Phase 3: Development Part 1

# Smart Parking System

**Diagram**:

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**Components used**:

* ESP32-S2
* Ultrasonic Sensor
* LED
* Servo motor
* Wires

**Working**:

* When a vehicle enters the slot the two ultrasonic sensors attached in the ceiling will detect it and send signal to the microcontroller that the slot is occupied. The red LED will turn on to indicate the slot is occupied.

The reason for using two ultrasonic sensors is to avoid incorrect detection of obstacles.

* If all the slots are filled the main servo motor closes the path for no more vehicles to enter unless any one slot is freed up.
* If the slot is available then the red light will turn off itself by the detecting work of the ultrasonic sensor.
* The limit of the ultrasonic sensor is set to the minimum height of a vehicle. When the ultrasonic sensor detects signal less than the limit then it means there is no vehicle and the LED will turn off.
* Whenever a slot is occupied or available the ESP32-S2 will update the firebase database on a regular basis. The user can also see which slot is available in the app also.
* Without paying the charged the gate i.e., the servo motor won’t open. If the used is paying the charges by cash to the service person the service person can open the gate in the app.

**App Working:**

* User can view which slot is available in the app.
* The parking charges will be displayed in the app and the user can pay it using the authorized payment gateways.
* The service person working the parking slot have access to open or close the gate in the app.

**Sample Images of working**:



