Urban Computing Project Proposal

Title: Enhancing Urban Mobility with Data-Driven Insights

Group Members:

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Description:

In the landscape of urban computing, urban mobility is a critical aspect of modern cities because it is essential for the efficient functioning of cities. Urban mobility refers to the movement of people and goods within urban areas, including transportation modes such as cars, buses, trains, and bicycles. With the increasing urbanization of the world's population, urban mobility has become a significant challenge for city planners. The main challenge the urban planners face is traffic congestion and environmental sustainability, behavioral changes and much more. We propose a project in the field of urban computing that harnesses the potential of the public bike-share data to address critical issues in urban mobility. This project focuses on optimizing urban bike share systems to enhance user experience, identifying trends and patterns, user behavior, etc. In addition, we also plan to identify areas that have potential for increased bike usage, therefore increasing bike share access.

Preliminary work:

Prior research has shown that data-driven insights can be used to improve urban mobility. For example, a study conducted by the National Renewable Energy Laboratory found that data analytics can be used to optimize the routing of public transportation vehicles, reducing travel time and improving service reliability.

Another study conducted by the University of California, Berkeley found that data-driven insights can be used to identify areas where bike-sharing programs can be most effective.

Plans:
The project will encompass 3 major areas:

1. User Behavior Analysis: By analyzing the dataset, specifically the ride information and member type, we could find about the peoples' behavior patterns, peak usage times, and the preferences of the bikes used by the different riders who have used the bike. The question that could be solved with this analysis is- Where do Capital Bikeshare riders go? When do they ride? How frequently do members and casual riders use the bike-sharing service?, etc.

2. Geospatial Analysis: By analyzing the dataset, specifically the latitudes and the longitudes, we could identify the hotspots, areas of connectivity, high demanding areas, and information much more regarding stations.The question that could be solved with this analysis is- What are the most highly connected stations? What are the most sparsely connected stations and how can they be better connected?, etc.

3. Route Optimization Analysis: By analyzing the dataset, specifically the information regarding the stations, we could identify frequently used routes, evaluating station congestion, etc. The question that could be solved with this analysis is- What are the highest ranked routes used by the riders to go from one point to another?What are the lowest ranked routes used by the riders to go from one point to another?, etc etc.

The dataset that would be used for the project is the Public Dataset of Capital Bikeshare. This dataset contains the data of rides from 2010 to July, 2023. This dataset contains 460k observations and 13 features.
The dataset has been taken from the link: https://capitalbikeshare.com/system-data