SMART PARKING

TEAM MEMBERS

Arasu Gk

Anto Augestin D

Ajay S

Abitha K

Aarthi S

Arjun M

Agenda

PROJECT DEFINITION

DESIGN THINKING

Project Definition

The project involves integrating IoT sensors into public transportation vehicles to monitor ridership, track locations, and predict arrival times. The goal is to provide real-time transit information to the public through a public platform, enhancing the efficiency and quality of public transportation services. This project includes defining objectives, designing the IoT sensor system, developing the real-time transit information platform, and integrating them using IoT technology and Python.

Design Thinking

- ✓ Project Objective
- ✓ IOT Sensor Design
- ✓ Real-Time Transit Information Platform
- ✓ Integration Approach

Project Objective

- ✓ Implement a system to continuously monitor the availability of parking spaces in real time.
- ✓ Develop a mobile application for users to access parking information, reserve spaces, and receive guidance.
- ✓ Provide efficient guidance to users to find and navigate to available parking spaces.
- ✓ Use data analytics to continually optimize parking operations.
- ✓ Encourage user engagement and gather feedback for ongoing improvements.
- ✓ Ensure that the parking system is accessible and inclusive for all users.
- ✓ Reduce the environmental impact of parking operations.

IOT Sensor Design

- Ultrasonic Sensors:

Deployment: Ultrasonic sensors are often mounted above parking spaces or on light fixtures. They emit ultrasonic waves to detect the presence of a vehicle in a parking space.Function: Ultrasonic sensors measure the distance to the ground and can determine if a parking space is occupied or vacant.

- Magnetic Sensors:

Deployment: Magnetic sensors are buried under the surface of each parking space.

- Infrared Sensors:

Deployment: Infrared sensors can be mounted on walls or ceilings overlooking parking spaces.

- Camera-Based Sensors:

Deployment: Cameras are typically installed at entry/exit points and throughout the parking facility.

IOT Sensor Design

- Lidar Sensors:

Deployment: Lidar sensors are often mounted on poles or infrastructure near parking spaces.

- Wireless Sensors:

Deployment: These sensors can be installed on the surface of each parking space.

- Ground-Loop Sensors:

Deployment: Inductive loop sensors are installed under the pavement near the entry and exit points of parking spaces.

- Acoustic Sensors:

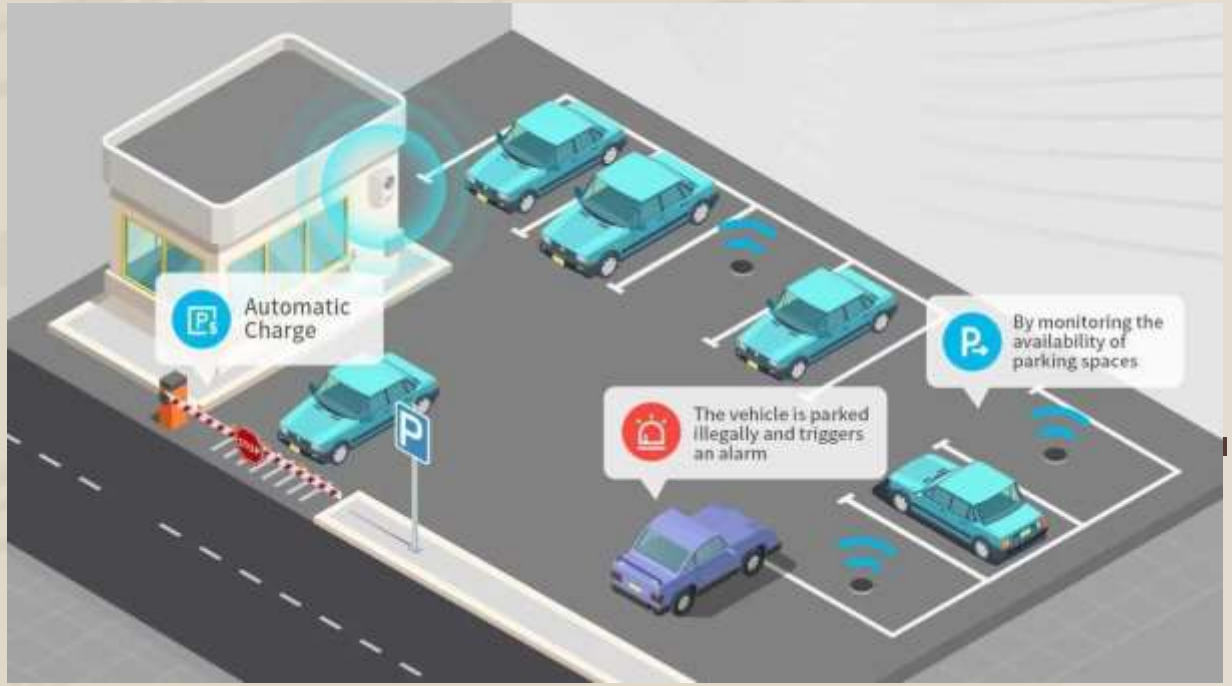
Deployment: Acoustic sensors can be mounted on walls or poles in the parking area.

