



ANALYSIS OF VEHICLE TRACKING SYSTEM

OOAD Assignment 1

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Introduction

An android application. Based on client-server technology along with the use of DB.

Using GPS one android user (driver) sends real time location of the vehicle along with date and time to the server.

Information provided by the driver stored in the DB. And other appropriate users can get the information from server. Admin can create, delete or modify account of any driver. Admin can also keep the record of the vehicle such as vehicle no, vehicle schedule, review of the vehicle, review of the driver, driver contact, etc in the DB. And the admin has the permission to update/modify records as per the needs.

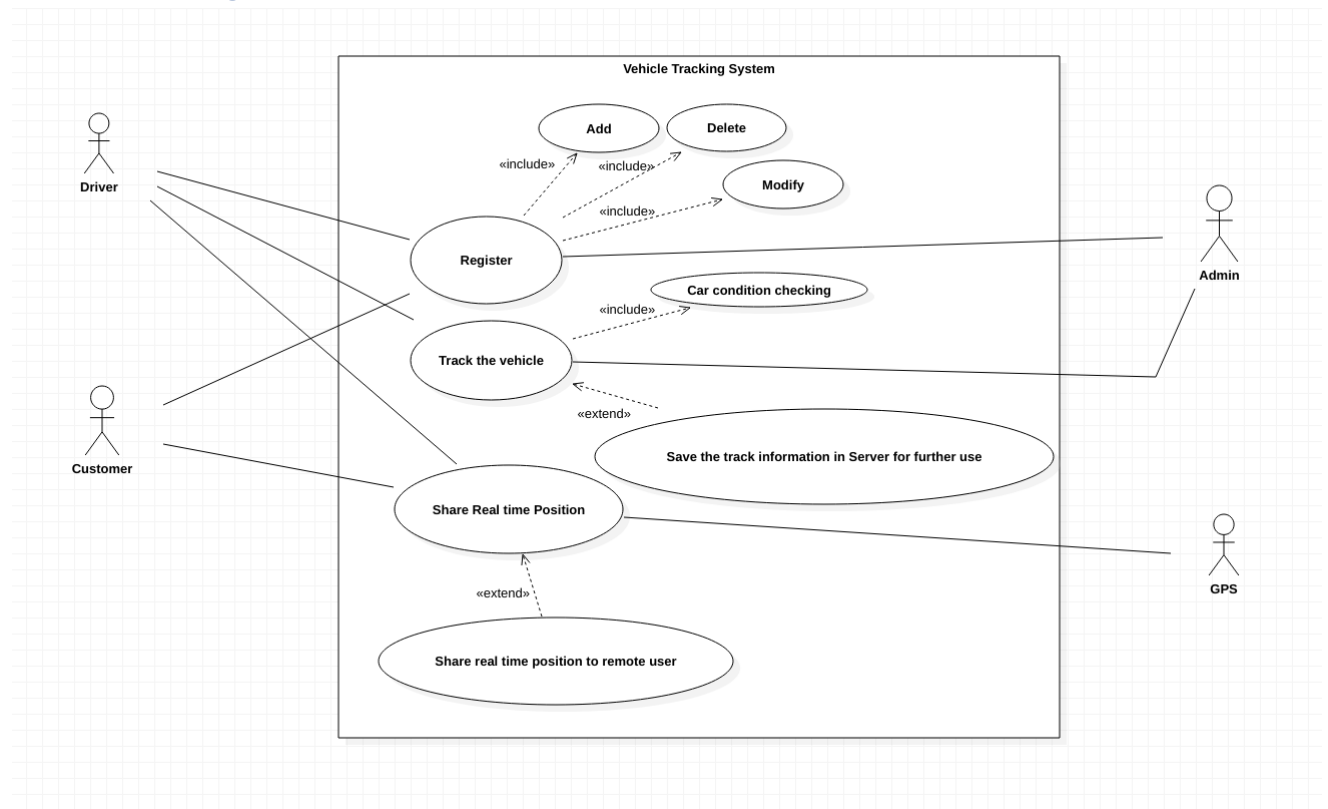
Customers can avail any of these registered vehicles. To do that, they have to have an account.

Customers, who are travelling in a vehicle, can share their travel details with anyone they want. Travel details include - vehicle no, vehicle schedule, route info, pickup point, drop point, real time location of vehicles.

Once vehicle reaches to the destination, customer and driver get the notification of the price. Customer pays the amount and leaves the vehicle. Among whom the travel details are shared, they can also get to know about the real time position of the person. In case, they have to meet the person, they can follow the real time position of the vehicle and accordingly reach to the drop point. In this way, they don't have to wait for the vehicle being unknown whether the vehicle is coming or has gone.

