**Smart Parking using IOT**

**Overview:**

This 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 principles:**

**Project Objectives:**

The goal of our project is to implement automated car parking system based on IOT.The project establishes specific objectives, including real-time ridership monitoring, mobile app integration, and the implementation of efficient transit information delivery.

These objectives serve as the foundation for the entire project, ensuring that each component aligns with the overarching goal of enhancing the transit experience.

We create a miniature model of an automated car parking system with car model and parking lots that can regulate and manage the number of cars that can be parked in a given space at any given time based on the availability of parking spot.

If the parking spot is full the parking spot sends a message to an autonomous car with detail of identify the nearest free parking spot.

Automated parking is a method of parking and exiting cars using sensing devices. And the automaticaly distance is calculated.

**IoT Sensor Design:**

The sensors are strategically placed to detect occupancy and availability, allowing for precise tracking of ridership patterns and real-time vehicle utilization.

When a vehicle enters the parking lot, sensors detect it and send data to a central control unit which then updates its information about the occupancy status of the lot.

Ultrasonic, electromagnetic field detection,infrared,RADAR are several types of iot smart parking sensors.

=> **Parking Sensors:**

The role of the parking sensors is to track space in the parking lot. Ultrasonic sensors are used to detect the presence of vehicles.

=>**Infrared sensor:**

These sensors would emit infrared energy and detect any object or vehicle by the amount of energy reflected,It detect changes in energy and when a vehicle occupies a parking space, these sensors identify the change in energy and detect occupancy.

=>**RADAR sensor:**

These sensor device that allows the detection of parking availability indoors and outdoors

**Real-Time Transit Information Platform:**

The development of a user-friendly mobile app interface is a core component of the project.

This interface is designed to display real-time transit information, including vehicle locations, expected arrival times, and occupancy status.

By offering this information to users, the platform empowers commuters to make informed decisions about their travel routes and schedules.

To collect real-time data on parking lot of occupancy and transmits this information to the cloud or local network such as Google Cloud IoT Core platform, and it allows a complete solution for connecting, managing, and reporting on car park usage.

**Integration Approach:**

The project's success hinges on the seamless integration of IoT technology and Python programming. Raspberry Pi devices are employed to collect data from the deployed sensors and update the mobile app in real-time.

This integration ensures that the data collected from vehicles is translated into meaningful and actionable information for passengers.

The Integration Approach for this project involves establishing a systematic method to facilitate data exchange between the Raspberry Pi and the mobile app. It is crucial to define how the Raspberry Pi will efficiently gather data from various sensors and subsequently transmit this information to the mobile application.

This entails selecting appropriate communication protocols, designing data structures, and implementing a seamless data transfer mechanism.

By carefully planning and executing this integration approach, we ensure that real-time sensor data seamlessly updates the mobile app, providing users with up-to-date and accurate information for a smooth and responsive user experience.

**Conclusion:**

This project represents a forward-looking initiative aimed at transforming public transportation services by leveraging the capabilities of IoT technology.

By embracing Design Thinking principles, it aspires to enhance the urban transit experience, reduce commuter uncertainty, and ultimately promote the use of public transportation as a sustainable and efficient mode of travel.

This abstract underscores the project's commitment to innovation and its potential to improve the lives of urban commuters.