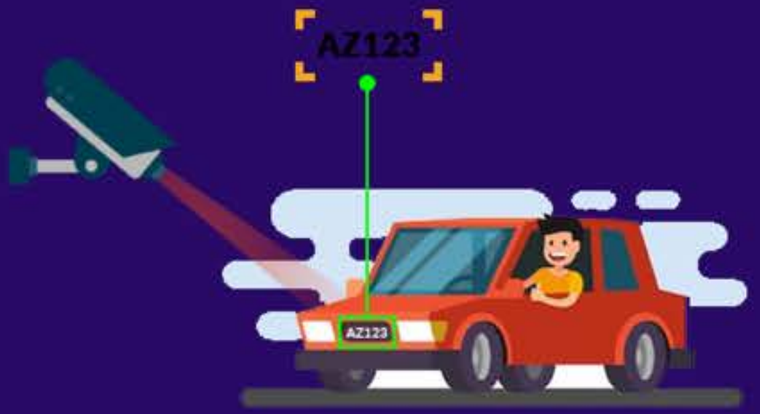
User Stories and Acceptance Criteria (1)

User Story 1 Summary:

Parking lot users can easily enter and exit using their registered license plate number and Bluetooth device. The system handles registration, automatic entry and exit, and displays confirmation messages.

User Story 2 Summary:

Administrators can ensure parking lot security by detecting and verifying license plate numbers and matching Bluetooth signals. The system allows entry for verified users and denies access to vehicles with mismatched Bluetooth signals.



User Stories and Acceptance Criteria (2)

User Story 3 Summary:

Administrators can maintain a record of vehicles entering and exiting the parking lot. The system records entry and exit timestamps and allows authorized personnel to query the records for vehicle history.

User Story 4 Summary:

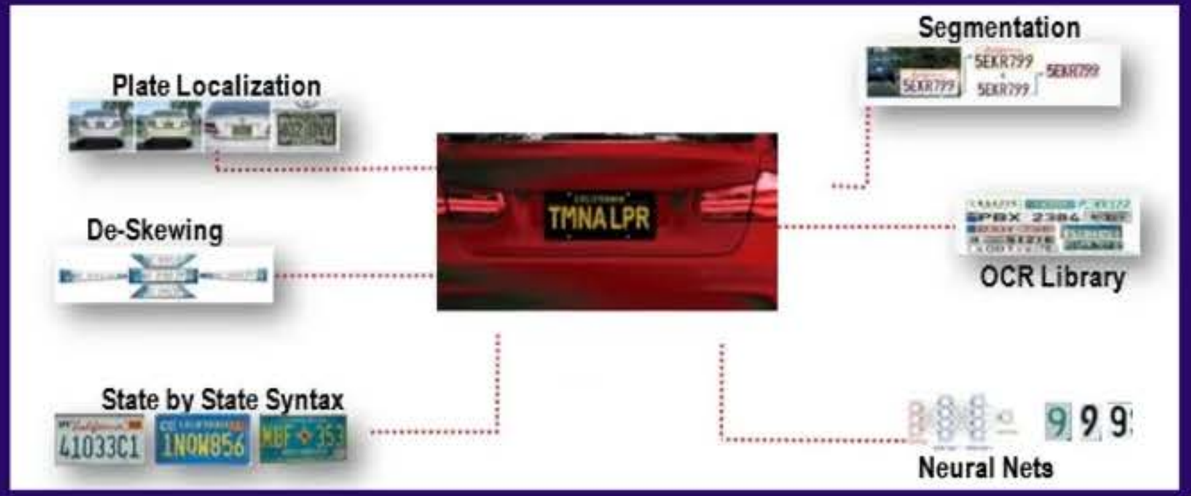
Parking lot users can book parking spots for their guests. The system enables parking spot reservation, recognizes guest bookings, and allows users to modify or cancel bookings.

OBJECTIVES

- DEVELOP A LICENSE PLATE DETECTION AND VERIFICATION SYSTEM THAT GRANTS ACCESS TO REGISTERED VEHICLES AND DISPLAYS ERROR MESSAGES FOR UNREGISTERED ONES.

