Capstone Project - Los Angeles Motor Traffic Collisions during Year 2018 (Week 2)

IBM Data Science Capstone by IBM/Coursera

Table of contents

Introduction: Business Problem

In this use case, lets analyze Los Angeles traffic collision data and identify & cluster similar venue categories near to the collision locations. So that LA Dept of Transportation authorities can better understand the public needs and plan accordingly to ease up traffic congestions in each locality around the popular venues, which will help in minimizing the traffic collision rates.

Background

Los Angeles has one of the highest motor collision rate among United States metropolitan cities.

Los Angeles traffic congestion is also rated as one of the highest in United States and probably in the world. Even though, LA has mass public transport system including public buses, light Rail and subway, ridership rates are decreasing annually and residents are taking on to roads to move around the city, which is resulting in high fatality collision rates.

There are several contributing factors for high collision rates like increasing population rates, aging public transit infrastructure, increasing economy, popular venues or events etc.

Popular venues may inadverently contributes to traffic congestions and collisions. Popular venues includes music arenas, parks, cafes, yoga studios etc. Analyzing venues near to collision locations helps in understanding traffic footnote and public needs. Thus helping LA Dept of Transportation to plan better in order to ease up congestions and minimize collisions.

Data

Under open data policy, **LAPD** (Los Angeles Police Department) collects and regularly updates Los Angeles traffic collision data every week.

Following are the data sources:

- Los Angeles traffic collision data is provided in LA city open data website.
  https://data.lacity.org/A-Safe-City/Traffic-Collision-Data-from-2010-to-Present/d5tf-ez2w
- Los Angeles Police Department reporting divisions geo location data is provided in LA Times website for open use.
  http://boundaries.latimes.com/1.0/boundary-set/lapd-divisions/?format=geojson
- Venues and venue categories data wil be obained from **Foursquare API** using their APIs.
  Foursquare API endpoint to fetch recommended venues https://api.foursquare.com/v2/venues/explore
  Foursquare API endpoint to fetch transport venues https://api.foursquare.com/v2/venues/search

Following are the observations made about the collision data provided to the public:

- Los Angeles traffic collision data is provided from year 2010 to till current date.
- Data is provided in various formats like csv, json (via api) etc.
- Provided data is sanitized to scrub all PII (personally identifiable information).
- Geo location coordinates are provided for all collisions.

Data Consumption is done the following way:

- Los Angeles traffic collision data will be read in csv format

- Los Angeles traffic collision data will be read in csv format.
- Los Angeles police reporting divisions data will be read in geojson format.
- Foursquare Venue exploration data will be read in json format.

Data Usage is done the following way:

- Los Angeles traffic collision data for year 2018 will be used to analyze the collisions.
- Collision geo location coordinates will be used as input to obtain nearby venue data from Foursquare.
- Obtained Foursquare venue data will be used to cluster collision locations
- LAPD reporting divisions geo json data will be used for choropleth maps.

Exploratory Data Analysis

In [72]:

```
# import all needed libraries

from bs4 import BeautifulSoup
import requests
import pandas as pd
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
import numpy as np # library to handle data in a vectorized manner

import json # library to handle JSON files
from pandas.io.json import json_normalize # tranform JSON file into a pandas dataframe

#!conda install -c conda-forge folium=0.5.0 --yes # uncomment this line if you haven't completed t
he Foursquare API lab
import folium # map rendering library
from folium.plugins import MarkerCluster

# Matplotlib and associated plotting modules
import matplotlib.cm as cm
import matplotlib.pyplot as plt
import matplotlib.dates as mdates
import matplotlib.colors as colors
import seaborn as sns

# import k-means from clustering stage
from sklearn.cluster import KMeans
from scipy.spatial.distance import cdist

# split feature and dependent arrays into train and test arrays
from sklearn.model_selection import train_test_split
import sklearn.utils
from sklearn.datasets.samples_generator import make_blobs
from sklearn.preprocessing import StandardScaler
```

Read LA Traffic Collision Data

In [73]:

```
la_collision_raw = pd.read_csv("https://data.lacity.org/api/views/d5tf-ez2w/rows.csv?
accessType=DOWNLOAD")
```

In [74]:

```
# print shape of read data to know the number of rows and columns in dataframe
print(la_collision_raw.shape)
la_collision_raw.head()
```

```
(466242, 24)
```

Out[74]:

	DR Number	Date Reported	Date Occurred	Time Occurred	Area ID	Area Name	Reporting District	Crime Code	Crime Code Description	MO Codes	Victim Age	Victim Sex	Victim Descent	Pre

	DR Number	Date Reported	Date Occurred	Time Occurred	Area ID	Area Name	Reporting District	Crime Code	Crime Code Description	MO Codes	Victim Age	Victim Sex	Victim Descent	Pre
0	190408788	04/20/2019	04/20/2019	1020	4	Hollenbeck	429	997	TRAFFIC COLLISION	NaN	41.0	F	O	
1	190709454	04/20/2019	04/20/2019	1250	7	Wilshire	701	997	TRAFFIC COLLISION	NaN	27.0	F	W	
2	191109241	04/20/2019	04/20/2019	900	11	Northeast	1184	997	TRAFFIC COLLISION	0605	18.0	M	X	
3	190808715	04/20/2019	04/20/2019	1110	8	West LA	836	997	TRAFFIC COLLISION	NaN	25.0	M	B	
4	190909546	04/20/2019	04/20/2019	655	9	Van Nuys	914	997	TRAFFIC COLLISION	NaN	58.0	M	B	

In [75]:

```
# Rename all column names to replace spaces in the between the words of column names
cols=[]
cols = list(la_collision_raw.columns)
for idx, col in enumerate(cols):
    cols[idx]=col.replace(' ','_')
la_collision_raw.columns=cols
la_collision_raw.columns
```

Out[75]:

```
Index(['DR_Number', 'Date_Reported', 'Date_Occurred', 'Time_Occurred',
       'Area_ID', 'Area_Name', 'Reporting_District', 'Crime_Code',
       'Crime_Code_Description', 'MO_Codes', 'Victim_Age', 'Victim_Sex',
       'Victim_Descent', 'Premise_Code', 'Premise_Description', 'Address',
       'Cross_Street', 'Location', 'Zip_Codes', 'Census_Tracts',
       'Precinct_Boundaries', 'LA_Specific_Plans', 'Council_Districts',
       'Neighborhood_Councils_(Certified)'],
      dtype='object')
```

In [76]:

```
# Print data types of all features
la_collision_raw.dtypes
```

Out[76]:

```
DR_Number                            int64
Date_Reported                       object
Date_Occurred                       object
Time_Occurred                        int64
Area_ID                              int64
Area_Name                           object
Reporting_District                   int64
Crime_Code                           int64
Crime_Code_Description              object
MO_Codes                            object
Victim_Age                         float64
Victim_Sex                          object
Victim_Descent                      object
Premise_Code                       float64
Premise_Description                 object
Address                             object
Cross_Street                        object
Location                            object
Zip_Codes                          float64
Census_Tracts                      float64
Precinct_Boundaries                float64
LA_Specific_Plans                  float64
Council_Districts                  float64
Neighborhood_Councils_(Certified)  float64
dtype: object
```

In [77]:

```
# Drop all null data
la_collision_fmt=la_collision_raw[['Date_Reported','Date_Occurred','Time_Occurred','Area_Name',
```

```
                                    'Victim_Age','Victim_Sex','Victim_Descent','Premise_Description'
'Address',
                                    'Location']].dropna().reset_index(drop=True)
la_collision_fmt.shape
```

Out[77]:

```
(388972, 10)
```

In [78]:

```
# Format features like dates, times and convert columns into integer type.
# Replace values of feature Victim_Descent and split Location into two features Latitude & Longitu
de
la_collision_fmt['Date_Reported']=pd.to_datetime(la_collision_fmt.Date_Reported)
la_collision_fmt['Date_Occurred']=pd.to_datetime(la_collision_fmt.Date_Occurred)
la_collision_fmt['Time_Occurred']=la_collision_fmt.Time_Occurred.astype(str).str.pad(width=4, side=
'left', fillchar='0')
la_collision_fmt['Victim_Age']=la_collision_fmt.Victim_Age.astype(int)
la_collision_fmt.replace({'Victim_Descent':{'H':'Hispanic','B':'Black','O':'Other','W':'White','X':
'Unknown','A':'Asian',
                                            'K':'Korean','C':'Chinese','F':'Filipino','U':'Hawaiian
','J':'Japanese',
                                            'P':'Pacific Islanders','V':'Vietnamese','Z':'Asian
Indian',
                                            'I':'American
Indian','G':'Guamanian','S':'Samoan','D':'Cambodian',
                                            'L':'Laotian','-':'Unknown'}}, inplace=True)
la_collision_fmt[['Latitude','Longitude']]=la_collision_fmt.Location.str.replace('(','').str.replac
e(')','').str.split(',',n=1,expand=True)
la_collision_fmt.drop(['Location'], axis=1, inplace=True)
```

In [79]:

```
la_collision_fmt.head()
```

Out[79]:

	Date_Reported	Date_Occurred	Time_Occurred	Area_Name	Victim_Age	Victim_Sex	Victim_Descent	Premise_Description	Address
0	2019-04-20	2019-04-20	1020	Hollenbeck	41	F	Other	STREET	MARNEY
1	2019-04-20	2019-04-20	1250	Wilshire	27	F	White	STREET	LA CIENEGA BL
2	2019-04-20	2019-04-20	0900	Northeast	18	M	Unknown	STREET	MORTON AV
3	2019-04-20	2019-04-20	1110	West LA	25	M	Black	PARKING LOT	SANTA MONICA BL
4	2019-04-20	2019-04-20	0655	Van Nuys	58	M	Black	STREET	VAN NUYS

Plot line graph for Collision Year vs Collisions count

To navigate back to results section ***Click Here***

In [80]:

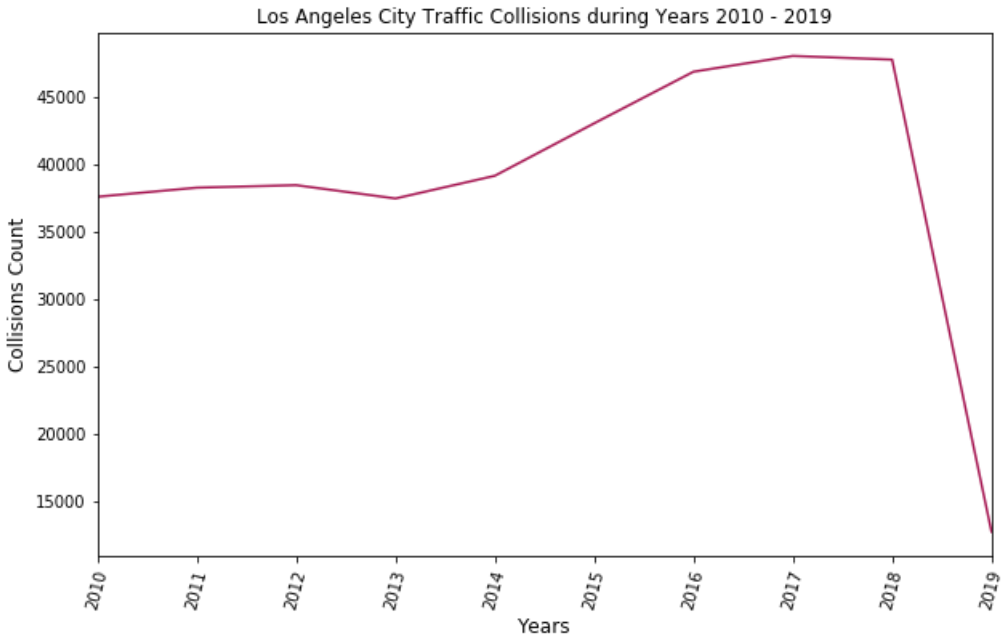
```
# Plot line graph for data Collision Year vs Collisions count
print('Year','Collisions_Count \n' +
str(la_collision_fmt.Date_Occurred.dt.year.value_counts().sort_index()))
la_collision_fmt.Date_Occurred.dt.year.value_counts().sort_index().plot(
    kind='line',figsize=(10, 6),rot=75,alpha=0.9,colormap=cm.get_cmap('Spectral'),
    title='Los Angeles City Traffic Collisions during Years 2010 - 2019')
plt.xlabel('Years', fontdict={'fontsize': 12})
plt.ylabel('Collisions Count', fontdict={'fontsize': 12})
```

```
Year Collisions_Count
2010    37554
```

```
2011    38226
2012    38411
2013    37424
2014    39107
2015    42994
2016    46822
2017    47990
2018    47719
2019    12725
Name: Date_Occurred, dtype: int64
```

