

Analysis of NYC-311 Service Requests

Problem and proposed solution

- By analyzing NYC-311 service request data and other demographic indicators like the poverty rate and racial diversity index, can we predict how long will it take for a request to be resolved?
- Depending on where you are, what issue are you most likely to encounter?
- Prediction model: request type, location and demographics.

Potential impact of solution

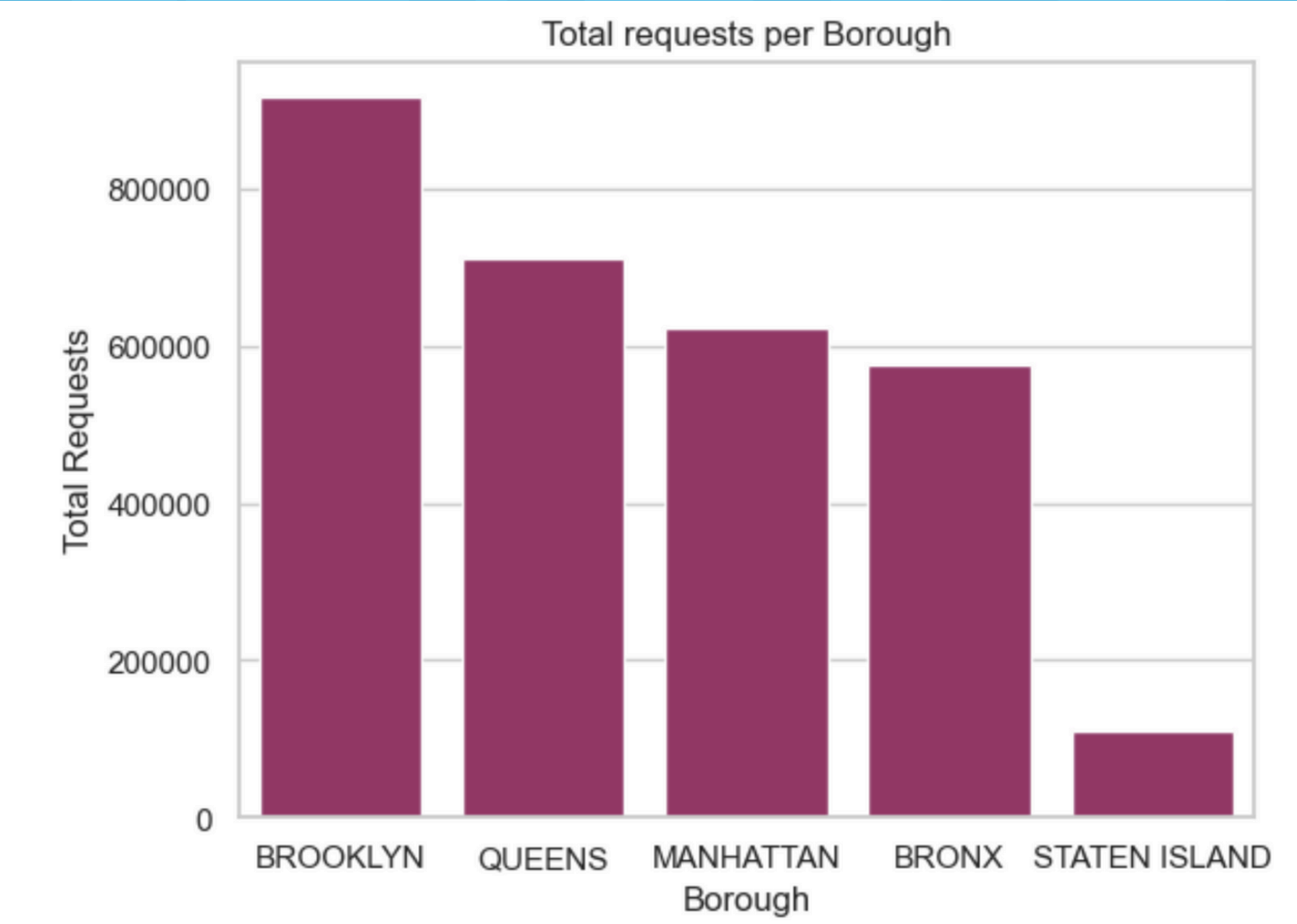
- Help identify biases and logistical issues within the government agencies.
- High cost of a NYC-311 request, with New York City's cost per call being \$2.57.
- More efficient request resolution -> shortening delays -> reducing the costs incurred by the city and its taxpayers.