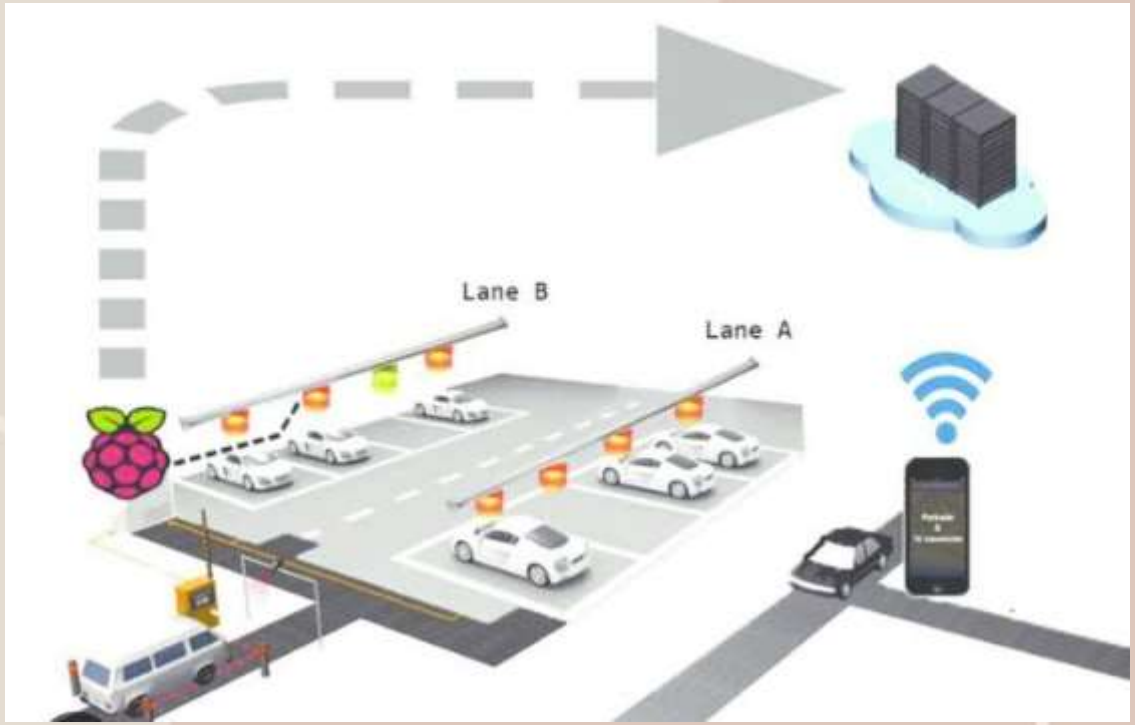
- Pressure Sensors:

Deployment: Pressure sensors are embedded in the pavement of each parking space.