Out[80]:

```
Text(0, 0.5, 'Collisions Count')
```



In [81]:

```
# Since we are anlyzing only for year 2018, filter data and capture collisions occured in year 201
8
la_collision_fmt=la_collision_fmt[(la_collision_fmt.Date_Occurred.dt.year==2018) &
(la_collision_fmt.Victim_Sex.isin(['M','F']))].reset_index(drop=True)
print(la_collision_fmt.shape)
la_collision_fmt.head()
```

```
(47569, 11)
```

Out[81]:

	Date_Reported	Date_Occurred	Time_Occurred	Area_Name	Victim_Age	Victim_Sex	Victim_Descent	Premise_Description	Addres
0	2018-12-31	2018-12-31	1445	Southwest	27	M	Hispanic	STREET	BUDLON
1	2018-12-31	2018-12-31	1515	Hollywood	30	F	White	PARKING LOT	SUNSE
2	2018-12-31	2018-12-31	1515	West LA	54	F	Other	STREET	NATIONA
3	2018-12-31	2018-12-31	0850	Van Nuys	22	F	Hispanic	STREET	VANOWE
4	2018-12-31	2018-12-31	2210	Southeast	20	F	Hispanic	STREET	AVALO

Plot line graph for Area (LAPD Divisions) vs Collisions count

To navigate back to results section [Click Here]

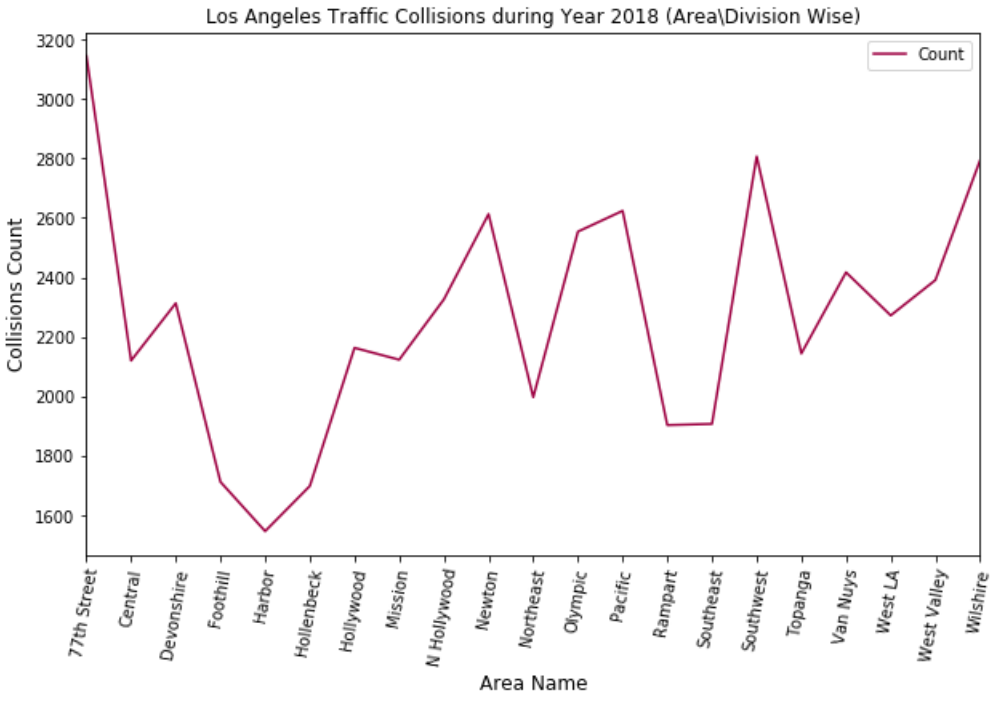
In [82]:

```
# Plot line graph for data Area (LAPD Divisions) vs Collisions count
print('Area_Name','   Collisions_Count \n' + str(la_collision_fmt['Area_Name'].value_counts()))
la_collision_fmt['Area_Name'].value_counts().sort_index().to_frame('Count').plot(figsize=(10,
6),rot=80,use_index=True,
                colormap=cm.get_cmap('Spectral'),
                title='Los Angeles Traffic Collisions during Year 2018 (Area\Division Wise)')
areanm=np.sort(la_collision_fmt['Area_Name'].unique())
x_idx=np.arange(len(areanm))
plt.xticks(x_idx, areanm)
plt.xlabel('Area Name', fontdict={'fontsize': 12})
plt.ylabel('Collisions Count', fontdict={'fontsize': 12})
```

```
Area_Name    Collisions_Count
77th Street    3145
Southwest      2807
Wilshire       2794
Pacific        2624
Newton         2613
Olympic        2554
Van Nuys       2417
West Valley    2391
N Hollywood    2326
Devonshire     2313
West LA        2272
Hollywood      2163
Topanga        2144
Mission        2123
Central        2120
Northeast      1997
Southeast      1907
Rampart        1903
Foothill       1712
Hollenbeck     1698
Harbor         1546
Name: Area_Name, dtype: int64
```

Out[82]:

```
Text(0, 0.5, 'Collisions Count')
```



Plot line graph for data Victim Descent vs Collisions count

To navigate back to resuts section [Click Here]

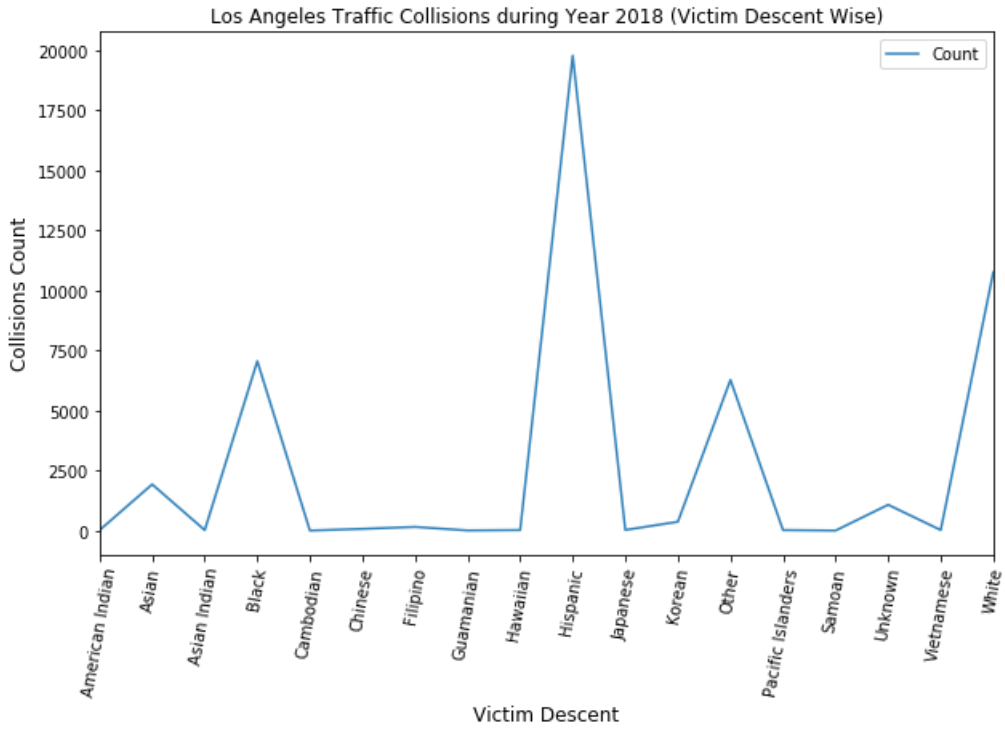
In [83]:

```
# Plot line graph for data Victim Descent vs Collisions count
print('Victim_Descent',' Collisions_Count \n' + str(la_collision_fmt['Victim_Descent'].value_counts
()))
la_collision_fmt['Victim_Descent'].value_counts().sort_index().to_frame('Count').plot(kind='line',
                figsize=(10, 6),rot=80,
                use_index=True,
                alpha=0.9,
                title='Los Angeles Traffic Collisions during Year 2018 (Victim Descent Wise)')
vic_descent=np.sort(la_collision_fmt['Victim_Descent'].unique())
x_idx=np.arange(len(vic_descent))
plt.xticks(x_idx, vic_descent)
plt.xlabel('Victim Descent', fontdict={'fontsize': 12})
plt.ylabel('Collisions Count', fontdict={'fontsize': 12})
```

```
Victim_Descent  Collisions_Count
Hispanic              19771
White                 10753
Black                  7053
Other                  6272
Asian                  1924
Unknown                1074
Korean                  366
Filipino                152
Chinese                  71
Japanese                 25
Hawaiian                 22
Vietnamese               22
Pacific Islanders        20
Asian Indian             19
American Indian          18
Guamanian                 5
Cambodian                 1
Samoan                    1
Name: Victim_Descent, dtype: int64
```