- IMPLEMENT A BLUETOOTH-BASED IDENTITY VERIFICATION FEATURE THAT MATCHES USERS' DEVICES WITH DETECTED LICENSE PLATES FOR SECURE ENTRY AND EXIT.

- CREATE A SYSTEM FOR MAINTAINING SECURE RECORDS OF VEHICLE ACTIVITY, INCLUDING LICENSE PLATES AND TIMESTAMPS, WITH EASY ACCESS FOR AUTHORIZED PERSONNEL.



System Overview

SYSTEM OVERVIEW

BACKEND

FRONTEND

Implementation plan

WEBCAM SETUP

Connect and test the webcam to capture the image

SETUP ENVIRONMENT FOR OCR

Import required libraries for OCR process

IMAGE PREPROCESSING

Implement image processing techniques to improve OCR accuracy

Implementation plan

LICENSE PLATE RECOGNITION

Integrate OCR library for
character recognition

BLUETOOTH LOW ENERGY

ESP32 scan bluetooth nearby
bluetooth device. then send bluetooth
address and RSSI through MQTT

APPLICATION IMPLEMENTATION

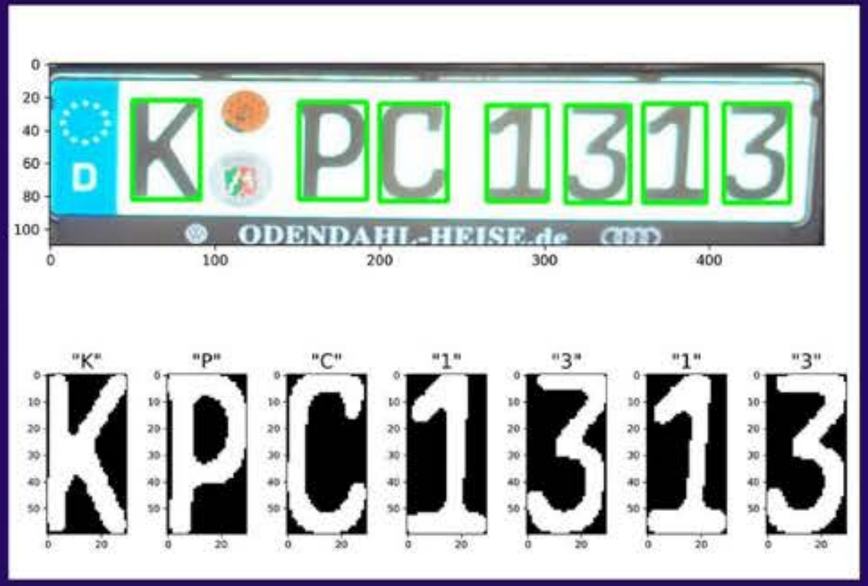
Java script and react framework
to create application

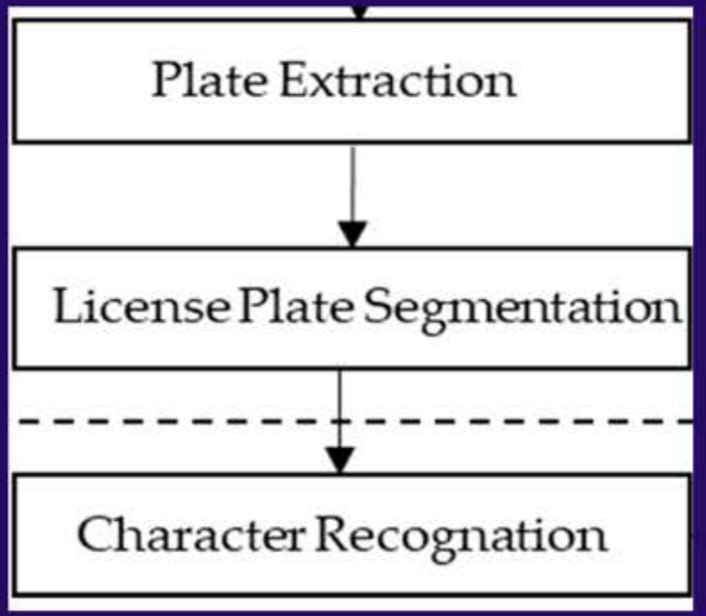
“DETECTION”

