The Evaluation of Crime Threat for Venues in San Francisco City

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Introduction

a. **Background**
There were many public venues unexpectedly suffered a loss caused by criminal incidents every day. Are stakeholders of every single venue aware of the threat level in their vicinities? Do they evaluate the public security is based on their feeling or data driven?

b. **Problem**
We already know there are some statistics available, and which are divided by district. Our concern the district is a broad scope with hundreds or thousands of venues, a venue where is sited in a good public security district would be less threat level than others in a poor public security district? Is this a fair judgement? In addition, the type of criminal incidents affect business differently, thus what type of criminal incidents occurred nearby is an important indicator too. This project aims to provide an evaluation of the crime threats to each venue in the radius of 50 meters.

c. **Interest**
Most insurance companies would be immensely interested to know the accurate threat level for each of venues; they can offer customized rates based on criminal types and frequency within the 50-meter radius. It means insurance companies can generate a strategic marketing plan and offer aggressive rates to their existing or potential customers with less risks as they have massive information to support the decision. Besides, real estate agencies and merchants will show huge interest in this project too.

Data Acquisition

First of all, we need the incident report from Police Department of San Francisco which shall include incident date, type, coordinates, and so on. It can be found from DataSF (http:data.sfgov.org), however I chose to retrieve dataset from IBM Developer Skills Network where provides data narrowed down to what I need mostly. (Data links)

I would use 2016 dataset to instantiate the project. In addition to the incident report, we also need venues information including name, location, and coordinates which we can retrieve through Foursquare API.

Solution

Now the answer has been buried under massive datasets. Once we get the crime incident report released by Police Dept of San Francisco and the venue info within the 50-meter radius to each of incidents through Foursquare API, we can analysis the cross-reference to find out the correlation between Crime Incident and Venue. At last, we can conclude the measurement of Thread Level for each of venue.

Methodology

In this project we will direct our efforts on detecting areas of San Francisco that have crime incidents occurred nearby venues in radius of 50 meters.

This project provides two measurement methods of the crime threat level:

a. Threat Score—According to the severity of possible damage to venues, I assign weights to each incident category, and then sum up scores for each venue. Higher score means higher threat level. Our clients can decide how to weight on each incident category at their own based on different purpose.

a. Clustering—We use **k-means clustering** to create clusters and categorize venues into several clusters. We will present map of all venues with their clusters, so our client can observe the correlation between location and crime incidents.
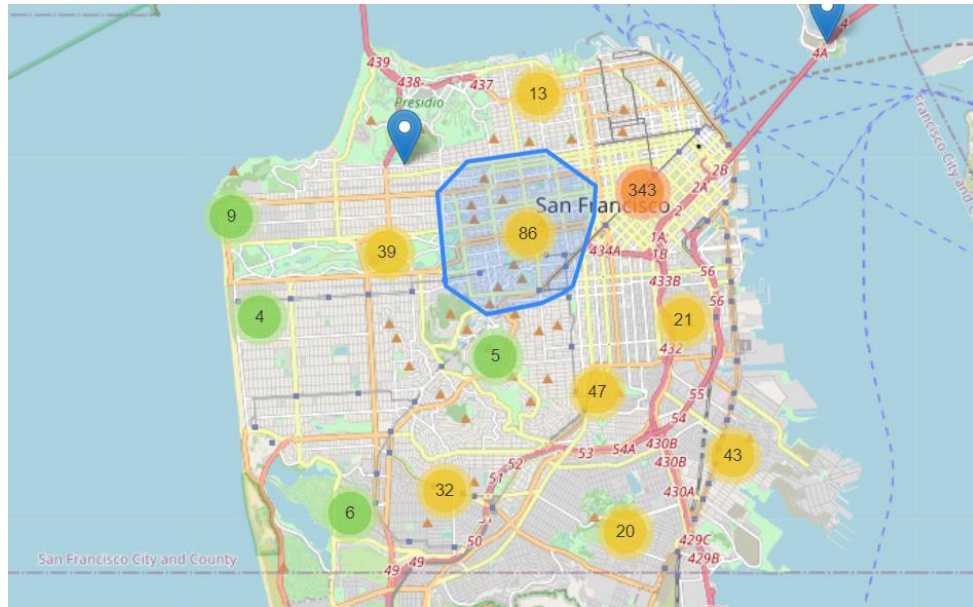
Crime Incidents Report