Out[83]:

```
Text(0, 0.5, 'Collisions Count')
```



Plot line graph for Month vs Collisions count

To navigate back to results section Click Here

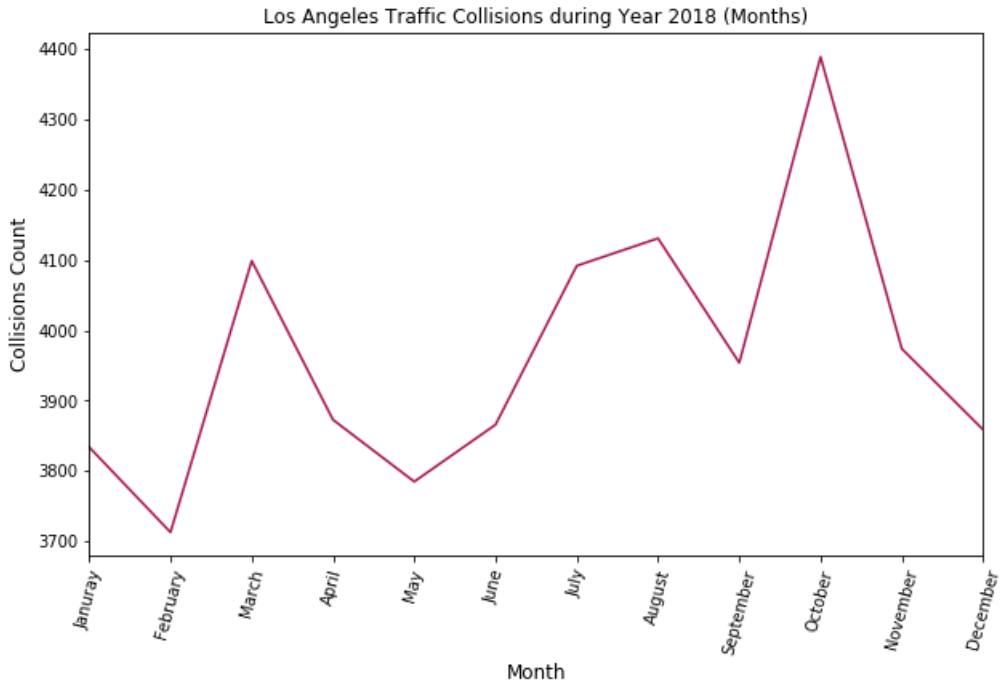
In [84]:

```
# Plot line graph for data Month (Collision Occured) vs Collisions count
print('Month','Collisions_Count \n' +
str(la_collision_fmt.Date_Occurred.dt.month.value_counts().sort_index()))
la_collision_fmt.Date_Occurred.dt.month.value_counts().sort_index().rename(
{1:'January',2:'February',3:'March',4:'April',5:'May',6:'June',7:'July',
 8:'August',9:'September',10:'October',11:'November',12:'December'}).plot(
    kind='line',figsize=(10, 6),rot=75,alpha=0.9,colormap=cm.get_cmap('Spectral'),
    title='Los Angeles Traffic Collisions during Year 2018 (Months)')
months=np.array(['Januray','February','March','April','May','June','July','August','September','Oct
ober','November','December'])
x_idx=np.arange(len(months))
plt.xticks(x_idx, months)
plt.xlabel('Month', fontdict={'fontsize': 12})
plt.ylabel('Collisions Count', fontdict={'fontsize': 12})
```

```
Month Collisions_Count
1     3834
2     3713
3     4099
4     3873
5     3785
6     3866
7     4092
8     4131
9     3954
10    4389
11    3974
12    3859
Name: Date_Occurred, dtype: int64
```

Out[84]:

```
Text(0, 0.5, 'Collisions Count')
```



Plot line graph for Week day vs Collisions count

To navigate back to results section [Click Here]

In [85]:

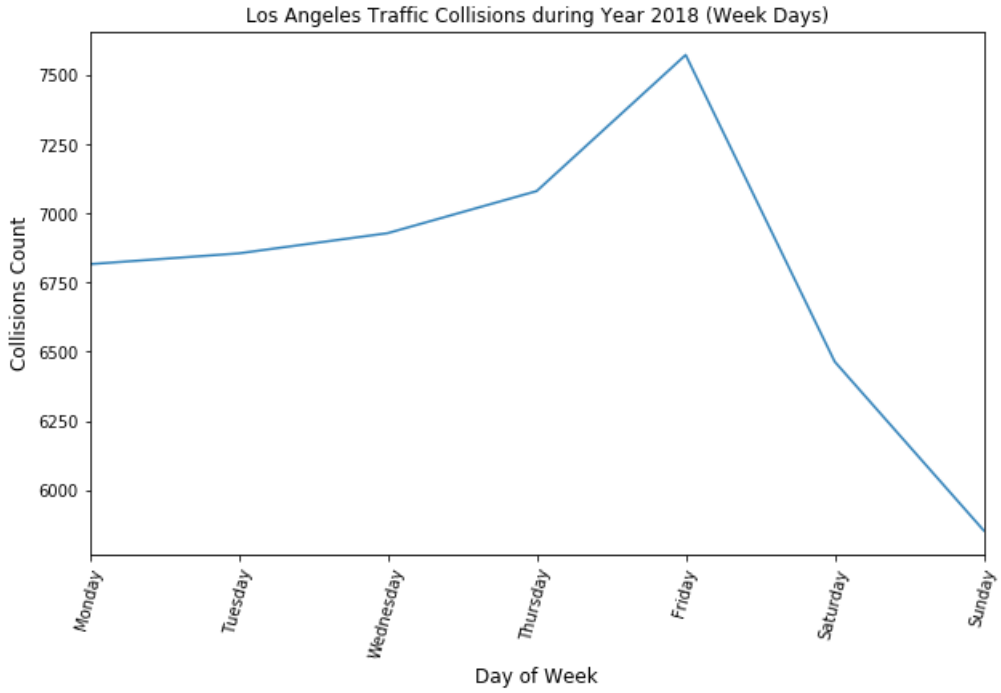
```
# Plot line graph for data Week day vs Collisions count
print('Week_Day','Collisions_Count \n' +
str(la_collision_fmt.Date_Occurred.dt.dayofweek.value_counts().sort_index()))
la_collision_fmt.Date_Occurred.dt.dayofweek.value_counts().sort_index().rename(
```

```
    {0:'Monday',1:'Tuesday',2:'Wednesday',3:'Thursday',4:'Friday',5:'Saturday',6:'Sunday'}).plot(ki
nd='line',
    figsize=(10, 6),rot=75,alpha=0.9,title=('Los Angeles Traffic Collisions during Year 2018 (Week
Days)'))
plt.xlabel('Day of Week', fontdict={'fontsize': 12})
plt.ylabel('Collisions Count', fontdict={'fontsize': 12})
```

```
Week_Day Collisions_Count
0     6816
1     6855
2     6928
3     7080
4     7572
5     6464
6     5854
Name: Date_Occurred, dtype: int64
```

Out[85]:

```
Text(0, 0.5, 'Collisions Count')
```



Plot line graph for Time vs Collisions count

To navigate back to results section [***Click Here***]

In [86]:

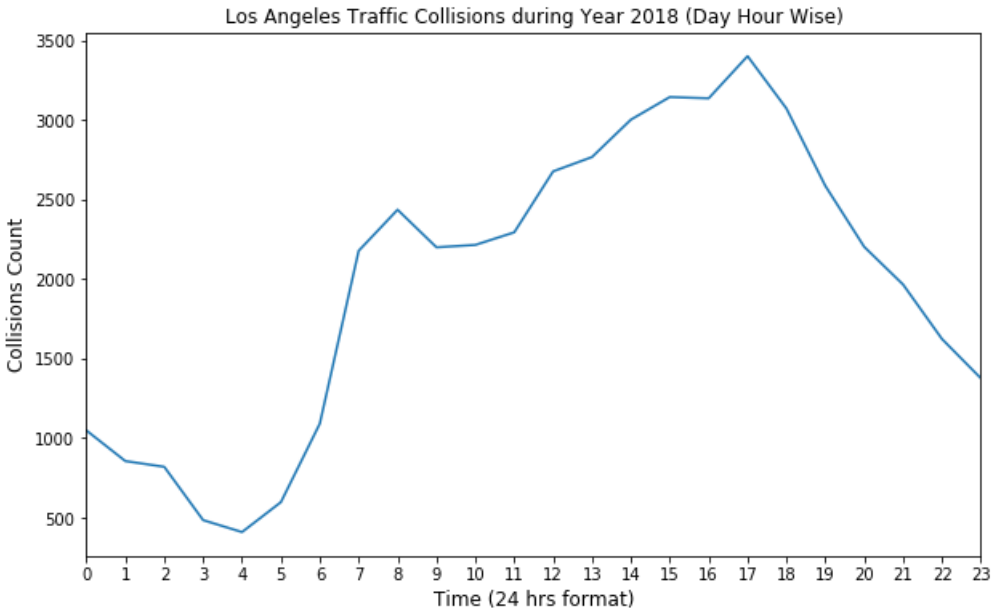
```
# Plot line graph for data Time vs Collisions count
print('Time(Hrs)','Collisions_Count \n' + str(la_collision_fmt.Time_Occurred.str.slice(start=0, sto
p=2).value_counts().sort_index()))
la_collision_fmt.Time_Occurred.str.slice(start=0, stop=2).value_counts().sort_index().plot(kind='li
ne',
            figsize=(10, 6),title='Los Angeles Traffic Collisions during Year 2018 (Day Hour Wise)'
)
hours=np.arange(0,24)
x_idx=np.arange(0,24)
plt.xticks(x_idx, hours)
plt.xlabel('Time (24 hrs format)', fontdict={'fontsize': 12})
plt.ylabel('Collisions Count', fontdict={'fontsize': 12})
```

```
Time(Hrs) Collisions_Count
00    1048
01     856
02     820
03     485
```

```
04     410
05     598
06    1091
07    2177
08    2435
09    2199
10    2214
11    2293
12    2676
13    2766
14    3001
15    3143
16    3135
17    3400
18    3071
19    2585
20    2202
21    1965
22    1623
23    1376
Name: Time_Occurred, dtype: int64
```

Out[86]:

```
Text(0, 0.5, 'Collisions Count')
```



Plot line graph for Victim sex vs Collisions count

To navigate back to results section [*Click Here*](#)

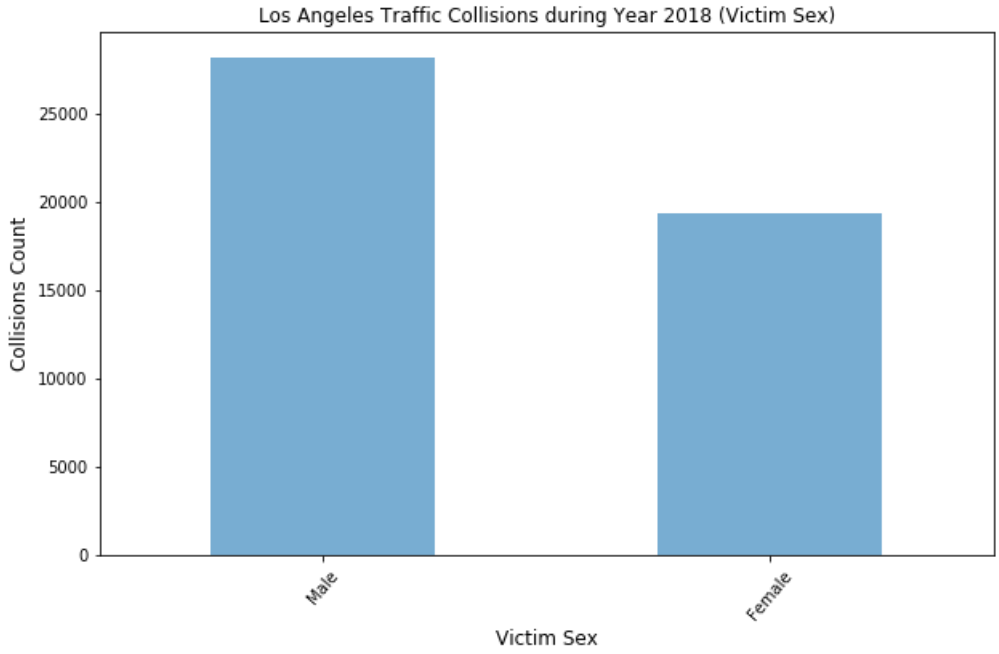
In [87]:

```
# Plot line graph for data Victim sex vs Collisions count
print('Victim_Sex','Collisions_Count \n' + str(la_collision_fmt['Victim_Sex'].value_counts()))
la_collision_fmt['Victim_Sex'].value_counts().rename({'M':'Male','F':'Female'}).plot(kind='bar',
    rot=50,alpha=0.6,figsize=(10, 6),
    title='Los Angeles Traffic Collisions during Year 2018 (Victim Sex)')
plt.xlabel('Victim Sex', fontdict={'fontsize': 12})
plt.ylabel('Collisions Count', fontdict={'fontsize': 12})
```

```
Victim_Sex Collisions_Count
M    28198
F    19371
Name: Victim_Sex, dtype: int64
```

