



# Parking in NYC

## 311 Complaints Analysis

Team Traffic Enforcement

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# Agenda

- Project focus and goals
- Research questions
- Dataset analysis and what we have learned
- Complaint resolution analysis
- Conclusion and further work



# Team Members



# Roles & Responsibilities

Alexander Makarov - average settlement time analysis, PCA

Azam Alfayez - documentation, final report

Sergey Ulyanenko - analytics and charts

Xiaohui (Eartha) Guo - Data Visualization, Interactives Maps and RMarkdown

Tao Yu - weather patterns

Xiyue Yu - resolution analysis, prediction

# Project Timeline

1st Week: Individual ideas, brainstorming

2nd Week: Hypothesis and research questions

3rd Week: Assigning tasks and compiling presentation

4th Week: Revising plan and incorporating feedback

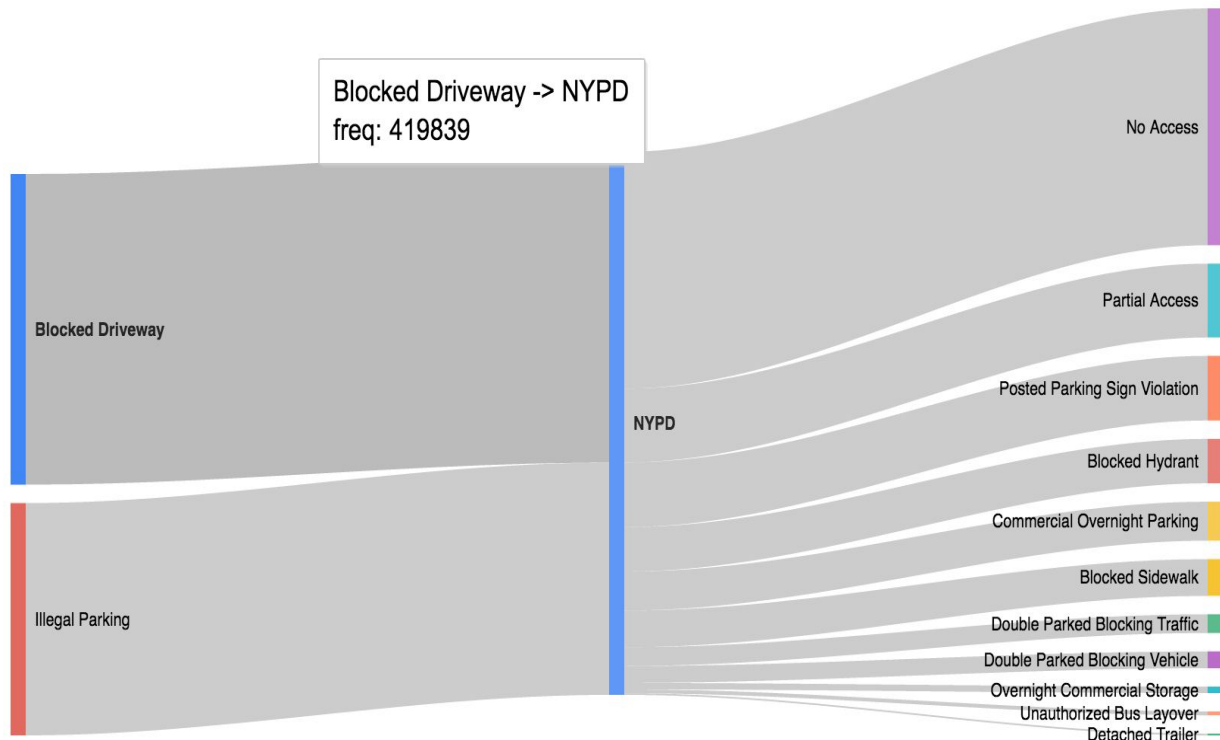
5th Week: Final report and submission

# Research Questions



- What are the complaint categories and their distribution?
- How many of the complaints end up in police action?
- How many of police actions end up in ticket issuance?
- Is there a strong relationship between complaint activity and external factors such as weather, etc?

# Dataset

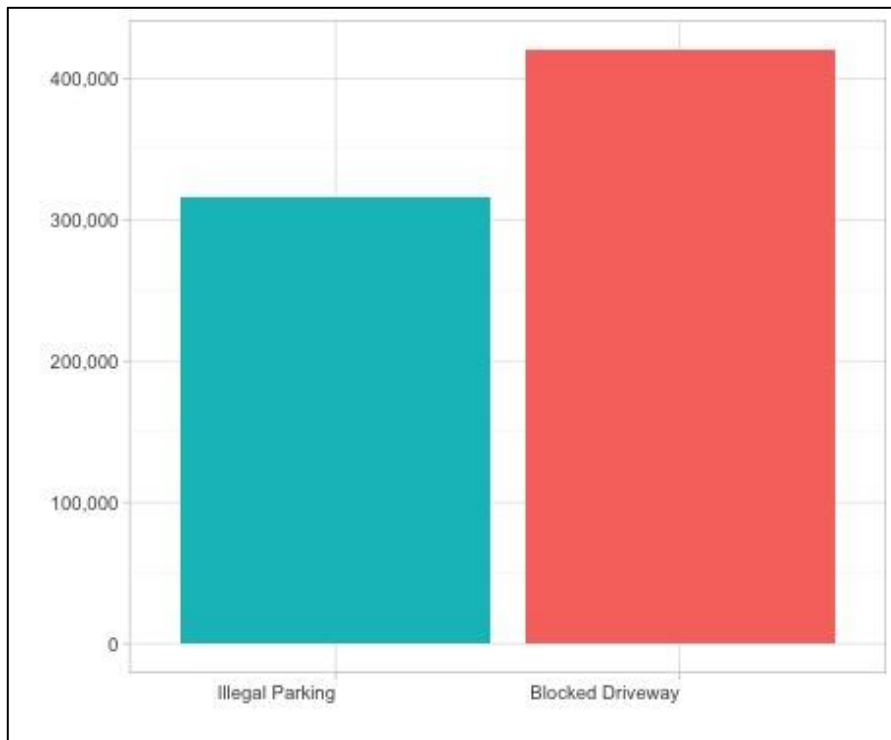
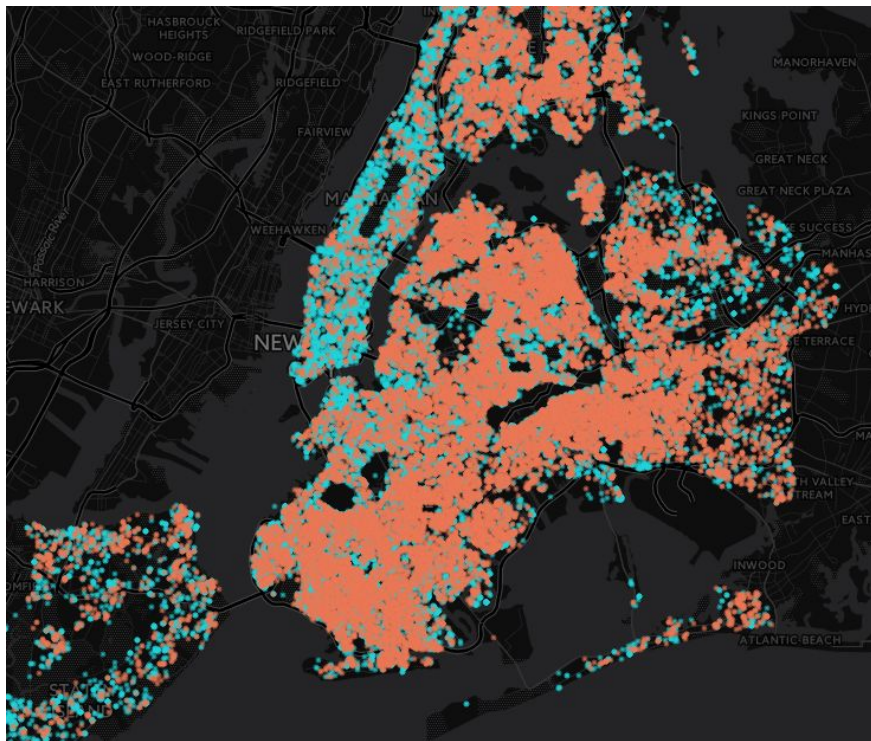


The dataset has five years worth of data, or 735k records.

All parking related complaints are handled by the NYPD.

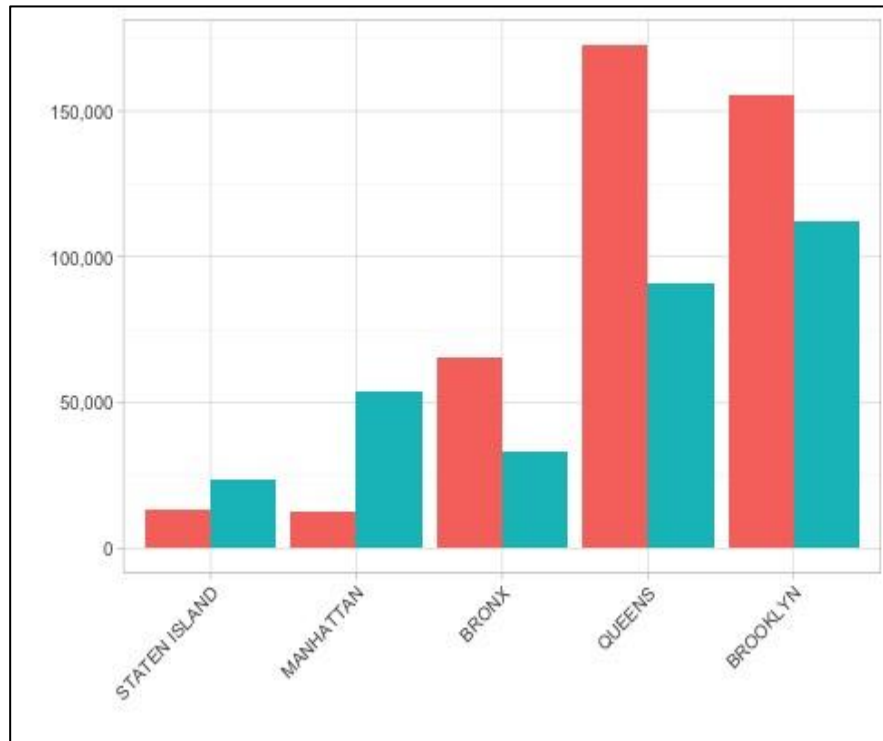
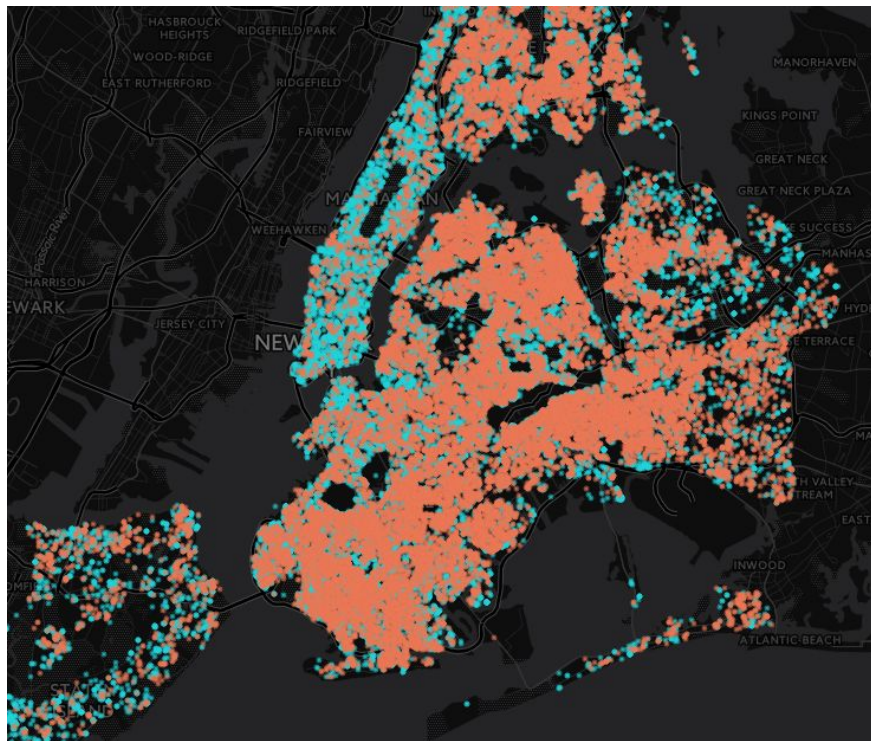
There are two main complaint types:  
(1) Blocked Driveway  
(2) Illegal parking

