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Software Engineering 2: “PowerEnjoy”

Requirements Analysis and Specifications Document

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# Introduction

## Description of the given problem

We will project and implement PowerEnjoy, which is a service based on mobile and web based digital management system for car sharing which exclusively employs electric cars. It targets two set of people:

* Guest users
* Registered users

The system should allow the user to register into the system by providing their credentials and payment information using the provided web or mobile app. It should also help the users in finding the locations of the car within a certain distance from the user’s specific location.

The app should also be provided with the freedom of cancelling the registration if the users doesn’t pick up the car in specified time.

Users may not always be registered in the app; they should also be able to see the available cars just by entering the app. This kind of users are considered as guest users.

The system included various kinds of services and benefits accordingly.

The main purpose of the system is to be more efficient and reliable than the current apps in the same domain which tries to offer better services to the client.

## Goals

* [G1] Allowing the guest users to enter the app.
* [G2] Allowing the users to find all nearby available cars and their locations.
* [G3] Allowing the users to register into the application by providing their credentials and payment information.
* [G4] Allowing registered users to book car in a selected geographical area.
* [G5] Allowing registered users to reserve only a single car and make it available for up to one hour before they pick it up.
* [G6] Allowing admin users to keep track of the cars are current locations.
* [G7] Allowing admin users to send notifications or alerts to some cars accordingly.
* [G8] Allowing registered users to choose option in sharing other passengers.
* [G9] Allowing registered users to choose on money saving option by letting them enter their destination.
* [G10] Allowing registered users to check the percentage of battery left in the car.
* [G11] Allowing registered users to check the price charged till that moment of time.
* [G12] Allowing registered users to find the safe areas for parking the car after their use.
* [G13] Allowing registered users to send the information of their current location for the car to get unlocked and ready for the drive.
* [G14] Allowing registered users to receive a confirmation SMS or an email stating that the car has been booked, location of the car and threshold time to collect the car.
* [G15] Allowing registered users to know the estimated price of the ride and optimal statistics.

## Domain properties

Assuming the following properties to be stick and not broken.

* The payment information of the user is genuine and transactions are not to be failed.
* The GPS system of the car and the user should be proper and accurate.
* Car’s GPS should not be turned off at any point of time.
* User doesn’t get a damaged car.
* User should not be charged more or less than the calculated price.
* Car contains all required documents
* Car should not carry more than the limited number of passengers.
* Car should be unlocked only if the respective reserved user is close by.
* User should be given the locations of the available cars in the sorted of the distances from the user to the car.
* Guest users should be stored in the system; they should be removed immediately after their session.
* The car codes and user ids should be unique.
* Discounts are fixed and system should act accordingly.
* Penalties are also fixed and the users are to be bound to pay the penalties in case of situations.
* The devices of the users should meet minimum hardware requirements of the application.

## Glossary

* Guest user: he is one of the clients of the application. Each should attach the following information whenever he tries to access the application data.
  + Name
  + Phone number
  + GPS location
* Registered User: he is another client of the application who has access to most of the part of the app. He can reserve/ cancel the cars. He will be charged accordingly for the drive he had made with the reserved car. He should provide the following details to the application for better service.
  + GPS location
  + Payment details
  + Sharing mode
  + Time of reservation
* GPS: Global Positioning System, it provides the exact location of the respective object.
* Electric Cars: those are the cars which work using the electric energy rather than the normal fuels. These are eco-friendly devices.
* Locking of the car: When the car is placed in the parking zone and if there are no people inside the car, the car moves to the locked mode.
* Unlocking of the car: When the user is close to the car, car receives the signal and unlocks the car so that user can use it for his drive.
* Car sharing: It is possible for the user to share his drive with other users who may join on the way of the main user’s path.
* Ride: A tour when the car gets unlocked and user starts the drive till the cars gets locked when users leaves the car is called a ride.
* Discount: A portion of amount that has been deducted from the user’s ride as a token of appreciation.
* Penalty: A portion of amount need to be extra paid by the user in case of violation of rules.
* User request: it is the request from the user to reserve a car close to his location for his drive.
* Reserving a car: it means the car has been blocked and no one else other than the respective user who reserved the car can use it. If the user fails to arrive the car with in an hour, the reservation will be cancelled and the car will be available open for reservation.
* Request queue: all the requests by the user should be processed in a first in first out approach without maintaining any priority. First request should be provided with the resource only then the next.
* Matching ride: If two persons (X and Y) are matching the ride if they meet the following conditions:
  + Starting point and ending point of Y are close to the starting point and ending point of X. And starting point of Y is in between start and end points of X.
  + There should be enough vacancy in the car.
  + Location of X should not overtake location of Y before matching.

