



Analysing Film Permits Granted in the city of New York

Harman Singh Chawla, Virendra Singh, Rachna Ramkumar



Developing Hypothesis → Gathering Data → Test Hypothesis

1. Film Permits Dataset: <https://data.cityofnewyork.us/City-Government/Film-Permits/tg4x-b46p>
2. 311-complaints Dataset (2010-Present):
<https://data.cityofnewyork.us/Social-Services/311-Service-Requests-from-2010-to-Present/erm2-nwe9>
3. Income by Neighbourhood: (web crawler)
4. Permits data for each state in the United States: (web crawler)
5. Jobs created and monetary benefits given out by the states: (web crawler)
6. Weather 2013 :
<https://github.com/kanishk1010/NYC-Crime-Data-Analysis/tree/master/WeatherCorrelation/SampleWeatherData>
7. Zip Demographics:
https://data.cityofnewyork.us/City-Government/Demographic-Statistics-By-Zip-Code/kku6-nxd_u

1. Hosted on Dumbo: /user/hsc367/film_permits.csv
2. Hosted on Dumbo: /user/hm74/311-complaints-all.csv
3. Hosted on Dumbo: /user/hsc367/income-by-zip.csv
4. Hosted on Dumbo: /user/hsc367/permits-state.csv

Methodologies and Toolkits

Map-Reduce Model (Speeding up computation)

```
df.show(3)
```

DBN	LOCATION NAME	LOCATION CATEGORY	ADMINISTRATIVE DISTRICT	ELL REMOVALS
01M015	P.S. 015 Roberto	Elementary	1	R
01M019	P.S. 019 Asher	Elementary	1	R
01M020	P.S. 020 Anna	K-8	1	R

`map_cols(df)`



```
df_cols.show()
```

COLUMN_NAME	COLUMN_VALUE
DBN	01M015
LOCATION NAME	P.S. 015 Roberto ...
LOCATION CATEGORY	Elementary
ADMINISTRATIVE DI...	1
ELL REMOVALS	R
DBN	01M019
LOCATION NAME	P.S. 019 Asher Levy

Timing Module:

```
def timed(fn) -> None:
```

```
# ...
```

```
total_runtime = 0
```

```
# Load generator
```

```
time_start = time.time()
```

```
output = fn(df, i)
```

```
time_end = time.time()
```

```
# add time to total_runtime
```

```
# ...
```

```
# compute timing statistics
```

```
# ...
```

Reduce Cols:

```
def map_cols(fn) -> None:
```

```
# ...
```

```
df_mapped_cols = df.select(  
    create_map(*[j for l in  
        [[lit(col),  
            spark_col(col)] for col in  
            df.columns] for j in l]))
```

```
df_exploded_cols =  
df_mapped_cols.select(  
    explode(*df_mapped_cols.columns))
```

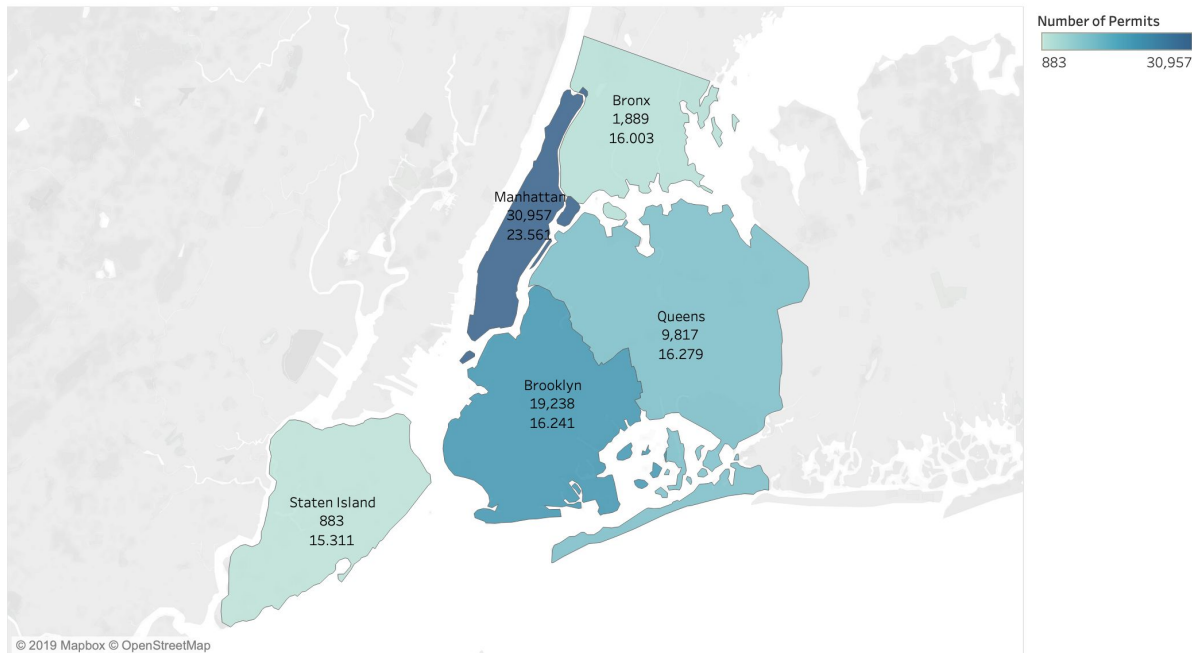
```
return df_exploded_cols
```

Exploring the data: Getting a feel of the problem

Borough	Number of Permits
Manhattan	30957
Brooklyn	19238
Queens	9817
Bronx	1889
Staten Island	883

Borough	Avg Duration (in Hours)
Manhattan	23.56061849231790
Queens	16.278966758344300
Brooklyn	16.241295006411000
Bronx	16.00328215987300
Staten Island	15.311004152510400