Filtered out Seven types/categories of crime incidents that have most influence on venues' security:

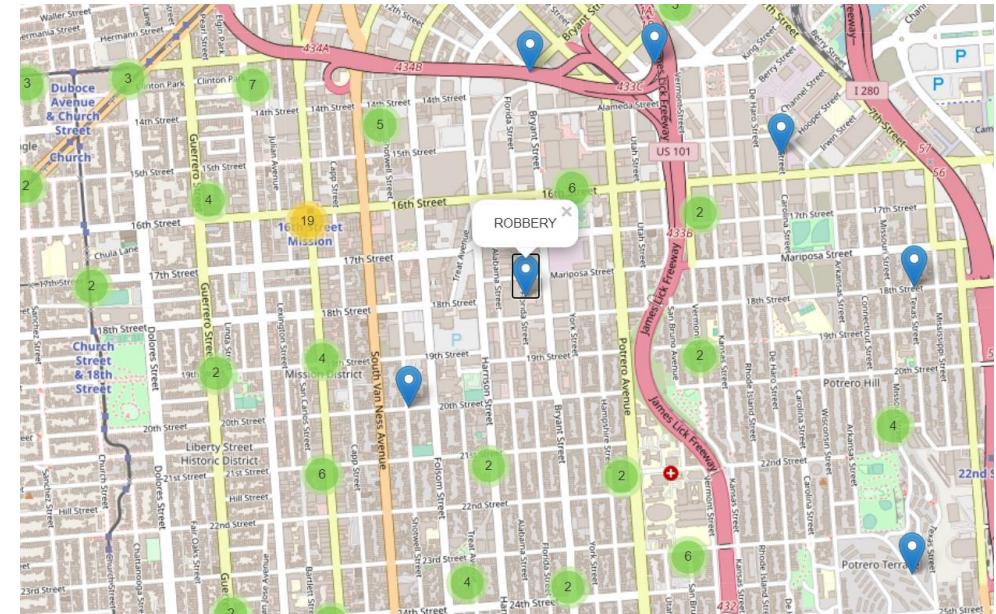## 'LARCENY/THEFT', 'ASSAULT', 'VANDALISM', 'BURGLARY', 'DRUG/NARCOTIC', 'ROBBERY', 'TRESPASS'

	IncidntNum	Category	Descript	DayOfWeek	Date	Time	PdDistrict	Resolution	Address	X	Y	Location
0	160086863	LARCENY/THEFT	ATTEMPTED THEFT FROM LOCKED VEHICLE	Friday	01/29/2016 12:00:00 AM	22:30	TARAVAL	NONE	1200 Block of 19TH AV	-122.477377	37.764478	(37.7644781578695, -122.477376524003)
1	160004837	LARCENY/THEFT	PETTY THEFT SHOPLIFTING	Saturday	01/02/2016 12:00:00 AM	17:39	SOUTHERN	JUVENILE BOOKED	900 Block of MARKET ST	-122.408421	37.783570	(37.7835699386918, -122.408421116922)
2	160138652	LARCENY/THEFT	PETTY THEFT SHOPLIFTING	Tuesday	02/16/2016 12:00:00 AM	12:40	INGLESIDE	NONE	3300 Block of MISSION ST	-122.421128	37.743555	(37.7435550542265, -122.421128029505)
3	160010505	LARCENY/THEFT	GRAND THEFT FROM LOCKED AUTO	Monday	01/04/2016 12:00:00 AM	19:40	MISSION	NONE	2300 Block of 16TH ST	-122.409530	37.765718	(37.7657184395282, -122.409529913278)
4	160012028	LARCENY/THEFT	GRAND THEFT FROM LOCKED AUTO	Tuesday	01/05/2016 12:00:00 AM	14:00	PARK	NONE	DIVISADERO ST / HAYES ST	-122.437800	37.774991	(37.7749912944366, -122.437799703468)
...	...	...	...	...	...	...	...	...	...	...	...	...
665	160089384	TRESPASS	TRESPASSING	Sunday	01/31/2016 12:00:00 AM	02:45	CENTRAL	ARREST, BOOKED	1200 Block of COLUMBUS AV	-122.417769	37.805622	(37.8056224540522, -122.417768709913)
666	160091549	TRESPASS	TRESPASSING	Sunday	01/31/2016 12:00:00 AM	18:26	SOUTHERN	ARREST, BOOKED	200 Block of FOLSOM ST	-122.392348	37.789060	(37.7890603555993, -122.392347671978)

Marking All Crime Incidents on Map

INCIDENTS SCATTER OVER SAN
FRANCISCO AREA

ZOOM IN TO GET ACTUAL LOCATION AND
CRIME CATEGORY

Introduce Venue Info

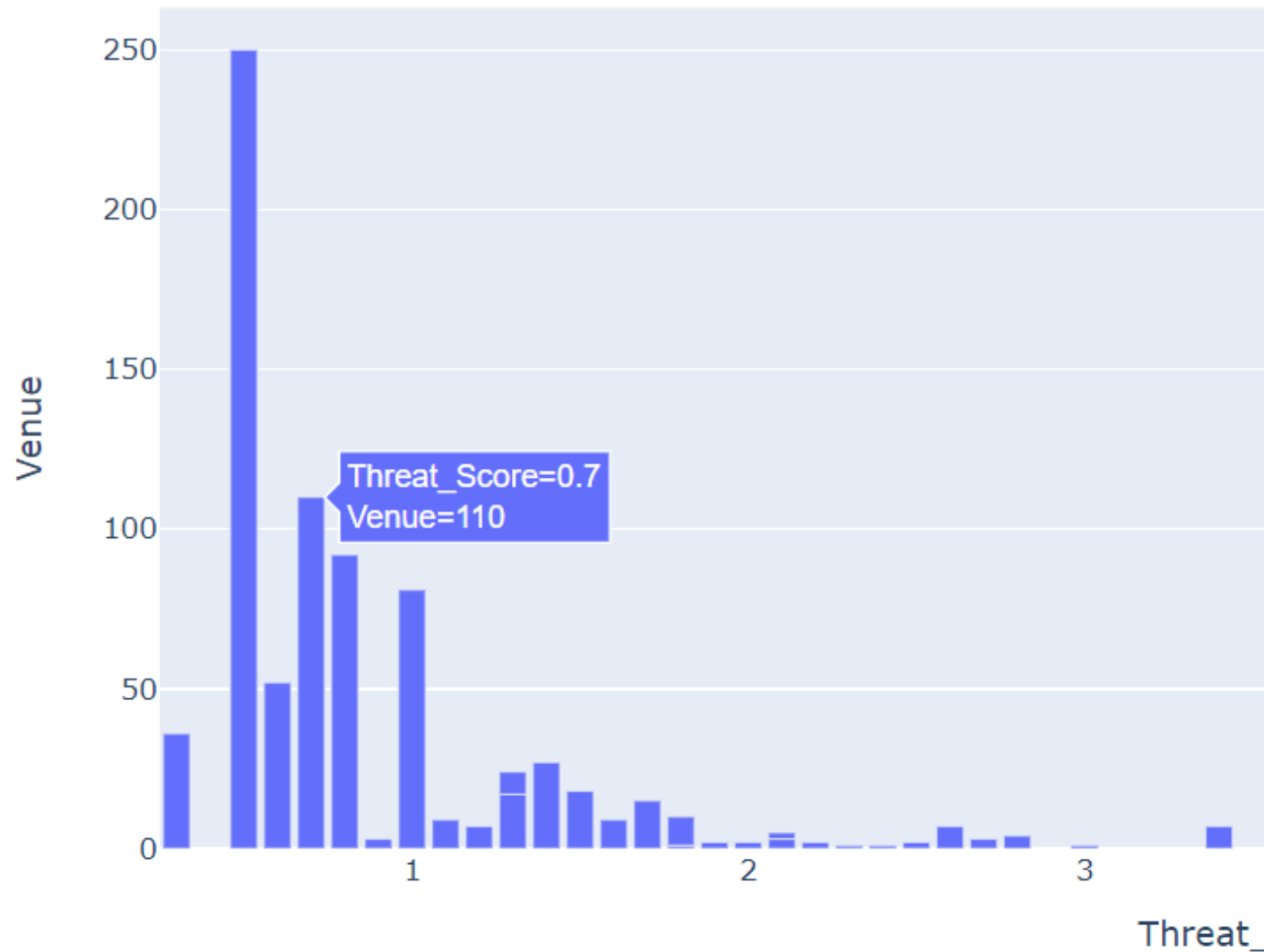|	Crime_cat	Crime_lat	Crime_lon	Venue	Venue_Add	Venue_Lat	Venue_Lon	Venue_Cat	Venue_cor
...	...	...	...	...	...	...	...	...	...
1176	TRESPASS	37.742877	-122.478377	Antigua Coffee Shop	1131 Taraval St (btwn 21st & 22nd)	37.742913	-122.478482	Café	37.74291309359446,-122.47848169874514
4	LARCENY/THEFT	37.774991	-122.437800	Bi-Rite Market	550 Divisadero St (btwn Hayes St & Fell St)	37.774796	-122.437739	Market	37.77479553269564,-122.4377388357674
1	LARCENY/THEFT	37.743555	-122.421128	Coco's Ramen	3319 Mission St	37.743871	-122.421038	Ramen Restaurant	37.74387073759982,-122.42103817416697
3	LARCENY/THEFT	37.743555	-122.421128	Crazy Sushi	3319 Mission St (29th Street)	37.743859	-122.421013	Japanese Restaurant	37.74385896174317,-122.42101293134586
1177	TRESPASS	37.742877	-122.478377	One Boiling Pot Mixian Noodles	1155 Taraval St (at 22nd Ave)	37.742884	-122.478811	Chinese Restaurant	37.74288387253323,-122.47881054150487
2	LARCENY/THEFT	37.743555	-122.421128	Pizza Hut	3349 Mission St (at Virginia Ave)	37.743253	-122.421165	Pizza Place	37.7432530399245,-122.42116503422949
0	LARCENY/THEFT	37.743555	-122.421128	Taqueria La Alteña	3348 Mission St (btw 29th St & Godeus St)	37.743274	-122.421552	Mexican Restaurant	37.743274044900836,-122.42155163920445
1179	TRESPASS	37.742877	-122.478377	Taraval Pizza	1115 Taraval St	37.742917	-122.478301	Pizza Place	37.74291711237988,-122.47830060112612
1178	TRESPASS	37.742877	-122.478377	Tennessee Grill	1128 Taraval St	37.743037	-122.478389	American Restaurant	37.743037,-122.478389
1180	TRESPASS	37.742877	-122.478377	The Deli King	1143 Taraval St (at 22nd Ave)	37.742770	-122.478641	Deli / Bodega	37.74277,-122.478641

