DATA ANALYTICS

A new hint to transportation - Analysis of the NYC bike share system

Literature Surveys

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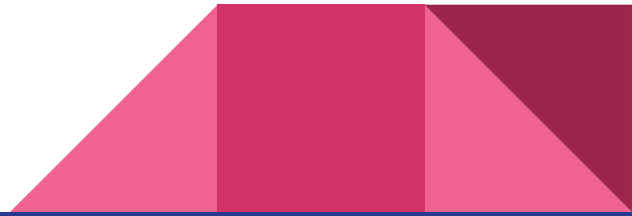
AGENDA

- Literature Survey (Takeaways) of Reference Papers/Journals referred to
- Use cases of the project chosen
- Existing solutions present in the market



Smart Bike Sharing System to make the City even Smarter

LINK: https://arxiv.org/ftp/arxiv/papers/1709/1709.01493.pdf

This paper talks about enhancing the efficiency of Bike sharing system by making bikes smart by deploying **sensors on bikes** which will help in **collecting real-time data** and **forwarding** them to nearby stations.

The embedded sensors are able to opportunistically communicate through wireless communication with stations when available, providing real-time data about **tours/minutes**, **speed, effort**, **rhythm**, etc.

Some of the predicted data that could be useful are:

- bikes available at stations
- bike schedule
- a location of the nearest hub where a bike is available

Data Analysis and Optimization for (Citi)Bike Sharing

LINK: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.874.9446&rep=rep1&type=pdf

This paper aims to tackle the problem of **maintaining system balance during peak rush hour usage** and **rebalancing overnight to prepare the system for rush hour usage**.

Approach for maintaining system balance during peak rush hour:

Discover the ideal system state before the morning and evening rush hours - stations that experience similar behavior during rush-hours will belong to the same cluster - analyze the type of behavior typical of each cluster and label the cluster with a desired level.

Approach for rebalancing overnight to prepare the system for rush hour usage:

Formulate a model to optimize the use of a given-size fleet of rebalancing trucks - derive an IP formulation that is reasonably tractable for fleets with a small number of trucks - provide a heuristic approach that takes advantage of the fact that the IP finds high quality solutions for the 1-truck special case.

Gender gap generators for bike share ridership: Evidence from Citi Bike system in New York City

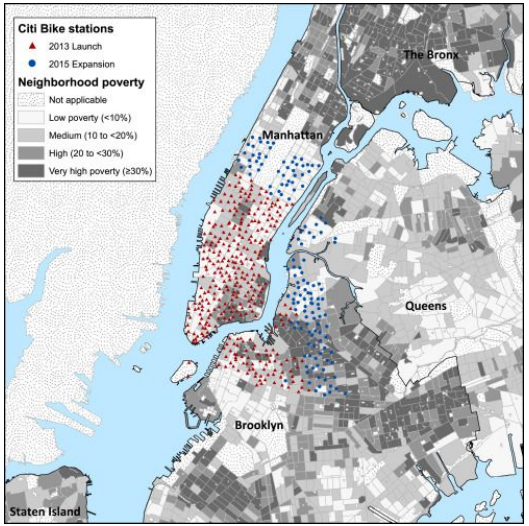
LINK: https://www.sciencedirect.com/science/article/abs/pii/S0966692318306045?fr=RR-2&ref=pdf_download&rr=74c2dff18c1ca8f6

- Bike-sharing is a rapidly growing transport service around the globe. The objective of this study is to identify factors that contribute to gender differences in the use of bike share services.
- Data from New York City's Citi Bike Share system are used to investigate male and female environmental correlates of bike share usage.
- Most explanatory variables may influence men and women differently.
- As a result of the study, it appears that female bike share riders make fewer commuting trips using bike share than their male counterparts.

Exploring the health and spatial equity implications of the New York City Bike share system

LINK:
https://www.sciencedirect.com/science/article/pii/S2214140518304791

- An examination of spatial equity and the health impact of Citi Bike, a bike share program in New York City (NYC), is presented in this paper.
- Although Citi Bike stations are not evenly distributed, the estimated annual health benefits are substantial and have been increasing over time.
- Increasing spatial access in higher-poverty neighborhoods and communities of color could yield even greater benefits.
- Taking into account the social and political processes that perpetuate inequalities is crucial to understanding the role of the built environment in shaping health.



Bicycle Sharing Systems Demand

LINK : https://www.sciencedirect.com/science/article/pii/S187704281400086X

The **demand of New York City bike-sharing system** was designed using the user group patterns of successful bike-share programs: Velib'in Paris, Velo'v in Lyon and Bicing in Barcelona; from which three typical user groups were identified:

- commuters,
- recreational/errand riders and
- tourists

Analyzing the demand of bike sharing systems helps in deciding:

- location of bike-sharing stations
- full design of the system
- scheduling of the investments, etc.

Some major use cases of this project…

- Seeks to reduce carbon emissions and increase active travel, cities have increasingly adopted bike-sharing systems in recent years.
- Bike sharing services allow users to rent bikes for utilitarian and recreational trips in the urban area.
- Bike sharing has been considered a suitable mode to support the first-mile and last-mile connectivity problems of fixed-route transit problems.

Existing Solutions available in the market

Yulu Bikes : https://www.yulu.bike/

Yulu is a technology-driven mobility platform that enables Integrated Urban Mobility across public and private modes of transport. Using Micro Mobility Vehicles (MMVs) through a user-friendly mobile app, Yulu enables first and last-mile connectivity that is seamless, shared and sustainable.

Driven by three guiding principles of urban mobility :-

- Accessibility
- Availability
- Affordability


thank you