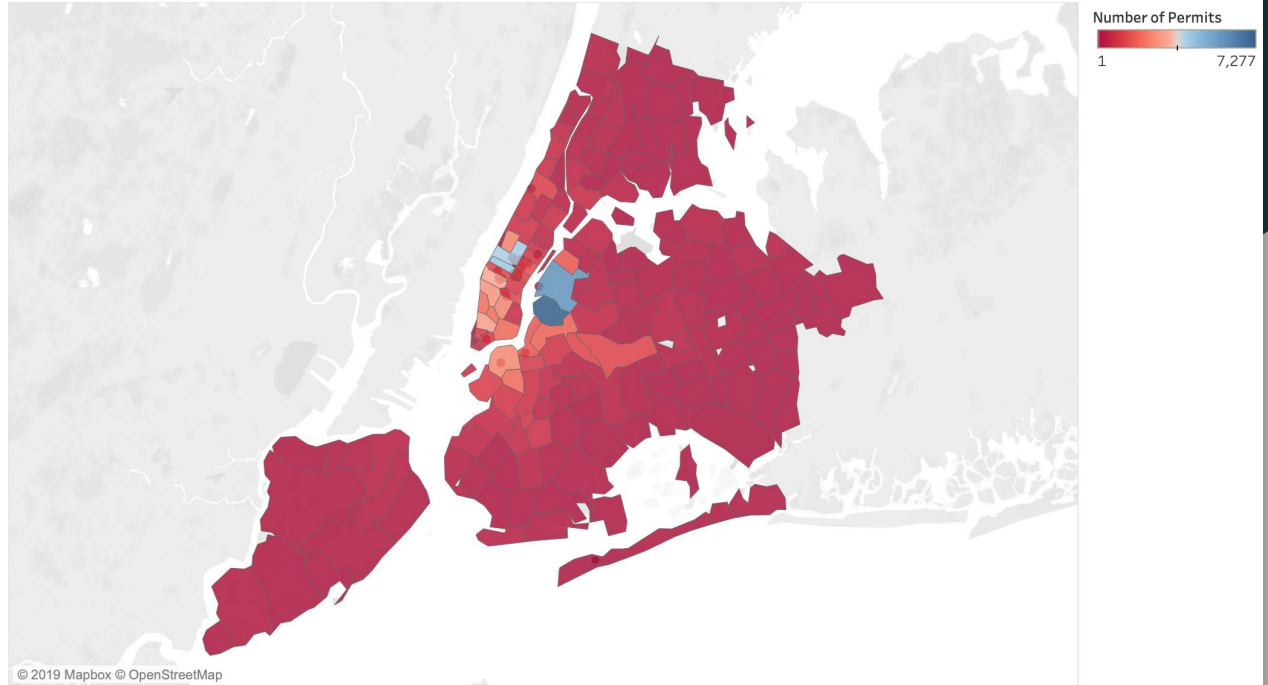
Number of Permits and Average Duration



Map based on Longitude (generated) and Latitude (generated). Color shows sum of Number of Permits. The marks are labeled by Borough, sum of Number of Permits and sum of Avg Duration (in Hours).

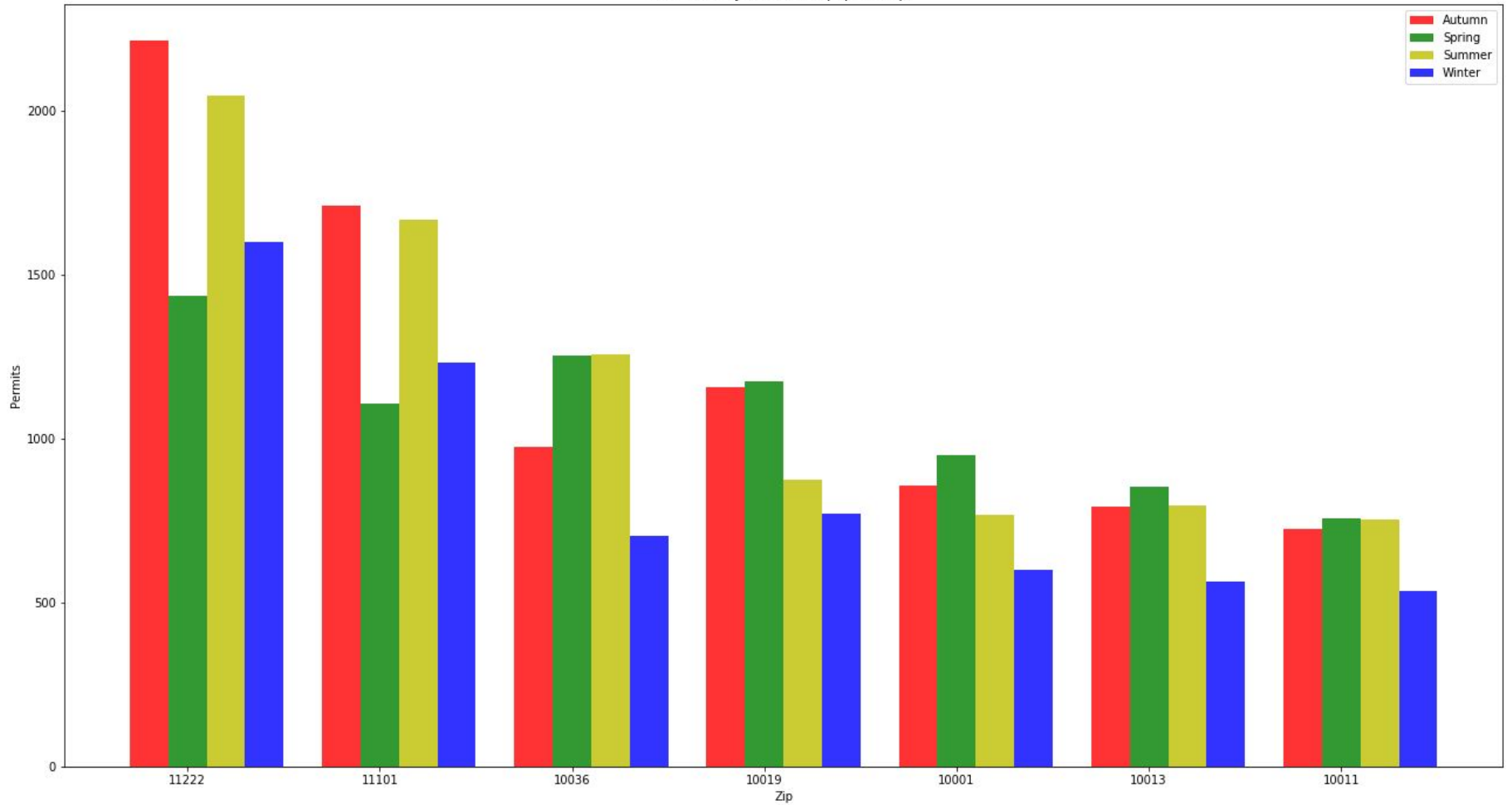
Borough	Event Type	Count
Staten Island	Shooting Permit	866
Staten Island	DCAS Prep/Shoot/Wrap Permit	11
Staten Island	Rigging Permit	5
Staten Island	Theater Load in and Load Outs	1
Queens	Shooting Permit	9566
Queens	Rigging Permit	165
Queens	DCAS Prep/Shoot/Wrap Permit	72
Queens	Theater Load in and Load Outs	14
Manhattan	Shooting Permit	24905
Manhattan	Theater Load in and Load Outs	4711
Manhattan	Rigging Permit	939
Manhattan	DCAS Prep/Shoot/Wrap Permit	402
Brooklyn	Shooting Permit	17762
Brooklyn	Theater Load in and Load Outs	1040
Brooklyn	Rigging Permit	331
Brooklyn	DCAS Prep/Shoot/Wrap Permit	105
Bronx	Shooting Permit	1688
Bronx	DCAS Prep/Shoot/Wrap Permit	159
Bronx	Rigging Permit	34
Bronx	Theater Load in and Load Outs	8

