SMART CARD BASED PARKING SYSTEM

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Introduction and Motivation

Due to urbanization, the use of automobiles has increased which in turn has led to traffic and parking problems. The solution used these days, is to increase manpower to address such traffic. In case, one does find and a place to park he does get stuck in a long queue while paying the parking charges. To reminisce where the car is parked after a three hour long movie is also a nuisance.

RFID schemes used in toll gathering, to grant access and supply-chain management systems by means of conventional RFID system.

Scope of the Project

The scope of our product is to ease the process of car parking in public parking lots and provide drivers a hassle-free and swift car parking experience. In this project, we aim to design a product that eliminates the need to stop while entering and leaving in the parking space, saves time and fuel, reduces air pollution.

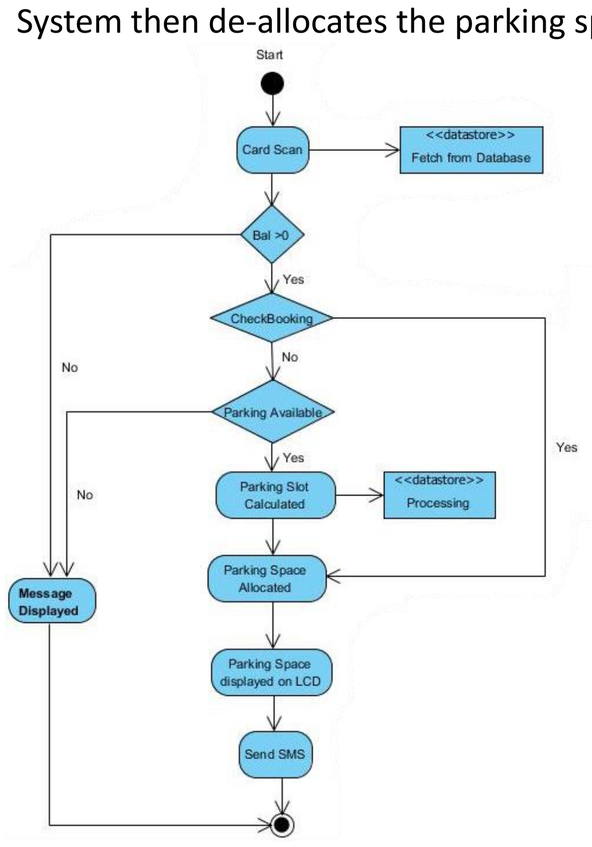
Methodology

Entry in the parking lot

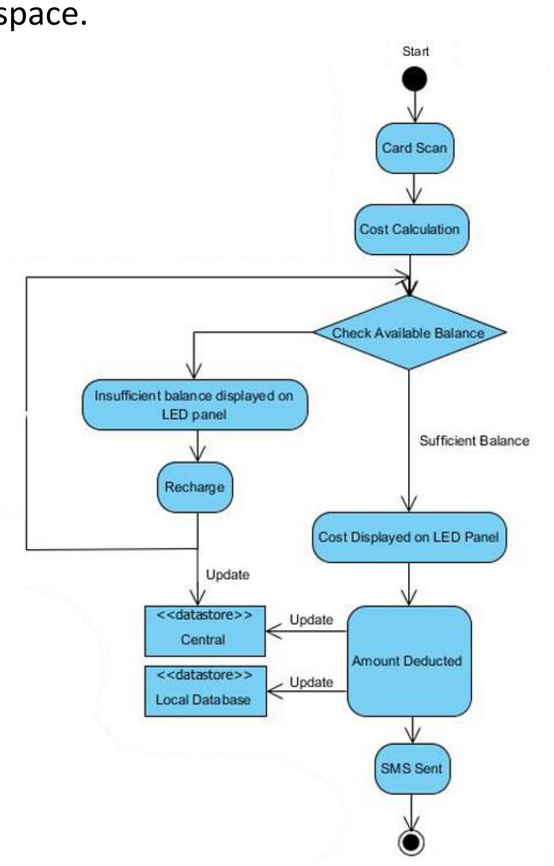
- As the car enters the parking area, the RFID card installed in the car is scanned though the RFID card reader at the gate.
- The card reader will extract the cars registration number.
- The System then checks if the owner of the car has any special parking space preference.
- The user is allowed to choose a parking slot based on his preference of least walking distance from the elevator, nearest parking slot (least driving distance), or security (total coverage/partial coverage of the slot by CCTV cameras).
- The best parking space available is allocated to the car and the same is displayed on an LCD panel .
- A similar SMS is sent to the owner's number using GSM. Time of entry is recorded into the system.

Exit from the parking lot

- During exit, as the car leaves the parking lot, the card is scanned again.
- Exit time is recorded and parking charges are calculated based on duration of parking.
- The parking cost is displayed on the LCD panel.
- Cost is deducted from the car owner's balance and the database is updated.
- A SMS will be sent giving information about the amount deducted and the remaining balance in the card.
- System then de-allocates the parking space.

