

New York 311 Service

Noise Complaints Analysis 2017



Group 7

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How can we help you?

NYC311 Search



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1. Executive Summary

NYC 311 is to offer customer service and provide the public with quick, easy access to all New York City government services and information. NYC 311 Data provides insights to improve city government through the detailed measurement and deep analysis of service delivery. Among all these aspects, noise is one severe problem which has significant relationship with living status. Our team chose and filtered 2017 NYC 311 Service Requests Data to analyze those noise complaints from various aspects including geographic, time and condition to see how the 311 noise complaints distribute and how the agency responds to the requests. Then we made a shiny web to showcase the analysis results interactively. Finally, we want to make recommendations on the agency efficiency and noise problems and see where can be explored deeply in the future.

Generally, we find that 1) the loud party noise accounts for the majority of 311 noise complaints. 2) And it happens most frequently during midnight at the weekend in the southeast of Manhattan, the north of Brooklyn and Bronx. 3) Specifically, the area along Hudson River and No. 87 Highway near Bronx and area south to Midtown should be paid more attention regarding severe noise problem. 4) Also, the commercial noise and residential noise have different location distribution. Most commercial noises are in Lower Manhattan while Brooklyn and Upper Manhattan have more residential noises, consistent with city zoning in NYC. 5) Agency efficiency was really high in the past year, which improved the living quality of New Yorkers. But maybe the police resource should be balanced better in the future. 6) The accurate address provided indicates that New Yorker citizens are responsible and kind-hearted to help agencies to improve the city.

2. Introduction

NYC 311 is an information hub created by the New York City government that provides information on and access to over 3600 non-emergency City services. Originally designed to filter non-emergency calls away from the emergency phone line, 911, NYC 311 receives service

requests and complaints 24 hours a day, seven days a week, 365 days a year via phone, email, and text in over 175 languages. Since 2010, NYC Open Data has made all NYC 311 service requests and complaints publicly available.

Among these services requests and complaints, noise made up a comparatively large percent of all complaints to 311. In the city that never sleeps, it should be no surprise that noise was the chief complaint among New Yorkers. So, We decided to focus our project on those noise complaints.

Therefore, we analyzed a subset of these data, those “Complaint.Type” of “Noise”, to provide insights into possible avenues by which NYC 311 might improve upon its mission to “provide the public with quick, easy access to all New York City government services and information...”.

NYC 311 accepts noise complaints from all aspects, shown as follows:

- Alarm: Report an alarm going off.
- Noise from Air Conditioner or Ventilation Equipment: Report noise from an air conditioner, ventilation equipment, or exhaust device.
- Noise from Airplane: Report noise from local airports, including John F. Kennedy (JFK), LaGuardia, or Newark Airports.
- Noise from Animal Other Than Dog: Report noise from a domestic animal other than a dog.
- Noise from Boat: Report noise from a boat in a New York waterway, including loud music, motor noise, or excessive horn blowing.
- Noise from Club or Bar: Report noise from inside a club or bar, including loud music, talking, or singing, coming from inside a club or bar.
- Noise from Construction: Report noise from street or building construction, including jackhammering and construction activity before or after hours. Before or after hours means Monday to Friday before 7 AM or after 6 PM, or anytime on weekends.
- Noise from Dog: Report noise from a barking dog.
- Noise from Factory: Report noise from a factory, power plant, or other industrial facility.

- Noise from Garbage Truck: Report noise from a garbage truck.
- Noise from Helicopter: Report noise from a helicopter.
- Noise from House of Worship: Report noise from inside a house of worship.
- Noise from Ice Cream Truck: Report music from an ice cream truck.
- Noise from Intercity Buses: Report noise from intercity or interstate buses.
- Noise from Large Party or Large Crowd: Report a large, loud party that has potential for danger.
- Noise from Lawn Care Equipment: Report noise from lawn care equipment.
- Noise from Neighbor: Report a noisy neighbor, including loud music or television, talking, and moving or dragging of furniture.
- Noise from Park: Report non-emergency noise coming from a park, except for noise from a dog. Non-emergency noise includes noise from loud music, talking, banging, or children playing sports.
- Noise from Store or Business: Report noise, other than an alarm, from a store or commercial location.
- Noise from Street or Sidewalk: Report noise from the street or sidewalk.
- Noise from Vehicle: Report noise from a vehicle, including horn honking, engine idling, and loud music.

3. Data Description

Our original data source is from NYC Open Data: 311 Service Requests from 2010 to Present. This dataset contains information about the complaints made to 311 from 2010 until the present. Obtained from: <https://data.cityofnewyork.us/Social-Services/311-Service-Requests-from-2010-to-Present/erm2-nwe9>.

The original dataset column description are as follows:

Column Name	Description
Unique Key	Unique identifier of a Service Request (SR) in the open data set

Created Date	Date SR was created
Closed Date	Date SR was closed by responding agency
Agency	Acronym of responding City Government Agency
Agency Name	This is the first level of a hierarchy identifying the topic of the incident or condition. Complaint Type may have a corresponding Descriptor (below) or may stand alone.
Complaint Type	Full Agency name of responding City Government Agency
Descriptor	This is associated to the Complaint Type and provides further detail on the incident or condition. Descriptor values are dependent on the Complaint Type, and are not always required in SR.
Location Type	Describes the type of location used in the address information
Incident Zip	Incident location zip code provided by geo validation.
Incident Address	House number of incident address provided by submitter.
Street Name	Street name of incident address provided by the submitter
Cross Street 1	First Cross street based on the geo validated incident location
Cross Street 2	Second Cross Street based on the geo validated incident location
Intersection Street 1	First intersecting street based on geo validated incident location
Intersection Street 2	Second intersecting street based on geo validated incident location
Address Type	Type of incident location information available.
City	City of the incident location provided by geo validation.
Landmark	If the incident location is identified as a Landmark the name of the landmark will display here
Facility Type	If available, this field describes the type of city facility associated to the SR
Status	Status of SR submitted
Due Date	Date when responding agency is expected to update the SR. This is based on the Complaint Type and internal Service Level Agreements (SLAs).
Resolution Description	Describes the last action taken on the SR by the responding agency. May describe next or future steps.
Resolution Action Updated Date	Date when responding agency last updated the SR.
Community Board	Provided by geo validation.
Borough	Provided by the submitter and confirmed by geo validation.
X Coordinate (State Plane)	Geo validated, X coordinate of the incident location.
Y Coordinate (State Plane)	Geo validated, Y coordinate of the incident location.
Park Facility Name	If the incident location is a Parks Dept facility, the Name of the facility will appear here
Park Borough	The borough of incident if it is a Parks Dept facility
Vehicle Type	If the incident is a taxi, this field describes the type of TLC vehicle.
Taxi Company Borough	If the incident is identified as a taxi, this field will display the borough of the taxi company.

Taxi Pick Up Location	If the incident is identified as a taxi, this field displays the taxi pick up location
Bridge Highway Name	If the incident is identified as a Bridge/Highway, the name will be displayed here.
Bridge Highway Direction	If the incident is identified as a Bridge/Highway, the direction where the issue took place would be displayed here.
Road Ramp	If the incident location was Bridge/Highway this column differentiates if the issue was on the Road or the Ramp.
Bridge Highway Segment	Additional information on the section of the Bridge/Highway where the incident took place.
Latitude	Geo based Lat of the incident location
Longitude	Geo based Long of the incident location
Location	Combination of the geo-based latitude & longitude of the incident location

Since the original dataset is huge, we focus our project on noise complaints made in 2017. And those cells in grey above are the columns we are not going to use in our analysis.

4. Data Cleaning

Before analysis, we cleaned the whole dataset by firstly formatting all variables depicting dates, including Created.Date and Closed.Date. We also mutated several variables including Created.Month, Created Weekday, Created.Time and Created.Hour to further analyze relationship between distribution of noise complaints and created time. Besides, complaints related with noises were described with a subtype in "Complaint.Type". Thus, we subtracted the subtype and created a variable named "Complaint.SubType", which has "Commercial", "Helicopter", "House of Worship", "Park", "Residential", "Street/Sidewalk", "Vehicle" and we used "Others" to describe those with no subtype depicted.

For agency analysis part, we spent some time analyzing current dataset to find what we could obtain based on agency-related information. The variable Resolution.Description provides agencies' feedback on closed complaints and with only 42 types. Thus, for analyzing agency's action, we focused on closed complaints. For closed complaints, there were 9 with no resolution description, and were removed considering it is a small number. The description reveals what level of response should be given. For example, some complaints were solved by contacting with complaints and respondents, some were considered unnecessary to response,

some were duplicated complaints on same issue and closed, and some were investigated on the spot. Then we decided to use 3 levels to describe importance of complaints to the agency. Level 1 are complaints that need response or investigation; level 2 are those closed or resolved by contacting complainants or directly referring to another agency; level 3 are cases that are unnecessary to respond. Since level 1 cases are the most important complaints with much resource invested, we would like to focus on level 1 cases to analyze how well they were solved in 2017. The description demonstrates how the case was resolved, and we added a variable named "Problem.Solution" to show whether specific solution was given. "Yes" indicates there was a specific solution given, while "No" means though agency conducted investigation but failed to complete it. We also categorized the details of feedback and added a variable named "Result.Detail" to show the resolution given or the reason why investigation was not completed. There are 7 categories, namely "No evidence of violation", "Violation resolved", "Condition fixed", "Further investigation", "Referred" (meaning after investigation, the case was referred to another agency), "Entry unobtainable" and "Incorrect address".

