**Hangil Chung**

**Hc685**

**Projection Description:**

This semester we will be exploring the different effects that incentivizations have on the Citibike bike riding system in New York. More specifically, the bike system currently suffers from the lack of rebalancing of bikes across stations throughout the day. This leads to some stations to have no bikes available at certain periods and others to have no docks available at certain periods. One possible approach to help counter this problem is to incentivize riders to take “incentivized rides” which help rebalance the system. We will explore the various incentivization models that Citibike could implement and the corresponding improvements in the system. Some of the models which we will explore include a completely dynamic incentivize scheme, which chooses what rides to incentivize completely dynamically throughout the day, an intraday dynamic scheme which updates what rides to incentivize every certain time interval throughout the day, as well as an inter-day dynamic scheme which updates what rides to incentivize at the beginning of every day. As a measure of the improvement of an incentivize scheme, we will use the predicted number of extra customers which Citibike can now serve that it couldn’t before. The overall goal of this project is to create a paper which carefully documents the various incentive models Citibike could possible implement and communicates to the reader the possible benefits gained from each of the incentive models. Also we hope to propose in the paper what we think to be the best incentive model that Citibike could realistically implement, and provide accurate predictions on the overall benefits for the Citibike bike system given they implement our proposed incentive scheme.

**Communicative Genre’s Produced:**

This project will require creating an research paper documenting the various incentive models we considered for the Citibike system. This includes explaining the exact features of each model, the assumptions we made regarding the system and model, the data we used to simulating the model and system, and the results we produced. To accurately describe such information regarding the model, the paper will include various data plots such as scatter plots, histograms, heat maps and probability density plots. Other visuals the project will also include are geolocation plots which show the customer flow rates across stations on a New York City map. Furthermore, the analysis of different incentive models will include various arithmetic symbols such as summations, integrals, sets, set inclusions, qualifiers and quantifiers to accurately show the quantitative calculations involved in each model. Likewise, to present the various results and data we used in the models, we will produce various tables and pie charts comparing the exact results of each model and the types of data used in each model. Finally, the paper will also include various analysis and comparisons between the models we explored and also provide a detailed recommendation for the best incentive scheme that Citibike could use. If time permits and Citibike agrees to implement our proposed scheme, the paper will also include the actual results gained from using our proposed incentive scheme and data and plots comparing the actual effects which the incentive model had on the overall bike system.

**Teaching and Learning Process:**

To complete this project, I will be meeting with my instructor Professor David Shmoys as well as the PhD. Student Daniel Freund once or twice every week. At every meeting we will discuss the followings points. First, we will analyze any new updates that have been made to the various models and the corresponding results gained from the updates. Secondly, we will discuss the best approach to portray and convey these results to a reader and whether the results are worth including into the paper. This will include deciding what sort of plots, tables or visuals to create to represent the results, deciding how to describe via words the model choices we made, and also deciding how important the updates and results are to the overall goal of presenting our optimal incentive scheme for Citibike. Thirdly, we will discuss the updates on the paper itself, and how we can improve it to make it more readable, understandable and concise for the reader. This weekly feedback loop will help me learn how to better communicate my ideas, results and models to a reader and also help me learn where my weaknesses and strengths are in this type of communicative writing. Via this process, I will hopefully continuously grow my technical communicative skills and improve the clarity, content and fluency of the research paper itself.