IMAGE PREPROCESSING & LICENSE PLATE RECOGNITION

MODEL WILL BE DIVIDED INTO 2 PARTS

1. LICENSE PLATE CHARACTER EXTRACTION
2. LICENSE PLATE CHARACTER PREDICTION





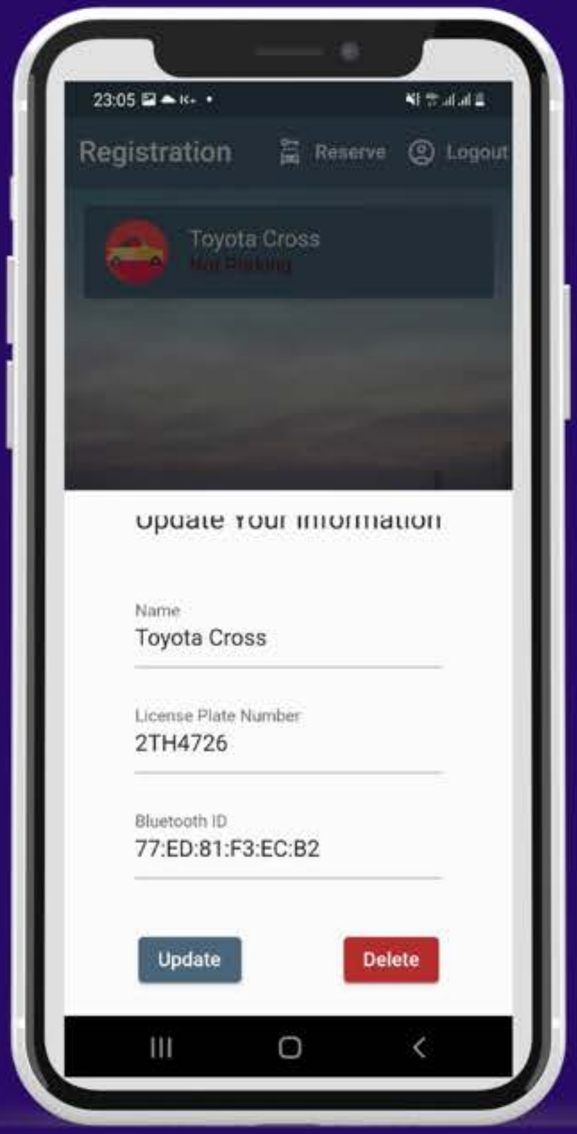
BLUETOOTH LOW ENERGY

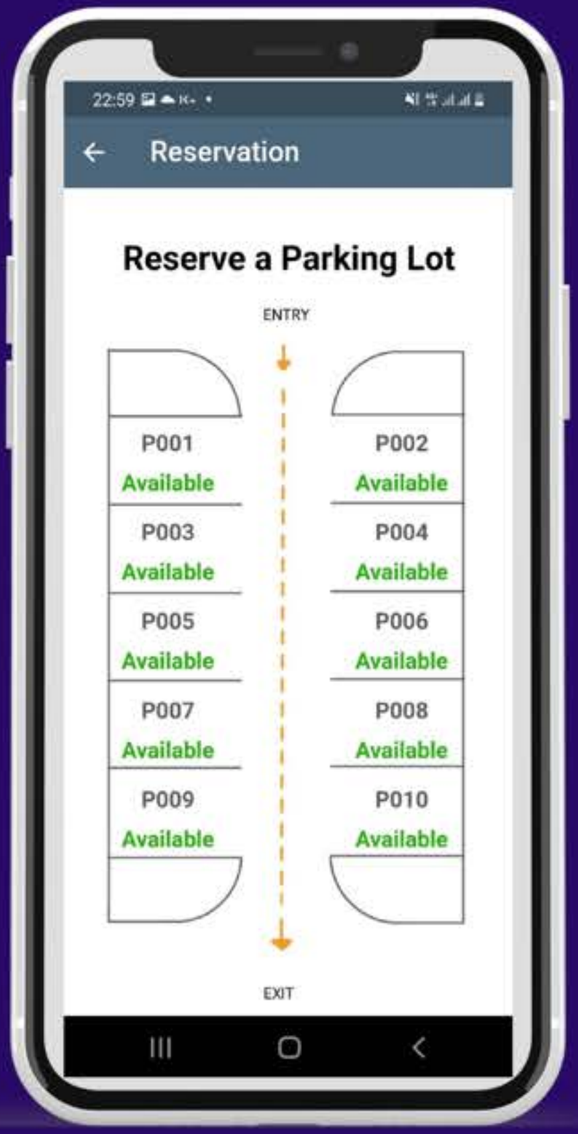
Step:

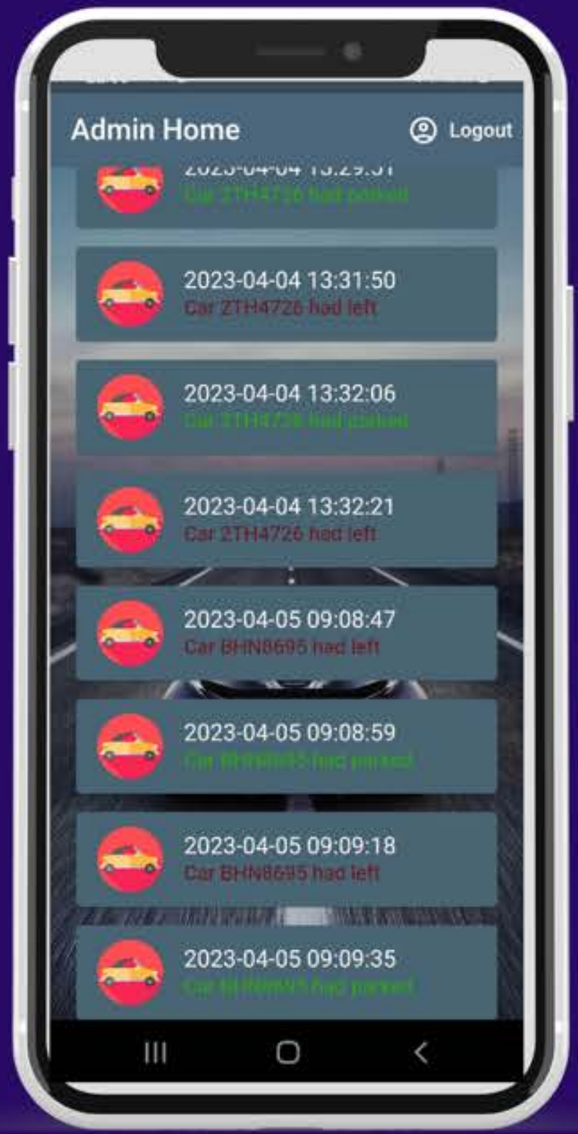
1. **ESP32 is BLE scanner: Periodically scan for nearby BLE devices**
2. **Collect device information: Gather device address and RSSI value for further processing**
3. **Establish MQTT client: Connect to Wi-Fi network and MQTT broker**
4. **Subscribe to topic: Process incoming messages using a callback function**
5. **Publish BLE data: Send BLE device information (MAC address and RSSI) to MQTT broker**
6. **Python app integration: Subscribe to information from the broker for further use**

“APPLICATION”