Overall Popularity

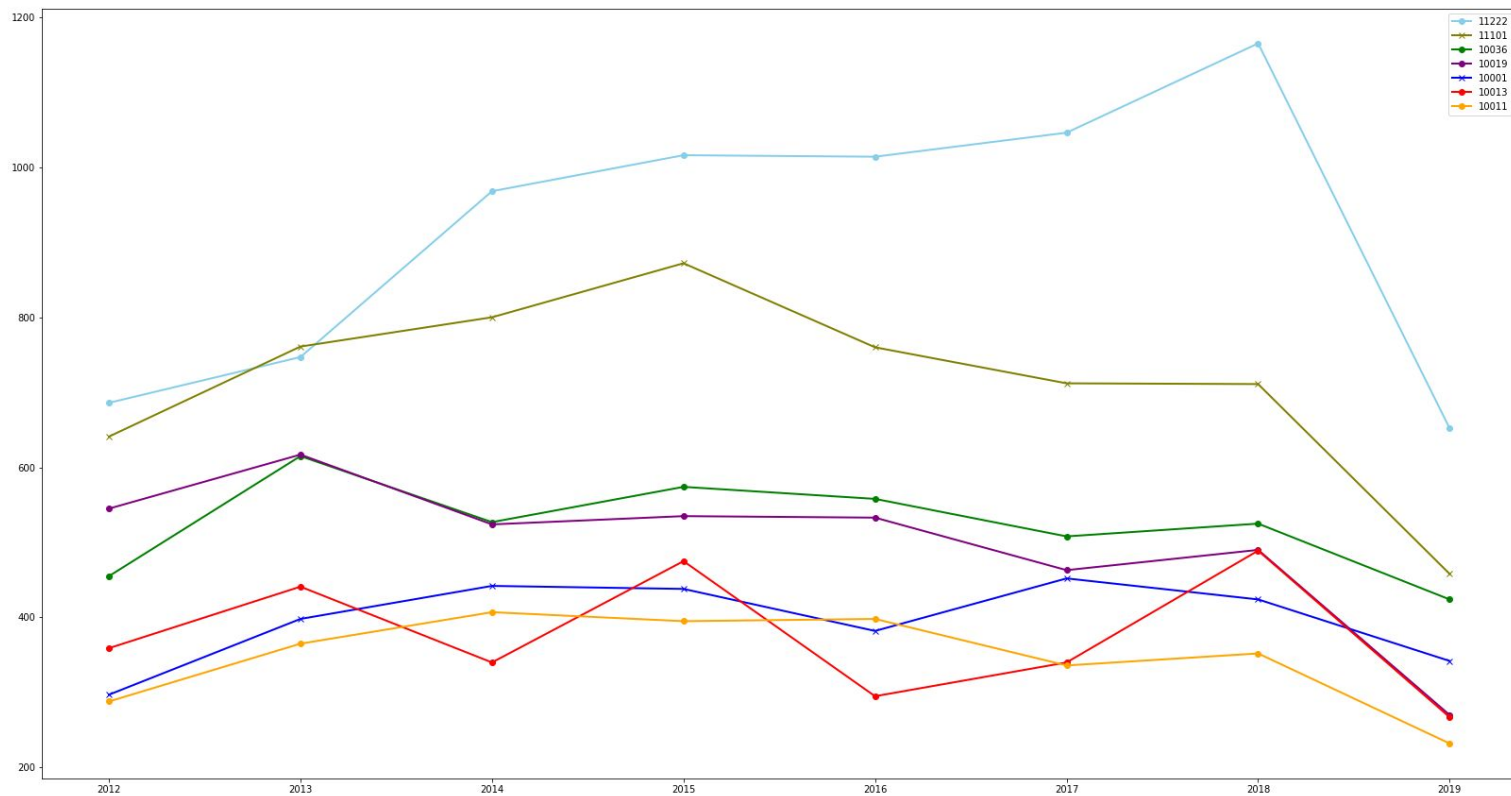


Map based on Longitude (generated) and Latitude (generated). Color shows sum of Number of Permits. Details are shown for Zipcode.