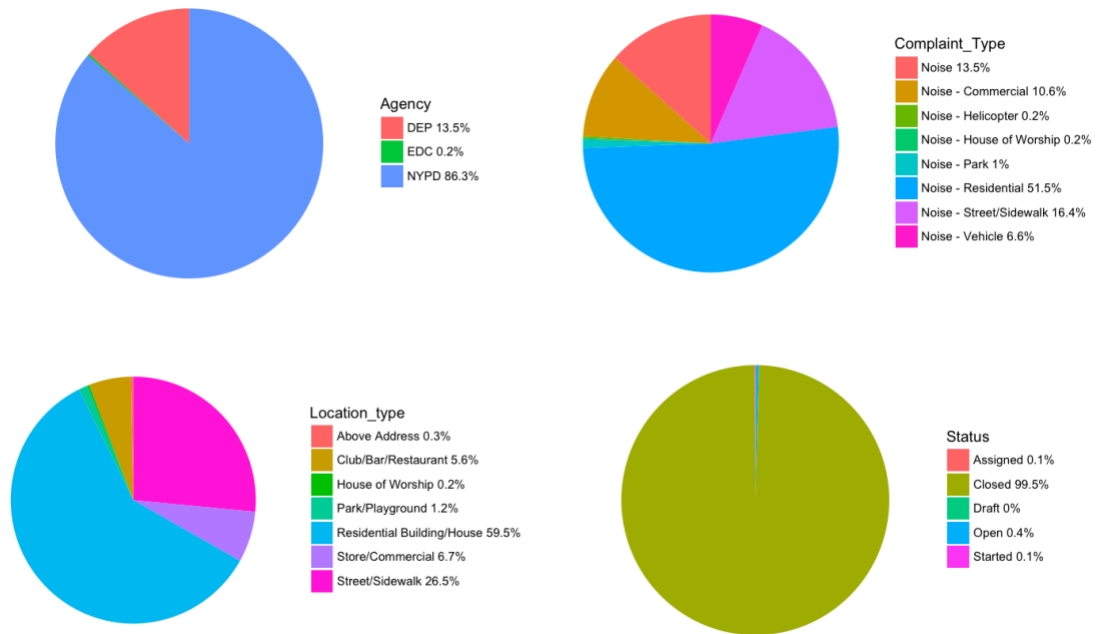
5. Exploratory Data Analysis

Overview Analysis

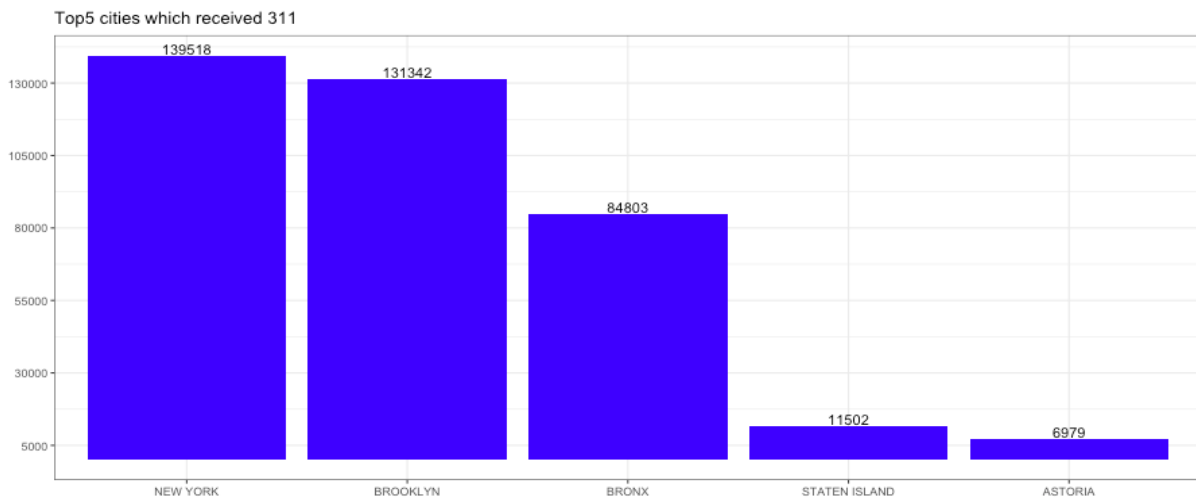
In the overview part, we look at the data in general and make the initial analysis.

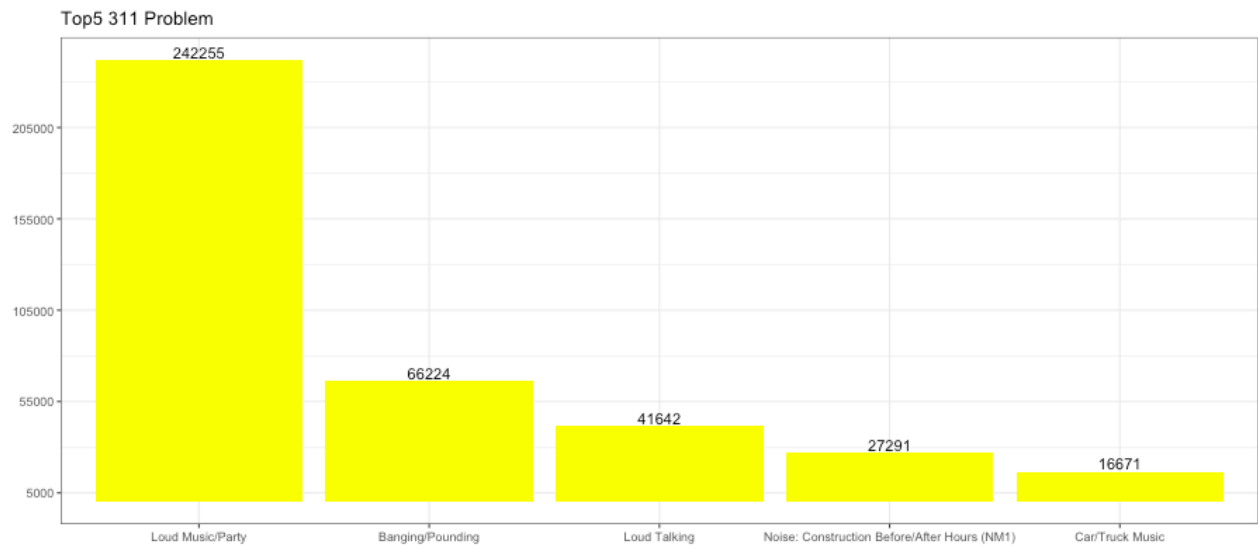
First, we use pie chart to see how agency, complaint type, location type and status distribute proportion and what are the biggest ones. Obviously, NYPD is the one that gets the most 311 noise complaints and EDC makes up a very few parts. Residential noise accounts for over half of the complaints, followed by the street sidewalk noise and commercial noise.

According with the complaint types, residential building house makes up the most part of location distribution. It shows that the residential area is the highlight of the 311 services in New York. The 99.5 percent of closed services shows the good efficiency of New York 311 service.

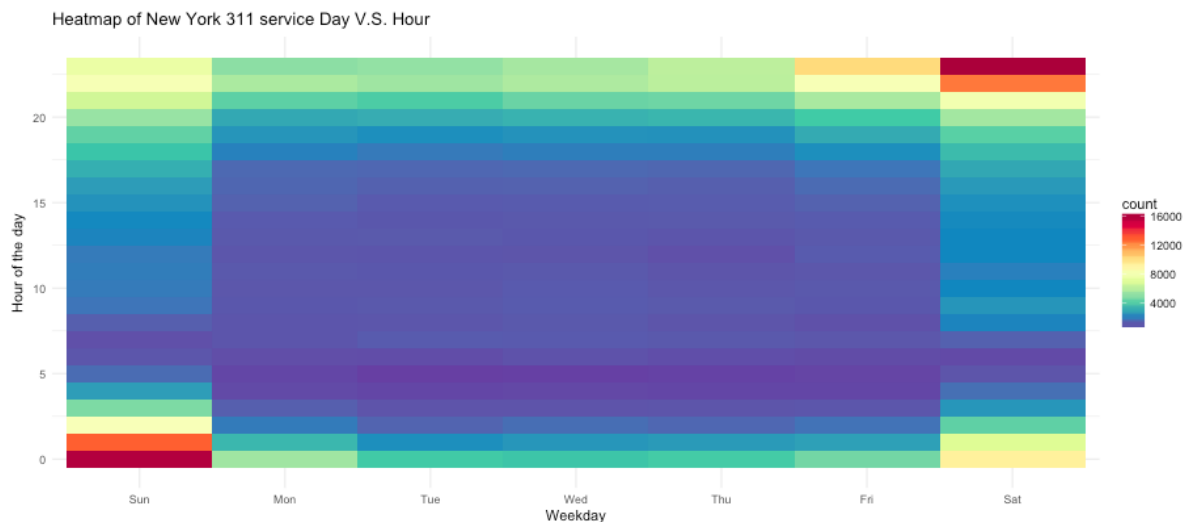


Second, we want to see which are top areas that received 311 and which are the top 5 noise complaint problems. It shows that New York and Brooklyn get most 311 requests. And the top issue is loud party noise.



