Milestone 2: Data Visualization: "NYC: Does Crime Ever Sleep in the City That Never Does?"

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1 Project Goal

The project aims to explore and visualize crime patterns in New York City by integrating the *NYC Crime Complaint Dataset* [1] with socio-economic data from *CCC New York*[2]. The main goal is to investigate the relationship between crime rates and factors such as poverty, unemployment, and demographics across different districts. Rather than simply mapping crime locations, the team seeks to uncover deeper insights into why crime occurs by combining spatial, temporal, and social dimensions. The project targets both the public and policymakers, aiming to provide an interactive, user-friendly tool that highlights crime disparities, trends, and potential root causes, thereby supporting data-driven decisions for urban safety improvements.

1.1 Visualization Goal

Creating intuitive and interactive visualizations is essential for effectively presenting complex data-driven results, especially in a project like this one that deals with large, multidimensional datasets. Interactive tools allow users to explore the data dynamically, uncovering patterns and correlations that static visuals might obscure. By making visualizations intuitive, we ensure that both experts and non-experts can easily interpret the findings, draw meaningful conclusions, and engage with the analysis. This not only improves accessibility and transparency but also empowers users, such as city residents or policymakers—to make informed decisions based on real insights. In the context of NYC crime, an engaging visual interface can bring clarity to nuanced relationships between crime and socio-economic conditions, fostering deeper understanding and impact.

For this purpose, we aimed to split our website in two parts: one interactive map and a statistical analysis. The interactive map will allow a user to play with many features in order to learn by himself about criminality and social-economic situation in the city. The user can focus his research on specific crimes or district (where he live for example). For the statistical analysis, the goal is to teach general information about the criminality in New-York. We will take the user through a more technical analysis, including the evolution of crime over time and the correlation between crime and social-economic indices, to reach some interesting findings that is not necessarily noticable on the interactive map.

2 Interactive Map

2.1 Leaflet map

The basis of the map is set using *Leaflet* [3]. It is a open-source JavaScript library used to display maps and add interactivity (markers, popups, layers, etc.). A grayscale layer has been used in order to make the map

[1] https://www.kaggle.com/datasets/aniket0712/nypd-complaint-data-historic?resource=download
[2] https://www.nyc.gov/site/planning/data-maps/open-data/districts-download-metadata.page
[3] https://leafletjs.com/examples/quick-start/

less busy and easier to read. The map is set so that when you enter the website you have a general vision of New-York. Then the community boudaries are added from the *New-York government website* [4].