# The two main complaint types

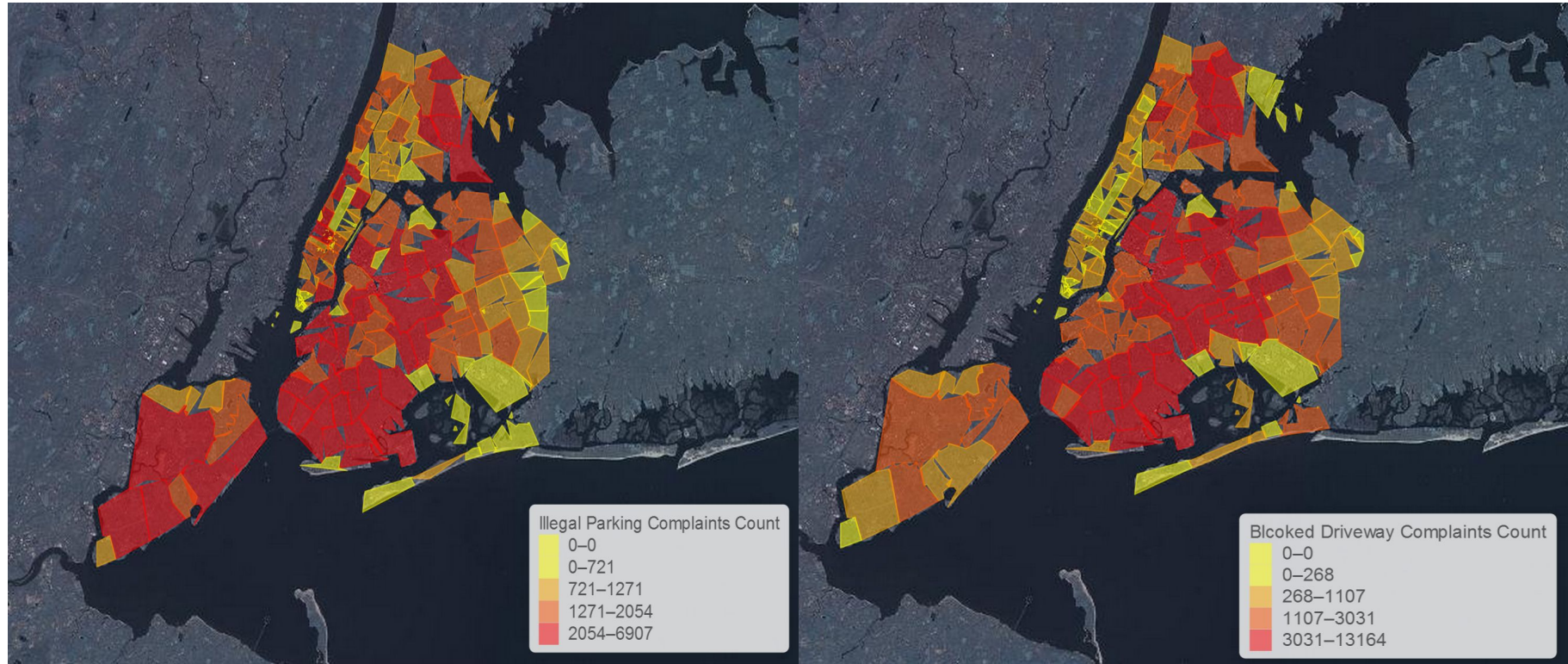




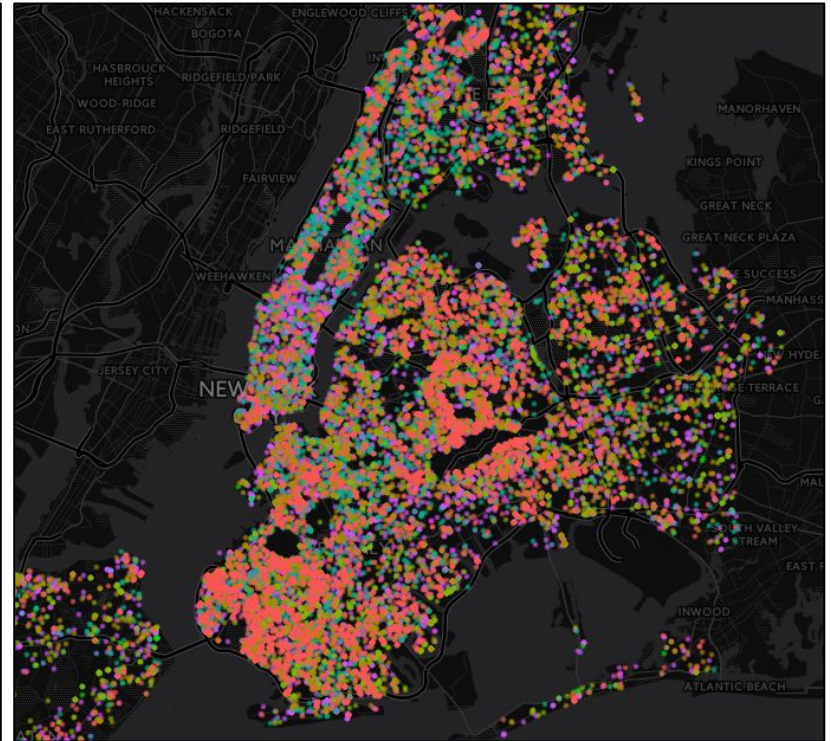
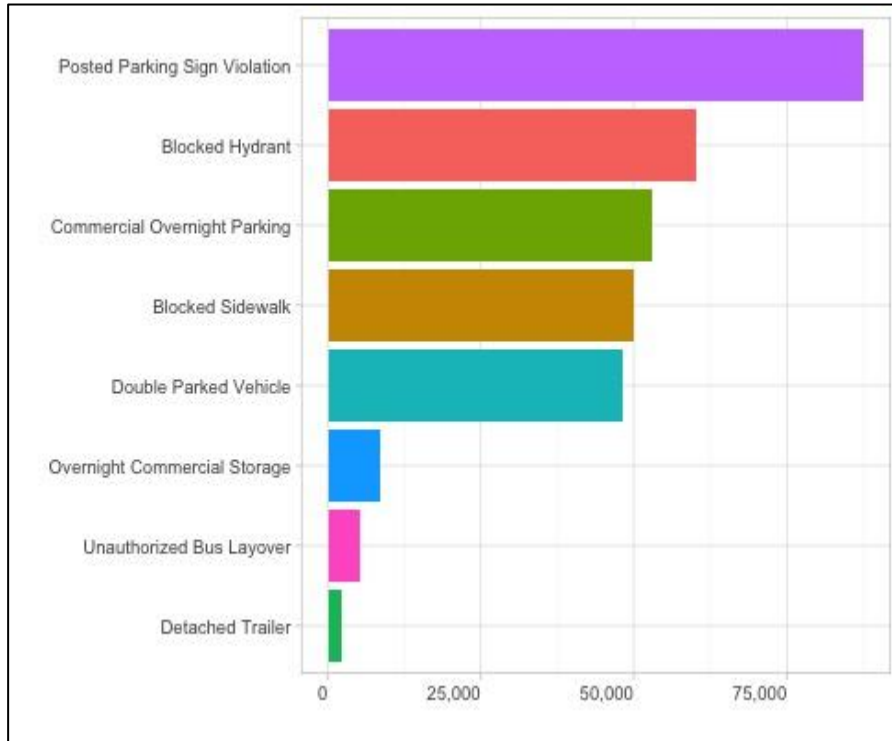
# The two main complaint types by borough



# Polygon by zip code Map: Illegal Parking VS Blocked Driveway Count



# Illegal parking breakdown



# Complaint Resolution Analysis

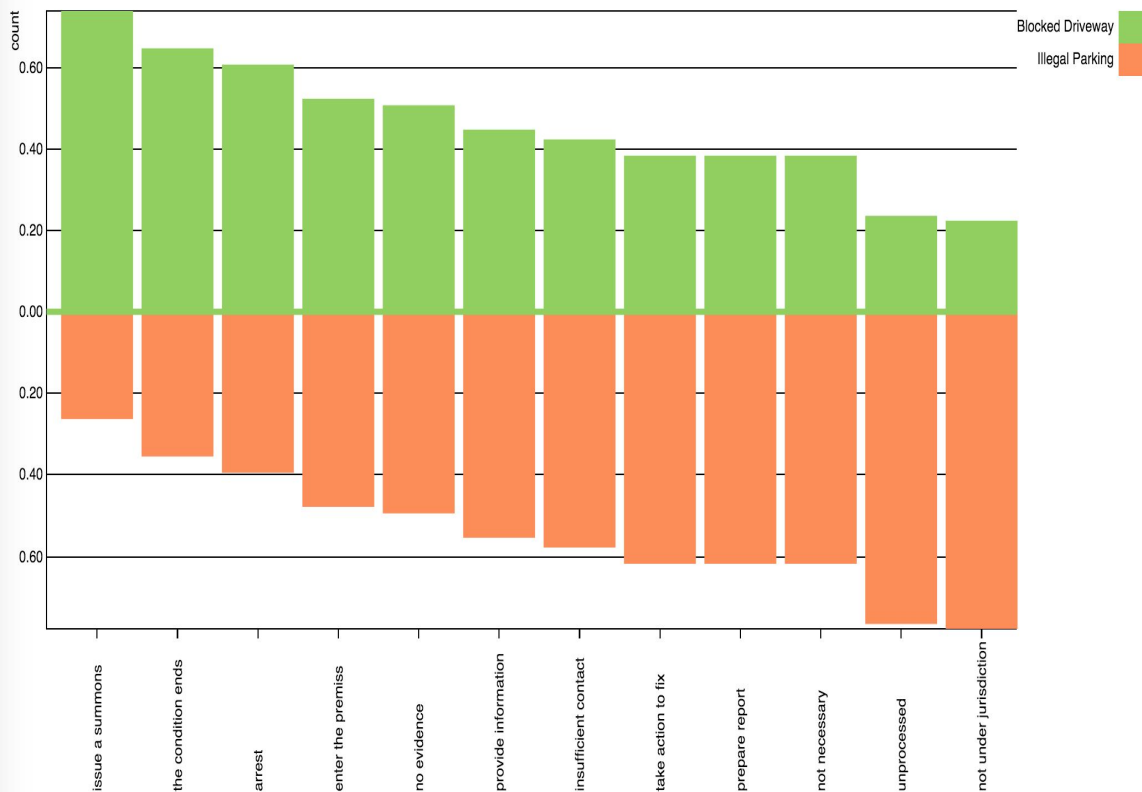


The resolutions of the parking related complaints can be classified into 3 types.

For most complaints, NYPD took some actions to solve the problem.



