# Data Visualization—Means of Transport

OutOfTouch–Milestone 2

Bojan Lazarevski; Cristian Botocan; Rares Epure

26th April 2024

## 1 Project Goal

Our project's goal is to show the effect of the pandemic on commuters' behavior in NYC by analyzing two means of transport: bikes and taxis. Analyzing datasets related to bike accidents, public bike rentals, and taxis throughout three periods (pre-, during, and post-pandemic), we aim to extract insights into how the pandemic has impacted road safety, urban mobility, and transportation patterns. Thus, we can split our work into two main dimensions: the **Modification in Transportation Behaviour** and the **Impact on Road Safety**.
*Note: We refer to use of taxis, renting out public bikes, and bicycle accidents as* ***datasets****.*

## 2 Visualizations

To highlight the aspects presented above, we distinguish the following visualizations:

1. **Map of NYC**: As a first step, we want to introduce the user to NYC by showing different zones and providing some information about them. We will create a **static** visualization for that, where the user can hover over a specific zone and receive some basic information about that zone. Figure 1 shows what the visualization will look like in the final version of the website. For this visualization we will use the `D3.js` library with interactive elements alongside the help from *`D3.js`*, *Maps* and *Interactive Maps* lectures.


Figure 1: Map of NYC zones Visualization—Sketch for future website

2. **Distances Bar Chart**: We also want to show how the distances for bike and taxi trips have changed over time. To achieve this, we will have a **static** visualization by a bar chart showing how much people traveled during a specific month. Figure 2 shows how the visualization will look like in the final version of the website. For this visualization, we will use the `D3.js` library with interactive elements alongside the help from *Interactive `D3.js`* lecture.

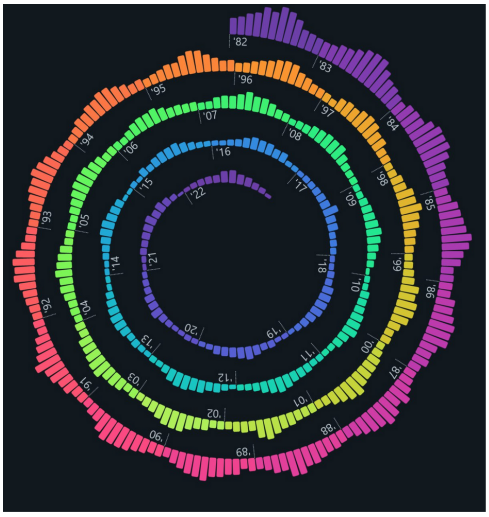

Figure 2: Distance Bar Chart Visualization—Sketch for future website

3. **Time Series**: We can visualize how commuters use taxis and bikes from the temporal aspect—trends change during the time. Moreover, we can also check the evolution of bike accidents in the same visualization. Thus, we will create an **interactive** visualization where the user should be able to choose the start and end date of the desired timeframe and select the dataset for which the visualization should be shown. Figure 3 shows how the visualization looks like on our prototype website. We will use the `D3.js` library with interactive elements alongside the help from *`D3.js` - Time-series data* lecture.