Threat Score

	Venue	Venue_Add	Venue_Lon	Venue_Lat	Threat_Score ▲	ASSAULT	BURGLARY	DRUG/N/
783	CVS pharmacy	1 Jefferson St (Powell St)	-122.412613	37.808396	0.3	0.0	0.0	
784	Starbucks	49 Jefferson St #P (Powell St)	-122.413017	37.808474	0.3	0.0	0.0	
786	Yerba Buena Island Tunnel	Bay Bridge (at Interstate 80 & Bay Bridge)	-122.365594	37.809670	0.3	0.0	0.0	
0	Grocery Outlet	2630 Bayshore Boulevard	-122.405877	37.708502	0.6	0.0	0.0	
1	Happy Donuts	2600 Bay Shore Blvd (at Sunnydale)	-122.405381	37.708755	0.6	0.0	0.0	
2	Corns car	San Francisco, CA 94134	-122.420731	37.711178	0.7	0.7	0.0	
782	San Francisco Bicycle Rentals	425 Jefferson St (at The Cannery)	-122.419445	37.807719	1.0	0.0	0.0	
3	MUNI Stop #15589	Mission (Foote)	-122.444498	37.712696	1.1	0.0	0.8	
4	Reina's Restaurant	5479 Mission St	-122.444407	37.712965	1.1	0.0	0.8	
785	Sea Lion Statue	The Embarcadero	-122.410749	37.808594	1.4	1.4	0.0	

Assigning weights to each crime incidents, multiple the frequency, then sum up score for each venue....FINALLY WE GOT THE THREAT SCORE!