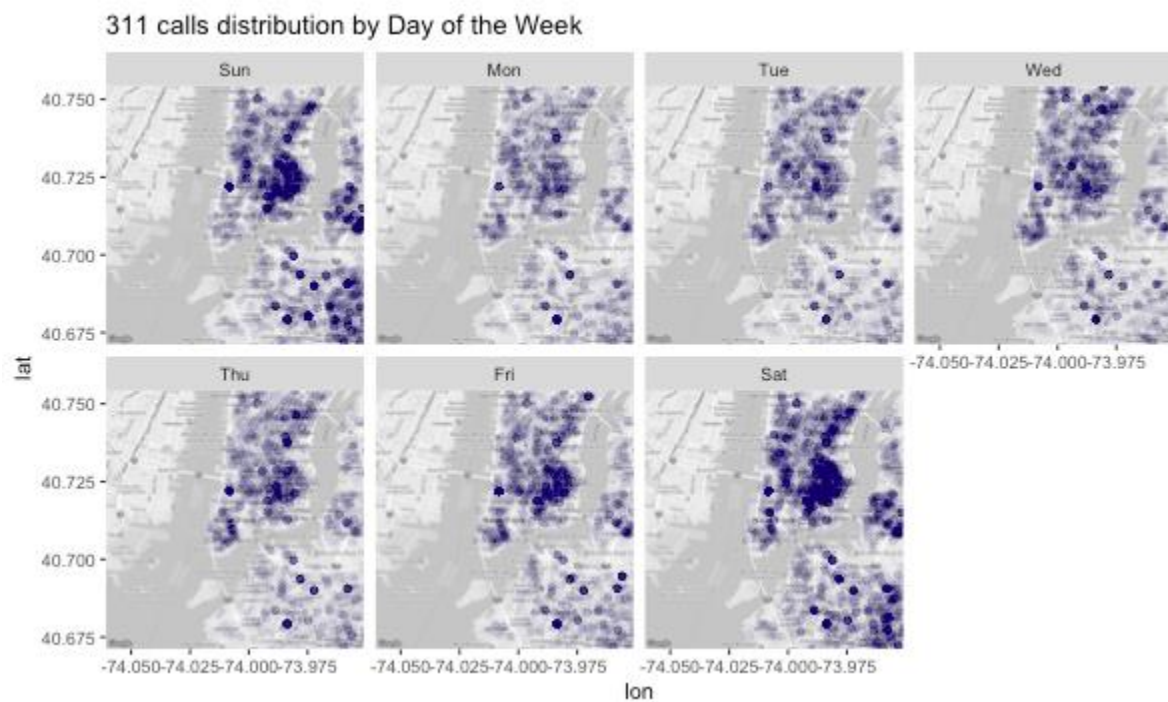
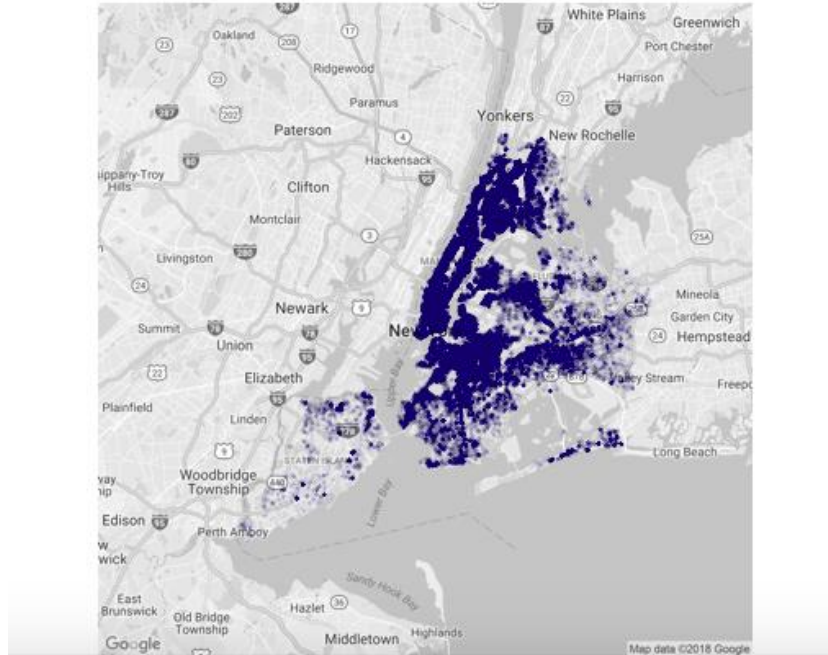


Third, we use heatmap to analyze the connection between 311 noise complaints and time. The map illustrates that the midnight(0am--1am) in weekend is the where there are frequently a large number of noise complaints to the police.



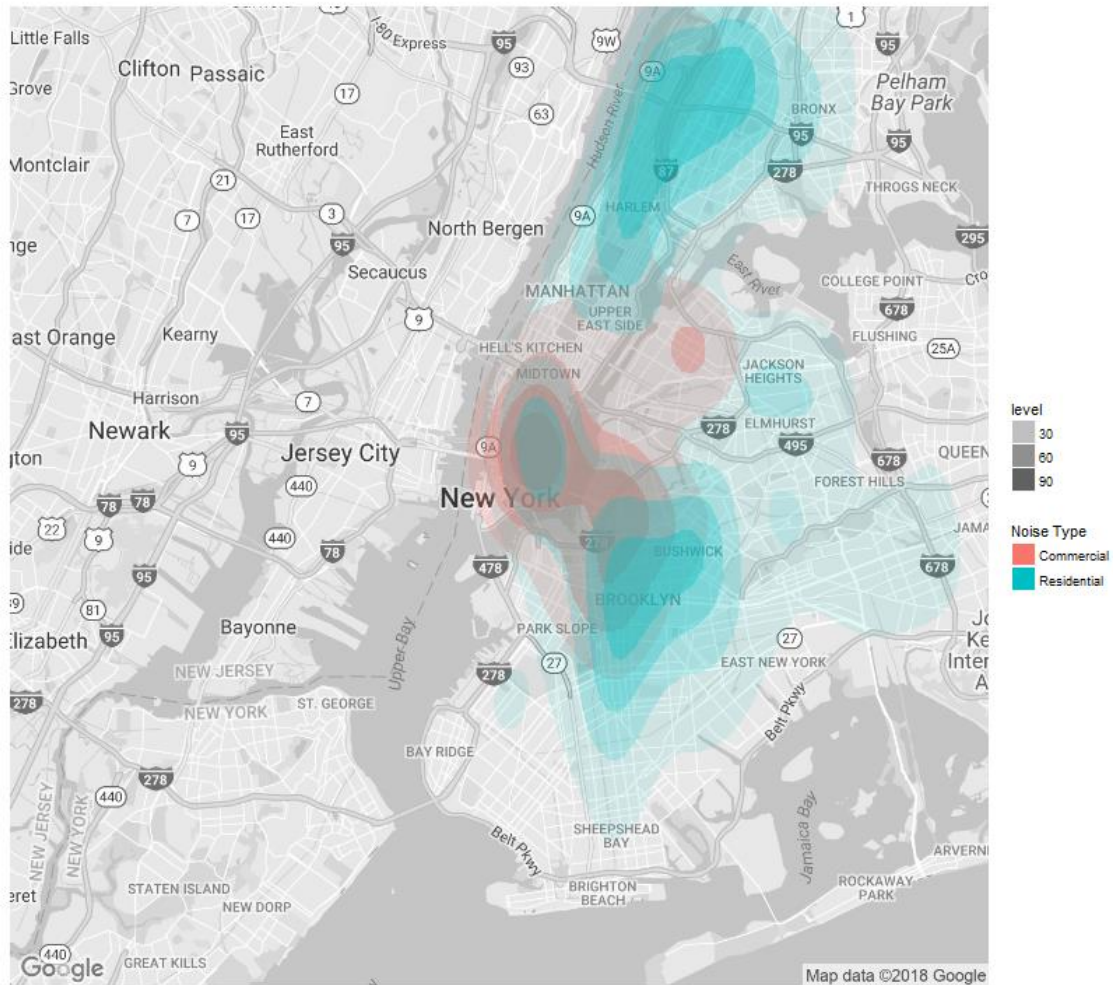
Fourth, we combine the noise data with the New York map to see the geographic distribution. The whole Manhattan, the north of Brooklyn and Bronx are the places where there are a large number of 311 noise complaints, consistent with city ranks bar.

Then, combining with weekday, we take a closer look at the map analysis. The 311 noise complaints in the southeast part of Manhattan take place most frequently.

