IBM Project

A New Hint to Transportation-Analysis of the NYC Bike Share System

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Ideation:

We brainstormed ideas together and came up with ideations with which we would like to move forward.

In metropolitan settings, bike-sharing programmes are becoming more and more common. They provide cities a less expensive, more ecologically friendly transportation option. Numerous optimization issues are generated by the administration of these systems. Rebalancing bicycles is the most significant of these issues. Users’ imbalance the system by creating demand in an asymmetric pattern. This calls for efforts to restore the system's balance and ensure that there are the necessary numbers of bicycles at each station to make future use easier. In this essay, we address the issue of keeping the system balanced during peak rush-hour demand as well as rebalancing the system overnight to get it ready for peak consumption.

We propose brand-new problem formulations that are the result of extensive system usage data analysis and close coordination with the Citibike bike share system in New York City. To find the ideal location for bikes to encourage use, we examine system data. We address clustering issues to manage use during mid-rush hour as well as routing issues for midnight shifts. At NYC Bike Share LLC, the company that runs Citibike, the instruments created through this research are presently used on a regular basis.

A well-liked form of public transit, bike-sharing programmes are expanding in scope and number worldwide. Public bike-sharing programmes cater to the demands of many commuters while keeping up with the pace of bigger cities. We develop an interactive visualization method to examine the dynamics of public bike-sharing systems by profiling its historical record in order to better understand how these systems are used. Our concept facilitates the identification of various patterns in temporal and spatial domains by coordinating a pixel-oriented timeline with a map and offering a technique of partial reordering of time series.

With Citi Bike, the bike-sharing system in New York City, as our use case, we develop a prototype to demonstrate system changes over the course of ten months, ranking stations according to various features and employing any time interval in daily and monthly timelines. In order to validate the visualisation system as a practical operational tool that can assist the staff of bike-sharing programmes of major cities in the exploration of such large datasets, in order to understand the dynamics of commuting, overcome management issues, and improve service to commuters, various analyses are presented.

The COVID-19 epidemic, which has affected everyone across the world and had an influence on urban transportation networks, has been unprecedented in its scope and pace. In March and April 2020, New York City (NYC) was very heavily affected. All but absolutely necessary enterprises were required to close, and a mandatory stay-at-home order was issued. In this essay, we look at the effects on the NYC subway and the Citi Bike system. Usage patterns on the day of the shutdown are contrasted with those on analogous days in 2019.

We investigate the impact of the closure and subsequent reopening on economic activity up until the end of September 2020 while controlling for weather trends. The findings demonstrate that both bikeshare use and subway ridership initially declined; bikeshare use has almost fully recovered, however subway usage is still significantly below pre-COVID levels. Policy implications show that during disasters when public transportation is deemed unsafe or is disrupted, the bikeshare system offers resilience to the whole transportation system.