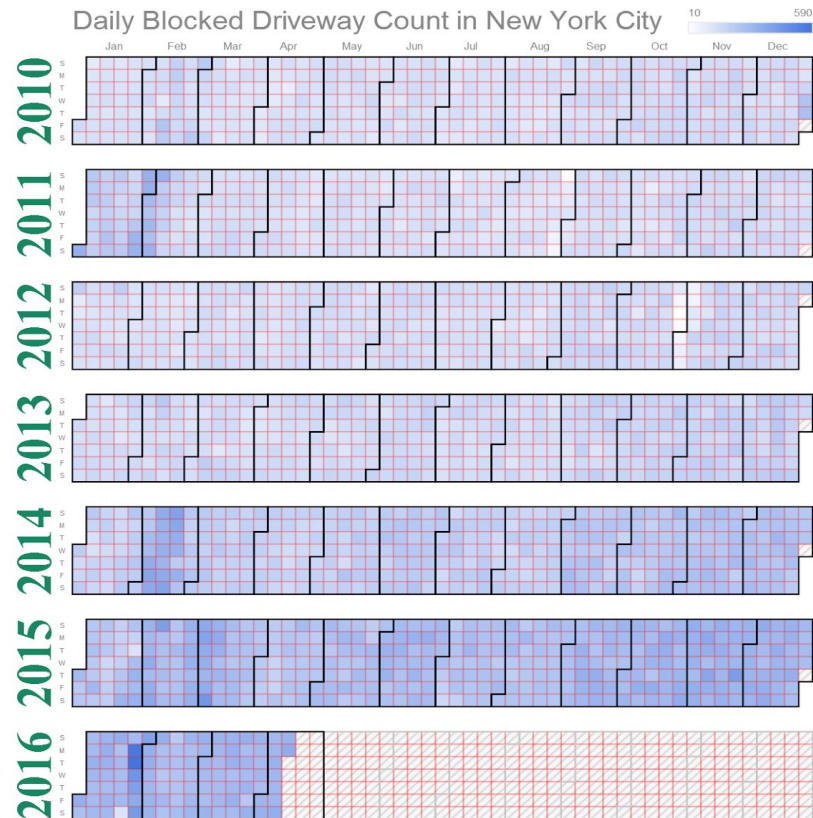
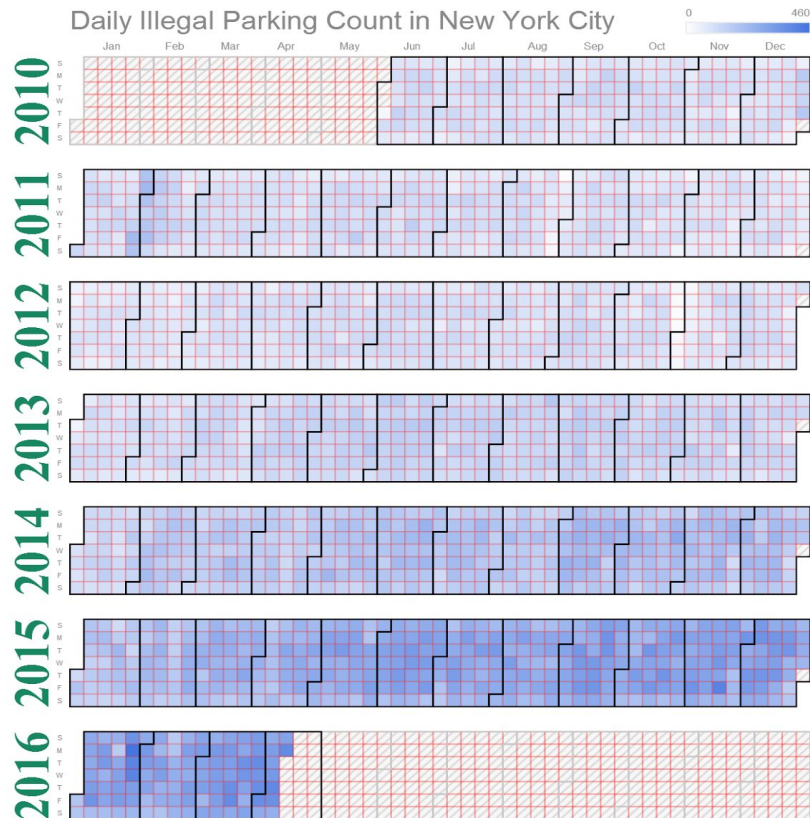
# Complaint Resolution Analysis



The types of complaints have different distributions of resolution type.

Most rejected and unresolved problems are illegal parking.

# Calendar



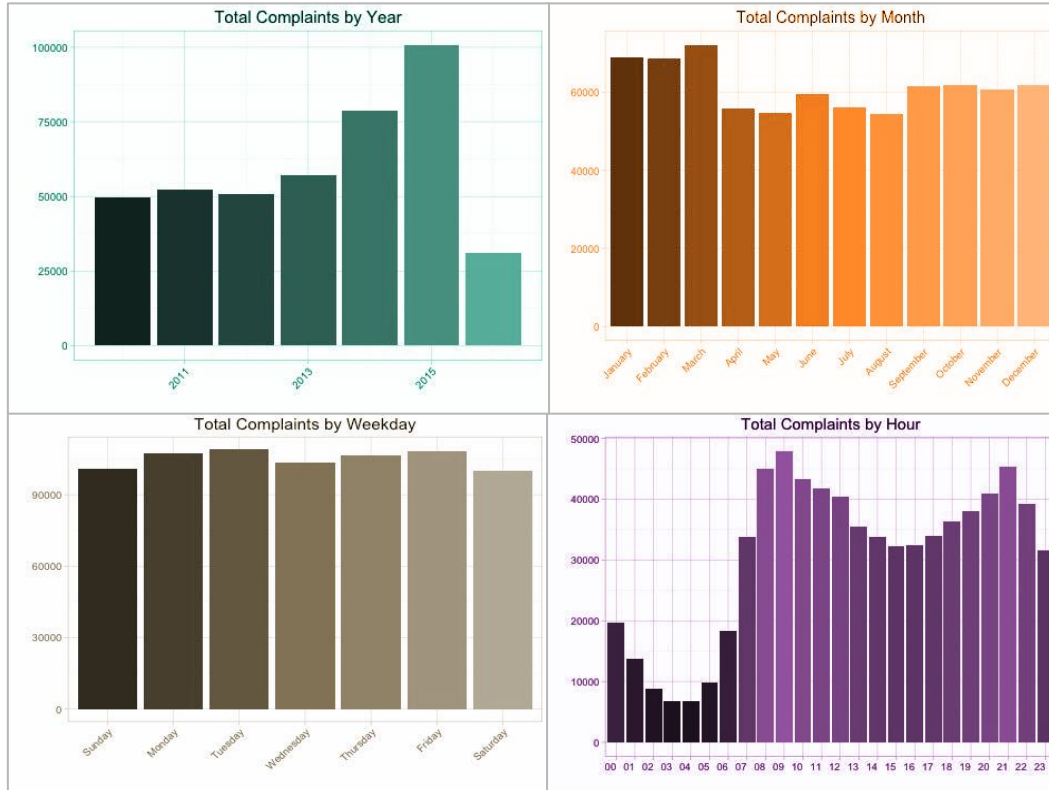
# Story: Heavy Snow Storm January 2016

## NYC Residents Deal With Cars, Driveways Buried In Snow

(Monday, January 25th, 2016 11:15 AM)