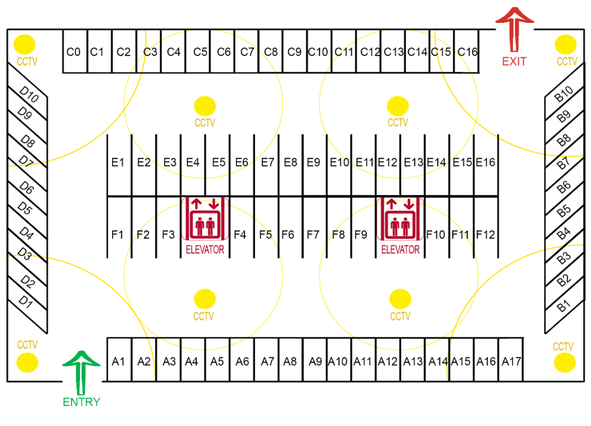


Entry Activity Diagram



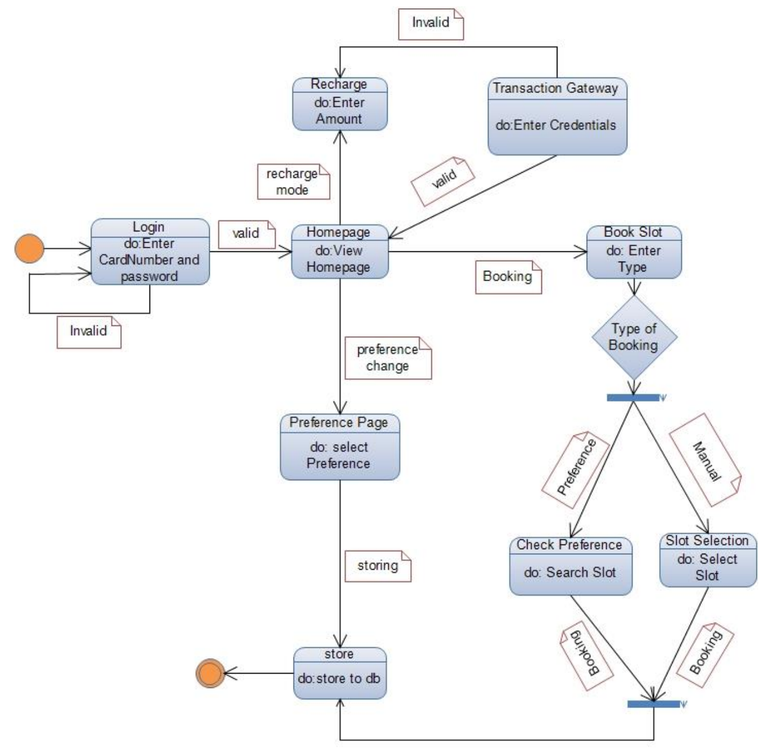
Exit Activity Diagram

Parking Preferences



- Least walking distance
- Least driving distance
- High security
- Parking types
  - Slash
  - Parallel

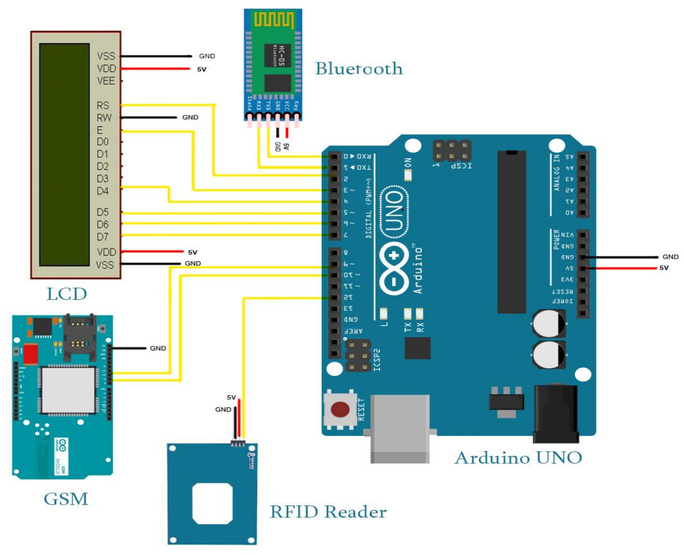
State Diagram of Website/Android App



Functionalities

- *Pre-Booking*
  - *Manual*
  - *Preferred*
- *Card recharge*
- *Preference change*
- *Profile view*

System Architecture



Components

- Arduino UNO
- RFID Reader and Cards
- GSM Module
- Bluetooth Module
- LCD
- SIM Card
- Jumper wires

Results

- The RFID cards can scan and transmit the data wirelessly.
- It will find and allocate the best available parking slot according to the parking preference selected.
- The system will display the allocated parking space on LCD.
- User can change the parking preference and recharge the card by directly paying from the app or website.
- User can also pre-book parking slots through app and website.
- User can extend the booking for two more hours by paying the booking amount or can cancel the existing booking.
- Our system automatically deducts the parking amount from the RFID card, so no need of handling the change or waiting in the queues.

Conclusion

- No need to stop while entering and leaving in the parking space.
- Saves time and fuel.
- Less pollution.
- No need to remember the parking location.
- Automatic deduction of parking amount.
- Paperless and cashless.
- Efficient parking management.

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