Real-Time Transit Information Platform

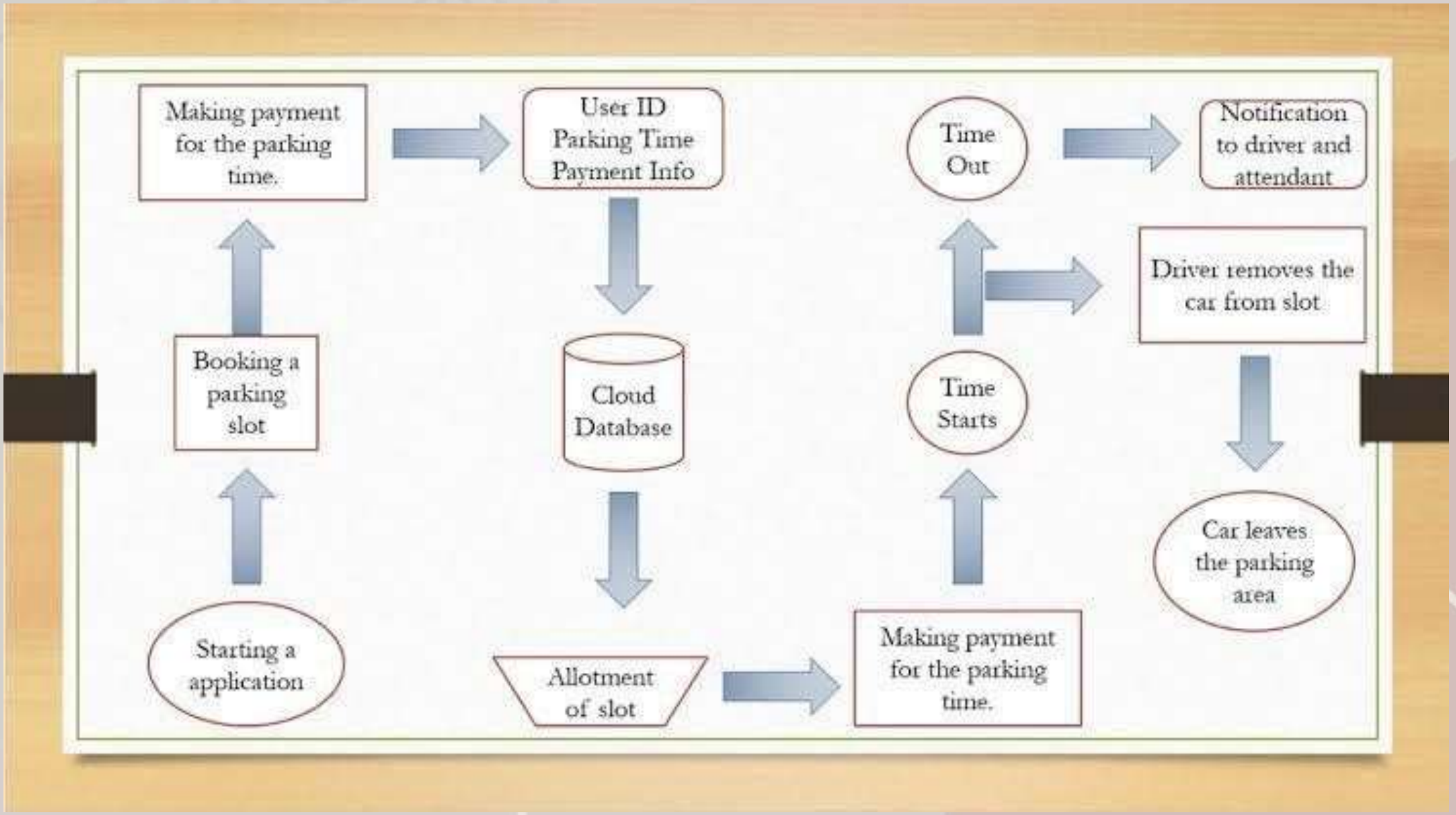
- In designing our mobile app for real-time parking availability, we focus on user-friendliness and efficiency. The home screen offers a map with color-coded markers for available, occupied, and nearly full parking spots. Users can also view this data in a convenient list format and search for parking based on location, price, and availability.
- Detailed information about each parking area, including available spots and pricing, is easily accessible. Integration with navigation apps ensures smooth transitions.
- Users can personalize their experience and receive real-time notifications about parking availability changes. Feedback options and an FAQ section enhance user engagement.
- Accessibility features and continuous real-time updates further streamline the parking experience."


Automatic Charge
By monitoring the availability of parking spaces
The vehicle is parked illegally and triggers an alarm


Lane B
Lane A

Integration Approach

- "The data collection process begins with connecting various sensors, such as ultrasonic or infrared, to the Raspberry Pi.
- These sensors are strategically placed to detect occupancy and other relevant information in parking spaces.
- The Raspberry Pi, functioning as a microcontroller, interprets the sensor data through GPIO pins. Python scripts or dedicated libraries are then utilized to interact with these pins, enabling the Raspberry Pi to read data from the sensors accurately.
- The data, representing parking space availability, is processed locally on the Raspberry Pi.
- Once processed, the Raspberry Pi communicates this information to a centralized server or cloud platform over the internet through protocols like HTTP or MQTT.
- This data is then made accessible to the mobile app via APIs integrated into the app's backend. The mobile app, with features to request and display real-time parking data, can fetch this data from the server.
- Through this streamlined process, the mobile app provides users with up-to-date parking availability, offering a seamless and efficient parking experience."


Starting a application
Booking a parking slot
Making payment for the parking time.
User ID
Parking Time
Payment Info
Cloud Database
Allotment of slot
Making payment for the parking time.
Time Starts
Time Out
Notification to driver and attendant
Driver removes the car from slot
Car leaves the parking area

Reference

- Title: "Smart Parking Systems for Future Smart Cities: An IoT-Based Approach"Authors: Mohammad S. M. Ali, Ahmed B. Altamimi, Fadi Al-Turjman
- Published in: IEEE Access, 2019Link: IEEE Xplore - Smart Parking Systems for Future Smart Cities
- Title: "An IoT-based Smart Parking System for Smart Cities"Authors:
- Varsha Jadhav, Sudhir Warier, Suresh Sankaranarayanan
- Published in: IEEE International Conference on Computing, Power and Communication Technologies (GUCON), 2016 Link: IEEE Xplore - IoT-based Smart Parking System for Smart Cities
- Title: "Smart Parking System using IoT: A Survey"Authors: Shrinivas R.
- Zanwar, Nitin A. Kadam
- Published in: Procedia Computer Science, 2017 Link: ScienceDirect
- - Smart Parking System using IoT

Thank you