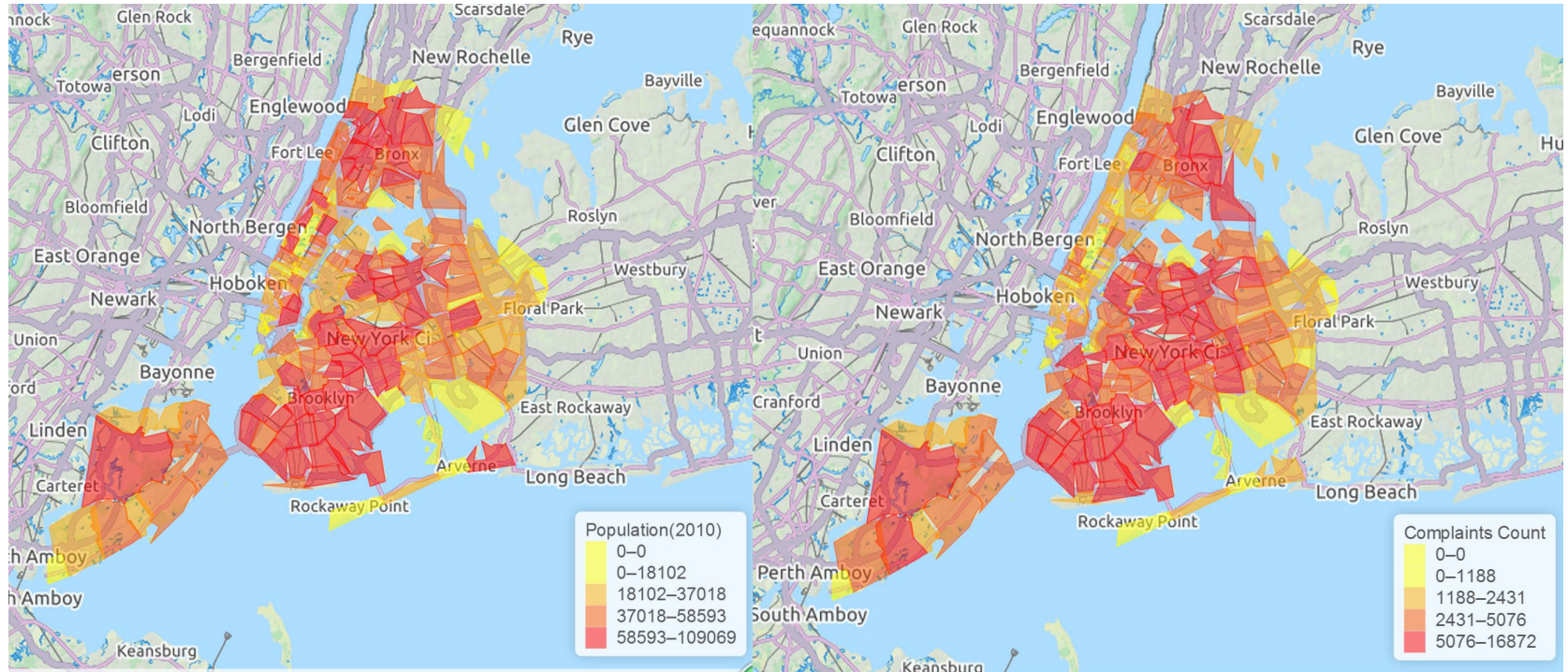
# Calendar patterns



- Number of parking related complaints has been increasing since 2010
- Seasonality pattern
- Lighter call volume during weekends
- Lighter call volume during nights

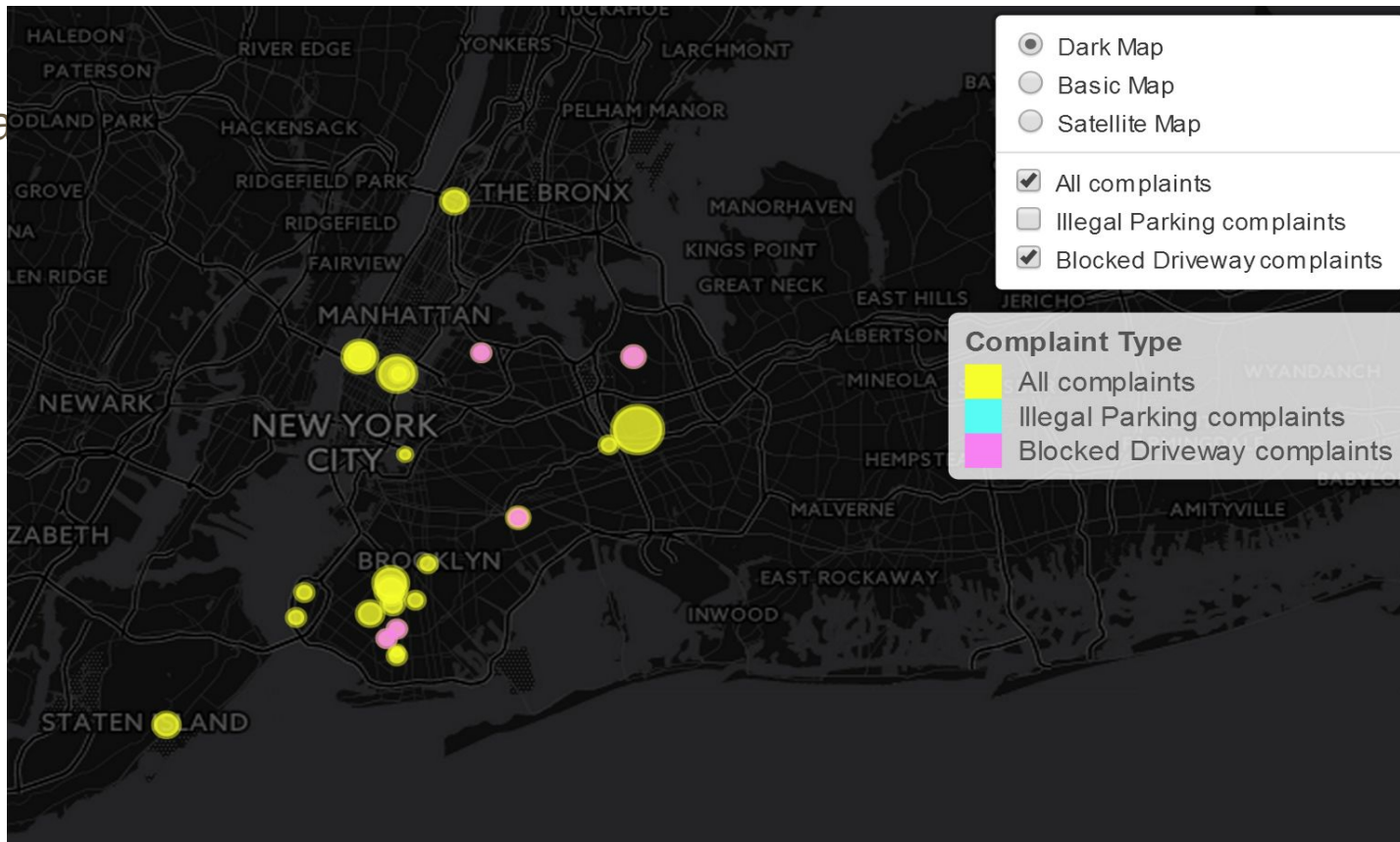


# Polygon by zip code Map: Population VS Complaints Count

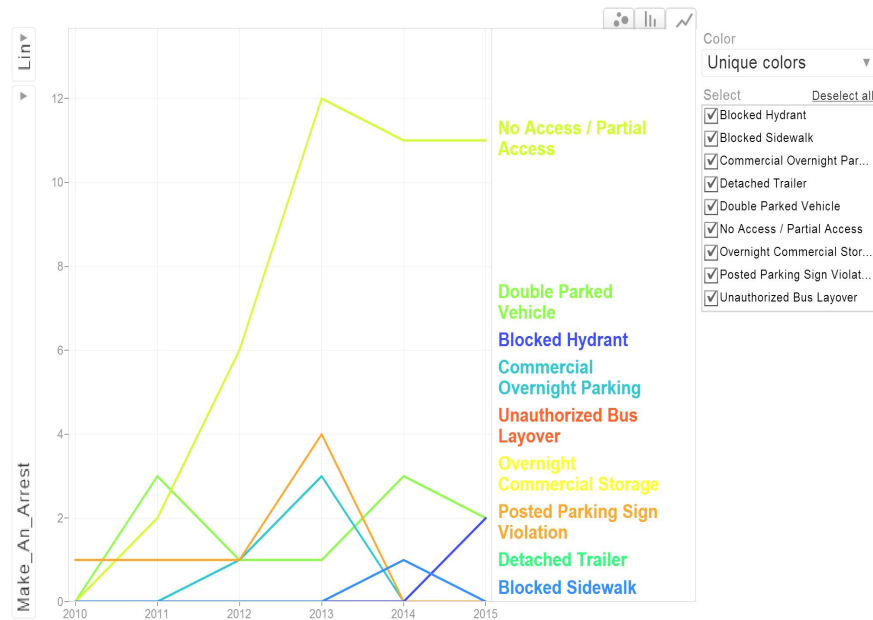
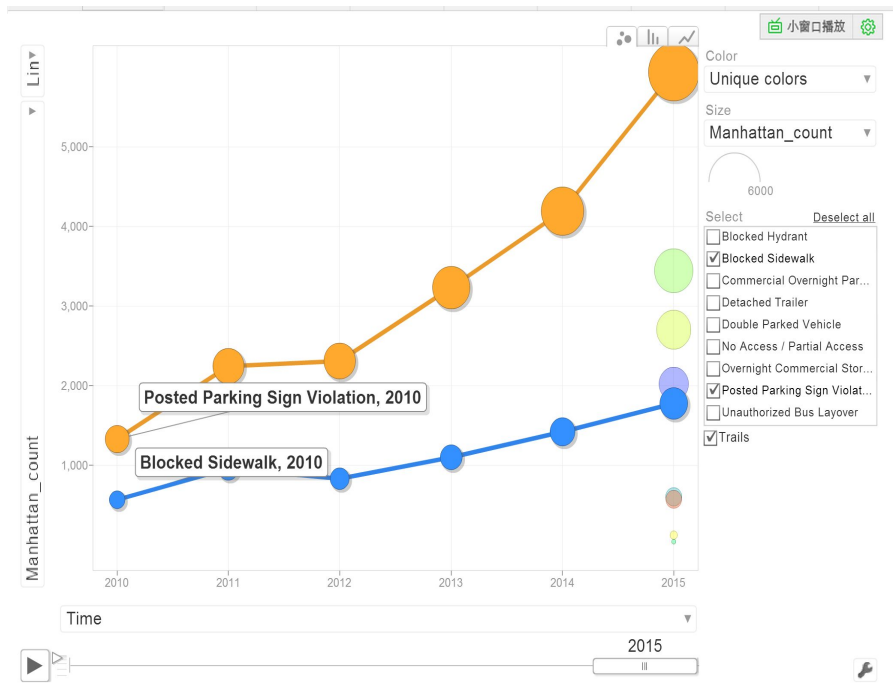