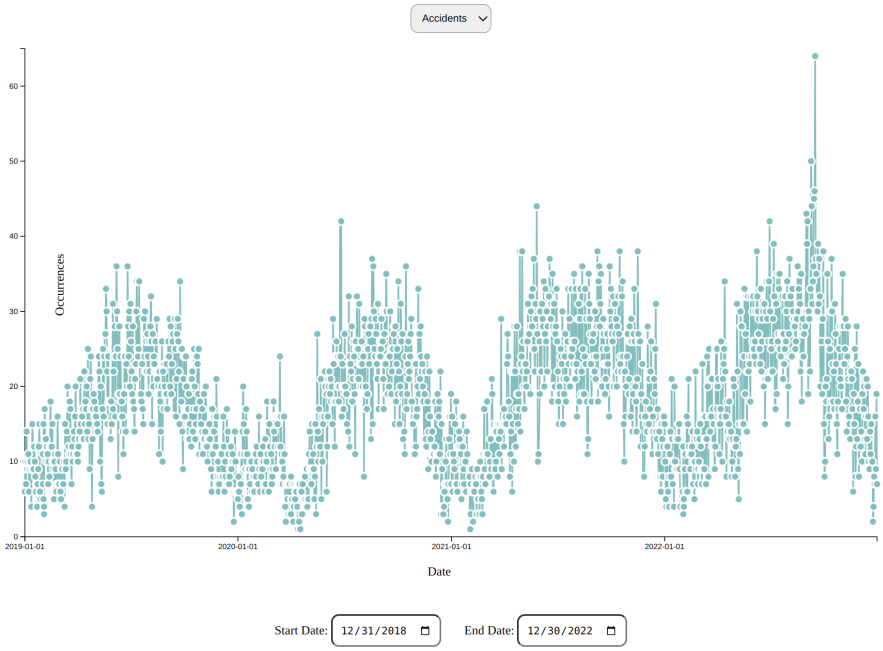


Figure 3: Time series Visualization—Picture from the prototype website

4. **Heatmap Density**: We can visualize how the trends in regards of the spatial aspect (by zones) change based on the space/location by using an **interactive** heat map of the city and showing the density of the used locations. The user should be able to select the dataset for which the heatmap should be displayed and also select the specific time. Figure 4 shows how the visualization looks like on our prototype website. For this visualization we use the `D3.js` library and the techniques shown in the *Practical Maps* lecture.

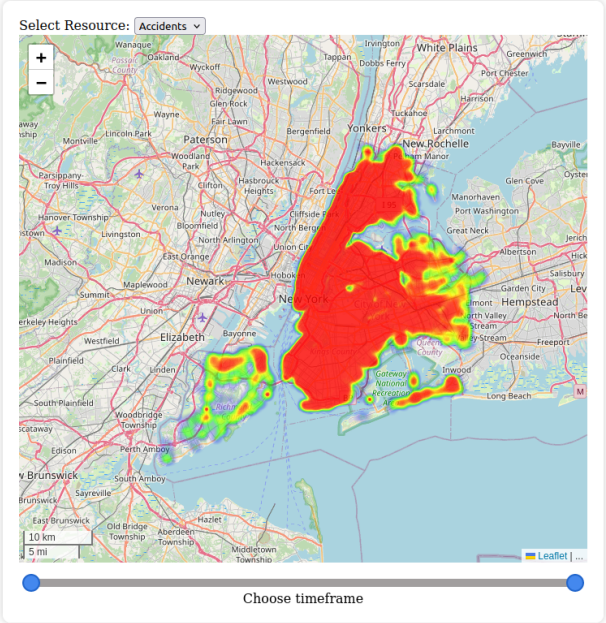


Figure 4: Heatmap Density Visualization—Picture from the prototype website

5. **Bar Chart Race**: We can visualize and highlight the busiest zones and identify regions with high transportation activity by using an **interactive** bar chart race. Additionally, we can track changes in the zones through time and find correlations between busy regions and the change in number of accidents. Figure 5 shows how the visualization looks like on our prototype website. For this visualization we will use the `D3.js` library and methods shown in the *Interactive `D3.js`* lecture.

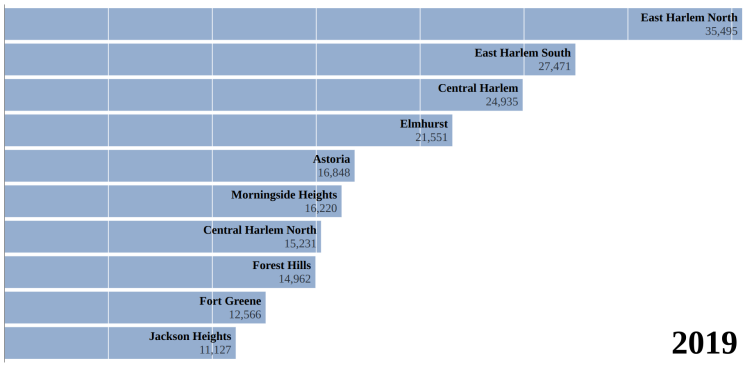


Figure 5: Bar Chart Race Visualization—Picture from the prototype website

6. **Prediction Accidents Map**: We also want to inform the user regarding the risk of riding a bike, by computing the probability of having an accident in a specific zone and time. To achieve this, we will have an **interactive** map where the user can select a point on the map, and it will receive the abovementioned probability. Figure 6 shows how the visualization looks like on our prototype website. For this visualization we will use the `D3.js` library with interactive elements alongside the help from *`D3.js` - Practical Maps* lecture.