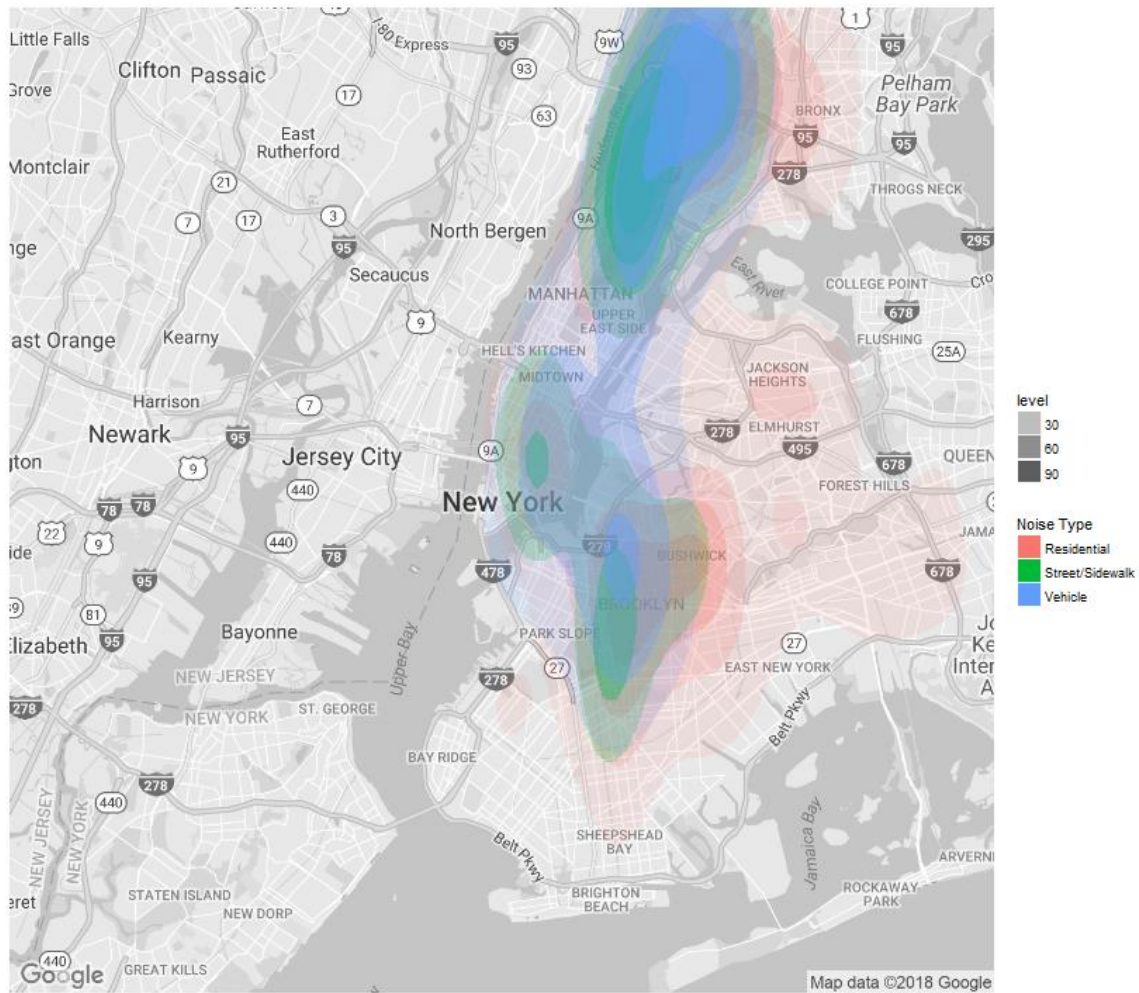


Distribution Analysis

In this part, we take a look at how different types of noise complaints is distributed in New York City during different times.

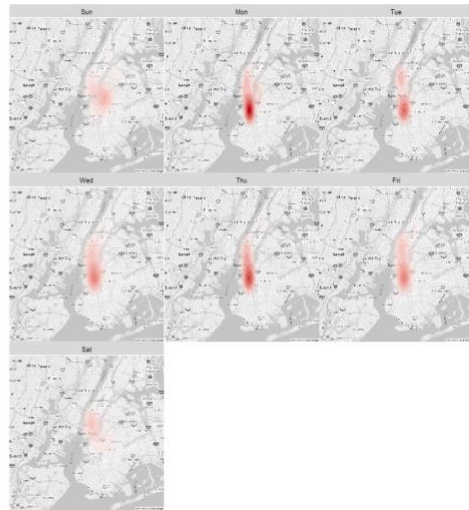


Most commercial noises are in Lower Manhattan while Brooklyn and Upper Manhattan have more residential noises, which is accord with the commercial and residential areas in New York City.



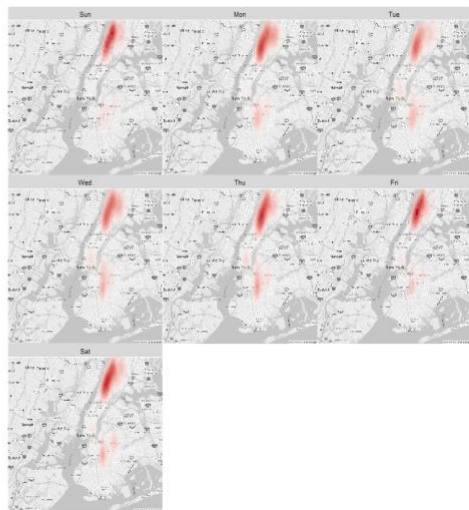
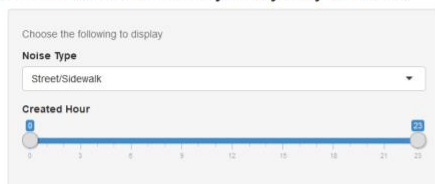
Residential, street/sidewalk, and vehicles noises are similar in distribution -- mostly in Upper Manhattan, and then Brooklyn and Lower Manhattan.

Noise Distribution Analysis by Day of Week

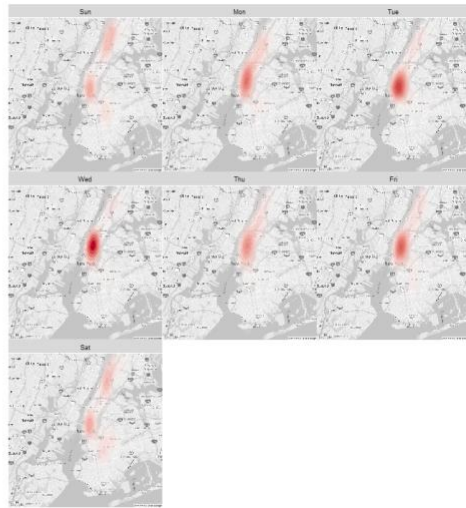
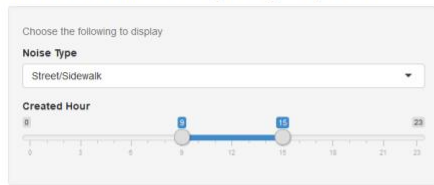


During the daytime from 6 a.m. to 6 p.m. in weekdays, commercial noise complaints happen more in Brooklyn than Lower Manhattan.

Noise Distribution Analysis by Day of Week

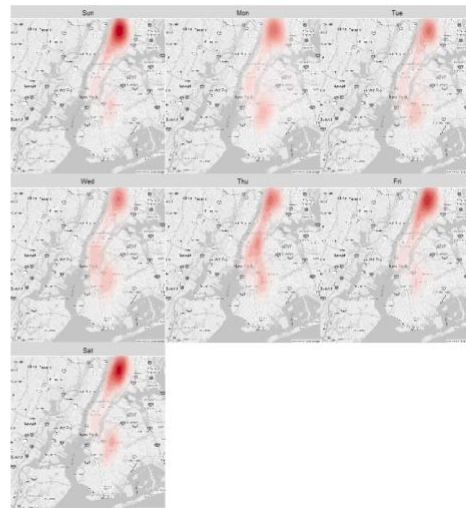
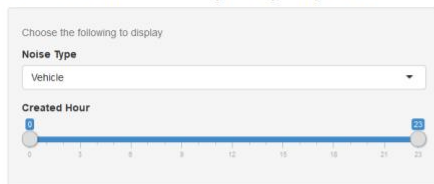


Noise Distribution Analysis by Day of Week

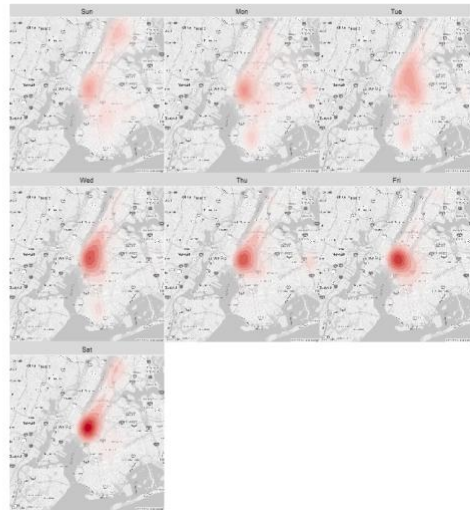
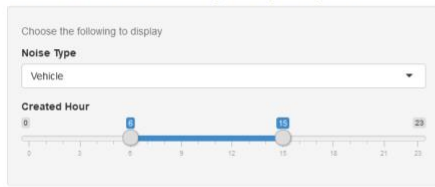


Although most street/sidewalk noise complaints are in Upper Manhattan area, yet if we look at the hours between 9 a.m. to 4 p.m., most of them happen in Lower and Midtown Manhattan in weekdays.

