Urban Insights: A Comprehensive Analysis of NYC's Land Use, Accessibility, and Infrastructure

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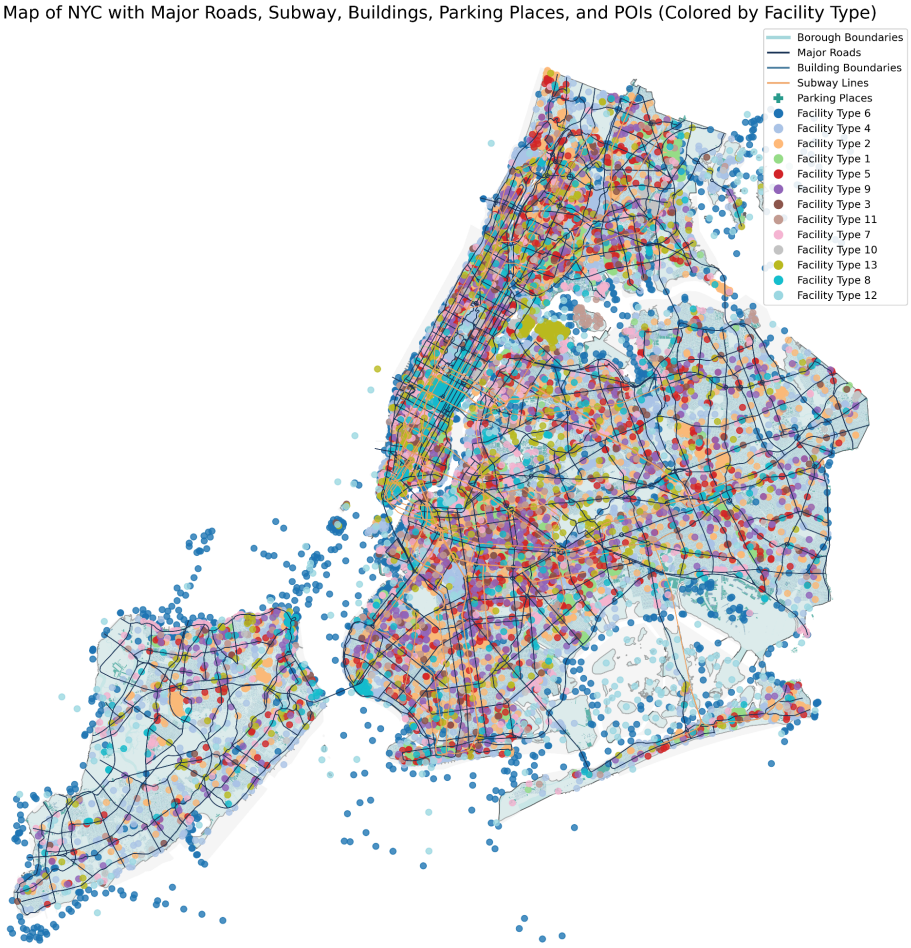
Main Visualization

The integrated visualization combines the following outputs to comprehensively represent NYC's urban landscape:

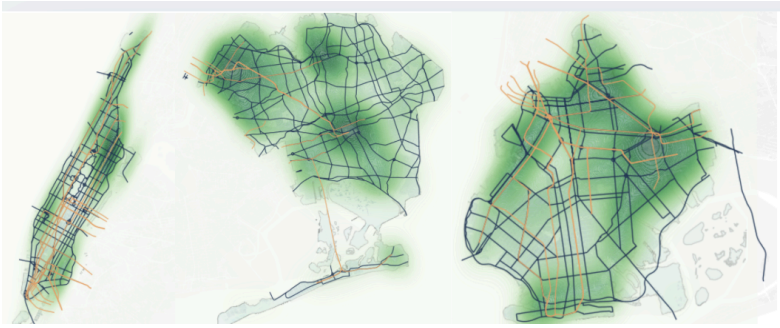
1. **Main Map**: Distribution of land use categories (residential, commercial, green spaces, industrial areas).