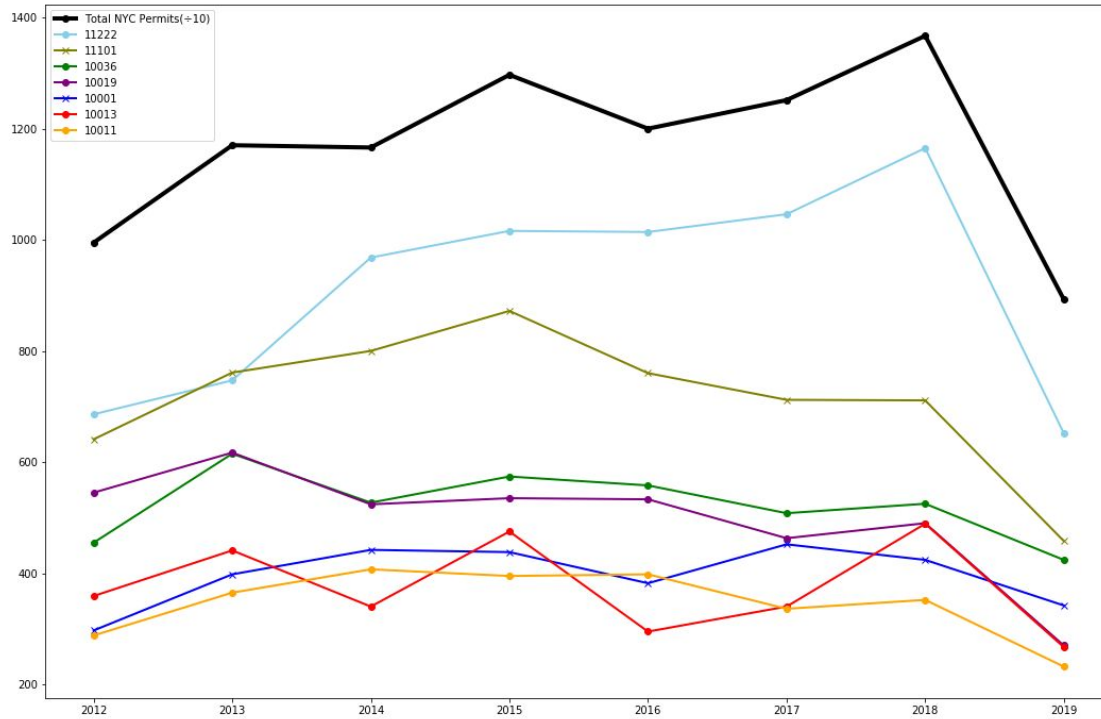
Permits by Season for popular Zips



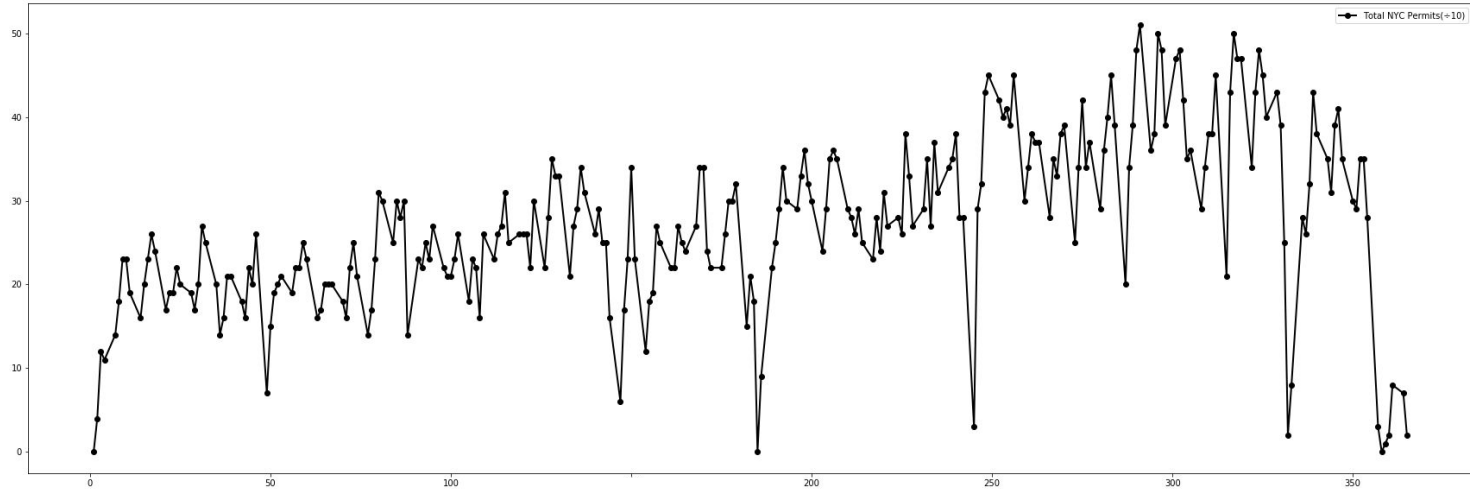
Number of Permits over the years for Most Popular Zips