Out[87]:

```
Text(0, 0.5, 'Collisions Count')
```



In [88]:

```
# Format Victim age to put them in bins
# For example, if victim age is 25, that victim will be placed in bin or group 'Age_21_30'
# Also create bins to victim age data to be placed in.
la_collision_binfmt=la_collision_fmt[['Victim_Age','Victim_Sex']]
bins = np.linspace(min(la_collision_binfmt['Victim_Age']), max(la_collision_binfmt['Victim_Age']),
10)
bin_names = ['Age_15_20', 'Age_21_30', 'Age_31_40', 'Age_41_50', 'Age_51_60', 'Age_61_70', 'Age_71_
80', 'Age_81_90', 'Age_91_100']
la_collision_binfmt['Victim_Age_Bin'] = pd.cut(la_collision_binfmt['Victim_Age'], bins, labels=bin_
names, include_lowest=True)
la_collision_binfmt.replace({'Victim_Sex':{0:'M',1:'F'}},inplace=True)
```

```
/Users/User1/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:7:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  import sys
/Users/User1/anaconda3/lib/python3.7/site-packages/pandas/core/generic.py:6517:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  regex=regex)
```

Plot line graph for Victim Age bins Vs Collision count

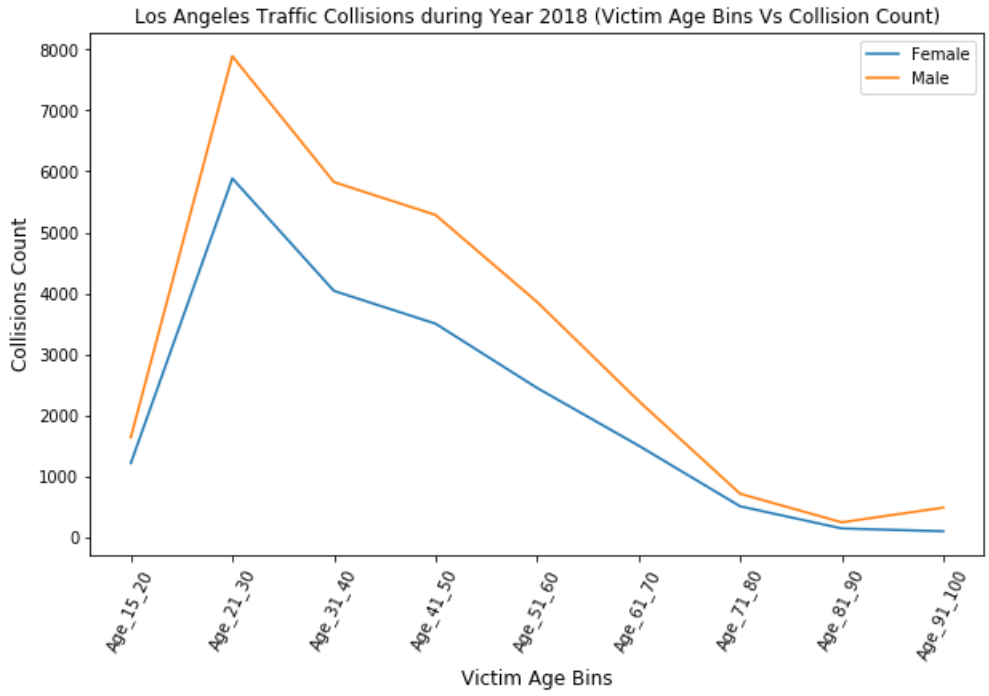
To navigate back to results section Click Here

In [89]:

```
# Place Victims into created bins and plot the line graph for data Victim Age bins Vs Collision co
unt
la_collision_bininfo=la_collision_binfmt.groupby(['Victim_Age_Bin','Victim_Sex']).count().reset_inc
ex()
la_collision_bininfo.columns=['Victim_Age_Bin','Victim_Sex','Count']
print(la_collision_bininfo)
la_collision_binx=la_collision_bininfo['Victim_Age_Bin'].unique().to_list()
la_collision_binyF=la_collision_bininfo[la_collision_bininfo['Victim_Sex']=='F']['Count'].to_list(
)
la_collision_binyM=la_collision_bininfo[la_collision_bininfo['Victim_Sex']=='M']['Count'].to_list(
```

```
la_collision_binyM=la_collision_binnno[la_collision_binnno['Victim_Sex']=='M']['Count'].to_list(
)
fig, ax = plt.subplots(figsize=(10, 6))
ax.plot(la_collision_binx, la_collision_binyF, label='Female')
ax.plot(la_collision_binx, la_collision_binyM, label='Male')
ax.legend()
ax.set_title('Los Angeles Traffic Collisions during Year 2018 (Victim Age Bins Vs Collision Count)
')
plt.xlabel('Victim Age Bins', fontdict={'fontsize': 12})
plt.ylabel('Collisions Count', fontdict={'fontsize': 12})
plt.xticks(rotation=65)
plt.show()
```

	Victim_Age_Bin	Victim_Sex	Count
0	Age_15_20	F	1219
1	Age_15_20	M	1642
2	Age_21_30	F	5885
3	Age_21_30	M	7888
4	Age_31_40	F	4042
5	Age_31_40	M	5825
6	Age_41_50	F	3505
7	Age_41_50	M	5287
8	Age_51_60	F	2452
9	Age_51_60	M	3861
10	Age_61_70	F	1506
11	Age_61_70	M	2239
12	Age_71_80	F	511
13	Age_71_80	M	717
14	Age_81_90	F	149
15	Age_81_90	M	249
16	Age_91_100	F	102
17	Age_91_100	M	490



Methodology

In exploratory data anyalsis, it can be observed that Los Angeles collision data is available from year 2010 to till date. For further analysis, lets consider data only for year 2018 (47K rows).

As part of exploratory data analysis, null data has been filtered and discarded. All possible relations between features are explored and understood. Its worth exploring further with features Area_Name, Victim_Age bins, Victim_Sex, Victim_Descents, Latitude and Longitude.

Foursquare API will be used to compile a list of all near by recommeded venues to the collision locations with in **radius of 500 meters**. And then find out **most frequent recommended venues near to those collision locations**. These most frequent recommended venues might be one of the inadvertent causes for more traffic which may led to collisions and congestions. Please

note that due to limited restricted usage of Foursqaure API, only 5 collision locations will be selected per LAPD division or Area_Name for exploration of nearby venues.

And also use Foursquare API to compile a list of all public transport venues with in radius of 500 meters of the collision locations. Public transport is one of the options available to public in order to avoid traffic congestions and collisions, provided they are with in the range of most frequented venues.

As per objective, it is imperative to cluster all collision locations based on explored near by recommended venues. Collision locations are clustered using **K-Means** after converting all categorical features to numerical values. And then those clusetered collision locations will be mapped using Folium package. LAPD reporting divisions are represented using choropleth mapping with geojson location data downloaded from LA City open data website. Public transport venues will also be added as markers to the clustered folium map.

Finally, report top most 5 recommended venues per collision location and all public transport venues available near to the collision location with in the radius of 500 meters for the public to make avail of them. So that, LA department of transportation can make use of above reported data and arrange more public transport venues near to the most frequented collision locations.

Analysis

Convert Categorical features to numerical values

In [90]:

```
# Lets convert Victim_Sex categorical values M (male) to 0 and F (female) to 1.
la_collision_fmt['Victim_Sex'].replace(to_replace=['M','F'], value=[0,1],inplace=True)
la_collision_fmt.head()
```

Out[90]:

	Date_Reported	Date_Occurred	Time_Occurred	Area_Name	Victim_Age	Victim_Sex	Victim_Descent	Premise_Description	Addre
0	2018-12-31	2018-12-31	1445	Southwest	27	0	Hispanic	STREET	BUDLON
1	2018-12-31	2018-12-31	1515	Hollywood	30	1	White	PARKING LOT	SUNSE
2	2018-12-31	2018-12-31	1515	West LA	54	1	Other	STREET	NATIONA
3	2018-12-31	2018-12-31	0850	Van Nuys	22	1	Hispanic	STREET	VANOWE
4	2018-12-31	2018-12-31	2210	Southeast	20	1	Hispanic	STREET	AVALO

In [91]:

```
# Normalize collision count frequency by Victim_Descent and Area_Name.
# It shows the frequency of collisions per each victim descent per each area name.
la_collision_fmt.groupby(['Victim_Descent'])['Area_Name'].value_counts(normalize=True).to_frame('Frequency')
```

Out[91]:

		Frequency
Victim_Descent	**Area_Name**	
American Indian	**Pacific**	0.222222
	Central	0.166667
	Rampart	0.166667
	Mission	0.111111
	N Hollywood	0.111111
	Devonshire	0.055556
	Harbor	0.055556
	Topanga	0.055556
	Van Nuys	0.055556
Asian	**Olympic**	0.160603

Victim_Descent	Area_Name	Frequency
Asian	Olympic	0.160603
	Wilshire	0.076403
	West LA	0.072765
	Central	0.070166
	Pacific	0.063410
	Rampart	0.060811
	Devonshire	0.059771
	Hollywood	0.049896
	West Valley	0.045218
	Northeast	0.044179
	Southwest	0.040541
	Topanga	0.038462
	Newton	0.035343
	Hollenbeck	0.031705
	Van Nuys	0.030665
	Mission	0.030146
	Harbor	0.027547
	N Hollywood	0.027027
	Foothill	0.013514
	77th Street	0.012474
	Southeast	0.009356
Asian Indian	Devonshire	0.157895
	Northeast	0.157895
	Hollenbeck	0.105263
	Hollywood	0.105263
	Mission	0.105263
	Wilshire	0.105263
	Olympic	0.052632
	Pacific	0.052632
	Southwest	0.052632
	Topanga	0.052632
	Van Nuys	0.052632
Black	77th Street	0.199490
	Southwest	0.153693
	Southeast	0.103502
	Wilshire	0.069758
	Pacific	0.058840
	Newton	0.057422
	Central	0.046363
	Olympic	0.038282
	Hollywood	0.032043
	West LA	0.029916
	N Hollywood	0.029775
	Rampart	0.028924
	Harbor	0.024387
	Van Nuys	0.023536
	West Valley	0.021551
	Devonshire	0.020417
	Topanga	0.015596
	Northeast	0.014604
	Mission	0.012619

Victim_Descent	Area_Name	Frequency
	Foothill	0.009785
	Hollenbeck	0.009500
Cambodian	Newton	1.000000
Chinese	Central	0.211268
	Hollenbeck	0.126761
	Pacific	0.126761
	Rampart	0.112676
	Hollywood	0.070423
	Northeast	0.056338
	West LA	0.056338
	Harbor	0.042254
	Wilshire	0.042254
	N Hollywood	0.028169
	Newton	0.028169
	Southwest	0.028169
	77th Street	0.014085
	Devonshire	0.014085
	Olympic	0.014085
	Topanga	0.014085
	Van Nuys	0.014085
Filipino	Northeast	0.157895
	Devonshire	0.092105
	Rampart	0.085526
	Central	0.078947
	Mission	0.078947
	Olympic	0.072368
	Van Nuys	0.059211
	Foothill	0.052632
	West Valley	0.046053
	Hollywood	0.039474
	Topanga	0.039474
	West LA	0.039474
	Newton	0.032895
	Southwest	0.026316
	Harbor	0.019737
	Hollenbeck	0.019737
	77th Street	0.013158
	N Hollywood	0.013158
	Southeast	0.013158
	Wilshire	0.013158
	Pacific	0.006579
Guamanian	77th Street	0.200000
	Central	0.200000
	Devonshire	0.200000
	Southeast	0.200000
	West LA	0.200000
Hawaiian	Pacific	0.227273
	West LA	0.227273
	Hollywood	0.181818
	Wilshire	0.181818