## Text assumptions

Here are the few assumptions which we make on the application which is being built.

* User’s device should transmit its location either using a Bluetooth or infrared channel which restricts the distance between the car and the user to be limited. This is when car will be unlocked.
* We need the information about the car, optimal locations where the car be parked by the user.
* All the discount prices are fixed and may not be changed.
* Penalties are also fixed in case of breaking any rules.
* Phone number verification for the guest user may be required to avoid unnecessary requests.
* We have fixed formula for the price calculator which takes distance time and peak hours into consideration.
* User may be notified with the list of entries of other users who are having their requests as per the matching a ride. It is up to the chose the option of sharing the drive.
* All the parking slots have recharging facilities and they don’t run out of charge.
* We may have to restrict the users who don’t break the rules more often.

## Constraints

### Regulatory policies

GPS locations are to be transferred to another entity in the system only with the permission of the user. Confidential data or sensitive data must be public and to be used only within the organization.

### Hardware limitation

* Internet connection (at least 50 Kbps)
* GPS support
* Smart phone in case of mobiles
* Web app support in case of PC

### Parallel operations

The server needs to make parallel operations to process the requests parallelly.

### Proposed System

The application will be implemented using AngularJS which supports Single Page Applications and will be continued using a MVC pattern.

## Identifying stakeholders

There are internal and external stakeholder. All the staff, board members and volunteers of the organization come under internal stakeholders. The guests, registered users, car maintenance services fall under external stake holder category.

## Reference documents

* Requirement Engineering part I
* Requirement Engineering part II
* Requirement Engineering part III
* Example docs: RASD sample from Oct. 20 lecture.pdf
* SRSExample-webapp.pdf
* http://www.slideshare.net/indrisrozas/example-requirements-specification

# Actors identifying

There are four main actors in the system:

Guest user: He is not registered in the system. He can check all the nearby available cars.

Registered user: He is registered in the system. He can check nearby cars and can also reserve them.

Admin: He is the responsible person for the system. He has rights to add/ remove a user. He can also send notifications to the users and cars in case of situation.

# Requirements

## Functional requirements

With all the assumptions, domain properties we can achieve the goals listed in the above section of the document by deriving the following requirements. Each goal has its own set of requirement and they are mentioned below.

* [G1] Allowing the guest users to enter the app.
  + The system should take user name and phone number as input.
  + The system should let the guests enter only if they enter a valid phone number.
* [G2] Allowing the users to find all nearby available cars and their locations.
  + The system must request the user for his GPS location.
  + The system must use the GPS location to find the nearest car hubs where the user can find the car.
  + The system must provide the user with appropriate results.
* [G3] Allowing the users to register into the application by providing their credentials and payment information.
  + The system should take user name, password and email id for registration.
  + The system should verify the email id by sending a confirmation mail.
  + The system should take the payment details when the email gets verified.
* [G4] Allowing registered users to book car in a selected geographical area.
  + The system should take username and password from the user and check if the provided information is correct.
  + If the information is correct the system should show the user with all nearby available cars.
  + The system should let the user to select the car chosen by the user if it is available.
  + The chosen car should be made available for this user and make it blocked for others.
* [G5] Allowing registered users to reserve only a single car and make it available for up to one hour before they pick it up.
  + The system should not allow user to book another car if there is already one car is blocked by the user.
  + The system should keep track of time of when the reservation was made.
  + If the difference between current time and the time of reservation is more than an hour the reservation must be cancelled by the system.
  + In case of cancellation of the cars by the system or by the user, a penalty of
* [G6] Allowing admin users to keep track of the cars are current locations.
* [G7] Allowing admin users to send notifications or alerts to some cars accordingly.
* [G8] Allowing registered users to choose option in sharing other passengers.
* [G9] Allowing registered users to choose on money saving option by letting them enter their destination.
* [G10] Allowing registered users to check the percentage of battery left in the car.
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* [G12] Allowing registered users to find the safe areas for parking the car after their use.
* [G13] Allowing registered users to send the information of their current location for the car to get unlocked and ready for the drive.
* [G14] Allowing registered users to receive a confirmation SMS or an email stating that the car has been booked, location of the car and threshold time to collect the car.
* [G15] Allowing registered users to know the estimated price of the ride and optimal statistics.

## Nonfunctional requirements