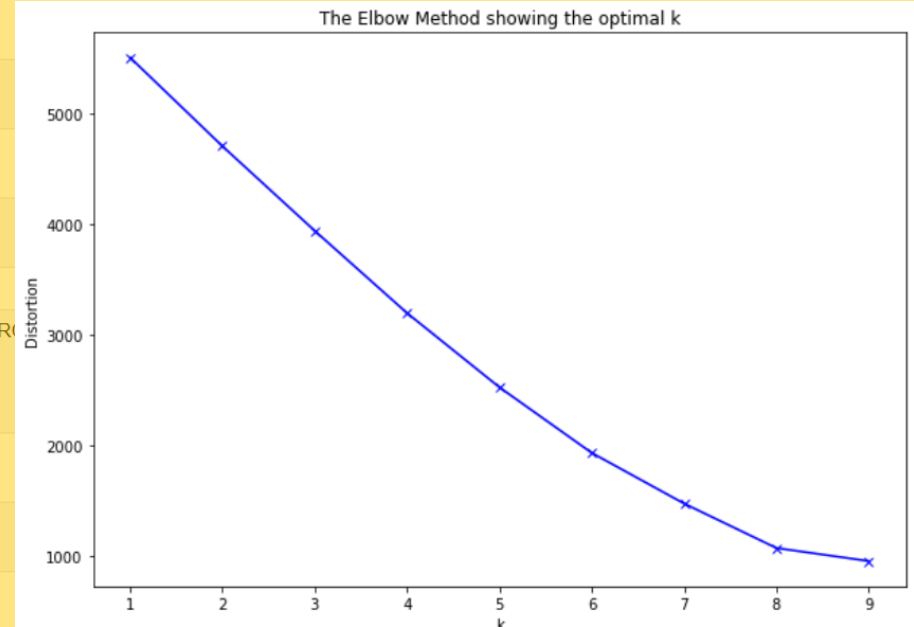# Threat Score Distribution

Most venues fell in the score range 0.3 to 1; score of 0.5 is most common score with 250 venues which takes 32% of total venues.

K-means

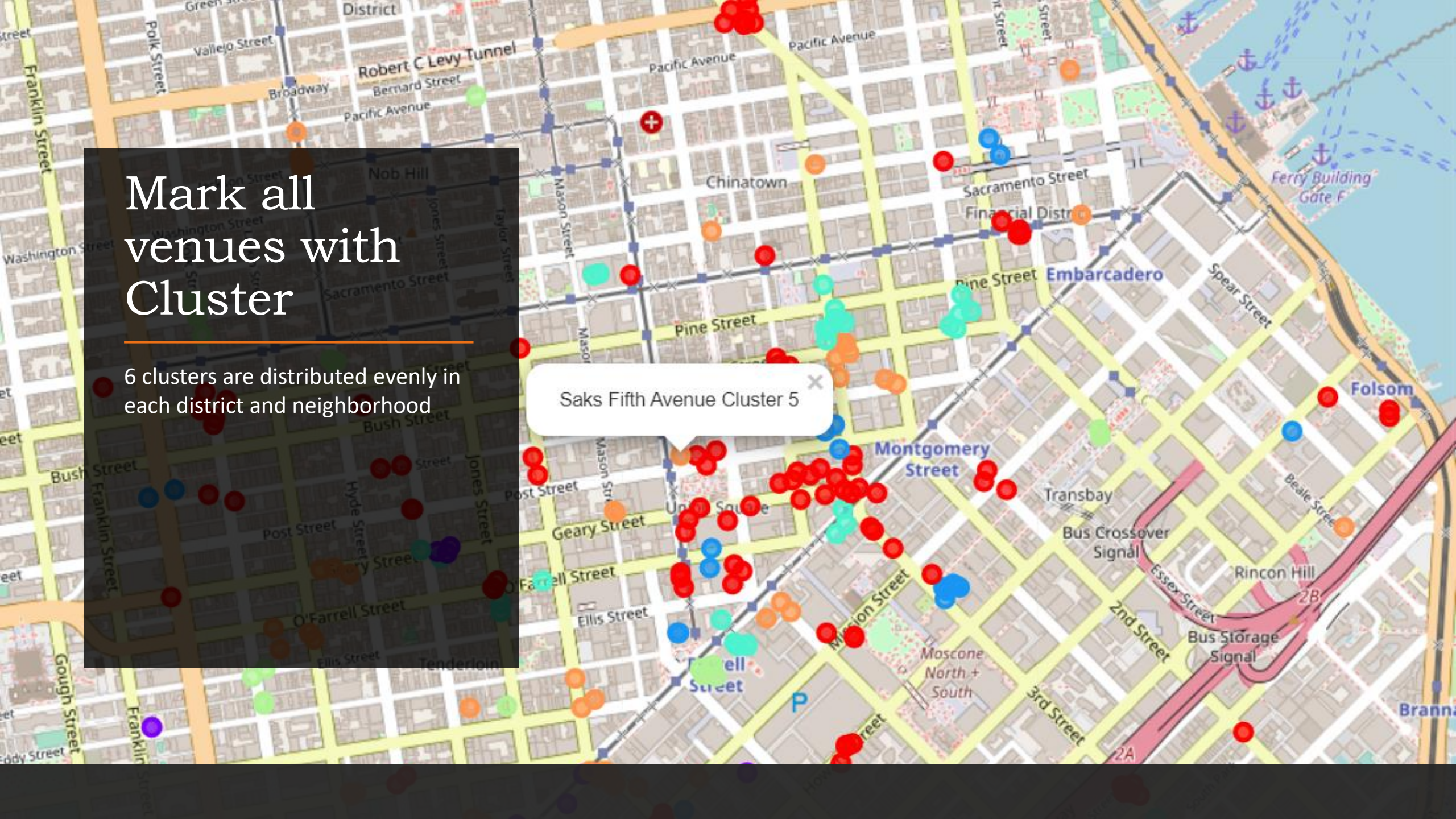Run k-means to cluster venues into 6 clusters