Victim_Descent	Area_Name	Frequency
	Olympic	0.090909
	Central	0.045455
	Rampart	0.045455
Hispanic	Newton	0.092762
	77th Street	0.071418
	Mission	0.068383
	Hollenbeck	0.062617
	Southwest	0.057559
	Olympic	0.055536
	Southeast	0.050276
	Rampart	0.049719
	Foothill	0.045167
	Central	0.044914
	Van Nuys	0.043093
	Northeast	0.043043
	Devonshire	0.042284
	West Valley	0.041930
	N Hollywood	0.039755
	Wilshire	0.039148
	Harbor	0.037934
	Topanga	0.031410
	Pacific	0.030651
	Hollywood	0.029538
	West LA	0.022862
Japanese	Central	0.240000
	Harbor	0.120000
	Rampart	0.120000
	West LA	0.120000
	N Hollywood	0.080000
	Northeast	0.080000
	Wilshire	0.080000
	Devonshire	0.040000
	Newton	0.040000
	Pacific	0.040000
	Topanga	0.040000
Korean	Olympic	0.513661
	Rampart	0.109290
	Wilshire	0.092896
	Central	0.076503
	Northeast	0.032787
	Newton	0.024590
	Southwest	0.024590
	Devonshire	0.021858
	Harbor	0.019126
	Hollenbeck	0.019126
	Hollywood	0.019126
	Pacific	0.013661
	Van Nuys	0.008197
	77th Street	0.005464
	Mission	0.005464
	Topanga	0.005464

Victim_Descent	Area_Name	Frequency
	Topanga	0.005464
	West LA	0.005464
	Foothill	0.002732
Other	West Valley	0.089126
	Van Nuys	0.083705
	N Hollywood	0.075255
	Topanga	0.072704
	West LA	0.069515
	Devonshire	0.061703
	Pacific	0.058036
	Wilshire	0.058036
	Foothill	0.054050
	Olympic	0.050542
	Hollywood	0.049426
	Northeast	0.045759
	Central	0.043527
	Mission	0.038265
	Rampart	0.029177
	Southwest	0.026945
	Harbor	0.023278
	77th Street	0.020249
	Hollenbeck	0.019452
	Newton	0.019133
	Southeast	0.012117
Pacific Islanders	Olympic	0.150000
	Topanga	0.150000
	West Valley	0.150000
	Mission	0.100000
	Pacific	0.100000
	77th Street	0.050000
	N Hollywood	0.050000
	Northeast	0.050000
	Southwest	0.050000
	Van Nuys	0.050000
	West LA	0.050000
	Wilshire	0.050000
Samoan	Harbor	1.000000
Unknown	Topanga	0.090317
	Devonshire	0.086592
	Van Nuys	0.080074
	Mission	0.069832
	Harbor	0.068901
	Hollywood	0.067970
	Southwest	0.058659
	Olympic	0.052142
	Foothill	0.050279
	Pacific	0.049348
	Rampart	0.046555
	West LA	0.042831
	Hollenbeck	0.040968
	77th Street	0.037244

Victim_Descent	Area_Name	Frequency
	N Hollywood	0.034451
	Northeast	0.026071
	West Valley	0.026071
	Wilshire	0.023277
	Southeast	0.019553
	Central	0.015829
	Newton	0.013035
Vietnamese	Central	0.136364
	Hollenbeck	0.136364
	Pacific	0.136364
	Topanga	0.136364
	Devonshire	0.090909
	West Valley	0.090909
	Wilshire	0.090909
	Foothill	0.045455
	Harbor	0.045455
	Newton	0.045455
	Northeast	0.045455
White	Pacific	0.096066
	West LA	0.089742
	Wilshire	0.087603
	Hollywood	0.079048
	Topanga	0.071422
	N Hollywood	0.070678
	West Valley	0.067330
	Van Nuys	0.066307
	Devonshire	0.065749
	Northeast	0.055426
	Central	0.038222
	Harbor	0.030875
	Foothill	0.029852
	Olympic	0.027713
	Rampart	0.027713
	Mission	0.026876
	Southwest	0.023993
	Newton	0.014229
	Hollenbeck	0.013206
	77th Street	0.011904
	Southeast	0.006045

In [92]:

```
#### Use binning technique to bin victim age
la_collision_fmt2 = la_collision_fmt[['Area_Name','Address','Latitude','Longitude','Victim_Age','V
ictim_Sex','Victim_Descent']]
la_collision_fmt2['Victim_Age_Bin'] = pd.cut(la_collision_fmt2['Victim_Age'], bins,
labels=bin_names, include_lowest=True )
la_collision_fmt2.drop(['Victim_Age'], axis=1, inplace=True)
print(la_collision_fmt2.shape)
la_collision_fmt2.head()
```

```
(47569, 7)
```

```
/Users/User1/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:3:
```

```
/Users/User1/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:3:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  This is separate from the ipykernel package so we can avoid doing imports until
/Users/User1/anaconda3/lib/python3.7/site-packages/pandas/core/frame.py:3940:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  errors=errors)
```

Out[92]:

	Area_Name	Address	Latitude	Longitude	Victim_Sex	Victim_Descent	Victim_Age_Bin
0	Southwest	S BUDLONG	34.0109	-118.2959	0	Hispanic	Age_21_30
1	Hollywood	SUNSET BL	34.098	-118.3267	1	White	Age_21_30
2	West LA	NATIONAL BL	34.0329	-118.3832	1	Other	Age_51_60
3	Van Nuys	VANOWEN ST	34.194	-118.4312	1	Hispanic	Age_15_20
4	Southeast	AVALON BL	33.9402	-118.2652	1	Hispanic	Age_15_20

In [93]:

```
# Since Foursquare free API calls are limited to 950 calls per day, limit traffic collision data 5
per each unique lapd division/area names.
la_collision_area_unique=la_collision_fmt2.Area_Name.unique()
la_collision_fmt3=pd.DataFrame()
la_collision_fmt2.sort_values(by=['Area_Name','Address'],inplace=True)
for aname in la_collision_area_unique:
    df_temp = la_collision_fmt2[(la_collision_fmt2['Area_Name']==aname)].head(5)   # max 20 rows
will be appended per area name
    la_collision_fmt3 = la_collision_fmt3.append(df_temp, ignore_index=True)
la_collision_fmt3.head(10)
```

```
/Users/User1/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:4:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
  after removing the cwd from sys.path.
```

Out[93]:

	Area_Name	Address	Latitude	Longitude	Victim_Sex	Victim_Descent	Victim_Age_Bin
0	Southwest	1000 W 39TH ST	34.0155	-118.2915	0	Hispanic	Age_21_30
1	Southwest	1000 W 43RD ST	34.0055	-118.2915	1	Unknown	Age_31_40
2	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0145	-118.2937	1	Black	Age_31_40
3	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0109	-118.2915	0	Hispanic	Age_21_30
4	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0109	-118.2915	0	Other	Age_61_70
5	Hollywood	1000 N HIGHLAND AV	34.0889	-118.3386	0	Other	Age_61_70
6	Hollywood	1100 N WESTERN AV	34.0944	-118.3125	0	Black	Age_21_30
7	Hollywood	1200 N CAHUENGA BL	34.0926	-118.3289	1	Unknown	Age_21_30
8	Hollywood	1400 BELFAST DR	34.096	-118.3812	0	Black	Age_41_50
9	Hollywood	1400 VINE ST	34.0962	-118.3266	1	Other	Age_31_40

In [94]:

```
#### Use one hot encoding technique to convert categorical varables to binary variables and append them to the new DataFrame
la_collision_fmt3 = pd.concat([la_collision_fmt3,pd.get_dummies(la_collision_fmt3['Victim_Age_Bin'])], axis=1)
la_collision_fmt3 = pd.concat([la_collision_fmt3,pd.get_dummies(la_collision_fmt3['Victim_Descent'])], axis=1)
la_collision_fmt3.drop(['Victim_Age_Bin','Victim_Descent'], axis=1, inplace=True)
print(la_collision_fmt3.shape)
la_collision_fmt3.head(10)
```

```
(105, 20)
```

Out[94]:

	Area_Name	Address	Latitude	Longitude	Victim_Sex	Age_15_20	Age_21_30	Age_31_40	Age_41_50	Age_51_60	Age_61_70
0	Southwest	1000 W 39TH ST	34.0155	-118.2915	0	0	1	0	0	0	0
1	Southwest	1000 W 43RD ST	34.0055	-118.2915	1	0	0	1	0	0	0
2	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0145	-118.2937	1	0	0	1	0	0	0
3	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0109	-118.2915	0	0	1	0	0	0	0
4	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0109	-118.2915	0	0	0	0	0	0	1
5	Hollywood	1000 N HIGHLAND AV	34.0889	-118.3386	0	0	0	0	0	0	1
6	Hollywood	1100 N WESTERN AV	34.0944	-118.3125	0	0	1	0	0	0	0
7	Hollywood	1200 N CAHUENGA BL	34.0926	-118.3289	1	0	1	0	0	0	0
8	Hollywood	1400 BELFAST DR	34.096	-118.3812	0	0	0	0	1	0	0
9	Hollywood	1400 VINE ST	34.0962	-118.3266	1	0	0	1	0	0	0

In [1]:

```
# @hidden_cell
# Define Foursquare Credentials and Version
CLIENT_ID = '' # your Foursquare ID
CLIENT_SECRET = '' # your Foursquare Secret
VERSION = '20180605' # Foursquare API version

#print('Your credentails:')
#print('CLIENT_ID: ' + CLIENT_ID)
#print('CLIENT_SECRET:' + CLIENT_SECRET)
```

In [96]:

```
# Create a function to explore nearby venues in Los Angeles
LIMIT=100
def getNearbyVenues(areaname, address, latitudes, longitudes, radius=500):

    venues_list=[]
    for aname, street, lat, lng in zip(areaname, address, latitudes, longitudes):
        # print(aname, street, lat, lng)

        # create the API request URL
        url = 'https://api.foursquare.com/v2/venues/explore?
&client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}'.format(
```

```
            CLIENT_ID,
            CLIENT_SECRET,
            VERSION,
            lat,
            lng,
            radius,
            LIMIT)

        # make the GET request
        results = requests.get(url).json()["response"]['groups'][0]['items']

        # return only relevant information for each nearby venue
        venues_list.append([(
            aname,
            street,
            lat,
            lng,
            v['venue']['name'],
            v['venue']['location']['lat'],
            v['venue']['location']['lng'],
            v['venue']['categories'][0]['name']) for v in results])

    nearby_venues = pd.DataFrame([item for venue_list in venues_list for item in venue_list])
    nearby_venues.columns = ['Area_Name',
                  'Street',
                  'Collision_Latitude',
                  'Collision_Longitude',
                  'Venue',
                  'Venue_Latitude',
                  'Venue_Longitude',
                  'Venue_Category']

    return(nearby_venues)
```

In [30]:

```
# Get Venues for all LA Areas and Collision locations
LA_venues = getNearbyVenues(areaname=la_collision_fmt3['Area_Name'],
                            address=la_collision_fmt3['Address'],
                            latitudes=la_collision_fmt3['Latitude'],
                            longitudes=la_collision_fmt3['Longitude']
                           )
```

In [97]:

```
print(LA_venues.shape)
LA_venues.head()
```

```
(2053, 8)
```

Out[97]:

	Area_Name	Street	Collision_Latitude	Collision_Longitude	Venue	Venue_Latitude	Venue_Longitude	Venue_Category
0	Southwest	1000 W 39TH ST	34.0155	-118.2915	Exposition Park	34.014445	-118.289019	Park
1	Southwest	1000 W 39TH ST	34.0155	-118.2915	Natural History Museum of Los Angeles County	34.016829	-118.288829	Museum
2	Southwest	1000 W 39TH ST	34.0155	-118.2915	The Discovery Center @ The Natural History Mus...	34.016538	-118.288824	Museum
3	Southwest	1000 W 39TH ST	34.0155	-118.2915	Dinosaur Hall	34.016900	-118.288380	History Museum
4	Southwest	1000 W 39TH ST	34.0155	-118.2915	Space Shuttle Endeavour	34.016272	-118.287246	Science Museum

In [98]:

```
# Count the venues returned for each neighborhood
LA_venues.groupby(['Area_Name','Street'])['Venue'].count().to_frame('Venue_Count').reset_index().head(25)
```

Out[98]:

	Area_Name	Street	Venue_Count
0	77th Street	100 E 84TH ST	9
1	77th Street	100 W 79TH ST	3
2	77th Street	100 W FLORENCE AV	8
3	77th Street	1000 W 56TH ST	16
4	77th Street	1000 W 60TH ST	18
5	Central	00 GATEWAY PA	12
6	Central	10 FWY WB ON	24
7	Central	100 E ANN ST	11
8	Devonshire	10000 CANOGA AV	2
9	Devonshire	10000 DE SOTO AV	11
10	Devonshire	10200 VANALDEN AV	2
11	Devonshire	10500 FORBES AV	38
12	Devonshire	11000 BALBOA BL	26
13	Foothill	10100 JANETTA WY	1
14	Foothill	10100 TELFAIR AV	5
15	Foothill	10300 TUJUNGA CANYON BL	3
16	Foothill	10400 GLENOAKS BL	2
17	Foothill	10400 LAUREL CANYON BL	11
18	Harbor	100 SWINFORD ST	10
19	Harbor	100 N GAFFEY ST	13
20	Harbor	100 W 22ND ST	7
21	Harbor	1000 CAPITOL DR	2
22	Harbor	1000 LAKME AV	4
23	Hollenbeck	100 N EVERGREEN AV	15
24	Hollenbeck	100 N LORENA ST	21

In [99]:

```
print('There are {} uniques categories.'.format(len(LA_venues['Venue_Category'].unique())))
```

```
There are 253 uniques categories.
```

In [100]:

```
# For clustering neighbourhoods based on the features like venues, convert categorical variables into
# one hot encoding
LA_onehot = pd.get_dummies(LA_venues[['Venue_Category']], prefix="", prefix_sep="")

# add area name and street columns back to one hot dataframe
LA_onehot['Area_Name'] = LA_venues['Area_Name']
LA_onehot['Street'] = LA_venues['Street']

# move  add area name and street columns to the first two columns of dataframes
fixed_columns = list(LA_onehot.columns[-2:]) + list(LA_onehot.columns[:-2])
LA_onehot = LA_onehot[fixed_columns]

print(LA_onehot.shape)
LA_onehot.head()
```

(2053, 255)

Out[100]:

	Area_Name	Street	ATM	Accessories Store	Adult Boutique	Airport	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Amphitheater	Antique Shop	Aquarium
0	Southwest	1000 W 39TH ST	0	0	0	0	0	0	0	0	0	0	0
1	Southwest	1000 W 39TH ST	0	0	0	0	0	0	0	0	0	0	0
2	Southwest	1000 W 39TH ST	0	0	0	0	0	0	0	0	0	0	0
3	Southwest	1000 W 39TH ST	0	0	0	0	0	0	0	0	0	0	0
4	Southwest	1000 W 39TH ST	0	0	0	0	0	0	0	0	0	0	0

In [101]:

```
# Group the venues and calculate mean for normalization.
LA_grouped = LA_onehot.groupby(['Area_Name','Street']).mean().reset_index()
print(LA_grouped.shape)
LA_grouped.head(25)
```

(94, 255)

Out[101]:

	Area_Name	Street	ATM	Accessories Store	Adult Boutique	Airport	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Amphitheater	Antiqu Sho
0	77th Street	100 E 84TH ST	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
1	77th Street	100 W 79TH ST	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
2	77th Street	100 W FLORENCE AV	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.125	0.0	0.00000
3	77th Street	1000 W 56TH ST	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
4	77th Street	1000 W 60TH ST	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
5	Central	00 GATEWAY PA	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
6	Central	10 FWY WB ON	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.04166
7	Central	100 E ANN ST	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
8	Devonshire	10000 CANOGA AV	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
9	Devonshire	10000 DE SOTO AV	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
10	Devonshire	10200 VANALDEN AV	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
11	Devonshire	10500	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000

	Area_Name	Street	ATM	Accessories Store	Adult Boutique	Airport	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Amphitheater	Antiqu She
11	Devonshire	FORBES AV	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
12	Devonshire	11000 BALBOA BL	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
13	Foothill	10100 JANETTA WY	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
14	Foothill	10100 TELFAIR AV	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
15	Foothill	10300 TUJUNGA CANYON BL	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
16	Foothill	10400 GLENOAKS BL	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.500	0.0	0.00000
17	Foothill	10400 LAUREL CANYON BL	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
18	Harbor	100 SWINFORD ST	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
19	Harbor	100 N GAFFEY ST	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
20	Harbor	100 W 22ND ST	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
21	Harbor	1000 CAPITOL DR	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
22	Harbor	1000 LAKME AV	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.250	0.0	0.00000
23	Hollenbeck	100 N EVERGREEN AV	0.066667	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000
24	Hollenbeck	100 N LORENA ST	0.000000	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00000

In [102]:

```
# Write a function to sort the venues in descending order.
def return_most_common_venues(row, num_top_venues):
    row_categories = row.iloc[2:]
    row_categories_sorted = row_categories.sort_values(ascending=False)

    return row_categories_sorted.index.values[0:num_top_venues]
```

In [103]:

```
# Create a new dataframe and display the top 10 venues for each area and street.

num_top_venues = 10

indicators = ['st', 'nd', 'rd']

# create columns according to number of top venues
columns = ['Area_Name','Street']
for ind in np.arange(num_top_venues):
    try:
        columns.append('{}{} Most Common Venue'.format(ind+1, indicators[ind]))
    except:
        columns.append('{}th Most Common Venue'.format(ind+1))

# create a new dataframe
neighborhoods_venues_sorted = pd.DataFrame(columns=columns)
neighborhoods_venues_sorted['Area_Name'] = LA_grouped['Area_Name']
neighborhoods_venues_sorted['Street'] = LA_grouped['Street']

for ind in np.arange(LA_grouped.shape[0]):
    neighborhoods_venues_sorted.iloc[ind, 2:] = return_most_common_venues(LA_grouped.iloc[ind, :],
num_top_venues)

neighborhoods_venues_sorted.head()
```

Out[103]:

	Area_Name	Street	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	
0	77th Street	100 E 84TH ST	Pizza Place	Taco Place	Southern / Soul Food Restaurant	Fast Food Restaurant	Marijuana Dispensary	Music Venue	Sandwich Place	Burger Joint	Mexican Restaurant	D
1	77th Street	100 W 79TH ST	Mexican Restaurant	Food Truck	Taco Place	Yoga Studio	Drugstore	Film Studio	Filipino Restaurant	Fast Food Restaurant	Farmers Market	
2	77th Street	100 W FLORENCE AV	Mexican Restaurant	Convenience Store	Fast Food Restaurant	Grocery Store	American Restaurant	Taco Place	Spa	Filipino Restaurant	Film Studio	
3	77th Street	1000 W 56TH ST	Fast Food Restaurant	Grocery Store	Mobile Phone Shop	Pharmacy	Fried Chicken Joint	Health & Beauty Service	Shoe Store	Video Store	Bank	
4	77th Street	1000 W 60TH ST	Fast Food Restaurant	Grocery Store	Pharmacy	Shoe Store	Food	Sandwich Place	Burger Joint	Bank	Fried Chicken Joint	

In [104]:

```
# Download LAPD Divisions geojson file
!wget --quiet http://boundaries.latimes.com/1.0/boundary-set/lapd-divisions/?format=geojson -O lap
d-divisions.geojson
print('GeoJSON file downloaded!')
```

```
GeoJSON file downloaded!
```

In [105]:

```
LA_geo = r'lapd-divisions.geojson' # geojson file lapd-divisions.geojson
```

In [106]:

```
# Assign a temporary Division number for each unique Area_Name, so that it can be use in legend.
Area_df=pd.DataFrame(la_collision_fmt3.Area_Name.unique())
Area_df['Division_Num']=np.arange(1,22)
Area_df.columns=['Area_Name','Division_Num']
la_collision_fmt4 = la_collision_fmt3.join(Area_df.set_index(['Area_Name']), on=['Area_Name'])
print(la_collision_fmt4.shape)
la_collision_fmt4.head()
```

```
(105, 21)
```

Out[106]:

	Area_Name	Address	Latitude	Longitude	Victim_Sex	Age_15_20	Age_21_30	Age_31_40	Age_41_50	Age_51_60	Age_61_70	Ag
0	Southwest	1000 W 39TH ST	34.0155	-118.2915	0	0	1	0	0	0	0	
1	Southwest	1000 W 43RD ST	34.0055	-118.2915	1	0	0	1	0	0	0	
2	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0145	-118.2937	1	0	0	1	0	0	0	
3	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0109	-118.2915	0	0	1	0	0	0	0	
4	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0109	-118.2915	0	0	0	0	0	0	1	

In [107]:

```
la_collision_fmt4.groupby(['Division_Num','Area_Name'])['Address'].count().to_frame('RowCount').reset_index()
```

Out[107]:

	Division_Num	Area_Name	RowCount
0	1	Southwest	5
1	2	Hollywood	5
2	3	West LA	5
3	4	Van Nuys	5
4	5	Southeast	5
5	6	Harbor	5
6	7	N Hollywood	5
7	8	Olympic	5
8	9	Mission	5
9	10	Topanga	5
10	11	West Valley	5
11	12	Wilshire	5
12	13	Pacific	5
13	14	Northeast	5
14	15	Devonshire	5
15	16	Foothill	5
16	17	Rampart	5
17	18	77th Street	5
18	19	Newton	5
19	20	Central	5
20	21	Hollenbeck	5

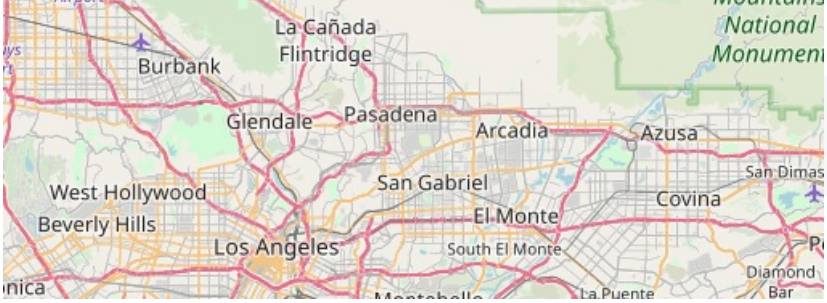
In [108]:

```
# create map before clustering collision locations based on common venues

map_LA = folium.Map(location=[34.052235, -118.243683], zoom_start=10)

map_LA.choropleth(
    geo_data=LA_geo,
    data=la_collision_fmt4,
    columns=['Area_Name','Division_Num'],
    key_on='feature.properties.name',
    fill_color='PuRd',
#     fill_color='BuPu',
#     fill_color='YlGnBu',
#     fill_color='YlOrRd',
#     fill_color='YlGn',
    fill_opacity=0.3,
    line_opacity=0.2,
    legend_name='LAPD Reporting Divisions'
)


# add markers to the map
markers_colors = []
for lat, lon, aname, addr in zip(la_collision_fmt4['Latitude'].astype(float),
                                 la_collision_fmt4['Longitude'].astype(float),
                                 la_collision_fmt4['Area_Name'],
                                 la_collision_fmt4['Address']):
    label = folium.Popup(str(aname) + ' ' + str(addr), parse_html=True)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        fill=True,
```



