**SMART PARKING**

**Problem definition:**

The objective of this project is to design, develop, and deploy an innovative parking management system that leverages Internet of Things (IoT) technology. The system will optimize parking space utilization, improve user experience, and reduce traffic congestion in urban areas. An IoT-based parking system is a centralized management that enables drivers to search for and reserve a parking spot remotely through their smartphones. It offers a convenient arrangement for drivers to park their cars when they are looking to avoid potential traffic congestion.

**Detailed Explanation:**

* **Parking Monitoring:** ImplementIoT sensors in each parking space or at entrance/exit points of parking slots. These sensors detect the presence or absence of vehicles and send this data to a central server or cloud platform.
* **Occupancy Monitoring:** Real-time data on parking space occupancy is collected and this information can be used to optimize parking space allocation and pricing strategies.
* **Parking Guidance:** Develop a system to guide a drivers to the nearest available parking spaces using navigation and mapping services. This reduces the time and fuel wasted in searching for parking.
* **User Interface:** A user-friendly mobile app provides real-time parking availability information to drivers. Users can view the nearest available parking spaces.
* **Reservation and Payment:** Users can reserve parking spaces through the app and make payments electronically. This reduces the need for physical payment.
* **Notifications and Alerts:** The system can send notifications and alerts to users, such as reminders for a parking reservations or notifications about parking availability**.**

**Design thinking:**

**Project objectives:**

* To develop a centralized management system based on IOT concepts that allows the drivers to use their smart phone to search for and reserve parking spot.

**IoT sensors:**

* Various type of IoT sensors used for detect the occupancy status of the parking spaces. The most commonly used sensors are Ultra Sonic sensors and Infra-Red sensors.
* These sensors collect the information about the parking spaces and transmit the data to a central server or a cloud platform via wired or wireless connectivity.

**Mobile Apps:**

* Users can access information about the available parking space and reserve them in advance using Mobile apps. These apps also provide navigation to the parking spot.

**Payment Integration:**

* Payment processing can be also integrated into the system allowing the users to pay for parking electronically via mobile apps.

**Real Time Notifications:**

* Users can receive real-time notification about parking availability and reservation confirmations through mobile apps.

**Integration approach:**

* ThinkSpeak is a popular Internet of Things (IoT) platform that allows users to easily build and control IoT projects through a user-friendly mobile app. It provides a simple way to connect various hardware devices, sensors, and microcontrollers to the internet and control them remotely.

**Work Flow:**

* Parking systems are installed on the outside of buildings or inside of buildings. When a vehicle enters the space, sensors detect its presence.
* After that microcontroller calculate available parking slots with help of the sensor inputs.
* The data sent to cloud and this data fetched from the cloud and displayed in a mobile app for user visualization.
* With help of this mobile app user can able to find the nearest parking space and he can also able to reserve a parking space through mobile app.

**Team Members:**

Hariharan S (2021504007)

Madhavan T (2021504020)

Sanmugavel R (2021504036)

Harish Keran E (2020504519)