Venue	Venue_Add	Venue_Lon	Venue_Lat	Cluster_Labels	1st Most Common Incident	2nd Most Common Incident	3rd Most Common Incident	4th Most Common Incident	5th Most Common Incident	6th Most Common Incident
Grocery Outlet	2630 Bayshore Boulevard	-122.405877	37.708502	0	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLAR
Happy Donuts	2600 Bay Shore Blvd (at Sunnydale)	-122.405381	37.708755	0	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLAR
Corns car	San Francisco, CA 94134	-122.420731	37.711178	5	ASSAULT	VANDALISM	TRESPASS			
MUNI Stop #15589	Mission (Foote)	-122.444498	37.712696	3	DRUG/NARCOTIC	BURGLARY	VANDALISM			
Reina's Restaurant	5479 Mission St	-122.444407	37.712965	3	DRUG/NARCOTIC	BURGLARY	VANDALISM			
...	...	...	...	...	...	...	...			
San Francisco Bicycle Rentals	425 Jefferson St (at The Cannery)	-122.419445	37.807719	4	ROBBERY	VANDALISM	TRESPASS	LAR		
CVS pharmacy	1 Jefferson St (Powell St)	-122.412613	37.808396	1	DRUG/NARCOTIC	VANDALISM	TRESPASS			
Starbucks	49 Jefferson St #P (Powell St)	-122.413017	37.808474	1	DRUG/NARCOTIC	VANDALISM	TRESPASS			
Sea Lion Statue	The Embarcadero	-122.410749	37.808594	5	ASSAULT	VANDALISM	TRESPASS			
Yerba	Bay Bridge (at	-122.365594	37.809670	2	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLAR

The Elbow Method showing the optimal k

Mark all venues with Cluster

6 clusters are distributed evenly in each district and neighborhood

Saks Fifth Avenue Cluster 5

Result and Discussion

My analysis shows total 787 venues have been exposed under several types of threat level. In order to get a fair result, I approach them from two perspectives, one is to calculate Threat Score for each venue, another to create Clusters to find out the similarity of venues.

For the approach of Threat Score, most venues fell in the score range 0.3 to 1; score 0.5 is most common score which has pocketed 250 venues, it takes 32% of total share.

As to Clustering, the result categorized 787 venues into 6 clusters, please refer to next 6 slides.