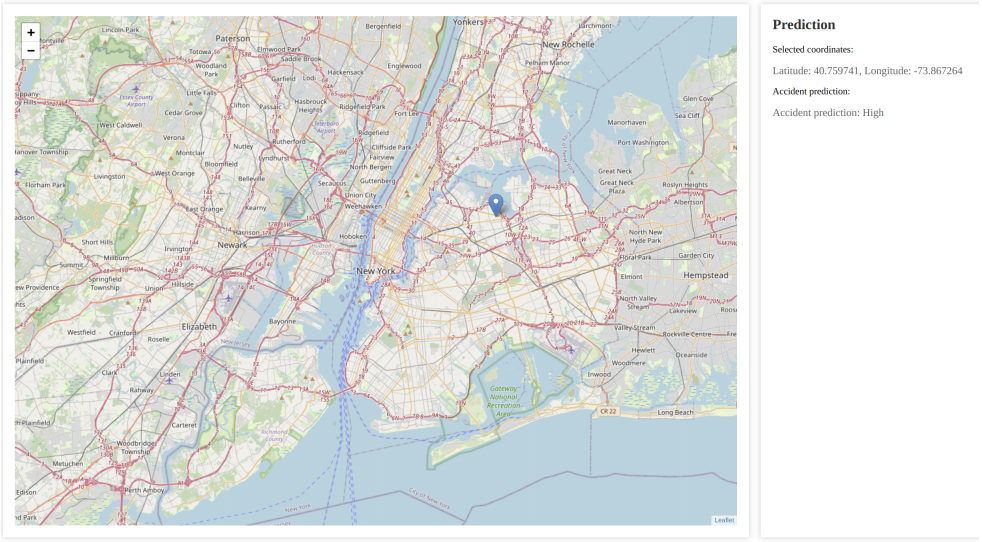


Figure 6: Prediction Accidents Map Visualization—Picture from the prototype website

# 3 Additional Improvements

In addition to our visualization ideas that we plan to realize for the final milestone, we will also focus on improving the following aspects of our project:

- **Visualizations Improvements**: Our main focus will be to make the visualizations **perfect**. We will further explore the possibilities of the `D3.js` framework to make our plots more intuitive, informative and interactive. We will also leverage useful information from the *Do and Don't in Viz* and *Designing Viz* lectures to further improve our visualizations.
- **Enhancing the Storyline**: We will connect the visualizations better by presenting an interesting and engaging story to the user. We will provide a more concise storyline with interactive elements such that the user can understand the narrative flow more intuitively. This may involve adding annotations, explanations, or transitions between visualizations to guide the user through the data effectively. For this we will use the future lectures *Storytelling* and *Beyond Visualization*. In case we include more textual information, we will also use techniques presented in the *Textual Viz* lecture.
- **Frontend Improvements**: The final website will be more user-friendly, visually appealing and accessible to everyone on any device. In addition to the base of HTML and CSS, we plan to integrate a frontend framework that will further improve the looks of our page. We will use the methods shown in the *Perception Colors* and *CSS* lectures in order to work with color more appropriately.
- **Implementation for the Predictions** We will create an ML model that does the task. Since we have only positive examples of bike accidents, we will artificially create negative samples so that we will have a balanced dataset. However, the ML part is not a core aspect of the course; we will focus on how this kind of task can be highlighted in an interactive way to the user. Based on the same reasoning, we will not focus on increasing the accuracy towards a high value or make extra checks on the user input (the point is in water).
- **Website Deployment** To reduce the setup time for the website, which is now done locally, we will deploy the website online such that it is more accessible to the users.