Project Description for The Ride - Multi Provider Optimization

Team 205
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Project Overview

Our goal is to design an application for MBTA to optimize the efficiency of trips that go through different areas and to minimize the cost both for clients (eg. people with disabilities) and company itself. If successful, MBTA will not only use fewer vehicles overall and maximize utilization of the remaining vehicles, but also it will use vehicles from third-party vehicle companies like Uber/Lyft, thus reducing transportation costs by millions of dollars, and helping more drivers get benefit. As the result of it, people with disabilities also can save money, get to their destination faster, and save their time of waiting for vehicles. Our solution will address the current situation that MBTA faces as well as focusing on the flexibility and extensibility so that we could have chance to change our product if something happens without in our expectation. We will use a pre-established development environment including JIRA and GitHub, and the Java programming language, JavaScript, Html, and CSS to develop our final product.

The Purpose of the project

MBTA is aiming at providing efficiency and convenient trips for every traveler with disability to travel through different regions in greater Boston. Meanwhile, they also want to reduce the operational cost. MBTA commissioned this project for a variety of reasons:

- The current transportation service through different region is operating by three companies (GLSS, VTS, NEXT), which is inefficient.
- When travelers cross through different region, they have to stop at transition points and then start the next trip operated by another company, which is inconvenient.
- The current model of transportation is costly. MBTA wants to reduce the cost in this field.

MBTA hopes for an application where they can enter or read in data about the users their transportation system serves, their start or the arrival time, their pickup location, destination, number of person who will take care of the traveler and “Uber” drivers who are available for serving these travelers. Then the application should accomplish the following task based on the given data:

- Plan a route, including the needed public transportation and the Uber, for the travelers based on the start or the arrival time.
- Based on the given data, determine how many cars are needed to serve travelers.
- Assign available cars to pick up the travelers and send them to their next start point.
- If the travelers need to be picked up, plan a route and assign cars to serve them.

If our application works well, the MBTA can provide the travelers with disability with more convenient trips and reduce the operational costs of the MBTA.

The Scope of the Work

- The Current situation

  If successful, our product will supplant MBTA's engineers who manually design the route of vehicles that pick people with disabilities when they cross different areas will no longer need to generate routes themselves. Also, they will not calculate the number of vehicles that are used for their clients, neither do they need to calculate the estimated time each trip will take. MBTA could reduce their responsibilities merely reviewing the output to ensure that the output is up to their standard. This review is necessary since there are vehicles that are not used to pick up passenger running on the street. With our product, fewer vehicles would be used, but the efficiency of vehicles that are used increases dramatically.

- The Context of the work

  The persons who oversee vehicles routing will interact without our product the most. We use Google Maps to assist with route distance calculations and mapping. Also, we would consider which vehicle would be used to pick more than 1 passengers based on their destinations and the route.

Sample Product Scenario

Vehicle route Generation: Before the day starts, MBTA needs to know who will use The Ride, and check whether they are qualified to use the service based on the records in The RIDE Eligibility Center. If the person is qualified, the user who is using our product will assemble data about the client (person with disabilities) including where the client would be picked up, and where they are heading. Besides, the data includes whether the person would bring someone with him/ her, whether the person needs service animal, and whether the trip would cross different areas. When the user runs the program and selects file, the program will use it to create a xml file. The file tells the number of vehicles, and where these vehicles will go (its routes).

Stakeholders

- The client

The client of this project is MBTA and their representatives. MBTA' IT department could also be considered a representative of the client since they must deploy our finished product into their environment.

- The customer/End user

  While MBTA is the customer, the specific end user(s) will be whoever has direct responsibility for generating bus routes and verifying that they meet legal and safety standards as well as additional criteria MBTA has imposed.

- Other Stakeholders:

  Developers

  Developers like us are the secondary stakeholders. We are directly responsible for the the development of the application.

  Travelers

  The travelers are the secondary stakeholders, since this project can provide them with more convenient service.

  Drivers

  The drivers are the secondary stakeholders, because this project will provide them with additional job opportunity. They are also responsible for serve the travelers.