So, in summary, our system handles all the data about current location of the vehicle and this information is then given to remote users who want to know the real time vehicle information.

Use case diagram



Use cases

Use case UC1 – Register

Scope:

Vehicle Tracking System

Primary Actor:

Driver, Customer

Stakeholder and interest:

- Admin: Wants to maintain the accounts. Validates all account information. Whenever necessary, they can delete or modify the content of the account.

Preconditions:

- Drivers must have all information of car and their personal details. Also, they must have a tracking device attached in their car.
- Customer should provide correct details about him/her. They must have a tracking device.

Success Guarantee:

- Drivers' tracking device, details of cars and their personal details are registered in the system.
- Customers' tracking device and their personal details are registered in the system.

Main Success Scenario:

1. User access a website of Vehicle tracking system
2. Provide the necessary information
3. Click the submit button
4. Login id and password will be generated and shared with the user

Extension:

- *a. User can be customer, driver or admin
 - 1a. Driver accesses the website of vehicle tracking system
 1. Show webpages, which are specific for drivers
 - 1b. Customer access the website of vehicle tracking system
 1. Show webpages, which are specific for customers
 2. Provide tracking devices' information
 3. Provide his/her personal details
 - 1c. Admin access the website of vehicle tracking system
 1. Show webpages, which are specific for admins
 2. Do the maintenance
 3. Validity check for new accounts
 - 2a. Driver provides the necessary information
 1. Provide driver's car information
 2. Provide tracking devices' information
 3. Provide driver's personal details
 - 2b. Customer provides the necessary information
 1. Provide tracking devices' information
 2. Provide customer's personal details
 - 3a. Admin will validate the information given by the user
 1. For Drivers
 - 1a. Validate the car's number plate
 - 1b. Validate the tracking device

- 1c. Start validation process for the personal details
2. For customers
 - 2a. Validate the tracking device
 - 2b. Start validation process for the personal details
- 4a. Upon successful validation, admin will generate login id and password for an account

Special requirement:

- Modify account
- Delete account
- Add account
- At any time, user can create an account
- Simultaneously, 1000 users should be able to create account

Technology and Data Variations List

3a. Use mobile as a tracking device and send a message to associated mobile number for validations

Frequency of occurrence:

Continuous

Open issues:

- How to initiate personal details validation?
- Who will verify personal details?

Use case UC2: Track the Vehicle

Scope:

Vehicle Tracking System

Primary Actor:

Driver, Customer

Stakeholder and interest:

- Admin: Check feedbacks for drivers and customers. Keep track about all travel histories of drivers and customers.

Preconditions:

- Servers must be up and running all the time
- Tracking system of Vehicle should work properly
- Tracking system of customer should work properly

Success Guarantee:

Once driver reach to the pick up point, all devices should be activated. Periodically, collected data will be uploaded to appropriate Servers. Once driver reach to destination, all data should be uploaded to appropriate Server.

Main Success Scenario:

1. Customer requests for a car to go to a destination
2. Server fetches condition of some cars, which are belong to close proximity
3. Server validates the conditions of cars
4. Server assigns a car to customer and notifies the driver
5. Driver reaches to pick up point
6. All tracking devices are activated
7. At regular interval, through internet, few data are saved in Server
8. Once driver reaches destination, all necessary data are saved in Server

Extension:

- 1a. Customer has to login to the system
 1. Use the credential, given by admin
 2. Login to the system
 3. Set destination
- 2a. Server can't validate car's condition
 1. Notify driver about it
 2. Don't assign any customer
- 4a. Driver rejects the request
 1. Server search for another car
 2. Server assigns a car to customer and notifies the driver
 3. If driver rejects the request, again start from step-1
 4. Above process will continue either driver accepts or all cars are assigned one by one but none accepts
- 7a. For some intervals, when internet is not available
 1. Track customer's device
 2. If customer's device is also facing internet issue, save information locally
 3. Once internet connection restored, share all information to Server

Special requirement:

- Devices can save information locally for some time
- Track the speed
- Track the condition of several parts of car

Technology and Data Variations List:

- 1a. Mobile app is required to communicate all information
- 2a. Server-Client mechanism is required to enable such facilities
- 7a. Car should have tracking devices attached to necessary parts of it. Here Automotive industry can help.