# Place where parking violation happened frequently

External



# Motion Chart

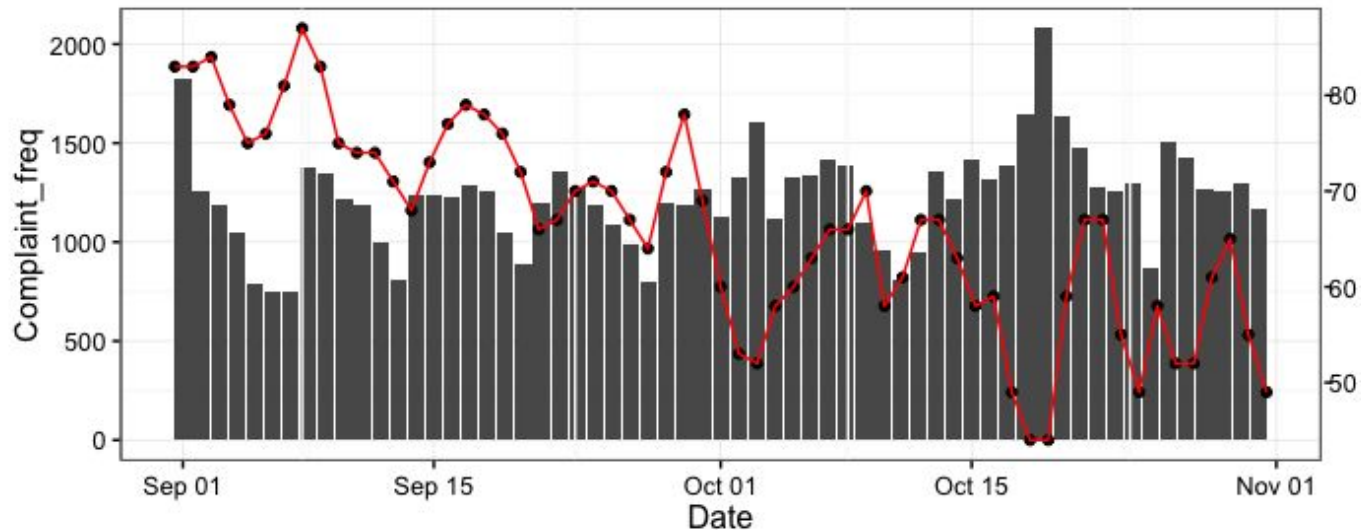


# Predict Complaint Amount Using Weather Info

- **Weather Data:** Precipitation (snow or rain), Temperature
- **Complaint Data:** total complaint amounts and settlement time by day
- **Time Duration:** Jan to Feb (more snow during this time), and Sep to Oct (temperature changes most dramatically)

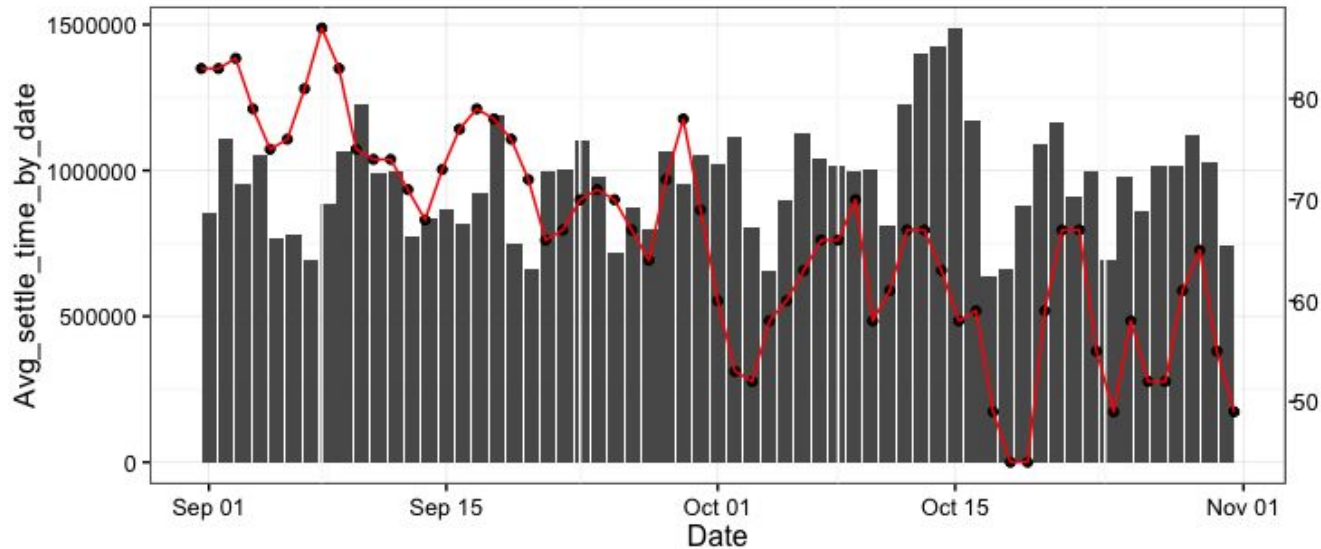
# Temperature and Complaint Frequency

In a certain temp range, the complaint freq goes up and down with temp simultaneously. However, it becomes the opposite if temp changes dramatically



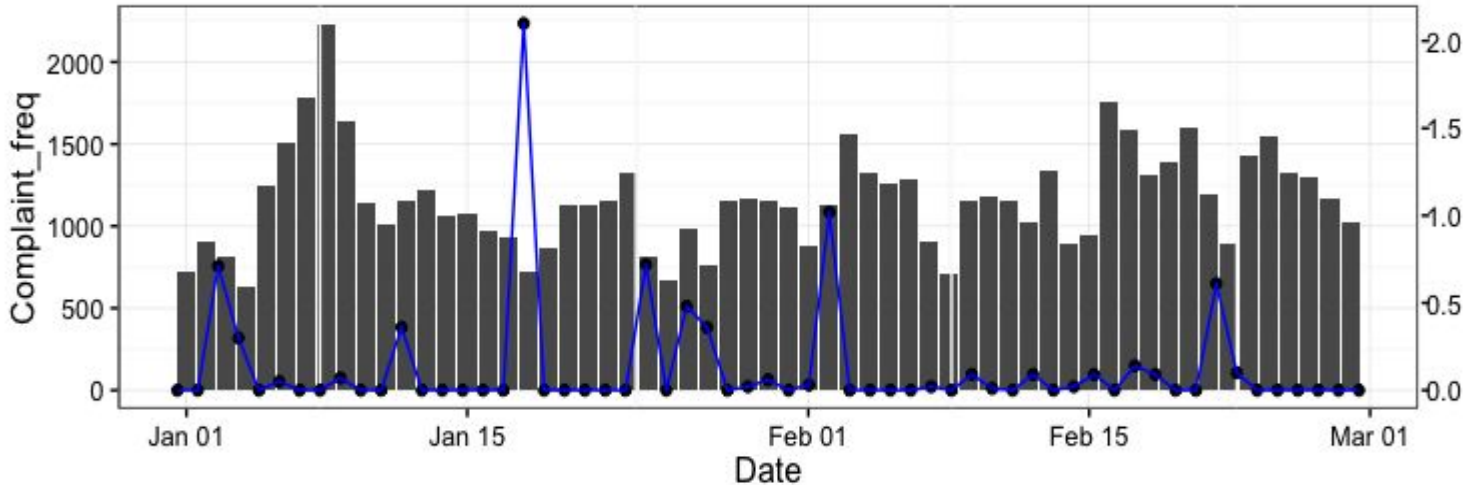
# Temperature and Settlement Time

Comparing to the previous graph of temp and complaint freq, the settlement time always moves with temp in the same direction even when temp changes dramatically(maybe officer just want to leave fast)