Application Overview





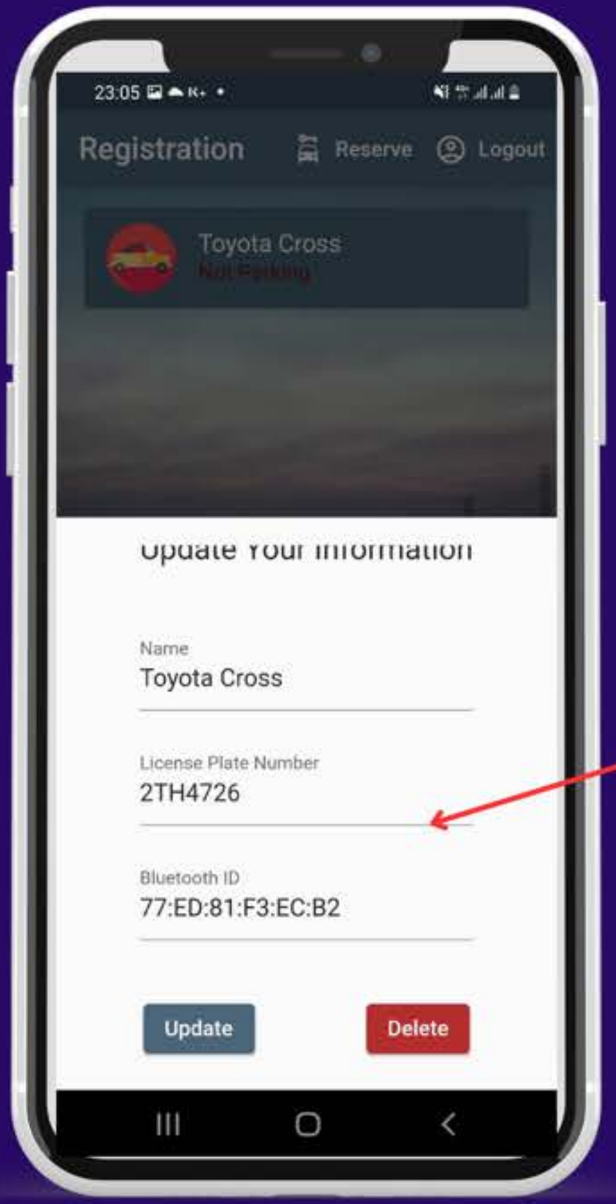


FOR USER

FOR ADMIN

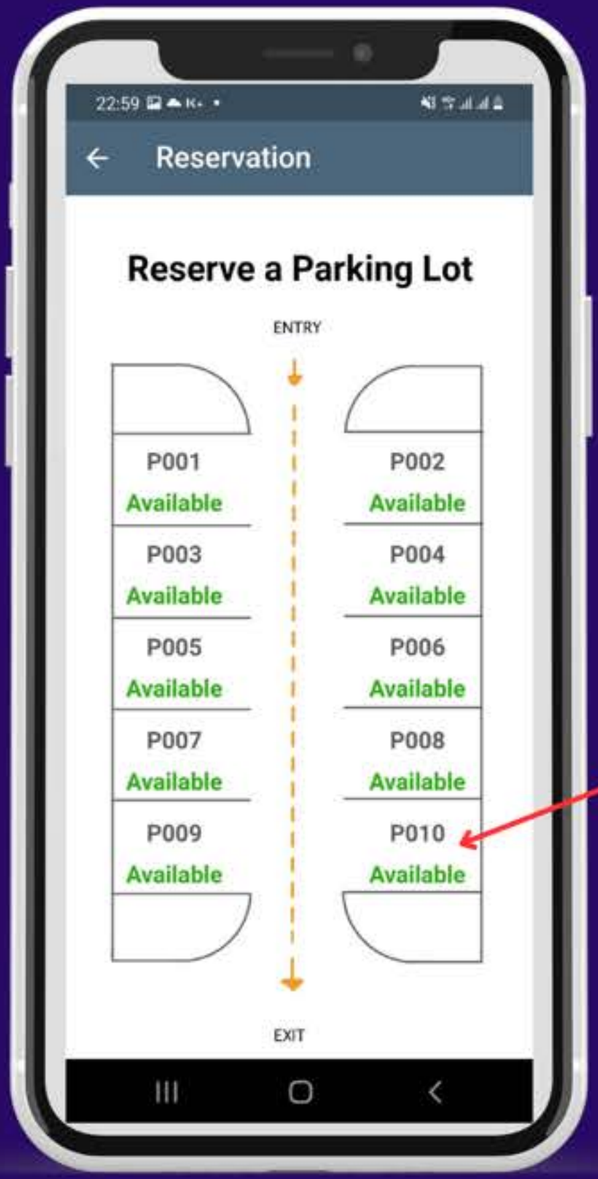
USER(REGISTRATION)