Number of Permits Over the years VS Total NYC Permits



Permit Trends for year 2013



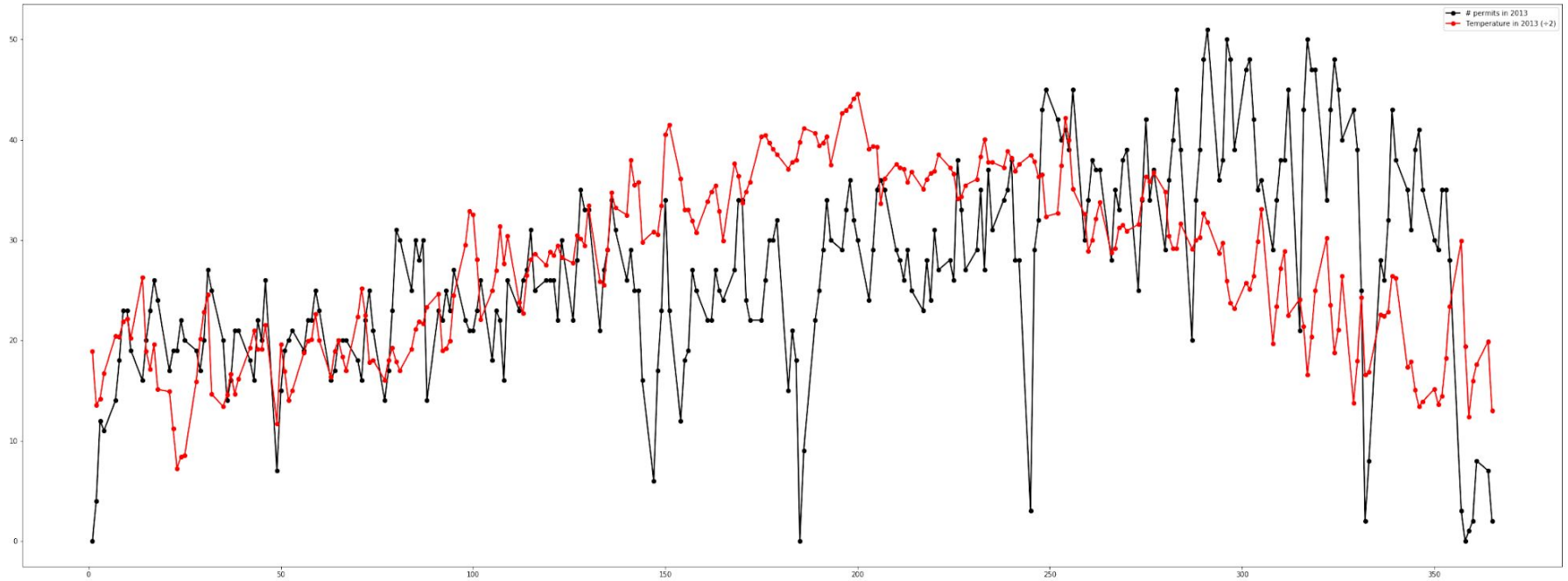
Record High And Low Days

cnt	day0fYear
45	249
45	256
45	283
48	290
51	291
50	296
48	297
47	301
48	302
45	312
50	317
47	318
47	319
48	324
45	325

cnt	day0fYear
0	1
4	2
7	49
6	147
0	185
9	186
3	245
2	332
8	333
3	357
0	358
1	359
2	360
8	361
7	364
2	365

// New years
 // New Years
 // Memorial Day
 // 4th of July
 // Labor Day
 // Thanksgiving
 // Christmas

