

Title: Transforming Urban Mobility: Resolving Parking Space Shortages in City X

Link to Kaggle: <https://www.kaggle.com/code/shubhampatel123nbf/notebook228cb1ba63>

Problem Statement:

The problem at hand is to evaluate the distribution and availability of parking spaces in a city to understand areas with parking shortages. Parking shortages in urban areas can lead to traffic congestion, reduced accessibility, and increased frustration among residents and visitors. Identifying areas with parking deficits is essential for efficient urban planning and improved quality of life.

Dataset Details:

The dataset for this analysis consists of GeoJSON or shapefiles of parking spaces, which include both street parking and dedicated parking lots. This data will be obtained from OpenStreetMap using the Overpass Turbo tool. OpenStreetMap (OSM) is a collaborative mapping platform that contains detailed geographical data contributed by volunteers. The parking-related data will be extracted using Overpass Turbo's querying capabilities.

City X, an urban hub renowned for its vibrant culture and economic opportunities, has long grappled with a persistent issue: a severe scarcity of parking spaces. This scarcity has become a pressing concern, straining daily life for residents, commuters, and businesses alike. The resultant traffic congestion not only impedes movement but also undermines economic productivity and the city's allure. To confront this challenge head-on, a comprehensive analysis of parking space distribution and availability was undertaken, utilizing cutting-edge technology and data-driven insights.

Objective:

The primary aim of this case study was to holistically evaluate the distribution and availability of parking spaces in City X. This analysis sought to identify areas besieged by parking shortages and devise innovative strategies to alleviate this critical problem.

Methodology:

Data Collection: Leveraging state-of-the-art technology, OpenStreetMap data was meticulously extracted using Overpass Turbo. This process yielded a comprehensive GeoJSON file encompassing diverse parking spaces, encompassing both street parking and designated parking lots.

Data Processing: The extracted GeoJSON file underwent rigorous processing to distill crucial attributes: geographical coordinates, parking capacities, parking types (street/dedicated), and accessibility features. This meticulous preparation laid the foundation for comprehensive analysis.

Spatial Analysis: Employing cutting-edge Geographic Information System (GIS) tools, a visual tapestry emerged, painting a vivid picture of parking space distributions across the sprawling landscape of City X. This spatial analysis facilitated the identification of areas teeming with

parking spots, categorizing regions based on parking density and highlighting zones grappling with inadequate parking provisions.

Quantitative Analysis: Delving into the statistical realm, an intricate web of data unfolded. The analysis meticulously calculated the parking-to-population density ratio across various neighborhoods. Additionally, peak-hour utilization rates were scrutinized to discern the true availability of parking spaces during high-demand periods.

Identification of Shortage Areas: A convergence of population density and traffic flow data was artfully overlaid atop the parking space distribution map. This overlay ingeniously pinpointed the precise locales where the demand for parking egregiously eclipsed the available provisions, illuminating the areas acutely affected by shortages.

Recommendations:

The findings of this comprehensive analysis culminated in a bouquet of strategic recommendations poised to revolutionize the parking landscape of City X:

Innovative Incentive Programs: Introduce visionary incentive programs designed to nudge citizens toward embracing public transportation alternatives.

Smart Parking Solutions: Implement cutting-edge smart parking systems to optimize the utilization of available parking spaces.

Vertical Mobility Solutions: Construct avant-garde multi-level parking facilities strategically positioned in high-demand zones.

Zoning Paradigm Shift: Advocate for a paradigm shift in zoning regulations to foster the creation of mixed-use parking structures.

Pedestrian-Centric Infrastructure: Invest substantively in infrastructure fostering pedestrian and cyclist-friendly urban designs, reducing dependency on vehicular transport.

Results:

The incisive analysis unearthed stark disparities in parking space distribution across City X. Central districts faced a palpable dearth of parking spots, whereas suburban areas exhibited a relatively copious availability. During peak hours, an overwhelming utilization rate in specific zones exacerbated the competition for parking, exacerbating the city's congestion woes.

Note: The successful implementation of these recommendations hinges upon collaborative efforts among city authorities, urban planners, and community stakeholders. A continual reassessment and adaptive approach will be indispensable to ensure a sustainable solution to City X's parking space shortages.