**An IoT-Based Intelligent System for Real-Time Parking Monitoring and Automatic Billing**

**Aim:**

The aim of the project, IOT based fully automated parking system for vehicle parking stations implemented by microcontroller and the RFID module. The main aim of this project is reduces human interaction in parking area.

**Abstract:**

The main aim that we have is to create a completely automated car parking system with minimal human interference. With the rising population in the world, time is of the essence and hence we need to minimize the time taken by trivial activities such as finding a place to park in a busy place and avoid traffic congestion. We have seen in existing systems sometimes accidents can occur in parking situations by cars going at high speed o caused by frustrated drivers unable to find a parking space for a long period of time. We propose a smart and automated car parking model that will help the user in booking their parking spaces beforehand and the vehicle will be able to park automatically once in the parking zone. The difference between our project of automated car parking systems is we hope to minimize human interaction as much as possible and make both the vehicle and the parking area fitted with sensors that will help us execute a safe and efficient way of parking. Hence, we aim to provide a completely safe and automated experience that is robust and can be implemented in real time and hopefully be implemented as the general norm for parking systems in the future.

**Existing system:**

In this existing system is A novel intelligent parking sensor system was presented. It allows real time parking monitoring along with parking payment without requiring any user/driver interaction. The sensor system has advantages in terms of detection and payment reliability and reduces costs by reducing system complexity.

**Proposed system:**

In this proposed system is fully automated car parking system implemented by the microcontroller. IR sensor is used to detect the car in parking station and allocate the parking slot automatically to the specific car for reducing car crashes. The Ultrasonic sensor is used in parking slots. The ultrasonic sensor is used to check the car was fully parked or not in parking slots. IOT is implemented in this project for automatic billing system.

**Block diagram:**

Arduino mega

Entrance IR

Exit IR

RFID

ESP8266

Power supply

LCD

Entrance servo

Ultra sonic 1

Ultra sonic 2

Exit servo

cloud

RTC

**Block diagram description:**

Above the block diagram is contained Arduino mega, ESP8266, RTC, two servo motor, two IR sensor, two ultrasonic sensor, LCD and RFID. IR sensor, Ultrasonic sensor and Servomotor are directly connected to GPIO pin of Arduino mega. IR sensor is used in the entrance and exit of parking station. If any car detected in the entrance IR sensor, controller will start the process and show the slot number in LCD for each car. The ultrasonic sensor is used to check the car is available or not in parking slots. RFID module is used for payment process. ESP8266 is a wifi device which is used to send data from controller to the cloud. Exit IR is used to allow the vehicle to outside of parking slots.

**Requirements:**

**Hardware requirements:**

* **Arduino mega**
* **ESp8266**
* **IR -2**
* **Ultrasonic sensor-2**
* **Servo motor-2**
* **RFID reader**
* **LCD**

**Software requirements:**

* **Compiler: Arduno IDE**
* **Language: c, sc++**