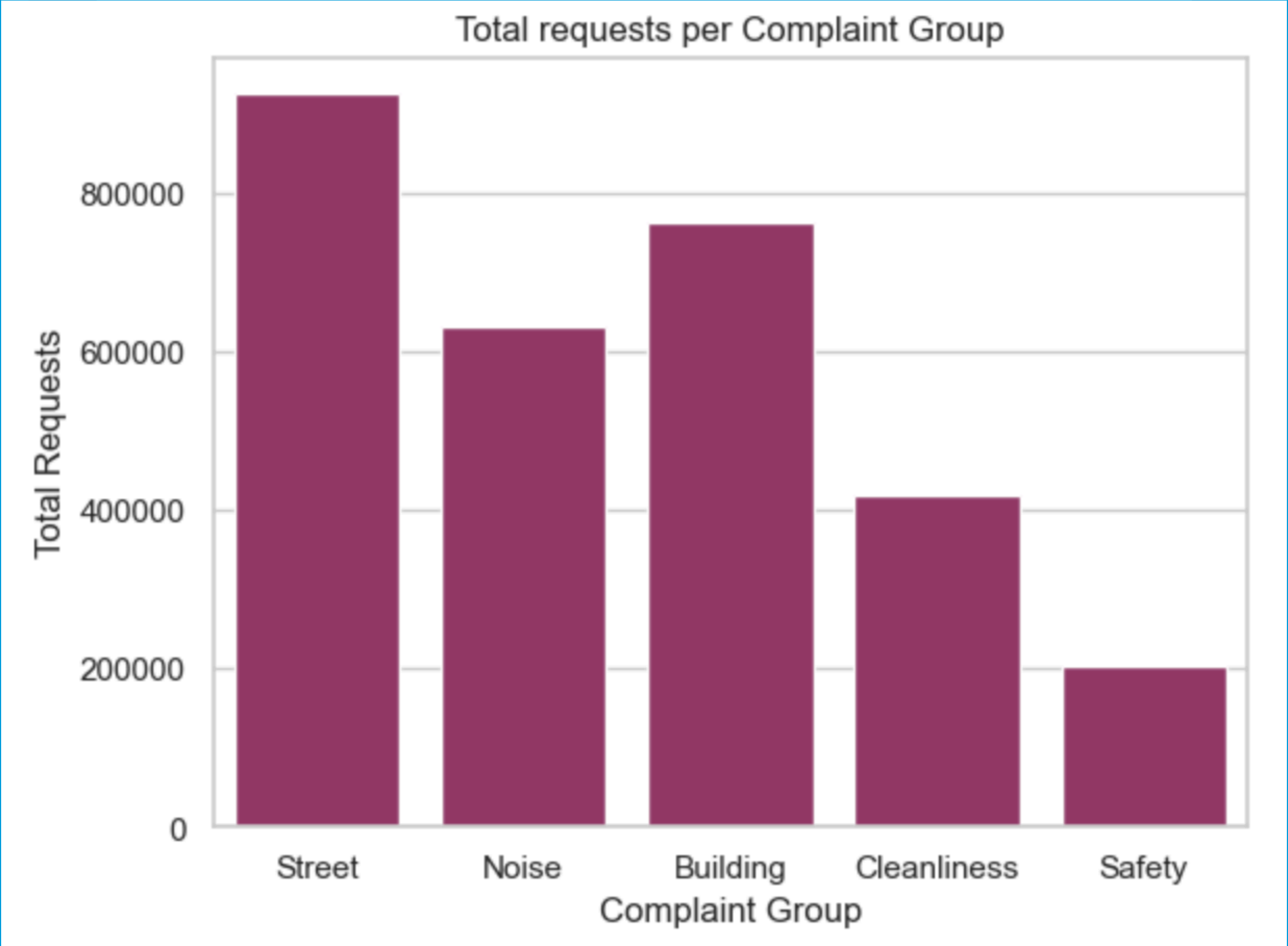
Data Processing.