Noise Distribution Analysis by Day of Week

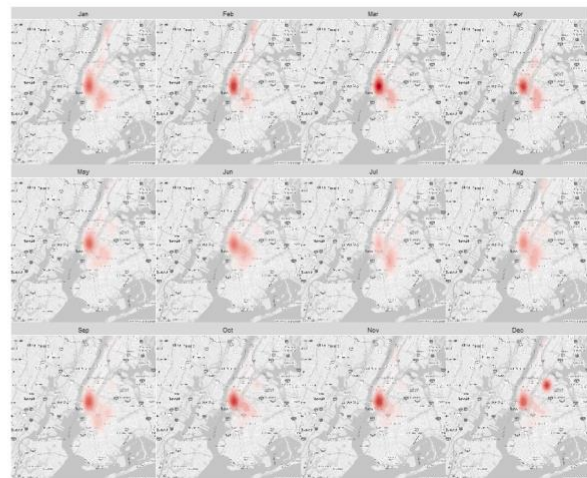


Noise Distribution Analysis by Day of Week



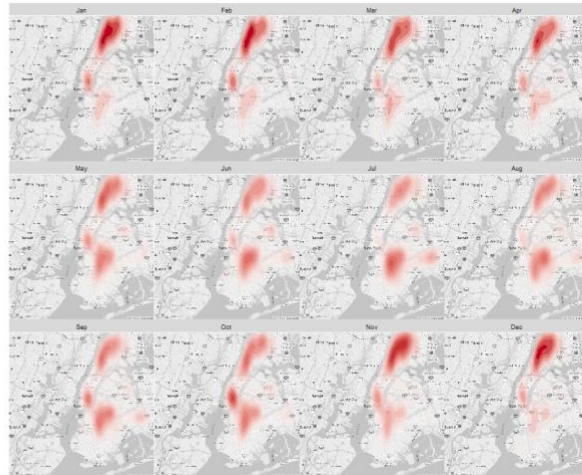
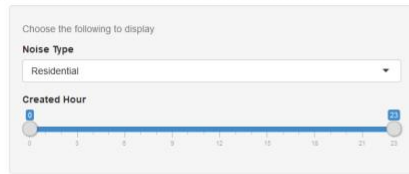
So are the vehicle noise complaints. Generally happens most in Upper Manhattan but from 6 a.m. to 4 p.m. are gathered in Lower Manhattan area.

Noise Distribution Analysis by Month



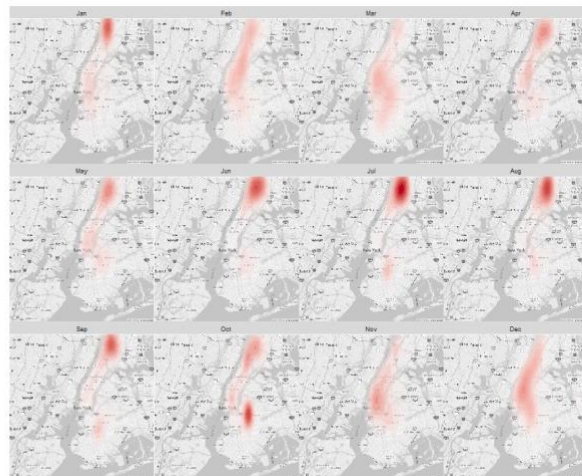
There are less commercial noise complaints during summer.

Noise Distribution Analysis by Month



Residential noise complaints are more likely to happen in winter than in summer in Upper Manhattan area, while it is the opposite in Brooklyn area.

Noise Distribution Analysis by Month



Most vehicle noise complaints are happened in Upper Manhattan area during summer.

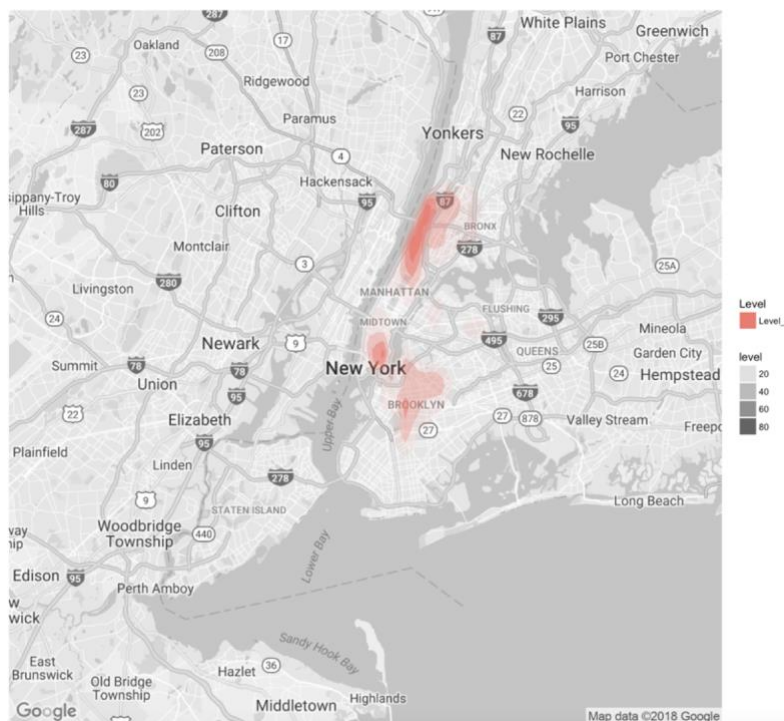
Analysis into Agencies

This part, we will stand in the viewpoint of agencies, who invested time and human resources to tackle these noise complaints, so that we could on one hand conclude where do most important or urgent issues happened in 2017 and how well these agencies did in resolving these complaints and given some recommendations regarding future work.

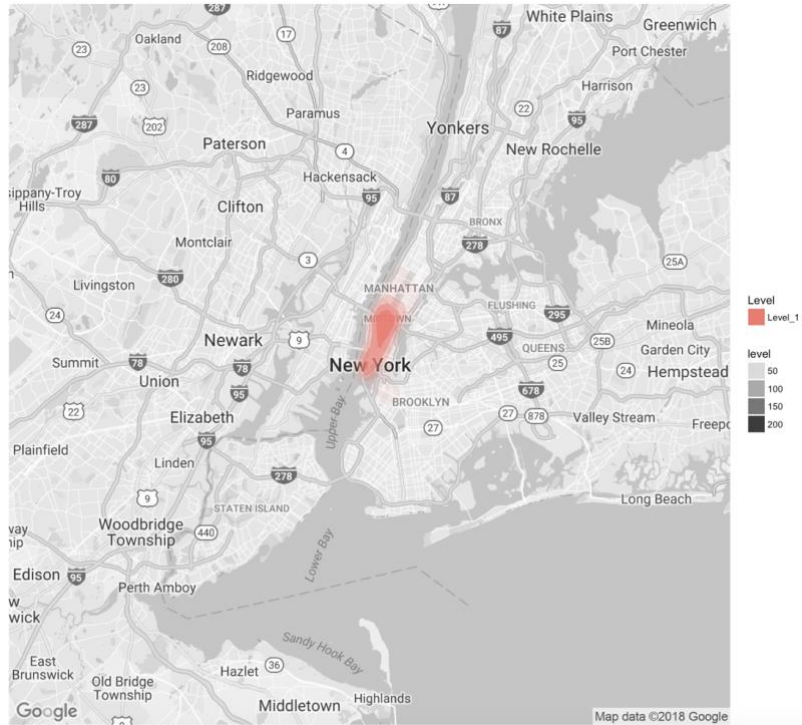
1) Where do most important complaints happen in 2017

In data cleaning part, we sorted those 41 types of resolutions and managed to categorize them into 3 levels based on how agencies evaluate the emergency level. Complaints of Level 1 need responded or investigated; those of Level 2 could be solved or closed by referring to another agency or communicating with complainants or respondents; and Level 3 complaints are determined that respond are unnecessary.

After looking into Level 1 complaints of three agencies. It was found that for EDC, there was no Level 1 complaints. For NYPD, the most serious noise issues happened in three areas: the first intensive one is along Hudson River near Bronx, the second area locates south to Midtown and the third one in Brooklyn.