Frequency of occurrence:

Continuous

Open issues:

- Which parts of a car should be tracked regularly?
- What are the measurements to declare that a car is in a condition to reach at destination?
- How to track the real time car speed?
- In case of thousands of such active rides how system will track every detail of every car?

Use case UC3: Share real time position

Scope:

Vehicle Tracking System

Primary Actor:

Driver, Customer

Stakeholder and interest:

- Admin: Admin will continuously monitor whether driver is maintaining all perimeters or not.
- Remote User: If customer share location with someone else, that person will be able to monitor the position uninterruptedly.
- Global positioning system: This system will continuously share the longitude and latitude of the tracking device
- One Sw component should always map the longitude and latitude of the tracking device to a virtual map

Precondition:

- User (Driver or Customer) must be logged in into the system
- Tracking device should be working properly
- Virtual Map should work properly

Success guarantee:

- Customer or Driver will share the information, received from tracking device
- SW component will continuously and accurately plot that information in virtual map

Main Success scenario:

1. Login to the system
2. System will establish communication between tracking device and GPS
3. System will have a virtual map
4. After getting longitude and latitude information from GPS, it will accurately update position in its virtual map

5. In case of sharing, appropriate information will be communicated among different users

Extension:

- 1a. Driver has to login to the system before starting a ride
 1. Once driver logged in, Admin will be notified
 2. From pick up point to drop point Admin will monitor all parameters
 3. In case of any emergency Admin can share that information to concern person
- 1b. Customer has to login to the system before starting a ride
 1. Whenever required, customer can check his/her live location.
 2. Customer can share that information with any remote user
 3. Remote user can see the live location of the customer reaches drop point or stops sharing
 4. From pick up point to drop point Admin will monitor the movement as well
- 5a. This virtual map will be shared among Admin, Driver, Customer and remote user
 1. Customer can only share live location through this system
 - a. Using that system remote users can track the movement of the customer.
- 5b. Due to some reason if tracking information is unavailable, system will show last known position to all remote users

Special requirement:

- Connectivity between tracking device and GPS
- Mapping between virtual map and actual longitude and latitude
- Keep track of the whole path in case of future analysis
- Provide securities to each account, so that users account information is remain safe
- Unless customer wants to share, no remote user should be able to access the live location feature

Technology and Data Variations List:

- 1a. Separate user account will be required for drivers and customers
- 2a. Mobile app should have capability to communicate with global positioning system
- 3a. Mobile app should be capable to map virtual map and longitude and latitude information

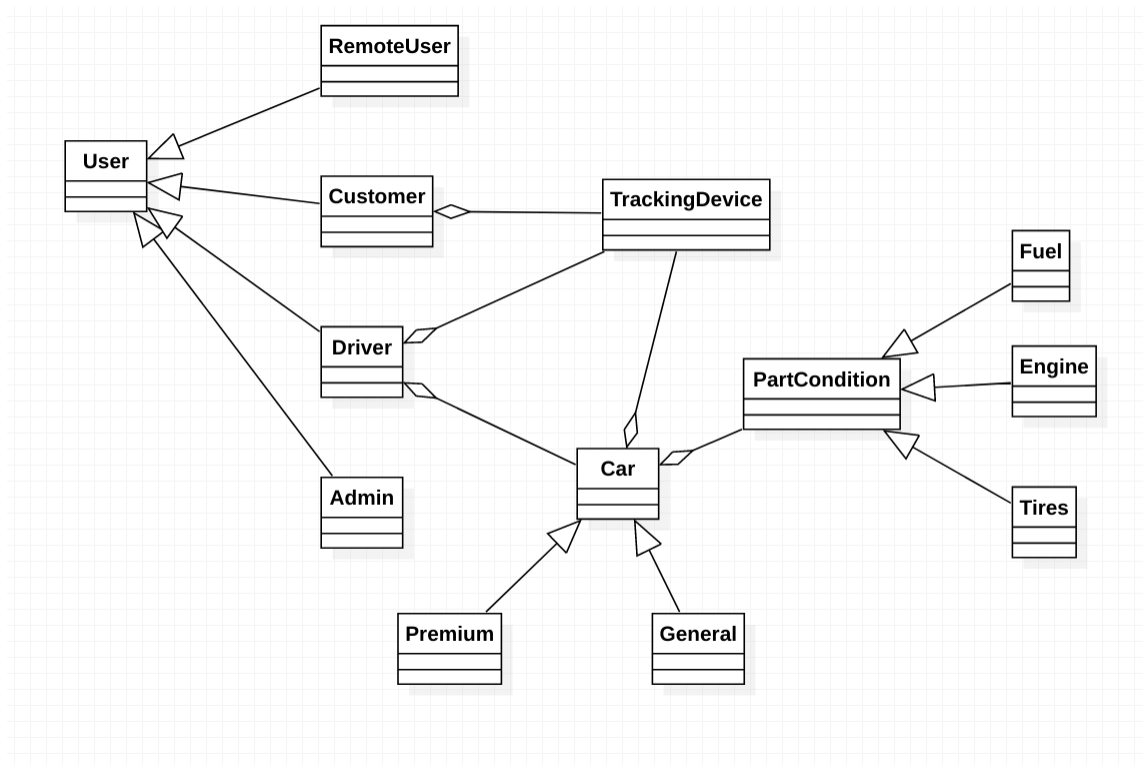
Frequency of occurrence:

Continuous

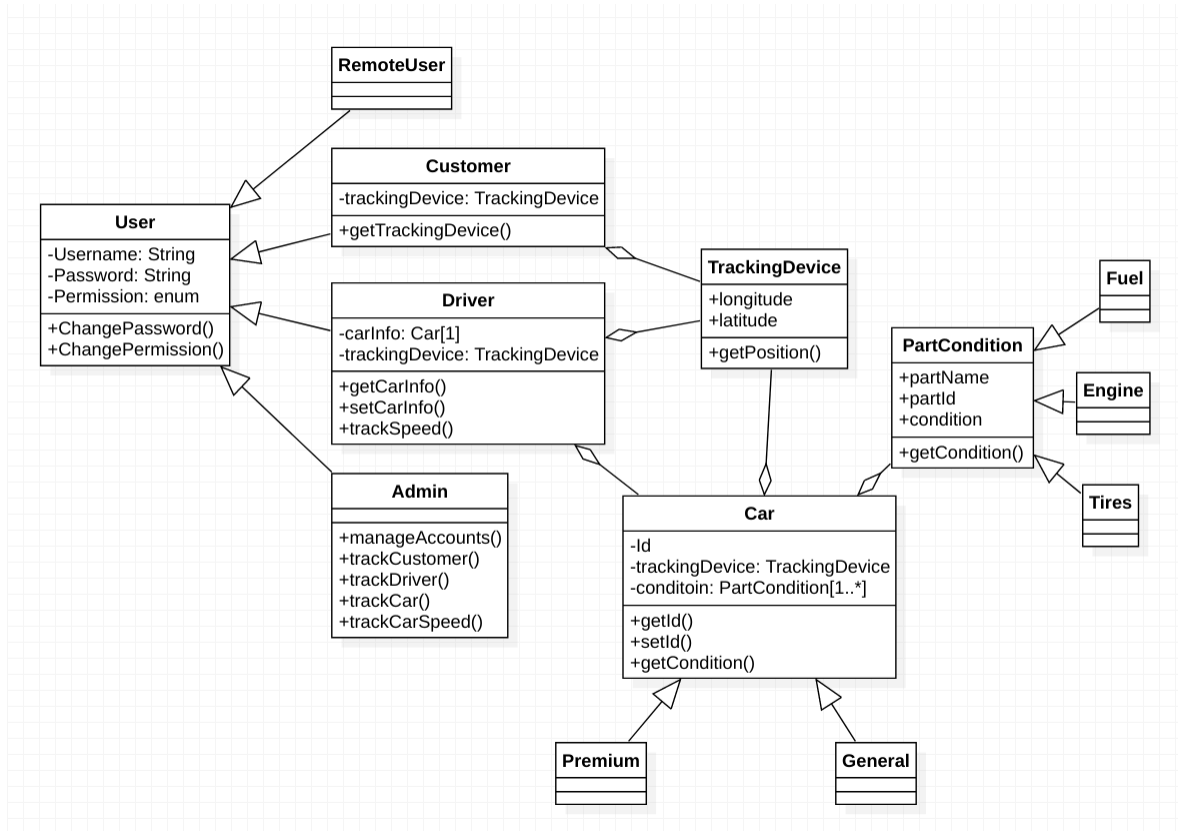
Open issues:

- If customer's tracking device malfunction, how system is going to detect that?
- What level of zoom of virtual map functionality will system provide?
- In case of thousands of such active rides how system will place every detail in the virtual map?

Domain Model



Class Diagram



Key Learning

1. How to derive use cases and use case diagram from description of a system.
2. Visualize all success scenarios and extension depending on the description of the system
3. How to picture the whole system in perspective of different objects
4. How to derive domain model and class diagram from use case descriptions