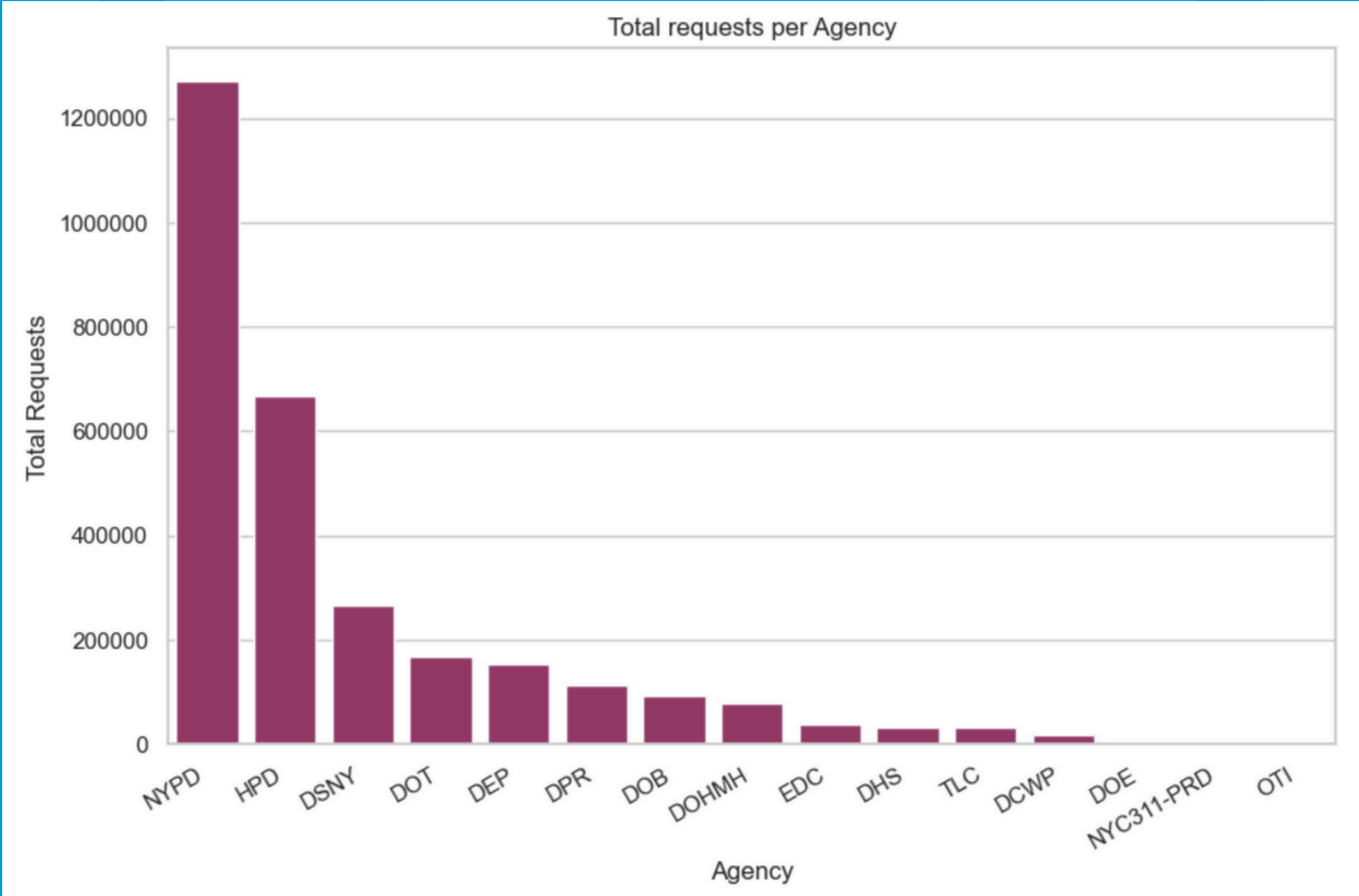
- "311 Service Requests from 2010 to Present" dataset from NYC OpenData.
 - Roughly, the max resolution time of a service request was 324 days and 10 hours.
 - 6 days and 20 hours on average for a service request to be closed.
- Racial diversity index and poverty rate distributions from NYU's Furman Center.
- Median household income distribution by ZIP code from simplemaps.
- "NYC Community Boards" dataset from NYC OpenData.