	Venue	1st Most Common Incident	2nd Most Common Incident	3rd Most Common Incident	4th Most Common Incident	5th Most Common Incident	6th Most Common Incident	7th Most Common Incident
5	Utilikilts	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
6	Taqueria Los Amigos	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
7	Quickly 快可立	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
8	Taqueria Reinas	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
9	Emergency Plumbers	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
10	Debbie does Dinner	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
44	One Waan Thai Restaurant	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
45	Glen Park Liquor	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
46	Viking's Giant Submarines	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
47	MUNI Bus Stop - Bosworth & Diamond	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
48	Bello Coffee & Tea	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
49	Pebble's Cafe	LARCENY/THEFT	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT

Cluster 1

This is largest group packed with 342 venues, takes 43.5%. LARCENY/THEFT is mainstream followed by VANDALISM, then TRESPASS.

	Venue	Common Incident	2nd Most Common Incident	Common Incident	Common Incident	Common Incident	6th Most Common Incident	7th Most Common Incident
262	Medithrive Mission	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
293	Dolls Kill	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
294	Puff Puff Pass	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
296	Black Scale	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
297	Ambiance	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
298	Pork Store Cafe	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
299	Cookies SF	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
300	Piedmont Boutique	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
301	Trax	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
302	Pink Dolphin SF	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
303	VeganBurg	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
304	Fred's New Lite Supermarket	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY
305	Derby Of San Francisco	DRUG/NARCOTIC	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	BURGLARY

Cluster 2

It is included 66 venues (8.4%) which are mainly DRUG/NARCOTIC, followed by ASSAULT and VANDALISM.

	Venue	1st Most Common Incident	2nd Most Common Incident	3rd Most Common Incident	4th Most Common Incident	5th Most Common Incident	6th Most Common Incident	7th Most Common Incident
544	SEPHORA	ASSAULT	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
545	Axiom Hotel	ASSAULT	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
577	One65 patisserie	LARCENY/THEFT	TRESPASS	ASSAULT	VANDALISM	ROBBERY	DRUG/NARCOTIC	BURGLARY
585	Boudin Bakery Café	LARCENY/THEFT	TRESPASS	ASSAULT	VANDALISM	ROBBERY	DRUG/NARCOTIC	BURGLARY
638	Capital One 360 Café	LARCENY/THEFT	TRESPASS	VANDALISM	ROBBERY	DRUG/NARCOTIC	BURGLARY	ASSAULT
65	The Deli King	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY	ASSAULT
66	Dumpling Specialist	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY	ASSAULT
67	One Boiling Pot Mixian Noodles	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY	ASSAULT
68	Antigua Coffee Shop	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY	ASSAULT
70	Taraval Pizza	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY	ASSAULT
71	Banhwich	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY	ASSAULT
72	Super Cue Cafe	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY	ASSAULT
76	Tennessee Grill	TRESPASS	VANDALISM	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY	ASSAULT

Cluster 3

This group has 39 venues (5%). Most common incident is TRESPASS, then VANDALISM and ROBBERY. This is the group having a higher threat level as ROBBERY involved.

Venue	1st Most Common Incident	2nd Most ▲ Common Incident	3rd Most Common Incident	4th Most Common Incident	5th Most Common Incident	6th Most Common Incident	7th Most Common Incident
Gym @ Park Merced	BURGLARY	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCO
1015 Folsom	BURGLARY	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCO
Pura Club	BURGLARY	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCO
MUNI Stop #15589	DRUG/NARCOTIC	BURGLARY	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	ASSAU
Reina's Restaurant	DRUG/NARCOTIC	BURGLARY	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	ASSAU
Folsom Street Foundry	LARCENY/THEFT	BURGLARY	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	ASSAU
Sextant Coffee Roasters	LARCENY/THEFT	BURGLARY	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	ASSAU
Away	LARCENY/THEFT	BURGLARY	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	ASSAU
Acrimony	LARCENY/THEFT	BURGLARY	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	ASSAU
minimal	LARCENY/THEFT	BURGLARY	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	ASSAU
Project Juice	LARCENY/THEFT	BURGLARY	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	ASSAU
Lers Ros Thai	LARCENY/THEFT	BURGLARY	VANDALISM	TRESPASS	ROBBERY	DRUG/NARCOTIC	ASSAU

Cluster 4

This is third largest group gathered 120 venues (15.2%). It is consisting of BURGLARY and VANDALISM as majority. Venues in this group may be imposed a significant loss from an incident.