K Means Clustering

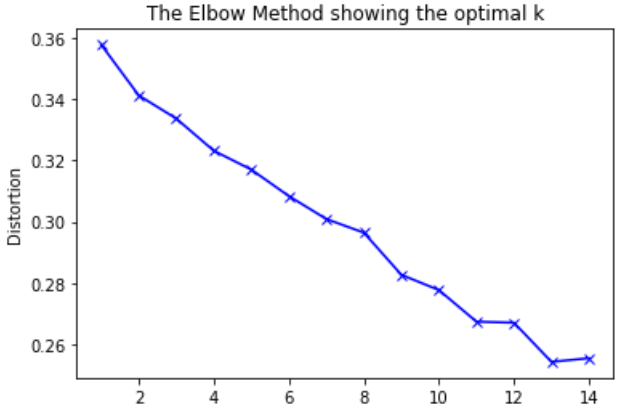
In [109]:

```
# Determine optimal k (centroids) for usage in K-Means

LA_grouped_clustering = LA_grouped.drop(['Area_Name','Street'], 1)

distortions = []
K = range(1,15)
for k in K:
    kmeanModel = KMeans(n_clusters=k).fit(LA_grouped_clustering)
    kmeanModel.fit(LA_grouped_clustering)
    distortions.append(sum(np.min(cdist(LA_grouped_clustering, kmeanModel.cluster_centers_, 'euclid
ean'), axis=1)) / LA_grouped_clustering.shape[0])

# Plot the elbow
plt.plot(K, distortions, 'bx-')
plt.xlabel('k')
plt.ylabel('Distortion')
plt.title('The Elbow Method showing the optimal k')
plt.show()
```



k

In [116]:

```
print("Best optimal k would be ",13)
```

```
Best optimal k would be  13
```

In [119]:

```
# set number of clusters and cluster using K-Means
kclusters = 13

LA_grouped_clustering = LA_grouped.drop(['Area_Name','Street'], 1)

# run k-means clustering
kmeans = KMeans(init = "k-means++", n_clusters=kclusters, random_state=0).fit(LA_grouped_clustering
)

# check cluster labels generated for each row in the dataframe
kmeans.labels_[0:10]
```

Out[119]:

```
array([1, 2, 7, 1, 1, 5, 1, 1, 5, 1], dtype=int32)
```

In [120]:

```
# add clustering labels
neighborhoods_venues_sorted2=neighborhoods_venues_sorted.copy()
neighborhoods_venues_sorted2.insert(0, 'Cluster_Labels', kmeans.labels_)

# Join la_collision_fmt3 with common venue data to add latitude/longitude for each area
LA_merged = la_collision_fmt3[['Area_Name','Address','Latitude','Longitude']]
LA_merged.rename(columns={'Address':'Street'},inplace=True)

Area_df=pd.DataFrame(LA_merged.Area_Name.unique())
Area_df['Division_Num']=np.arange(1,22)
Area_df.columns=['Area_Name','Division_Num']
LA_merged = LA_merged.join(Area_df.set_index(['Area_Name']), on=['Area_Name'])
LA_merged = LA_merged.join(neighborhoods_venues_sorted2.set_index(['Area_Name','Street']), on=['Ar
ea_Name','Street'])

LA_merged=LA_merged.dropna().reset_index(drop=True)
LA_merged["Cluster_Labels"]=LA_merged["Cluster_Labels"].astype(int)
LA_merged["Latitude"]=LA_merged["Latitude"].astype(float)
LA_merged["Longitude"]=LA_merged["Longitude"].astype(float)

print(LA_merged['Cluster_Labels'].value_counts().sort_index())
LA_merged.head()
```

```
0       4
1      73
2       3
3       1
4       1
5       4
6       2
7      11
8       1
9       1
10      1
11      1
12      2
Name: Cluster_Labels, dtype: int64
```

```
/Users/User1/anaconda3/lib/python3.7/site-packages/pandas/core/frame.py:4025:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/indexing.html#indexing-view-versus-copy
```

```
  return super(DataFrame, self).rename(**kwargs)
```

Out[120]:

	Area_Name	Street	Latitude	Longitude	Division_Num	Cluster_Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Southwest	1000 W 39TH ST	34.0155	-118.2915	1	1	Science Museum	Museum	History Museum	Aquarium	Fast Food Restaurant
1	Southwest	1000 W 43RD ST	34.0055	-118.2915	1	1	Chinese Restaurant	Mobile Phone Shop	Bakery	Pet Store	Grocery Store
2	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0145	-118.2937	1	1	Pizza Place	Fast Food Restaurant	Cosmetics Shop	Park	Donburi Restaurant
3	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0109	-118.2915	1	1	Pizza Place	Fast Food Restaurant	Cosmetics Shop	Park	Donburi Restaurant
4	Southwest	1000 W MARTIN LUTHER KING JR BL	34.0109	-118.2915	1	1	Pizza Place	Fast Food Restaurant	Cosmetics Shop	Park	Donburi Restaurant

In [121]:

```
# Define function to grab public transport venues with in 500 meters of collision locations

transport_catg_id = '4d4b7105d754a06379d81259'    # root category id for Travel & transport

LIMIT=100
radius=500

def getTransportVenues(areaname, street, latitude, longitude, cluster_label, raduis=500):

    transport_list=[]
    for aname, street, lat, lng, cluster in zip(areaname, street, latitude, longitude,
cluster_label):
        # print(aname, street, lat, lng, cluster)

        # create the API request URL
        url = 'https://api.foursquare.com/v2/venues/search?&client_id={}&client_secret={}&v={}&ll=
{},{}&categoryId={}&radius={}&limit={}'.format(
            CLIENT_ID,
            CLIENT_SECRET,
            VERSION,
            lat,
            lng,
            transport_catg_id,
            radius,
            LIMIT)

        # make the GET request
        results = requests.get(url).json()['response']['venues']

        # return only relevant information for each nearby venue
        transport_list.append([(
            aname,
            street,
            lat,
            lng,
            cluster,
            v['name'],
            v['categories'][0]['name'],
            v['location']['distance'],
            v['location']['lat'],
            v['location']['lng'],
            v['categories'][0]["id"]
            ) for v in results])
```

```
    nearby_transport_venues = pd.DataFrame([item for transport_list in transport_list for item in t
ransport_list])
    nearby_transport_venues.columns = ['Area_Name',
                  'Street',
                  'Collision_Latitude',
                  'Collision_Longitude',
                  'Cluster_Label',
                  'Transport_Venue',
                  'Transport_Venue_Category',
                  'Transport_Venue_Distance',
                  'Transport_Venue_Latitude',
                  'Transport_Venue_Longitude',
                  'Transport_Category_Id'
                  ]

    return(nearby_transport_venues)
```

In [122]:

```
LA_Transport_venues = getTransportVenues(LA_merged['Area_Name'],
                   LA_merged['Street'],
                   LA_merged['Latitude'],
                   LA_merged['Longitude'],
                   LA_merged['Cluster_Labels']
                  )
```

In [123]:

```
print(LA_Transport_venues.shape)
LA_Transport_venues.head()
```

```
(1165, 11)
```

Out[123]:

	Area_Name	Street	Collision_Latitude	Collision_Longitude	Cluster_Label	Transport_Venue	Transport_Venue_Category	Transport_V
0	Southwest	1000 W 39TH ST	34.0155	-118.2915	1	Expo / Vermont Metro Station	Light Rail Station	
1	Southwest	1000 W 39TH ST	34.0155	-118.2915	1	Metro 754 MLK And Vermont Bus Stop	Bus Line	
2	Southwest	1000 W 39TH ST	34.0155	-118.2915	1	Natural History Museum (NHM) Metro Bus 102/550	Bus Stop	
3	Southwest	1000 W 39TH ST	34.0155	-118.2915	1	Martin Luther King, Jr. Boulevard at Vermont A...	Intersection	
4	Southwest	1000 W 39TH ST	34.0155	-118.2915	1	USC Tram Stop - Viterbi Engineering	Bus Line	

In [124]:

```
# Below are the Foursquare category ids for public transport like bus stops, metro stations, light
rail stations etc

#Travel & transport 4d4b7105d754a06379d81259 root category id
#bus stop 52f2ab2ebcbc57f1066b8b4f
#Bus line 4bf58dd8d48988d12b951735
#Bus station 4bf58dd8d48988d1fe931735
#Cable car 52f2ab2ebcbc57f1066b8b50
#Airport 4bf58dd8d48988d1ed931735
#Metro Station 4bf58dd8d48988d1fd931735
#Light Rail 4bf58dd8d48988d1fc931735
#Intersection 52f2ab2ebcbc57f1066b8b4c
#Tram station 52f2ab2ebcbc57f1066b8b51
```

```
#Train station 4bf58dd8d48988d129951735
#Taxi Stand 53fca564498e1a175f32528b

public_transport_catg_ids = ['52f2ab2ebcbc57f1066b8b4f', '4bf58dd8d48988d12b951735',
'4bf58dd8d48988d1fe931735',
                             '52f2ab2ebcbc57f1066b8b50', '4bf58dd8d48988d1ed931735', '4bf58dd8d4898
d1fd931735',
                             '4bf58dd8d48988d1fc931735', '52f2ab2ebcbc57f1066b8b4c', '52f2ab2ebcbc5
f1066b8b51',
                             '4bf58dd8d48988d129951735', '53fca564498e1a175f32528b']

LA_Public_Transport_venues = LA_Transport_venues[(LA_Transport_venues.Transport_Category_Id.isin(p
ublic_transport_catg_ids))].drop_duplicates(subset=['Transport_Venue','Transport_Venue_Category'])
.reset_index(drop=True)
LA_Public_Transport_venues.shape
```

