

Design and Development of a Smart Parking Spot Availability Identification System Using Ultrasonic Sensor

Group 7

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Aim

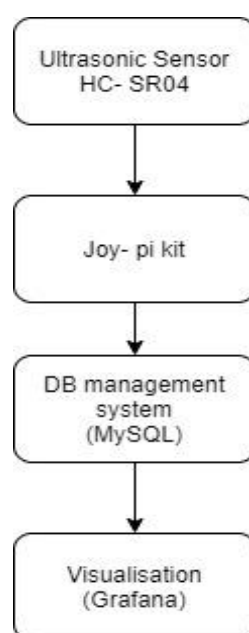
To identify the available parking spots in a parking lot thereby indicating a driver before entering the parking lot.

The Problem

In the modern day, the advancement of technology in the field of mobility has put multiple forms of transport on the road. With the ever increasing transport sector, the need for real estate to accommodate the vehicles when not in action is at a rise. Parking lots in buildings and on roads are usually always found to be accommodating and really hard to identify vacant spots in case of private vehicles. Modern day car users face this challenge on an everyday basis, trying hard to find a vacant spot before running into work or into a supermarket. This brought about the challenge to identify and indicate the available parking spots to the driver in hand, based on which the driver can make his way into the parking lot.

Proposed Approach

The availability of a parking spot is entirely dependent on the presence of a car in the parking lot. Identifying a car's position in the parking spot helps provide an insight into the availability of the slots in a particular building of parking spaces. For this purpose, multiple methods can be incorporated but upon considering various parameters and finalising upon the Ultrasonic sensor: HC- SR04.



Based on the flowchart above, a sequence can be derived for the workflow. As indicated in the flowchart, the HC- SR04 collects data regarding the presence of a car. This can be determined by the distance of the object determined by the HC- SR04 sensor and based on the distance measured, the presence of a car can be identified. Based on this principle, the detection of a car can be identified.

Methods used in source code:

We have used MySQL as our db management system. The Ultrasonic sensor sends pulse signals and receives back if the signal is reflected. If the distance satisfies the 'if' condition, appropriate responses are recorded and saved in the database table. We use grafana to visualize the received data.

We have assigned availability of parking spot as 1 and absence as 0 (boolean type notation). Since we need to have live status of the availability of the parking spot, we monitor continuously and gather every data from the sensor. This way we can use grafana to not only determine the presence or absence of the parking spot, but also to know how long the parking spot was occupied. This is an extension of the initial application for cost estimation.

Note:

The source code is written considering the help from the internet and also by members.

Referred code:

<https://github.com/engcang/HC-SR04-UltraSonicSensor-ROS-RaspberryPi>