<u>12.03.15 – Capstone Project Report Six - TBTB</u>

This iteration we concentrated on getting the last bit of the requirements done as we were given a couple of weeks ago. We had nearly all of them done and had been working on the others, but having that document allowed us to really pin down what we needed to do. There have been some issues with the interface not scaling well on smaller screens and some functionality even being lost when a smaller screen/resolution was used. In these past few iterations we have spent some time trying to fix these glaring issues and it seems they have finally been resolved.

A second toolbar has been added so that more functionality may be added without compromising the experience on smaller screens. We have also implemented a nearest point query using the marker Leaflet Draw tool and wherever you place it on the map it will find the closest point during the timespan. We also got the dual region query working where you can select a region with either a polygon or a rectangle, and select another region and it will query the first for pickups and the second for dropoffs and then display them on the map. We have also spent more time working on the visualization charts to get those up and running in the popup windows as we had planned and we have made progress there as well. In addition to those coding accomplishments we have begun work on both the Programmer's Guide and the User Guide for our application.

Tyler:

This iteration I concentrated on trying to squash any bugs that I could find with the interface as I had grown tired of having issues when presenting. I also wanted to make sure we had all of the queries completed and functioning so that the last iteration could be spent on finishing up the documentation and the visualizations. I reworked the UI again and added a second toolbar so the items could be more spaced out and not break on a smaller screen, and even if the screen is substantially smaller all of the buttons and toggles will still work as they should. I also ran into the problem of properly scaling my Parallel Coordinates chart when I want to resize the window it is contained in. After a good while of fighting with it I got the chart to resize perfectly with the window, but it seems there is an issue with the d3 extension I am using for the chart and it completely wipes the coordinates from the chart. I have no idea why it does this and will look into it more this next iteration, but it does not seem to be my fault.

I also worked on getting the last two main queries we need for our application implemented in the server side and client side code after Tom gave me the actual stored procedure for them to run. I have implemented a nearest point query that will take a single coordinate and find the nearest trip pickup (or dropoff/both if you query for it) to that as long as it is within 100,000 meters. The reason for this is to optimize the query and not return a large amount of things we do not need, I initially give the stored procedure a radius of 10 meters to search in and double that up to 100,000 and then return the first one it finds. 100,000 meters is around 63 miles and it should never reach that point in a search, but I wanted to give it a

stopping point so I could avoid an infinite loop and there are so many trips at so many times, it will find one 99.9% of the time.

I also implemented the server and client side code for the dual region query as well as the interface necessary for it. There is now a toggle switch that when it is active it will save the first rectangle or polygon layer added and when the second one has finished, fire off the stored procedure Tom wrote to get the pickups in the first region that have dropoffs in the second region. This works like a charm with one caveat to its functionality, at the moment the user must toggle "Display Both" to see the full effect of the query. This is something I do plan on automating so when this mode is enabled it will always display both pickup and dropoff points otherwise it is a little pointless. There are a few more bugs like that one that I wish to iron out before the project is all said and done, and I do feel like I will have enough time to accomplish all of those.

<u>Brendan Gray:</u>

These past two weeks were productive in terms of problem solving. On the last iteration of our report, I was implementing a bar chart. After I had it successfully working and in order, it seems as if it stopped working. Perhaps I didn't save my changes or something to that effect, but I looked over the code and it looks like my changes indeed went through. For this reason, I'm not exactly sure why it isn't successfully working like it was at one point, so I need to continue my debugging and have it finished for next week.

The other project I had is shared with Bill. We are creating the User Documentation

guide for the program. This isn't really difficult as we all know how the application works, we just

need to put it on on paper. I implemented documentation for much of the buttons on the top

User Interface bar and for the drawing shapes buttons. These buttons include the three Query

buttons, the Display Buttons, the Shape buttons, and the zooming buttons. I also described

what he Clear Map button does, as I implemented this many weeks ago.

<u>Bill:</u>

Over this last two weeks I was in charge of working on both the User guide and finishing up the

pie chart. For the User guide working in tandem with Brendan. I added different topics like a

summary and overall view of what are application is suppose to show. Also I talked about

different features and locations to be easily accessed like the Toolbar across the top of the

screen like the day time picker, different visualization for the pickup, drop off, and both. Another

feature i discussed was what happens when you click the different boroughs from showing just

one boroughs or all the boroughs. Finally I discussed how the clear map button is used and the

location of the button which is in the top corner. There is still a lot that needs to be added to the

user guide from the different charts and visualizations to make it a complete guide but it is a

very good start for a user to be able to use our application.

For the Pie chart in D3 that i have been working on since the last sprint. I am still running into

issue with the pie chart being able to tell the pie chart how to split it up into slices and what text

to show on each individual slice of the pie. Currently right now I have the pie chart to show each

different passenger in its own slice. Also i got an array to calculate the value for each different

passenger count from 1 passenger to 6 and up. I am close to getting a pie chart to work after i

figure out how to get d3 to recognize the data that i am giving the Pie chart.

Tom Taylor:

In this last iteration I have primarily been working on cleanup and making sure that we have a

solid production database and all of the necessary stored procedures for our upcoming

presentation. I have also made it almost all the way through a first pass in creating the

programmer's guide as it relates to the back end. I also solidified my points as volume work in

the last iteration into our final stored procedure.

In regards to cleanup I have still been working on data validation. I finally feel that I am most of

the way through in removing what I would consider invalid data. I am starting to realize that this

data cleanup is a tedious and time consuming process. First you have to come up with criteria

to use to look for data invalidity.   Then you have to figure out how to properly query against the

data set using those criteria. Finally, you have to carefully review the returned results to make

determinations about validity and where the line is crossed between valid and invalid data. This

final point is actually up to interpretation somewhat. For example the taxi meter marks the

pickup and dropoff times and somewhere along the line a calculation is done to provide the

time_in_secs field. You would think that this would mean you could correlate these results

directly (droppoff – pickup = time in secs) but you cannot. Granted, for the vast majority of rows

this works out as expected. However, I determined that there are several thousand rows where

this correlation breaks down and the difference just keeps getting larger. I finally made a

decision that a mismatch in time in seconds of greater than four would invalidate those

particular rows.

Next was working on the programmer's guide. I knew I needed to get a start on that because it

would be a fairly time consuming process. A lot of the early work done regarding data analysis,

database creation, and column indexing was accomplished a while back. I wanted to make sure that I would have time to review that whole process.   I wanted to ensure that the write up regarding that part of the guide would also include the trials and tribulations incurred. This whole process was a major learning curve so I feel it is important to talk about the things that had to be figured out or where our approach needed to change as we progressed.   At this point I would say that my part of that guide is at around 75 - 80% complete.

The last stored procedure, which now actually takes the line that is passed and gives that line some "volume" is what the final iteration of that stored procedure became. It seemed to give somewhat better performance this way than when giving all of the points themselves volume when querying the rows.