EDA

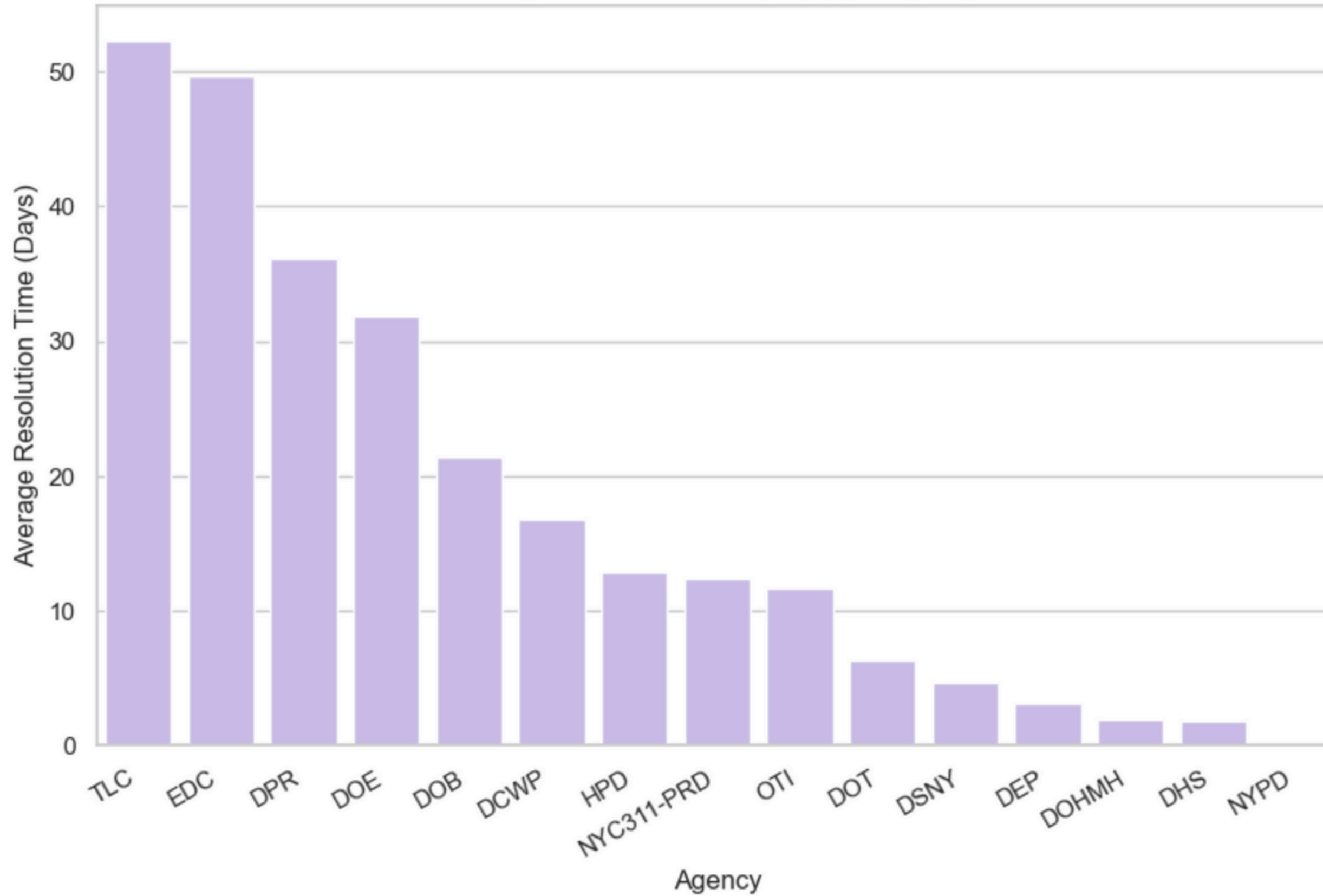








Average Resolution Time (Days) per Agency

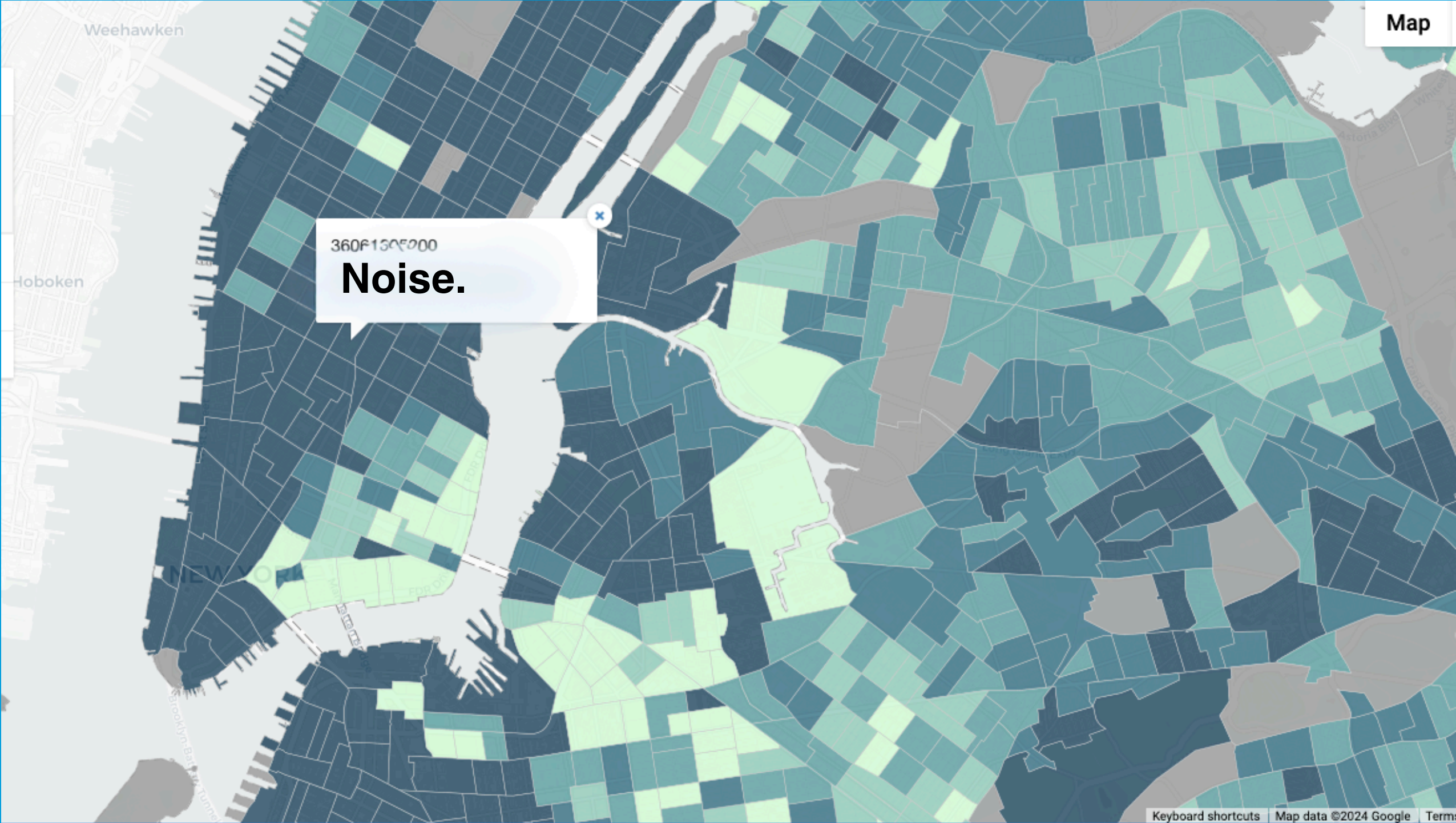


agency	agency_name	descriptor	resolution_description	time_until_resolution
HPD	Department of Housing Preservation and Development	COOKING GAS	The Department of Housing Preservation and Development inspected the following conditions. No violations were issued. The complaint has been closed.	324 days 10:24:33
HPD	Department of Housing Preservation and Development	PESTS	The Department of Housing Preservation and Development contacted an occupant of the apartment and verified that the following conditions were corrected. The complaint has been closed. If the condition still exists, please file a new complaint.	322 days 21:12:57
DOB	Department of Buildings	Illegal Conversion Of Residential Building/Space	The Department of Buildings has made a second attempt to conduct an inspection of this premises and was denied access. No further attempts will be made.	321 days 06:20:43
DPR	Department of Parks and Recreation	Hitting Building	Under NYC Parks's Tree Risk Management Program, work is prioritized to address the conditions with the highest risk first. NYC Parks determined that the issue will be addressed in the next pruning cycle