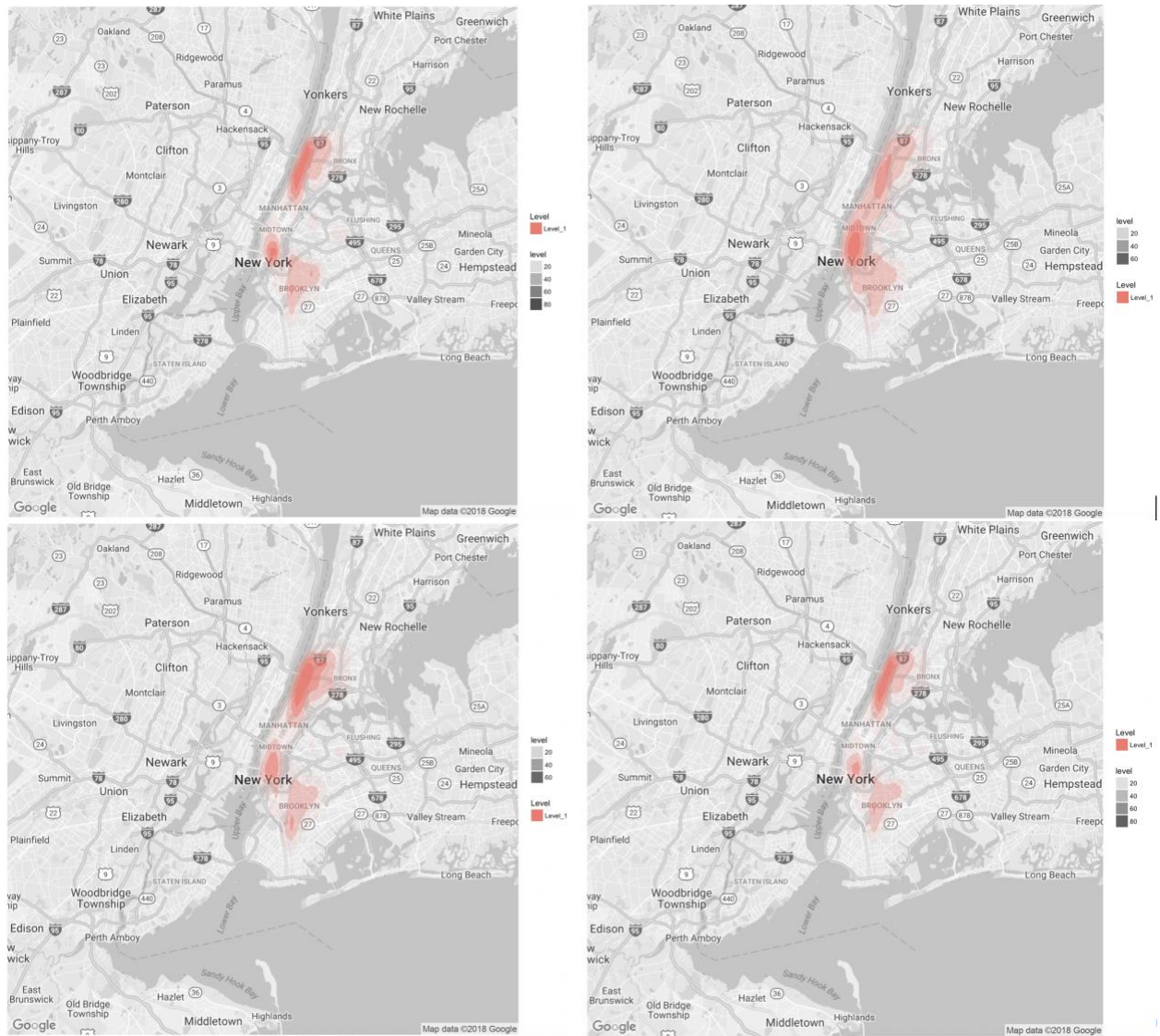
For DEP, the most important issues happened near Midtown.



For Level 2 and Level 3 complaints, since they are not worth investigating, they were viewed for three agencies as a whole. From the graph, we could see that they usually happen in midtown and along No. 87 highway near Bronx.



Then we checked these three levels by 4 created time slots, namely 0-5, 6-11, 12-17, 18-23. For level 2 and 3, there is an apparent tendency that during daytime, significantly there are more complaints compared with nighttime. This might be caused by peoples' activities. To analyze into relationship between locations and complaints importance, Level 1 was analyzed for 4 time slots. The graphs are as shown below.

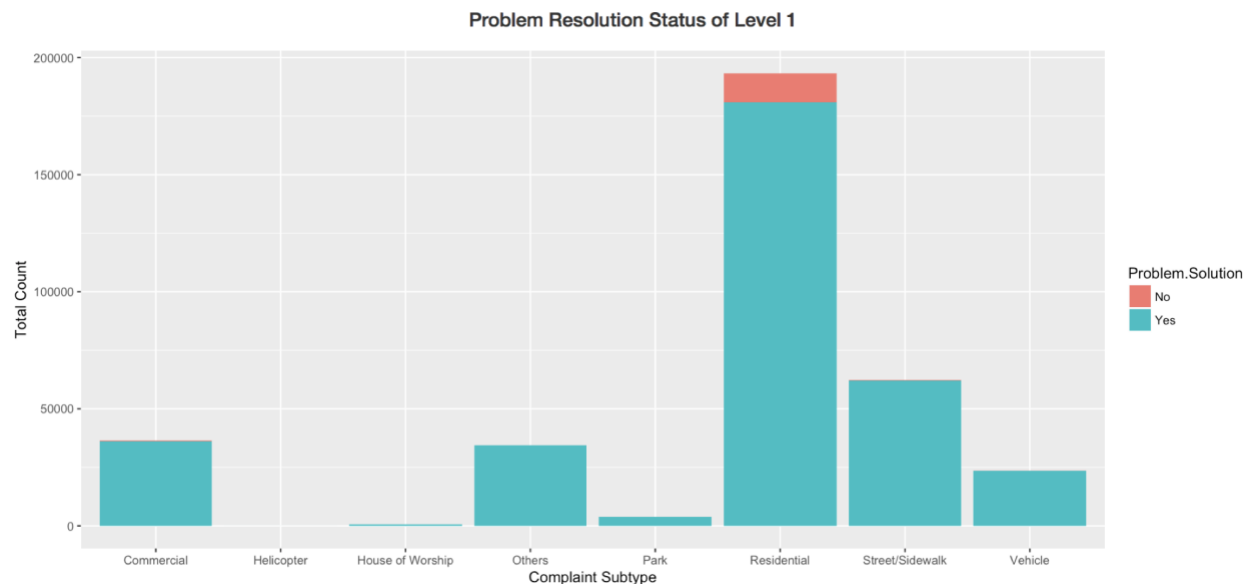


From the graphs, it could be concluded that area along Hudson River and No. 87 Highway near Bronx and area south to Midtown should be paid more attention regarding severe noise problem, since Level 1 complaints could be received during all time slots.

2) How were Level 1 complaints solved in 2017

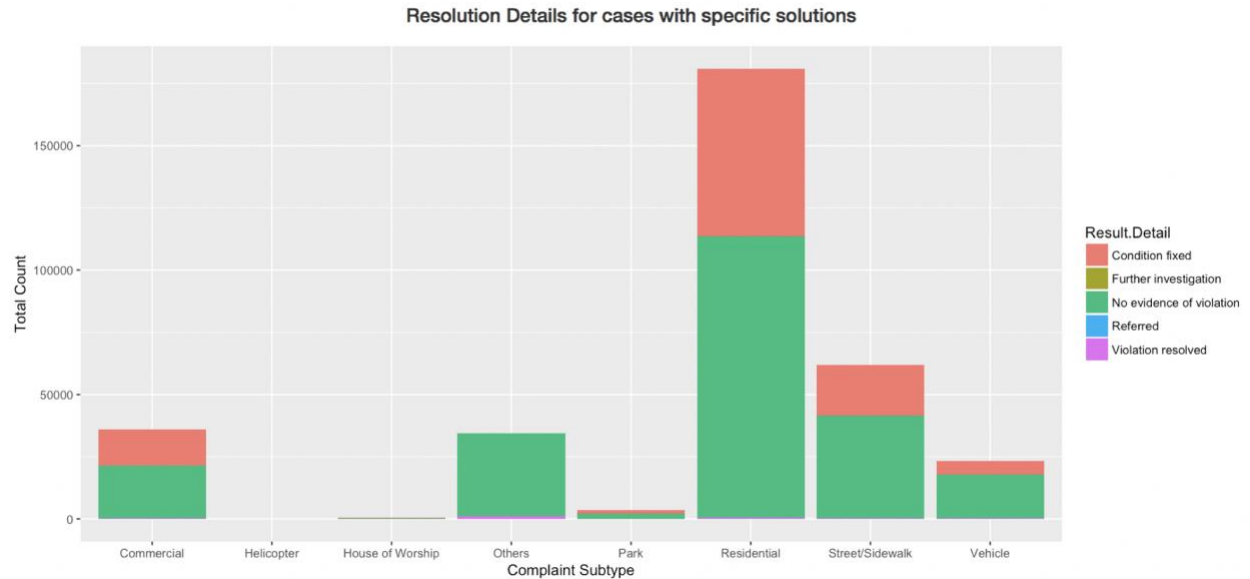
Then based on the resolution description given to Level 1 cases, we looked into how were these cases solved in 2017.

Firstly, we looked into whether complaints were given specific solutions on different noise types (Helicopter is not included, since in 2017 there were no Helicopter complaints of Level 1).



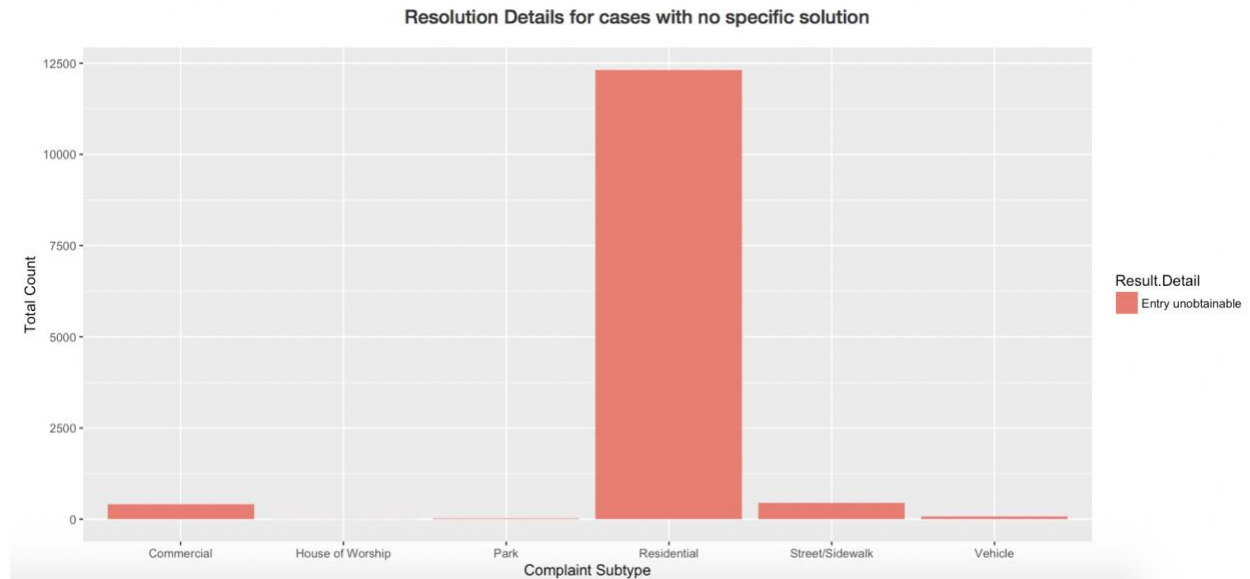
From the bar charts, it could be seen that agencies were really efficient in the past year. Only a really small proportion of Level 1 noise complaints were not given specific resolutions.