# Precipitation and Complaint Frequency

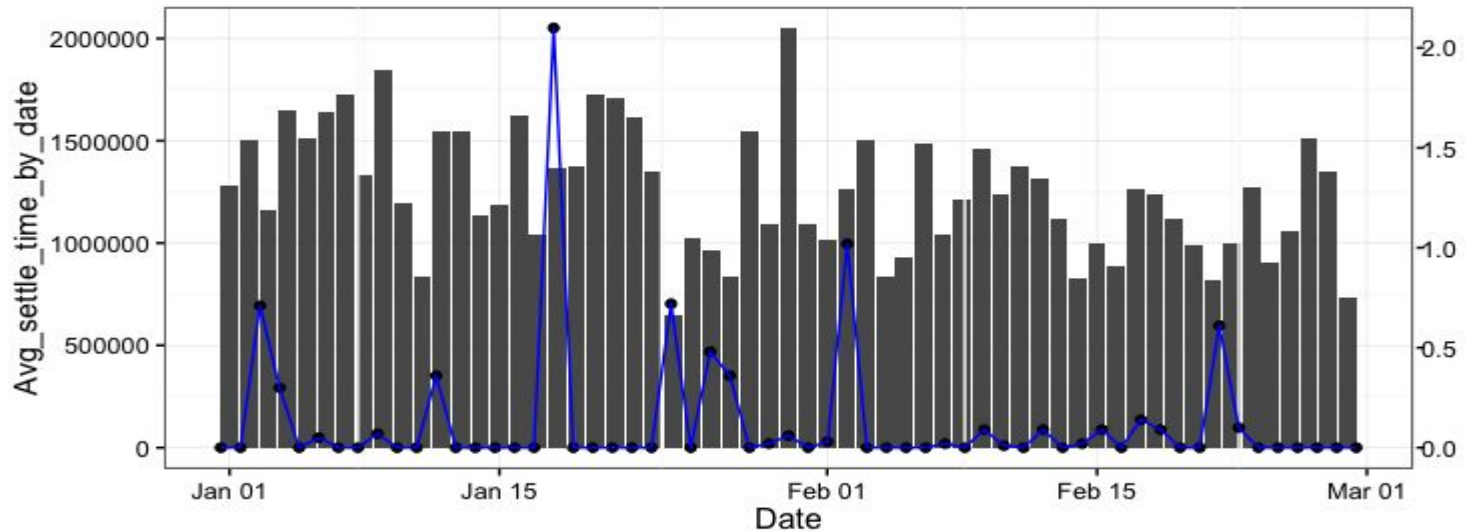
In the most cases, complaint frequency decreases when it has snow or rain (might because people do not go out), but rises rapidly right after the snow (because of the snow on the road).





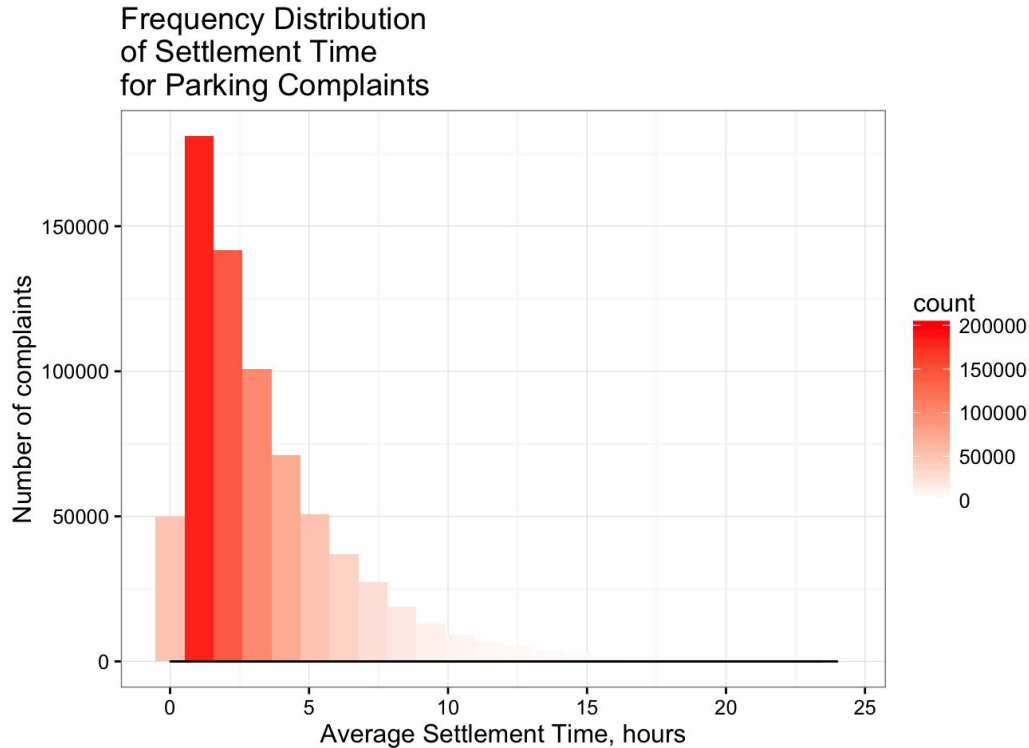
# Precipitation and Settlement Time

The same as the relation b/w precipitation and complaint freq, settlement time would be shorten if it has a snow.





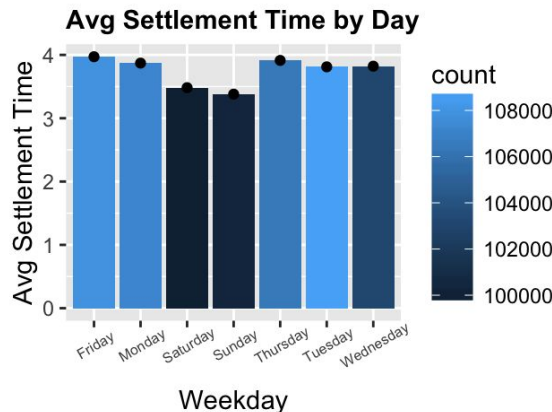
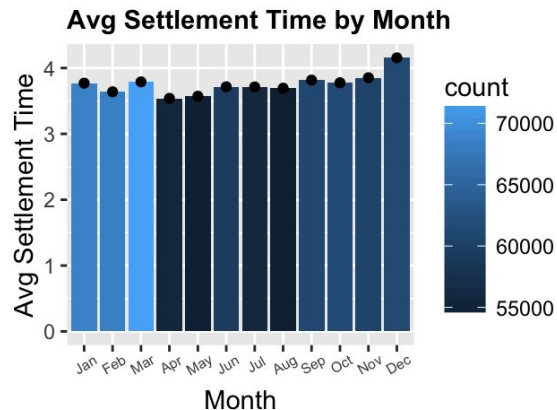
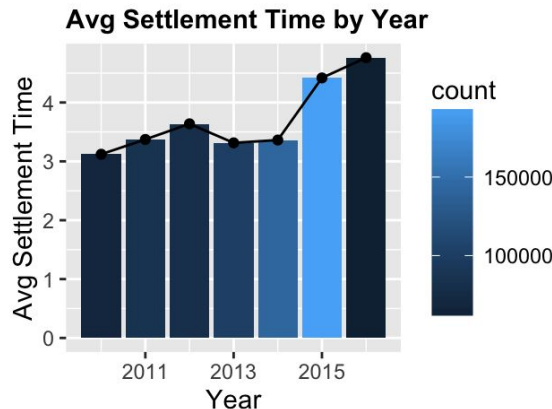
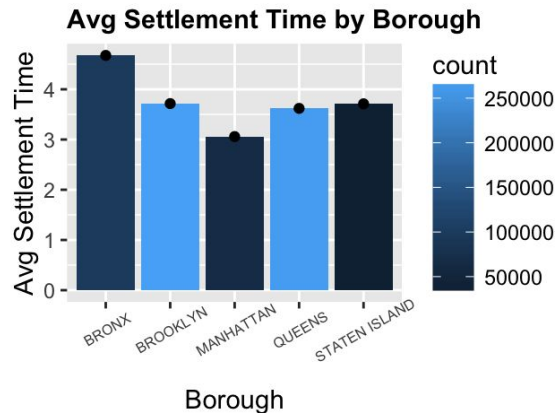
# Average Settlement Time