You can add or register new license plate here

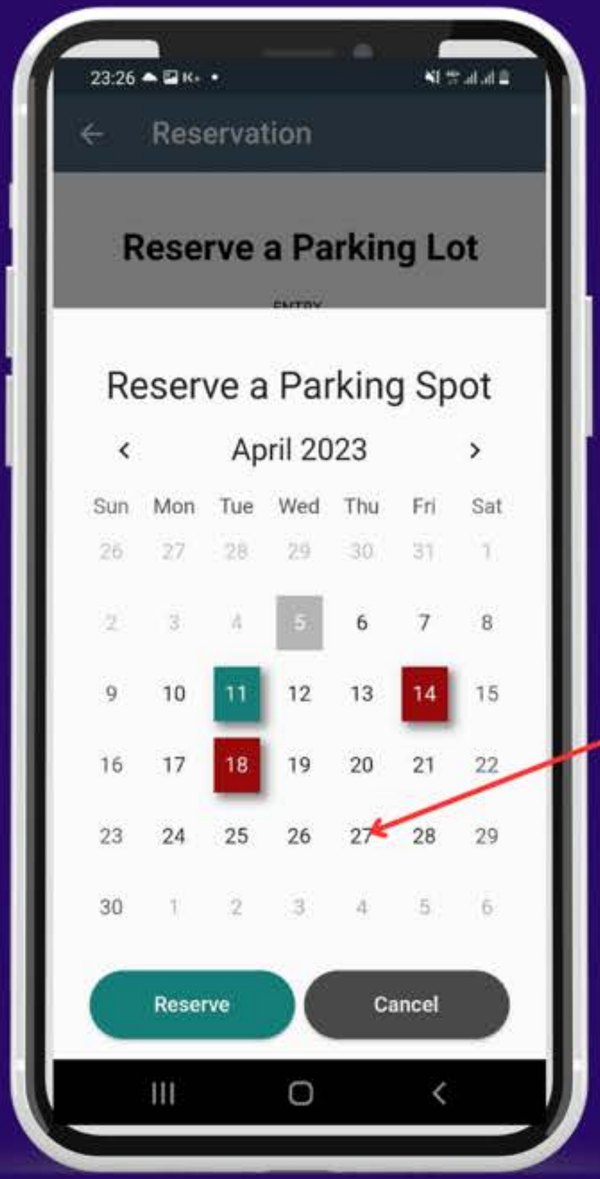


Car's information

USER(RESERVATION)