Number of Permits VS Temperature for year 2013

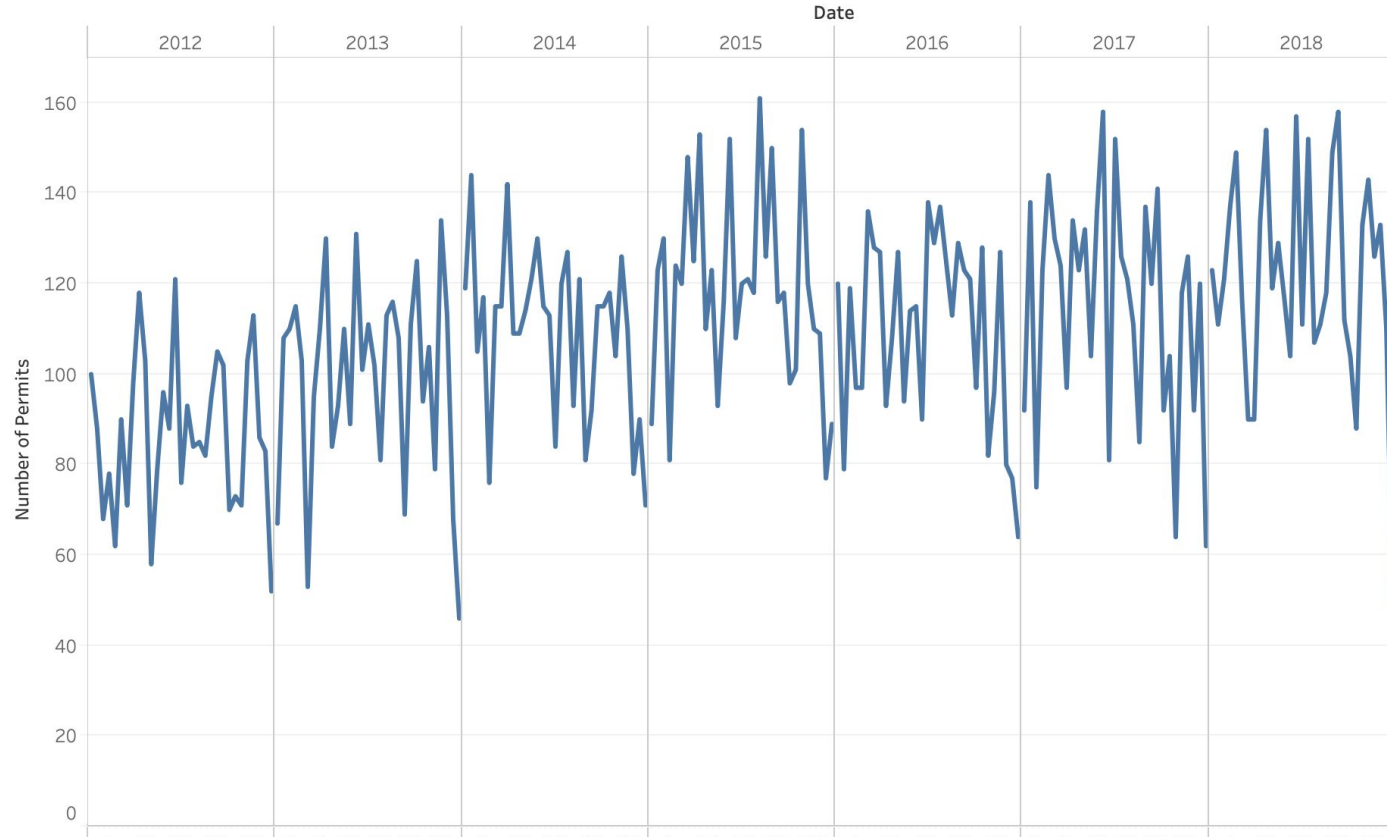


Factor	Correlation
Weather	0.19878961858168726
US Citizen Neighborhood	0.1685760188209232
White Non-hispanic Neighborhood	-0.11742141292817125
Hispanic Latino Neighborhood	0.1892730768700985
Asian Non Hispanic Neighborhood	0.10755895535994457
Black Non Hispanic Neighborhood	0.05192380017097818

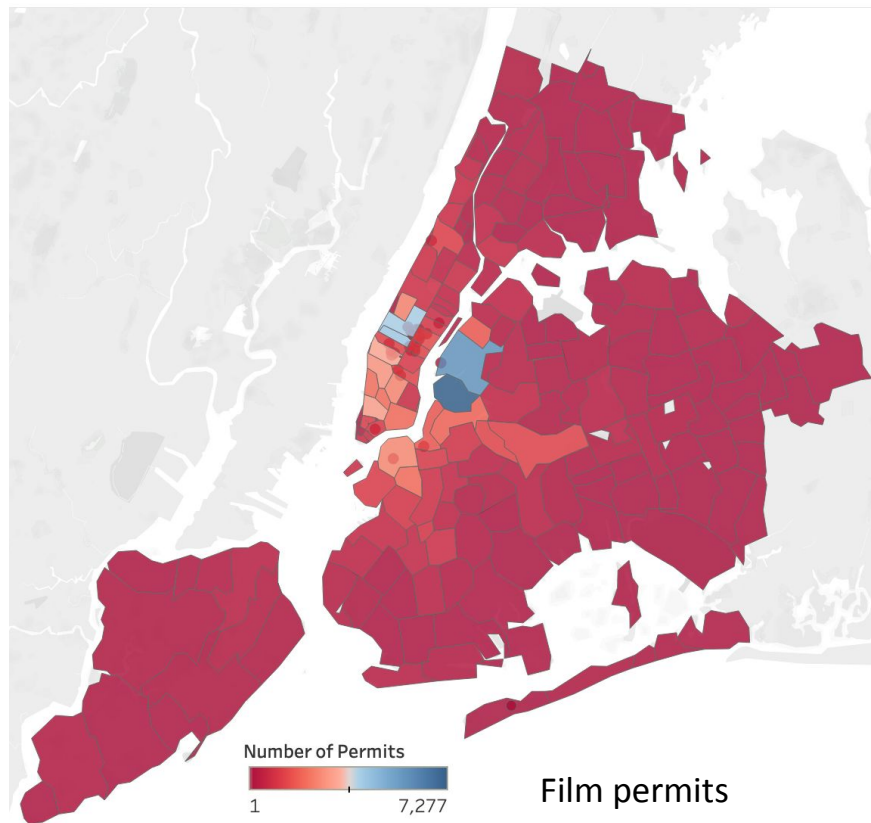
Weather 2013: <https://github.com/kanishk1010/NYC-Crime-Data-Analysis/tree/master/WeatherCorrelation/SampleWeatherData>

Zip Demographics: <https://data.cityofnewyork.us/City-Government/Demographic-Statistics-By-Zip-Code/kku6-nxdu>