## Duration Analysis:

- Expected frequency distribution shape — exponential family
- Under normal circumstances, time to resolve the complaint is rarely more than 5-6 hours

# Average Settlement Time



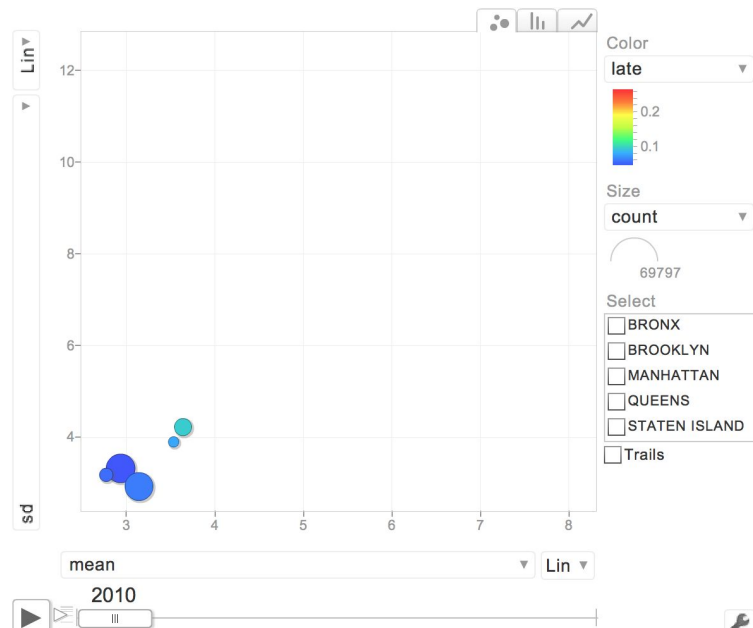
## Duration Analysis:

- Average Settlement Time varies across boroughs, from month to month, from day to day
- Surprisingly, the number of complaints, as well as AST grew year over year since the introduction of 311

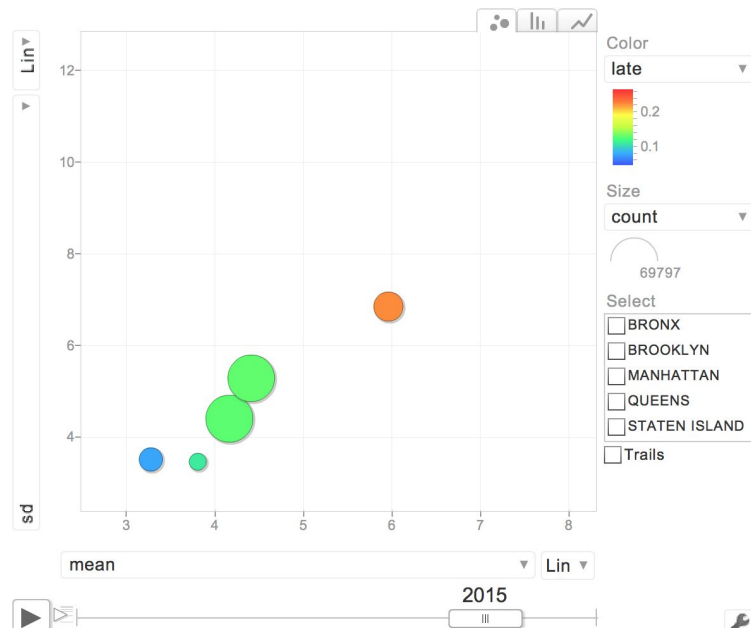
# Average Settlement Time

**Important finding:** some boroughs are overwhelmed with the number of complaints, thus facing the lack of patrol units, higher average settlement time, its standard deviance is higher, much more late responses.

**Problematic boroughs:** **Bronx**, **Brooklyn**, **Queens**

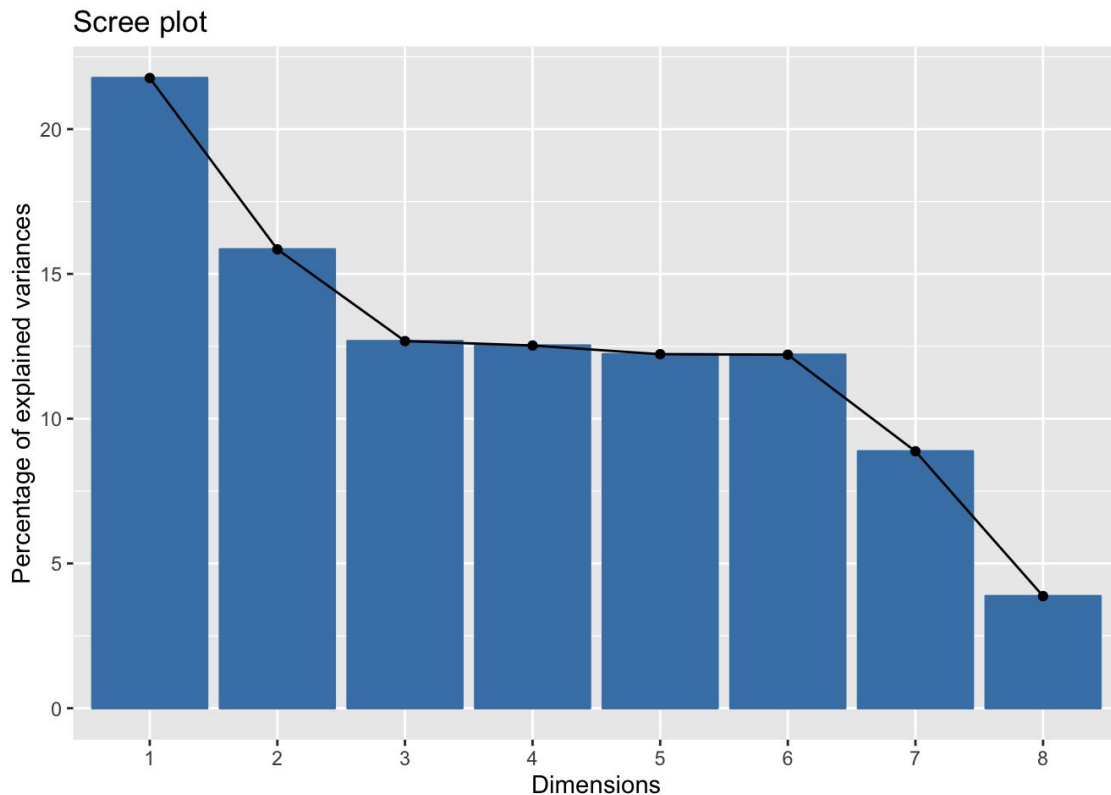


Data: duration\_by\_borough • Chart ID: MotionChartID20174d72ffb • googleVis-0.5.10  
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# Average Settlement Time



## No strong PCs:

- the biggest PC explains only approx. 22% of the total variance in dataset