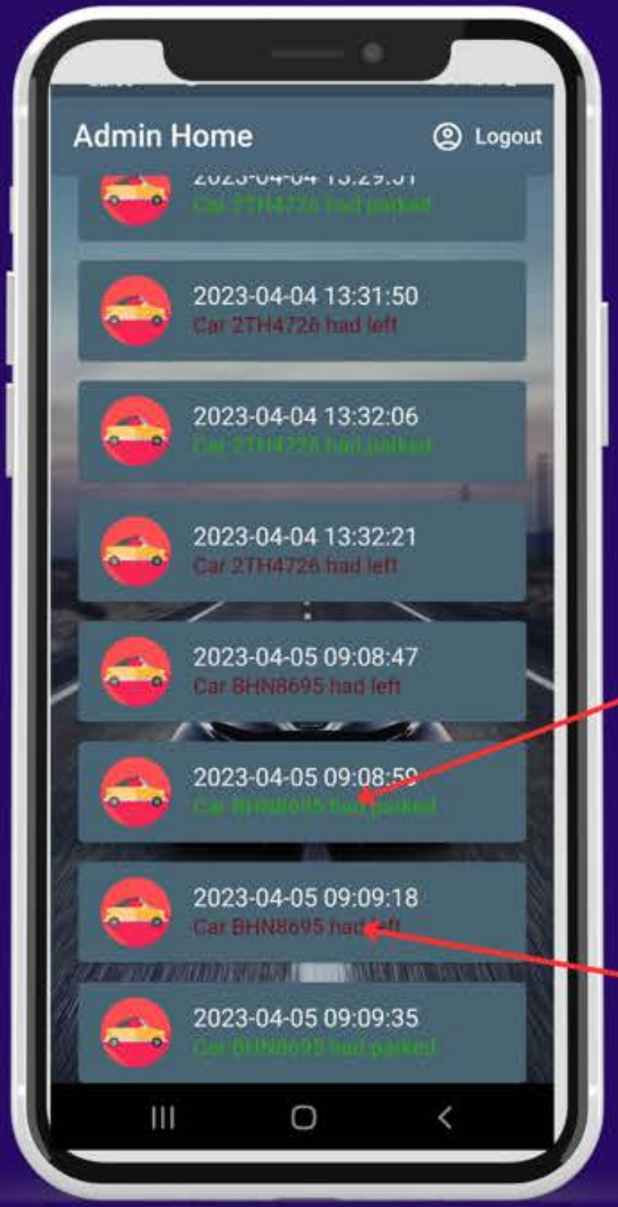


Booking area



Pick a date

ADMIN ACCOUNT



When the user parked

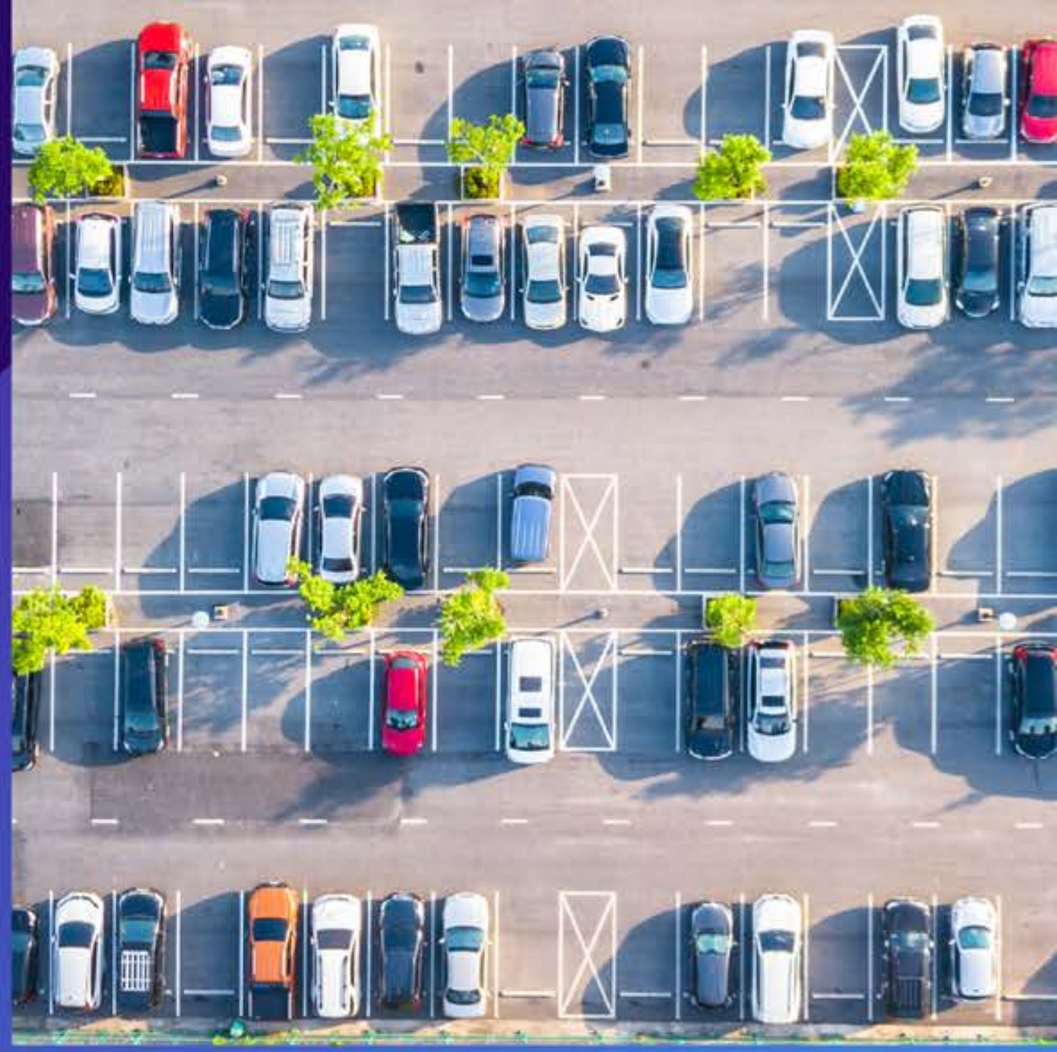
When the user left

“RESULT”


BIRTHPLACE OF AVIATION
BHN 8695
HAMILTON
8-00

Result

Successfully implement an automated car parking system with OCR License plate recognition which should be able to distinguish between guess's car and member's car



THANK YOU!