Then we looked into what kind of resolution were given to further evaluate the efficiency.



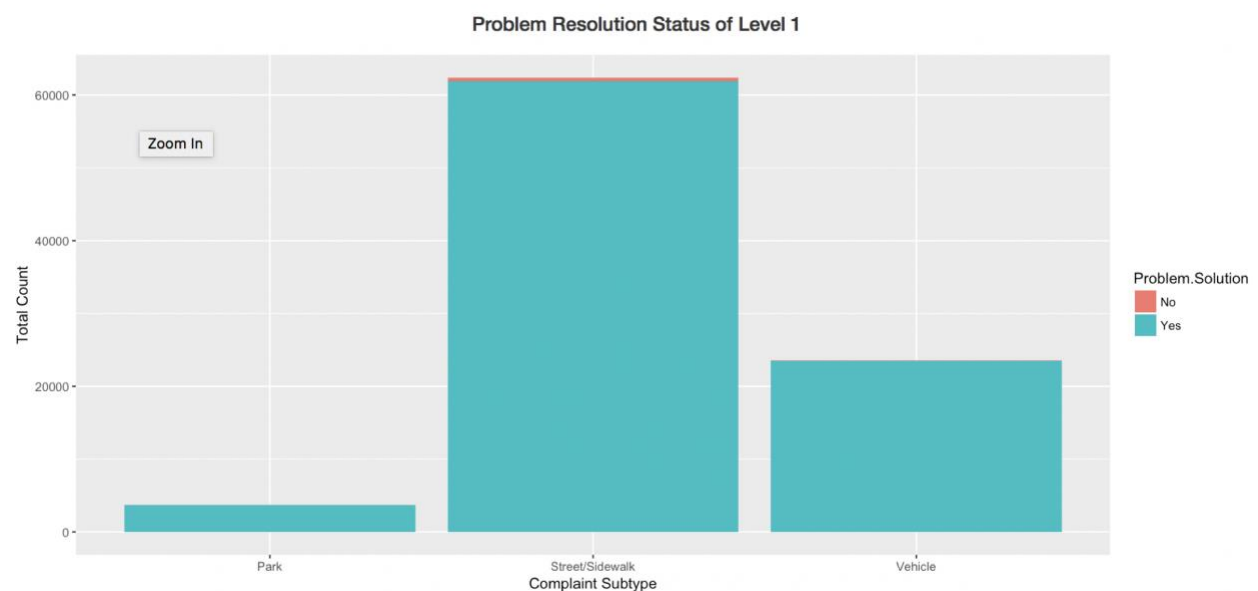
However, from the bar chart above, it could be seen that the most frequently given resolution fell in “No evidence of violation”. This indicates that though relative agency took actions to investigate or respond, the public resources were actually wasted because there were no results. The second largest proportion of resolution were condition fixed, showing that our citizens’ living status were improved by prompt response.

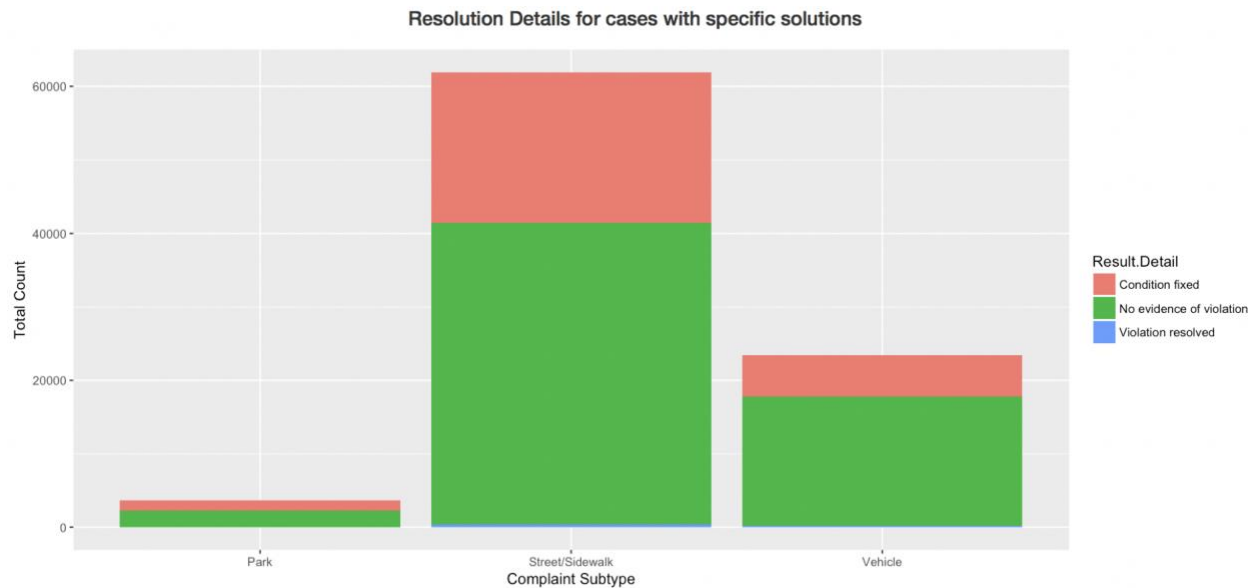
For Level 1 cases without specific solutions, we checked each subtype and found that only one case in subtype “Others” was not solved due to wrong address provided. This indicates that when complaining severe cases, citizens are usually providing necessary information to help improve the living status. Then we looked into the other subtypes.



From the chart, it could be seen that most cases were not solved due to unobtainable entries, especially Residential cases.

Additionally, we analyzed cases related with transportation, since in previous part we found that the area along Hudson river and No 87 Highway near Bronx. Thus, we looked into Park, Street/Sidewalk and Vehicle types. And most complaints could be resolved and though over 2/3 were without notice of violation, condition of a great proportion were improved.





6. Dashboard

New York 311 Noise Complaints Analysis 2017

Overview

Noise Distribution Analysis

Agency Response Analysis

The dashboard includes three tabs, namely "Overview", "Noise Distribution Analysis" and "Agency Response Analysis".

Overview

The overview tab concludes 3 parts: share pie, rank bar and distribution map with multiple selections. These illustrates the general situation of 311 noise complaints in New York 2017.

311 Noise Complaints in 2017

This app is to visualize 311 Service Request data

Share Pie:

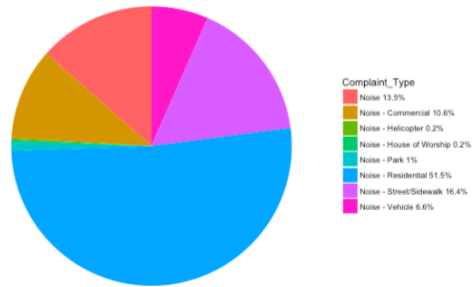
Complaint Type

Rank Bar:

City

Distribution Map:

☒ Time distribution
☐ Location distribution
☐ Location distribution by weekday



Noise Distribution Analysis

On this tab, we provided three modes to explore the data.

[Overview](#) [Noise Distribution Analysis](#) [Agency Response Analysis](#)

[Noise Distribution Analysis](#) [Compare by Day of Week](#) [Compare by Month](#)

Noise Distribution Analysis

Users can explore all the data in one map. User can choose from Noise Type, Month, Week of Day, and Created Hour to display on a single map. User can also choose to differentiate each type of noise by different colors.

Choose the following to display

Noise Type

- ☒ Commercial
- ☒ Helicopter
- ☒ House of Worship
- ☒ Park
- ☒ Residential
- ☒ Street/Sidewalk
- ☒ Vehicle
- ☒ Others
- ☐ Differentiate Types by Color

Month

- ☒ Jan
- ☒ Feb
- ☒ Mar
- ☒ Apr
- ☒ May
- ☒ Jun
- ☒ Jul
- ☒ Aug
- ☒ Sep
- ☒ Oct
- ☒ Nov
- ☒ Dec

Day of Week

- ☒ Sun
- ☒ Mon
- ☒ Tue
- ☒ Wed
- ☒ Thu
- ☒ Fri
- ☒ Sat

Created Hour

0 3 6 9 12 15 18 21 24



Compare by Day of Week

User can compare how different types of noise complaints are distributed during the week.