	Venue	1st Most Common Incident	2nd Most Common Incident	3rd Most Common Incident	4th Most Common Incident	5th Most Common Incident	6th Most Common Incident	7th Most Common Incident
78	Pizza Hut	LARCENY/THEFT	ASSAULT	ROBBERY	VANDALISM	TRESPASS	DRUG/NARCOTIC	BURGLARY
79	Taqueria La Alteña	LARCENY/THEFT	ASSAULT	ROBBERY	VANDALISM	TRESPASS	DRUG/NARCOTIC	BURGLARY
82	Crazy Sushi	LARCENY/THEFT	ASSAULT	ROBBERY	VANDALISM	TRESPASS	DRUG/NARCOTIC	BURGLARY
83	Coco's Ramen	LARCENY/THEFT	ASSAULT	ROBBERY	VANDALISM	TRESPASS	DRUG/NARCOTIC	BURGLARY
90	The Salvation Army	ROBBERY	ASSAULT	VANDALISM	TRESPASS	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
91	The Salvation Army Family Store & Donation Center	ROBBERY	ASSAULT	VANDALISM	TRESPASS	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
92	Al's Place	ROBBERY	ASSAULT	VANDALISM	TRESPASS	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
246	Gotham Boxing SF	ROBBERY	ASSAULT	VANDALISM	TRESPASS	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
480	Target	ROBBERY	ASSAULT	VANDALISM	TRESPASS	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
489	Sally's Beauty Supply	ROBBERY	ASSAULT	VANDALISM	TRESPASS	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
490	Chipotle Mexican Grill	ROBBERY	ASSAULT	VANDALISM	TRESPASS	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
491	Starbucks	ROBBERY	ASSAULT	VANDALISM	TRESPASS	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
494	GNC	ROBBERY	ASSAULT	VANDALISM	TRESPASS	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY

Cluster 5

There are 79 venues (10%) in this cluster. The first place is taken by ROBBERY, followed by ASSAULT and VANDALISM. Obviously, this is the most violent group with highest threat in the loss of damage.

	Venue	1st Most Common Incident	2nd Most Common Incident	3rd Most Common Incident	4th Most Common Incident	5th Most Common Incident	6th Most Common Incident	7th Most Common Incident
2	Corns car	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
11	Walgreens	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
12	Nameless Tea & Coffee	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
13	Little Caesars Pizza	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
14	Claddagh Coffee	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
15	Alice Griffith Community Garden	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
16	Super Star Restaurant	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
17	MUNI Bus Stop - Geneva & San Jose	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
19	Beach Yard	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
20	Geneva Station Cafe	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
21	AJ's Barbeque Cafe	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY
23	Nina Claire's Cafe	ASSAULT	VANDALISM	TRESPASS	ROBBERY	LARCENY/THEFT	DRUG/NARCOTIC	BURGLARY

Cluster 6

This is secondary largest group packed 141 venues (17.9%). The first most common criminal incident is ASSAULT, and then followed by VANDALISM. Although ASSAULT and VANDALISM may not necessarily happen inside stores, it still alert that venues are surrounding in the environment with violent intense.

Conclusion

The purpose of this project is to provide our clients reliable indicators that may help them to evaluate the potential loss caused by crime incidents for each of venues in San Francisco. Typically, the risk is measured by the security of district or neighborhood, but we have raised a question: "A venue where is sited in a good public security district would be less threat level than others in a poor public security district?" We got the answer while observing the cluster distribution on map. Our data shows 6 clusters are basically distributed evenly in each district or neighborhood; thus, we cannot tell a venue in a poor public security district faces more crime threats than better public security area. Instead, we narrowed down the affect zone in radius of 50 meters, and provide two indicators, Threat Score and Clusters, which successfully made threat level of every signal venue visible. With these two significant indicators, insurance companies can consolidate with other basic info that they have, such as business type, property value, historic records, etc., to customize the best proposal for each of venues.

The predicting accuracy still have plenty rooms to improve. For instance, more venue data may show more accurate result. This can be improved by acquiring a commercial Foursquare account. Besides, if we can get more details of incidents, such as the loss of dollar amount, it will help too.

Thank You!