Automated Parking Allotment and Reservation System

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AIM

Creation of an efficient, automated mall parking allotment system with reservation for movie audiences.

OBJECTIVE & DESCRIPTION

- A car entering the parking lot will be detected using a motion sensor and will have its number plate scanned, and will have an entry generated for it (number plate, entry time and parking slot number). An alcohol breathalyser (which uses alcohol detectors) is operated by a human employee to test for drunken driving before entering the parking lot.
- A free parking slot's number is allotted to it, and displayed, based on the distance from the entrance being maximum. This ensures the parking lot is uniformly and most efficiently filled without any car waiting for ones in front of it to park.
- Each slot has a proximity sensor to check for occupancy, and is numbered for unique identification.
- Ultrasonic sensors within the parking lot at long stretches of straight paths detect and prevent over-speeding for safety and crash prevention.
- When the car exits, it is detected using a motion sensor and its number plate is scanned again and the difference between its exit and entry timestamp generates the parking cost, and a human employee can collect the due cash.

- During entry, the driver can display the QR code(s) of the movie ticket(s) of the passengers to a scanner, and a reserved parking slot is allotted to them, and their movie's audi number and show timing is also saved.
- The Reservation System utilises a Machine Learning Regression model. It plots a closest fit line to a scatter plot of a Parking Slots Vs. Audience Size graph. Based on the QR code scanned, the audience size of the movie's audi is ascertained. A set number of parking slots is allotted, which is determined from the closest fit line. The slots closest to the entrance are allotted for this purpose, so as to give priority to them.
- The previous data is collected from the Allotment System. A particular show timing for an audi (to determine audience size) and the number of slots allotted to it generates a point on the scatter plot.
- This Linear Regression Model is used because 1 person or 5 people of an audience may travel in one car. Thus, an estimate of the number of slots for reservation is to be calculated.

HARDWARE REQUIREMENTS

1. Proximity sensors
2. Motion sensors
3. Ultrasonic sensors
4. Alcohol sensors
5. Mux
6. Web camera
7. LCD
8. Motor
9. Raspberry pi
10. Other components like resistors, etc.

SOFTWARE REQUIREMENTS

1. Python
2. OpenCV module
3. Zbar module
4. Other libraries for hardware interfacing