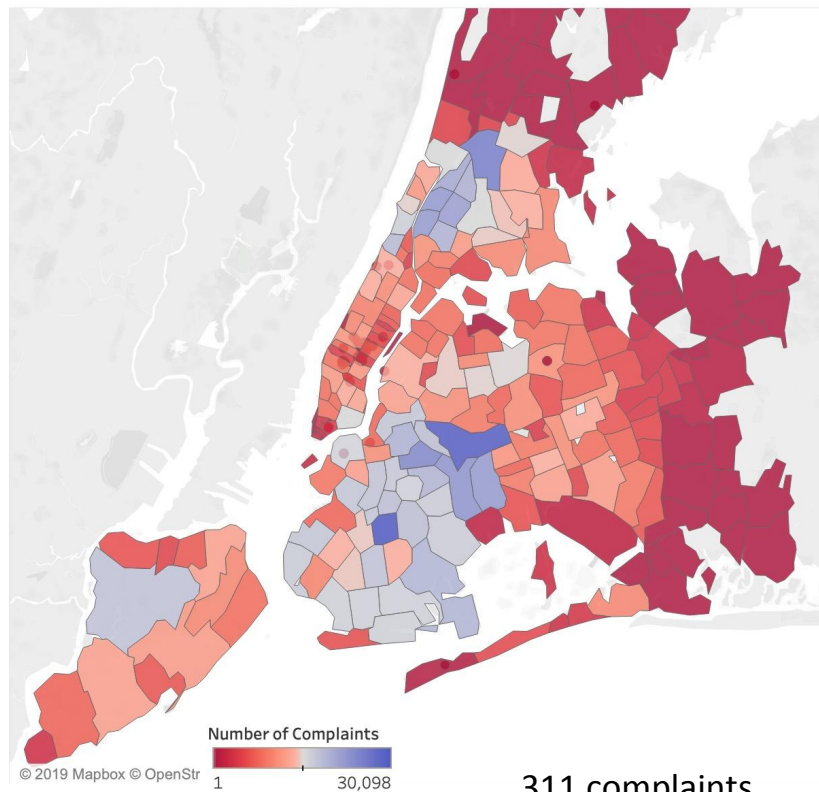
Seasonality: Permits



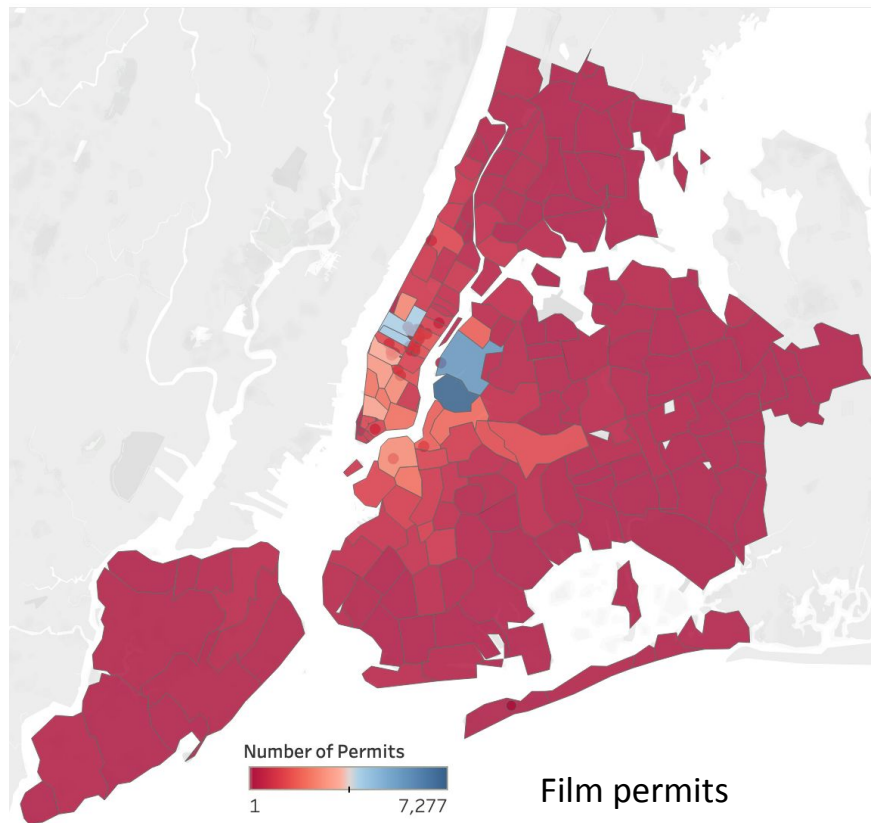
Correlation with 311-complaints



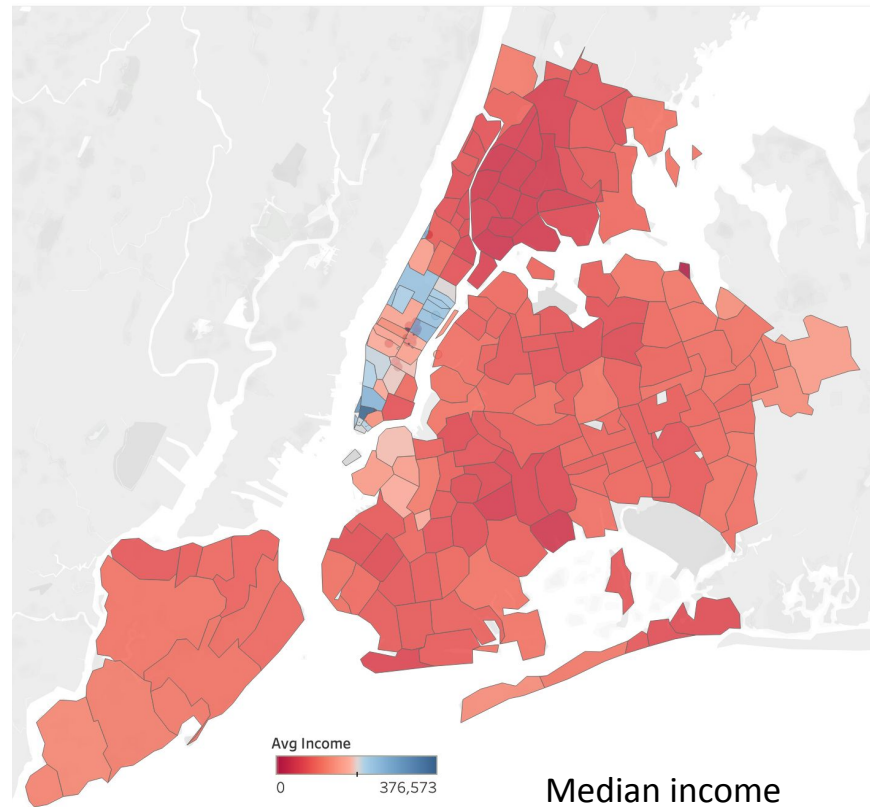
Year 2019



Correlation with median household income of a neighborhood

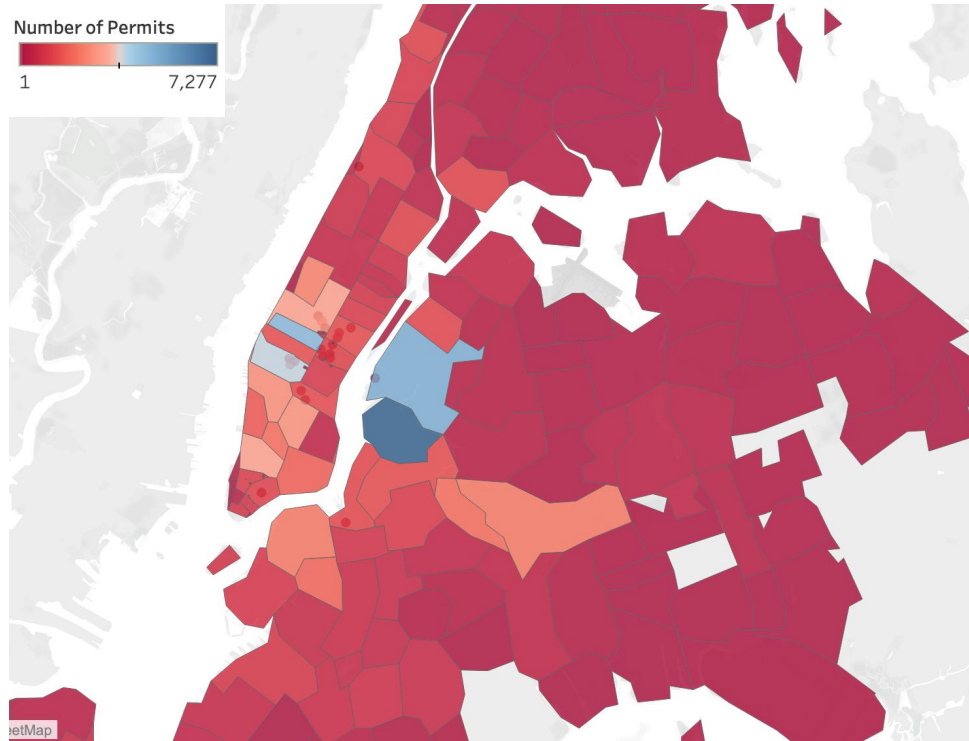


Film permits



Median income

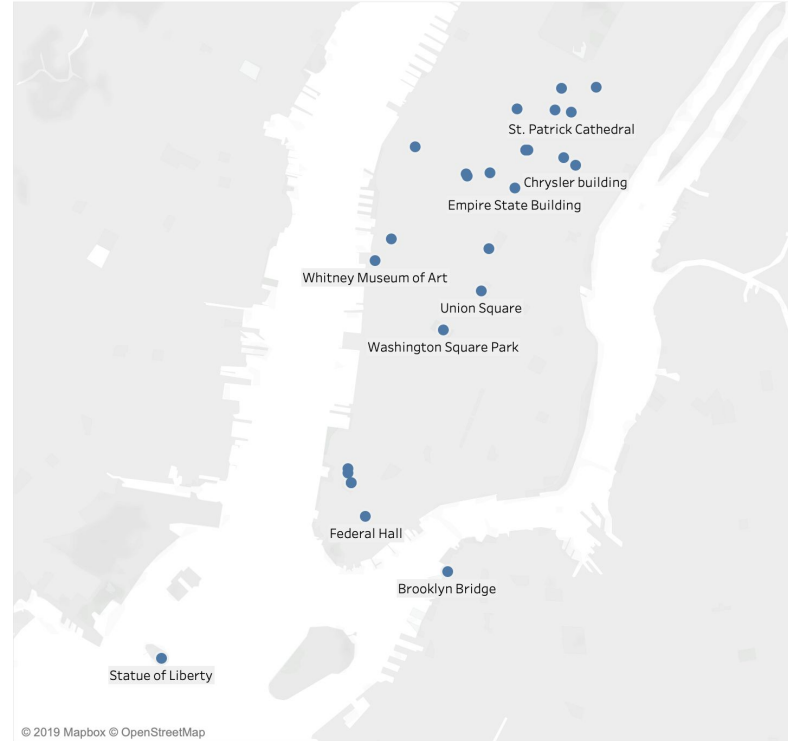
Correlation with tourist attractions



generated) and Latitude (generated). Color shows sum of Number of Permits. Details are shown for Zipcode1.

Film permits

Tourist Attractions



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Map based on Longitude (generated) and Latitude (generated). The marks are labeled by Name.

Things to explore and do (tonight!) in the coming days

1. Permits data for each state in the United States: (web crawler)
2. Jobs created and monetary benefits given out by the states: (web crawler)

State	Year	Category	Project	Company	Jobs Created	Qualified Expenditures	Incentive Issued
New York	2015	Film/TV	Knick Season 1 (13/14)	Shadow Infirmary Productions LLC	3,014	\$65,510,361.00	\$15,674,198.00
Massachusetts	2014		Equalizer	Columbia Pictures Industries, Inc.			\$15,546,926.00
New York	2015	Film/TV	Good Wife Season 5	Eye Productions Inc.	3,772	\$73,091,630.00	\$15,540,226.00
New York	2017	Film/TV	Good Wife - Season 6	Eye Productions Inc.	3,945	\$73,817,515.00	\$15,447,616.00
Connecticut	2014	Film and Digital Media Production Tax Credit		Stamford Media Center Productions, LLC		\$164,193,908.00	\$15,258,377.00
Louisiana	2015	Feature Film	deepwater Horizon	Long Night Productions LLC		\$49,321,361.00	\$15,244,202.00
Pennsylvania			Outsiders TV series - Season #2.	Woodridge Productions, Inc.	150		\$15,154,121.00

*Raw scraped data

Jobs Created? Incentives Issued? Justified?