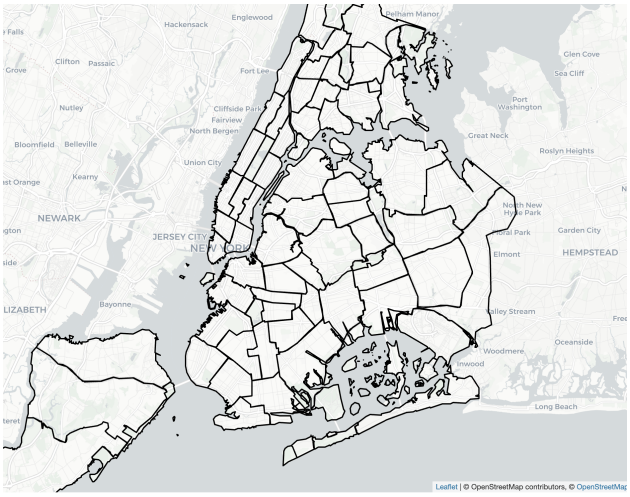

Figure 1: Leaflet map setup

2.2 Choropleth map

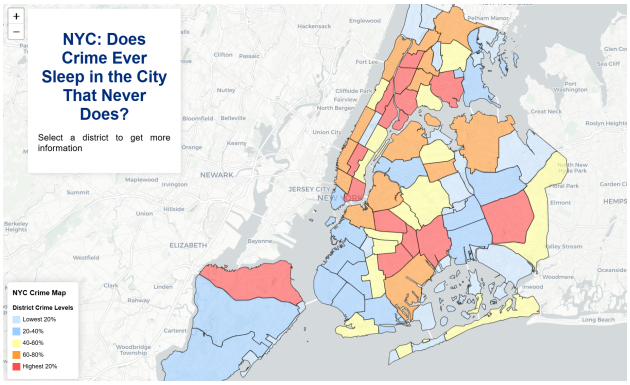

Figure 2: Choropleth map of crime distribution in New York

We used a choropleth map to display the crime density in New York city. This visualization method uses color gradients to represent varying levels of criminal activity, allowing users to quickly identify high and low crime areas throughout the city.
The choropleth map utilizes a five-tier color scheme ranging from light blue to deep red , representing crime intensity from lowest to highest. The map dynamically calculates quintiles from the available crime data to ensure the color distribution accurately represents the relative crime rates across districts.

2.3 Crime Type Selection

When a district is selected, all reported crimes in the district are displayed on the map at their respective locations. This allows for a detailed geographical analysis of crime patterns across New York City. More serious crimes are marked with distinctive icons to highlight their severity, while other incidents are shown

[4] `https://www.nyc.gov/content/planning/pages/resources/datasets/community-districts`

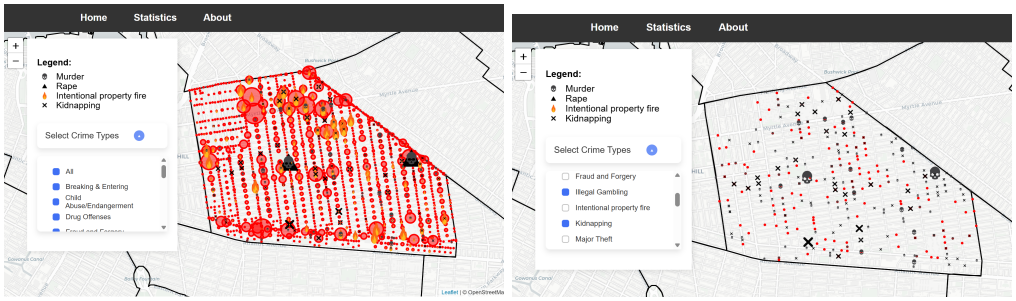

Figure 3: Selection of type of crimes

as red circles. The size of each symbol reflects the number of crimes that occurred at that location. The menu allows users to select and display multiple types of crimes simultaneously for a more customized view.

2.4 Temporal selection

Be able to select years with slider with by default the 3 last years and maybe a day/night setting.

3 Later implementations

The final version of the website will resemble the layout shown in Figure 4, with a more polished map and improved overall design. Economic information will be accessible via a menu on the right, which will appear when a district is selected. This feature will enable users to directly compare crime data with relevant economic indicators.

Additionally, a Statistics section will be included to highlight key insights from the data, featuring basic interactive plots that illustrate relationships between crime rates and economic factors. This further analysis will take root in the existing exploratory data analysis and take it further. An About section will provide references to the datasets and resources used throughout the project.

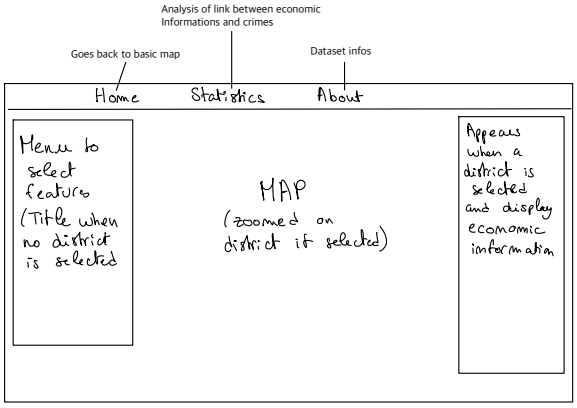

Figure 4: Website draft