through the routine block pruning program. For more information about the Tree Risk Management Program, visit the NYC Urban Forest page on the NYC Parks website at nyc.gov/parks/trees . To learn more about the trees in your neighborhood, visit the NYC Tree Map at nyc.gov/parks/treemap .	320 days 21:14:51
DOB	Department of Buildings	Adult Establishment	The Department of Buildings investigated this complaint and issued an Office of Administrative Trials and Hearings (OATH) summons.	319 days 13:25:36
HPD	Department of Housing Preservation and Development	PESTS	The Department of Housing Preservation and Development was not able to gain access to inspect the following conditions. The complaint has been closed. If the condition still exists, please file a new complaint.	318 days 23:55:11
HPD	Department of Housing Preservation and Development	NO LIGHTING	The Department of Housing Preservation and Development was not able to gain access to inspect the following conditions. The complaint has been closed. If the condition still exists, please file a new complaint.	318 days 14:25:19
DPR	Department of Parks and Recreation	Hitting Building	The Service Request submitted did not have sufficient location or complaint information for NYC Parks to respond. Please submit a new Service Request with adequate site details, including a full street address and descriptive location information.	317 days 01:08:40
DPR	Department of Parks and Recreation	Remove Stump	The Service Request submitted did not have sufficient location or complaint information for NYC Parks to respond. Please submit a new Service Request with adequate site details, including a full street address and descriptive location information.	317 days 00:28:00
DOT	Department of Transportation	Multiple Street Lights Out	Service Request status for this request is available on the Department of Transportation's website. Please click the "Learn More" link below.	316 days 20:52:00

Modeling

- Target: seconds until 311 request is resolved.
- Encoding of all relevant categorical variables.
- Baseline: Linear regression.
- Final model: XGBoost regressor.
- Right track, not there yet.
- 26% variance explained.
- More relevant features, imbalanced distribution of target variable.

Product Design



Product Design

- Interactive map.
- Grouping by community board, select and retrieve most prevalent request.
- Get “most likely” complaint you can encounter.
- Identify prevalent issues on each neighborhood.
- Useful for residents, city agencies.
- Scalable, can be updated easily.