Noise Distribution Analysis by Week of Day

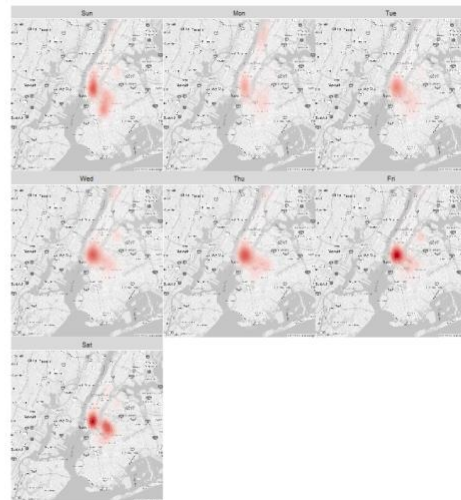
Choose the following to display

Noise Type

Commercial

Created Hour

0 3 6 9 12 15 18 21 24



Compare by Month

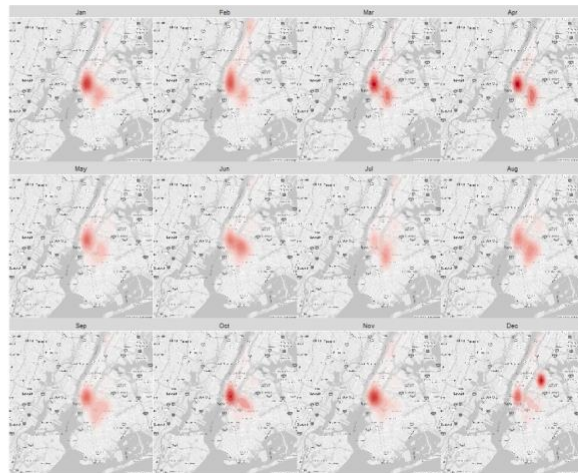
User can compare how different types of noise complaints are distributed during the year.

Noise Distribution Analysis by Month

Choose the following to display

Noise Type
Commercial

Created Hour
0 24



Agency Response Analysis

This tab includes two parts: Agency Response Analysis and Level 1 Resolution Analysis.

Overview Noise Distribution Analysis Agency Response Analysis

Agency Response Analysis Level 1 Resolution Analysis

Agency Response Analysis

On "Agency Response Analysis", how complaints of different importance levels were distributed on the map will be shown. This density map was colored by the importance level of cases so that users could see how cases of level 1,2 and 3 were distributed. Users could also select which agencies the cases were dealt by, what subtypes they belong to, which days in the week and what time period the issues took place.

Complaint Importance Analysis

Choose the following to display

Responding Agency

- ☒ New York Police Department
- ☐ Economic Development Corporation
- ☐ Environmental

Noise Type

- ☒ Commercial
- ☒ Helicopter
- ☒ House of Worship
- ☒ Park
- ☒ Residential
- ☒ Street/Sidewalk
- ☒ Vehicle
- ☒ Others

Day of Week

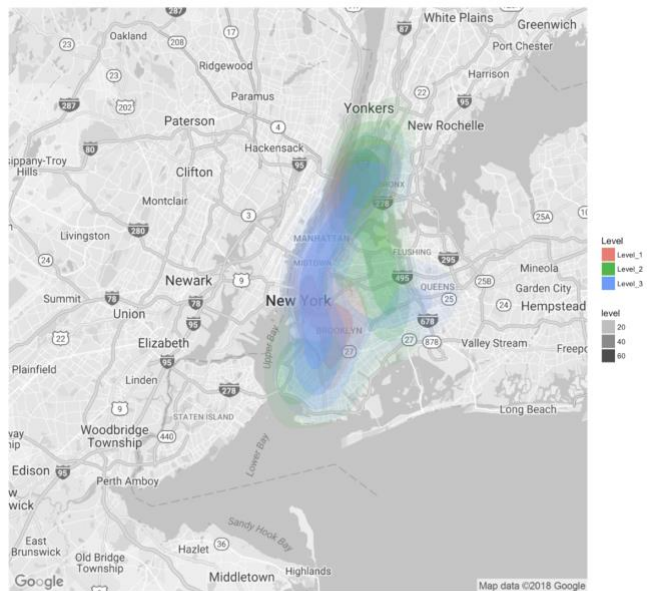
- ☒ Sun
- ☐ Mon
- ☐ Tue
- ☐ Wed
- ☐ Thu
- ☐ Fri
- ☐ Sat

Created Hour

0 8 12 23

Importance Level

- ☒ Level 1: Response or investigation demanded
- ☒ Level 2: Solved or closed via referring or contacting
- ☒ Level 3: Response unnecessary



Level 1 Resolution Analysis

On "Level 1 Resolution Analysis", barcharts are shown to visualize agencies' performance on level 1 cases. On the sidebar, users could choose what subtypes of level 1 complaints they want to see and three bar charts will be shown on the main panel.

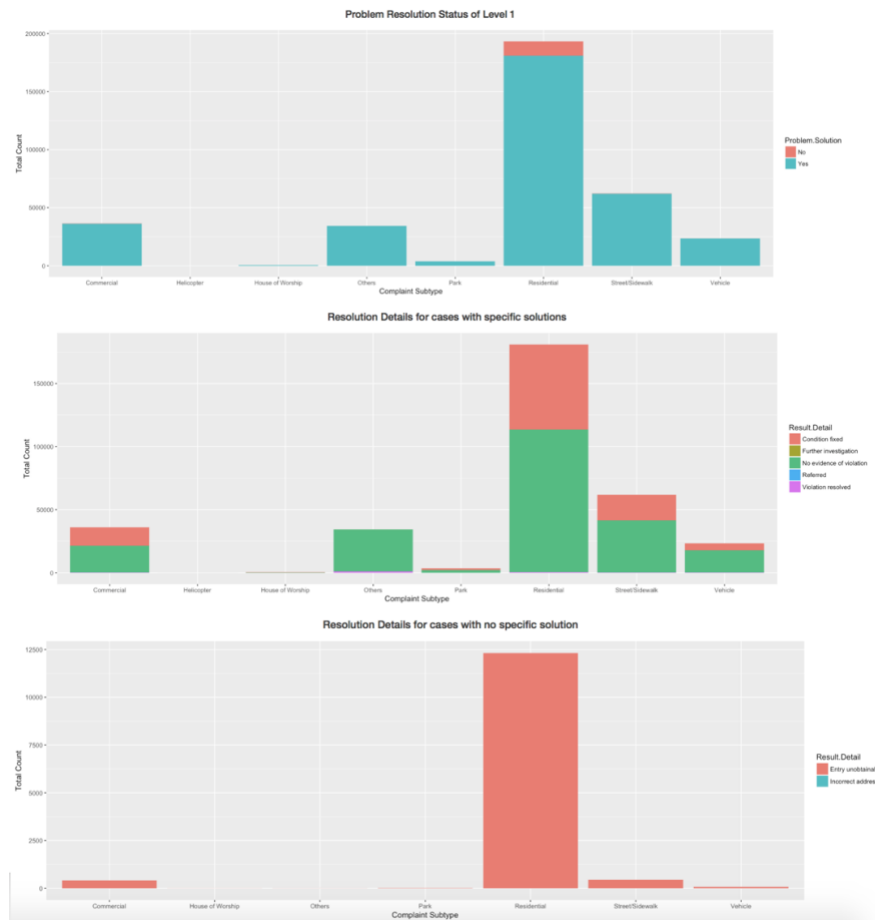
Agency Resolution Analysis - Level 1

Choose the following message to display

Noise Type

- ☒ Commercial
- ☒ Helicopter
- ☒ House of Worship
- ☒ Park
- ☒ Residential
- ☒ Street/Sidewalk
- ☒ Vehicle
- ☒ Others

The first graph shows problem resolution performance, bars show number of level 1 cases in total and cases with or without specific resolutions were differently colored, so that comparison could be apparently shown. The second graph shows result details of complaints with specific feedback. The parts of the bars were filled in different colors according to the way they were solved. The third one, similarly with second one, shows result details of cases about why investigation were not completed.



7. Conclusion

In general, the noise complaints happen most frequently in the midnight at the weekend due to loud party music, especially in the southeast of Manhattan area. Brooklyn and Bronx are also the areas where the police should pay high attention to. Also, New York police efficiency is quite high.

Most commercial noises are in Lower Manhattan while Brooklyn and Upper Manhattan have more residential noises, which is accord with the business and residential areas in New York City. During the daytime of weekdays, commercial noise complaints happen more in Brooklyn than Lower Manhattan. There are less commercial noise complaints during summer.

Residential, street/sidewalk, and vehicles noises are similar in distribution. Most street/sidewalk and vehicle noise complaints are in Upper Manhattan, but during the daytime in weekdays, more of them happen in Lower and Midtown Manhattan.

Area along Hudson River and No. 87 Highway near Bronx and area south to Midtown should be paid more attention regarding severe noise problem, since level 1 complaints could be received during all time slots in these areas. Measures should be taken to solve severe noise problems to provide a better living standard. As for agency efficiency on level 1 cases, overall it is really high level. Most of level 1 noise cases were given specific resolutions in 2017, though over a half were not observed with violation, which could be regarded as a waste of public resource. Among level 1 cases that were not given specific resolutions, only 1 was because of wrong address provided, indicating New Yorker citizens are responsible and kind-hearted to help agencies to improve the city. The other cases were not given specific resolution because investigations were not completed due to unobtainable entry.

8. Future work

- 1) Compare with other city 311 noise data and make communications.
- 2) Further analysis into distribution of level 1 complaints with or without specific resolution. Currently we only compared the number of these two types without mapping them. The variable "Descriptor" should also be included in the analysis to figure out where most level 1 complaints without specific resolution happened and what kind of issues were they. Then we will be able to provide more detailed information about wastage of agencies' resource and make recommendations on how to avoid incomplete investigation.