MUSA611 Final Project Proposal
Apr. 23rd, 2020
Hanyong Xu, Jia Yuan

Problem / Question

The problem that the application is trying to solve is that the current bus system planning requires the public agency to mostly outsource and is not efficient in terms of money and time. Inspired by the Cap Remap, a major bus system overhaul conducted in Austin in June 2018, the application aims to provide a platform for planners to visualize the bus ridership and projections in the city of Austin based on our prediction models from the Capstone class. The application will have two main functions, the first function is to allow the user to explore the spatial and temporal trend of the existing bus ridership in the city, and the second function is to showcase the ridership prediction generated under different real estate scenarios.

The data

The main data to be used is already processed by us and ready to be mapped out. There are four sets of data to be plotted. The first set consists of the city's daily bus boarding for each stop in 2019, which is in the form of .csv or .geojson (can be exported from R); each row has information about each stop and there are 2404 rows/stops in total. The other three sets of data have the same format, but consist of the predicted ridership at each stop under 3 different scenarios.

Technologies used

Leaflet will be used to mark the location and the ridership level at each stop. jQuery will be used to select HTML components as well as sending the request from the data sources. Underscore library is used to transform data. Chart.js or other charting libraries might be used to create charts summarizing the temporal and spatial trends of the boarding information. Bootstrap, pretty-checkbox, fontawesome, selectize.js will be used to implement certain functions of the app, such as toggle, icons, dropdown menu. Chroma.js will be used to create color schemes.

Design spec
  - **User experience**

Planners are the primary users of this application. We envision that planners can use this tool to test out how changes in the built environment and/or bus network impact bus ridership in Austin. By being able to have a better understanding of future ridership change, planners would not only be able to plan for suitable adjustments to the bus system but also be more equipped to make decisions in terms of allocating resources. In addition, this tool provides easy access for planners to try different development scenarios and see the effects on bus ridership on the fly, without relying on consulting firms. Moreover, with clear

visualizations, this application can also ease the barrier for planners when they try to explain any decisions to the general public.

A series of products developed by CARTO seem to be interesting examples to learn from.

- **Layouts and visual design**

We have already finished a prototype (see below image), and we plan to add some dashboard next to the map summarizing ridership trends.
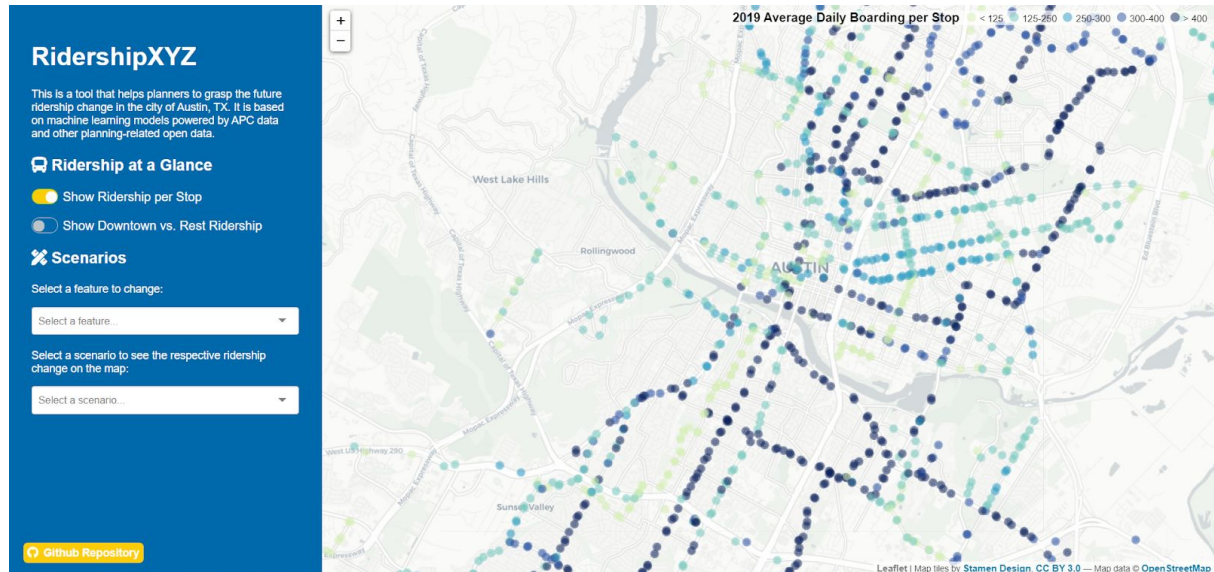
Anticipated difficulties

We aim to summarize the ridership boarding per stop in different regions/neighborhood, e.g., summarizing the total boarding per neighborhood. This requires more than just mapping out the location of each stop. We will need to group the data either in javascript or process the data beforehand. We also need to think of a creative way to interact with the summarized data. Furthermore, we want the user to be able to inspect stops per neighborhood/region, so we need to associate the two datasets together.

Missing pieces

The implementation of libraries such as chart.js or C3.js might be useful for our app. Ideally, the prediction model could run in the server, meaning that users can change whatever variables they want and send that to the server. Then, the model will return the predictions. However, this is out of the scope of the class, and given that we only have a limited amount of time left in the semester, we decided to set it aside. It would still be interesting to learn how to build and interact with a server.