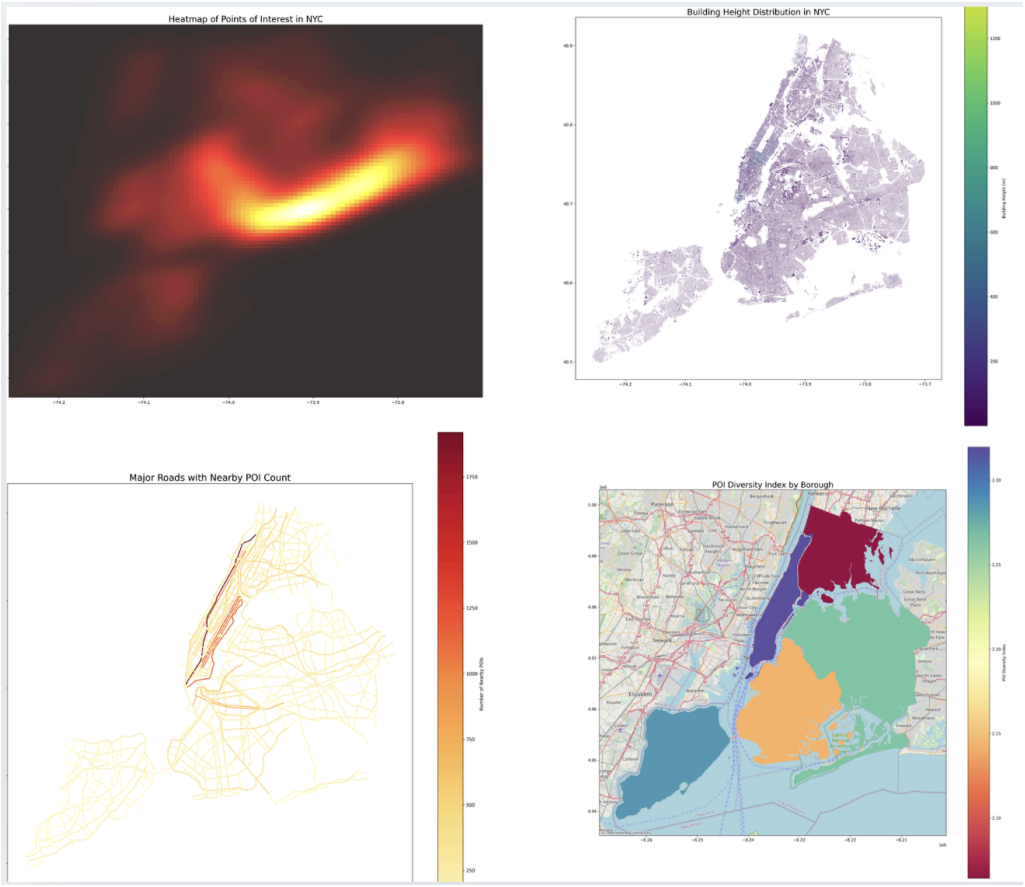
   1: 'Residential', 2: 'Education Facility', 3: 'Cultural Facility', 4: 'Recreational Facility', 5: 'Social Services', 6: 'Transportation Facility', 7: 'Commercial', 8: 'Government Facility (non-public safety)', 9: 'Religious Institution', 10: 'Health Services', 11: 'Public Safety', 12: 'Water', 13: 'Miscellaneous'



2. **Side Panels**:
    - POIs density (green) computed using the data and formulating a gaussian KDE
    - Heatmap that shows the distribution of POIs across NYC
    - Building Height Distribution: A gradient map illustrating the vertical growth patterns in NYC.
    - Land Use Summary:Pie charts summarizing the frequency of various land use categories.

A plot explaining the diversity of each borough ranging from red(low) to blue(high) and a plot that shows the roads that have more POIs in a darker shade.





Legend

Main Map

- **Lines**:
    - Red: Major roads.
    - Yellow: Subway lines.
    - Parking spaces are in green and
    - All the other facilities are mapped according to the color code.

Side Panels

- **Building Heights**:Gradient from purple (shorter buildings) to yellow (taller buildings).
- POIs density (green) computed using the data and formulating a gaussian KDE
- Heatmap showing the distribution of POIs across NYC
- A plot explaining the diversity of each borough ranging from red(low) to blue(high) and
- A plot that shows the roads that have more POIs in a darker shade of red.

Findings: Residential zones dominate Staten Island and the Bronx, while Manhattan features a mix of residential, commercial, and recreational areas, with parks like Central Park and Flushing Meadows adding vital greenery. Industrial zones cluster in Queens and parts of Brooklyn. Manhattan leads in POI accessibility within 500 meters of subways, while the Bronx and Staten Island show gaps. Midtown Manhattan and Downtown Brooklyn are traffic hotspots, with moderate congestion in Queens and the Bronx. Skyscrapers dominate Manhattan, while Brooklyn and Queens have moderate heights, and Staten Island remains low-rise. Parking clusters near commercial hubs but is sparser in residential areas.

Datasets

The study uses diverse geospatial datasets:

1. **Major Roads**: Primary streets across NYC with borough and route type metadata.
2. **Subway Lines**: Geometries of all subway routes for accessibility analysis.
3. **Borough Boundaries**: Defines the spatial extent of NYC's boroughs.
4. **Points of Interest (POIs)**: Categorizes facilities into 13 types, including residential, educational, and transportation hubs.
5. **Building Boundaries**: Includes footprints, heights, and construction years.
6. **Land Use**: Maps zoning details, including residential, commercial, and industrial land.
7. **Parking Places**: Maps parking facilities and their spatial distribution.

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