CUSP-GX-6006.001: Data Visualization

SUMMER 2019

Final Challenge – Ride-pooling Simulation

Due Date: 10:00 AM on July 31, 2019

Problem Statement: Ride-hailing services have become extremely popular in urban areas by providing a convenient an[illegible]arable to owning a private car, wh[illegible]igh up-front costs, maintenance, [illegible] vehicle fleet, ride-hailing service[illegible]rtunity to reducing the cost of pe[illegible] and sustainability of these servi[illegible]ser demand. More precisely, ride-[illegible] to ensure that the vehicle supply[illegible]ebalancing has the unfortunate si[illegible]the same demand. This raises co[illegible]ecently by multiple city planners i[illegible]ers simultaneously, one strategy f[illegible]ging passengers to share rides wi[illegible]ooling service (e.g. Uberpool, Ly[illegible]he inconveniences (additional tra[illegible]ere have also been more transit li[illegible]n drop off points) instead of pro[illegible]. This can further increase the ef[illegible]

We would lik[illegible]t to be shared. In order to do th[illegible]ing various service matching and [illegible] into the simulator output, which [illegible]ough visualization. For this challe[illegible]

DATA S[illegible]

There will be two set of simulation results, where each produces all of the output files below.

vehicle_events.csv: a CSV file containing vehicle activities during the simulation, with the following fields:

- *Timestamp* – the time of the event in seconds. It is either since 1/1/1970, or since 00:00AM if it is a single day simulation.
- *Vehicle_ID* – this is an ID that uniquely identify a vehicle.
- *Stop_Intersection* – the intersection ID of the event. This ID should match with the intersection ID of the road network GeoJSON file.

- *Stop_Passengers* – the number of passengers involved at this stop. It is greater than 0 for picking up passengers; less than 0 for dropping off passengers; and equal 0 for waiting or rebalancing events.
- *Requested_Stop_Intersetion* – this is the original requested intersection ID. For example, a user might request to pick up at intersection A, but the framework can only assigned a cab to pick the user at intersection B. In this case, A is the Requested_Stop_Intersection, and B is the Stop_Intersection. For waiting or rebalancing, Interesevtion_Stop and Requested_Stop_Interesection should be the same.

request.csv: contains a list of all trip requests, and matched-up locations, with the following fields:
- *Timesta* ... if it is a single day simula...
- *Reques* ...
- *Reques* ...
- *Actual_* ...
- *Actual_* ... d)

vehicle_paths ... each vehicle, it is guaranteed tha... road segment) or idling position... it only includes the following field...
- *Timesta* ... 00:00AM if it is a single ...
- *Vehicle* ...
- *Latitud* ...
- *Longitu* ...
- *Num_I* ...

In addition, w... ork of Manhattan, where each ve...

YOUR T...

You are aske... tion) and help us answering the...

1. What is the serving rate for each scenario throughout the day, comparing to the overall serving rate? Serving rate is the number of successfully matched trip in a period of time. For example, is the serving rate higher in the rush hour or at night?
2. For those trips that could not be served, do they follow a spatial or temporal pattern? For example, are most of those trips originated in particular regions, and of certain times?
3. For the entire simulation, we limit vehicle speed to under 25mph. Could you see any vehicle travel exceeded those limits? If so, could you show us where (and potentially how) that happen?

4. We also limit vehicle capacity to at most 4 passengers. Were there vehicles violating this condition? If so, can you show any pattern about these vehicles? For example, how many of them were violating, and where were they distributed in both time and space?
5. What can we learn about the vehicle utilization? Are most of them empty, or with 1, 2, 3 or 4 passengers? Are there particular vehicles that tend to ride with more passengers than others? If so, how are they distributed in space and time.
6. Are most vehicle moving or idling? In which part of the city that we see vehicle idling/moving more often? For example, are there any "dead zone" where a vehicle just drops off passengers, and stay idling f …
7. We w … verage number of passen … of rebalance trips (stops … elp us explore this trends: …
8. If we a … ies throughout the day?

YOUR S …)

You can pick … tively tackle them. You are not … on this challenge individually or … uble the workload (aka. roughly t …

You submissio …

- Team …
- The ta …
- Link(s) … essible throughout the tim …
- A shor …