Out[124]:

```
(289, 11)
```

In [125]:

```
# create map for clustered collision data
map_clusters = folium.Map(location=[34.052235, -118.243683], zoom_start=11)

# set color scheme for the clusters
x = np.arange(kclusters)
ys = [i + x + (i*x)**2 for i in range(kclusters)]
colors_array = cm.rainbow(np.linspace(0, 1, len(ys)))
rainbow = [colors.rgb2hex(i) for i in colors_array]

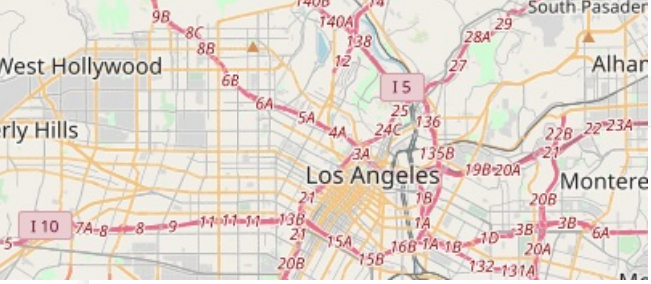
# add choropleth layer to the map showing LAPD divisions
map_clusters.choropleth(
    geo_data=LA_geo,
    data=LA_merged,
    columns=['Area_Name','Division_Num'],
    key_on='feature.properties.name',
#     fill_color='PuRd',
#     fill_color='BuPu',
#     fill_color='YlGnBu',
    fill_color='YlOrRd',
#     fill_color='YlGn',
    fill_opacity=0.3,
    line_opacity=0.2,
    legend_name='LAPD Divisions'
)

# add Collision markers to the map
markers_colors = []
for lat, lon, poi, cluster in zip(LA_merged['Latitude'], LA_merged['Longitude'], LA_merged['Area_Na
me'], LA_merged['Cluster_Labels'].astype(int)):
    label = folium.Popup(str(poi) + ' Cluster ' + str(cluster), parse_html=True)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[cluster-1],
        fill=True,
        fill_color=rainbow[cluster-1],
        fill_opacity=0.7).add_to(map_clusters)

# add Public transport markers to the map
mc = MarkerCluster()
for lat, lon, transport, catg, dist in zip(LA_Public_Transport_venues['Transport_Venue_Latitude'],
                                   LA_Public_Transport_venues['Transport_Venue_Longitude'],
                                   LA_Public_Transport_venues['Transport_Venue'],
                                   LA_Public_Transport_venues['Transport_Venue_Category'],
                                   LA_Public_Transport_venues['Transport_Venue_Distance']):
    poplabel = folium.Popup(catg + ' - ' + transport + ' - ' + str(dist) + ' M away', parse_html=Tr
ue)
    mc.add_child(folium.Marker(location=[lat,  lon],
                 popup=poplabel))

map_clusters.add_child(mc)

map_clusters
```



Top 5 recommended venue categories and all transport venues per each collision street in each cluster

To navigate back to results section *Click Here*

In [126]:

```
# print top 5 common venues among each collision street in each cluster
LA_merged_no_transport = pd.DataFrame(columns=['Area_Name', 'Street'])
print('Cluster', 'Count', '\n'+ str(LA_merged['Cluster_Labels'].value_counts().sort_index()),
      '\n\nTop 5 recommended venue categories and all transport venues per each collision street (
with in 500 meters) in each cluster \n')
for cluster in LA_merged.Cluster_Labels.sort_values().unique():
    print("---- Cluster",cluster,"----")
    for aname, st, v1, v2, v3, v4, v5 in zip(LA_merged[(LA_merged['Cluster_Labels']==cluster)]['Are
a_Name'],
                           LA_merged[(LA_merged['Cluster_Labels']==cluster)]['Street'],
                           LA_merged[(LA_merged['Cluster_Labels']==cluster)]['1st Most Common Venue']
,
                           LA_merged[(LA_merged['Cluster_Labels']==cluster)]['2nd Most Common Venue']
,
                           LA_merged[(LA_merged['Cluster_Labels']==cluster)]['3rd Most Common Venue']
,
                           LA_merged[(LA_merged['Cluster_Labels']==cluster)]['4th Most Common Venue']
,
                           LA_merged[(LA_merged['Cluster_Labels']==cluster)]['5th Most Common Venue']
                          ):
        df_tmp = LA_Public_Transport_venues[(LA_Public_Transport_venues['Cluster_Label']==cluster)
&
                                            (LA_Public_Transport_venues['Area_Name']==aname) &
                                            (LA_Public_Transport_venues['Street']==st)
                                           ].copy()
        df_tmp.sort_values(by='Transport_Venue_Distance',inplace=True)
        print('LAPD Division','|','Collision Street \n' +
              '-------------',' ','-----------------','\n',
              aname, '    | ',' '.join(st.split()),'\n',
              '1st Most Common Venue',':',v1,'\n',
              '2nd Most Common Venue',':',v2,'\n',
              '3rd Most Common Venue',':',v3,'\n',
              '4th Most Common Venue',':',v4,'\n',
              '5th Most Common Venue',':',v5
             )
        print('\n Public transport venues near to this collision street')
```

```
        print('\n Public transport venues near to this collision street')
        if df_tmp.shape[0]==0:
            LA_merged_no_transport=LA_merged_no_transport.append(pd.DataFrame([[aname, st]],columns
=['Area_Name', 'Street']),ignore_index=True)
            print(' ','-----None-----')
        for catg, transport, dist in zip(df_tmp['Transport_Venue_Category'],
                                         df_tmp['Transport_Venue'],
                                         df_tmp['Transport_Venue_Distance']
                                        ):
            print(' ',catg,'|',transport,'|',dist,'Metres')
        print('\n')
```

```
Cluster Count
0       4
1      73
2       3
3       1
4       1
5       4
6       2
7      11
8       1
9       1
10      1
11      1
12      2
Name: Cluster_Labels, dtype: int64

Top 5 recommended venue categories and all transport venues per each collision street (with in 500
meters) in each cluster

---- Cluster 0 ----
LAPD Division | Collision Street
-------------   ----------------
 Southeast    |  100 E CENTURY BL
 1st Most Common Venue : Hotel
 2nd Most Common Venue : Fast Food Restaurant
 3rd Most Common Venue : Liquor Store
 4th Most Common Venue : Gym / Fitness Center
 5th Most Common Venue : Mobile Phone Shop

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Southeast    |  100 E COLDEN AV
 1st Most Common Venue : Mobile Phone Shop
 2nd Most Common Venue : Wine Bar
 3rd Most Common Venue : Liquor Store
 4th Most Common Venue : Gym / Fitness Center
 5th Most Common Venue : Yoga Studio

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Southeast    |  100 W 98TH ST
 1st Most Common Venue : Hotel
 2nd Most Common Venue : Gym / Fitness Center
 3rd Most Common Venue : Liquor Store
 4th Most Common Venue : Mobile Phone Shop
 5th Most Common Venue : Film Studio

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Harbor     |  100 W 22ND ST
 1st Most Common Venue : Harbor / Marina
 2nd Most Common Venue : Hotel
 3rd Most Common Venue : Boat or Ferry
```

3rd Most Common Venue : Bank of Italy
4th Most Common Venue : Clothing Store
5th Most Common Venue : Grocery Store

Public transport venues near to this collision street
Bus Station | Max Bus Stop | 340 Metres

---- Cluster 1 ----
LAPD Division | Collision Street

Southwest | 1000 W 39TH ST
1st Most Common Venue : Science Museum
2nd Most Common Venue : Museum
3rd Most Common Venue : History Museum
4th Most Common Venue : Aquarium
5th Most Common Venue : Fast Food Restaurant

Public transport venues near to this collision street
Light Rail Station | Expo / Vermont Metro Station | 305 Metres
Bus Stop | Natural History Museum (NHM) Metro Bus 102/550 | 388 Metres
Bus Line | Metro 754 MLK And Vermont Bus Stop | 449 Metres
Bus Line | USC Tram Stop - Parkside | 466 Metres
Intersection | Martin Luther King, Jr. Boulevard at Vermont Avenue | 516 Metres
Bus Line | LA Metro 740 MLK JR And Vermont Rapid Bus Stop | 523 Metres
Bus Line | 40/42 LA Metro Mlk And Vermont Bus Stop | 531 Metres
Bus Line | USC Tram Stop - Viterbi Engineering | 611 Metres
Bus Line | USC Tram Stop - Downey Way & Watt Way | 639 Metres

LAPD Division | Collision Street

Southwest | 1000 W 43RD ST
1st Most Common Venue : Chinese Restaurant
2nd Most Common Venue : Mobile Phone Shop
3rd Most Common Venue : Bakery
4th Most Common Venue : Pet Store
5th Most Common Venue : Grocery Store

Public transport venues near to this collision street
Bus Line | LA Metro 754 Southbound Vermont And Vernon Bus Stop | 210 Metres

LAPD Division | Collision Street

Southwest | 1000 W MARTIN LUTHER KING JR BL
1st Most Common Venue : Pizza Place
2nd Most Common Venue : Fast Food Restaurant
3rd Most Common Venue : Cosmetics Shop
4th Most Common Venue : Park
5th Most Common Venue : Donburi Restaurant

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

Southwest | 1000 W MARTIN LUTHER KING JR BL
1st Most Common Venue : Pizza Place
2nd Most Common Venue : Fast Food Restaurant
3rd Most Common Venue : Cosmetics Shop
4th Most Common Venue : Park
5th Most Common Venue : Donburi Restaurant

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

Southwest | 1000 W MARTIN LUTHER KING JR BL
1st Most Common Venue : Pizza Place
2nd Most Common Venue : Fast Food Restaurant
3rd Most Common Venue : Cosmetics Shop
4th Most Common Venue : Park
5th Most Common Venue : Donburi Restaurant

Public transport venues near to this collision street
-----None-----

LAPD Division	Collision Street
Hollywood	1000 N HIGHLAND AV

1st Most Common Venue : Boutique
2nd Most Common Venue : Donut Shop
3rd Most Common Venue : Performing Arts Venue
4th Most Common Venue : Theater
5th Most Common Venue : Breakfast Spot

Public transport venues near to this collision street
- Bus Line | Metro 4 | 206 Metres
- Bus Line | Santa Monica / Highland Bus Stop #6018 | 216 Metres
- Bus Line | Highland / Santa Monica Bus Stop #25002 | 221 Metres
- Bus Line | 4/704 Bus | 229 Metres
- Bus Stop | Metro 4: Santa Monica / N Las Palmas | 247 Metres
- Bus Station | Metro 156 (Santa Monica/Highland) Northbound | 249 Metres
- Bus Stop | Santa Monica / Orange Bus Stop | 274 Metres
- Bus Line | Metro Bus 212 | 508 Metres
- Bus Stop | Metro Bus Stop La Brea / Willoughby | 525 Metres
- Bus Line | 212 & 312 N. Hollywood Via La Brea Ave | 528 Metres
- Intersection | La Brea Avenue and Santa Monica Boulevard | 556 Metres
- Bus Line | Santa Monica / LaBrea - 4 & 31 & 212 & 704 | 566 Metres
- Bus Station | Santa Monica / La Brea Bus Stop (4/704) | 571 Metres
- Tram Station | Yarra Tram no: 234 | 581 Metres

LAPD Division	Collision Street
Hollywood	1100 N WESTERN AV

1st Most Common Venue : Coffee Shop
2nd Most Common Venue : Convenience Store
3rd Most Common Venue : Yoga Studio
4th Most Common Venue : Dive Bar
5th Most Common Venue : Shoe Store

Public transport venues near to this collision street
- Bus Line | Metro 4 Bus | 214 Metres
- Intersection | Van Ness & Lemon Grove | 305 Metres
- Bus Line | 207 Bus Stop | 408 Metres
- Intersection | Santa Monica Boulevard & Wilton Place | 416 Metres
- Bus Line | Metro Bus Stop Sunset And Wilton | 431 Metres
- Bus Line | DASH - Fountain/Serrano | 491 Metres
- Bus Station | Metro 2/302 - Sunset & Western | 500 Metres
- Intersection | Santa Monica Boulevard & Western Avenue | 504 Metres
- Intersection | Van Ness & Fountain | 506 Metres
- Bus Stop | Metro Tan Line/Metro Valley Line - Santa Monica/Western | 507 Metres
- Bus Line | 757/207 Bus Stop (western/sunset) | 511 Metres
- Bus Line | 757/207 Bus Stop Western/Santa Monica | 547 Metres

LAPD Division	Collision Street
Hollywood	1200 N CAHUENGA BL

1st Most Common Venue : Bar
2nd Most Common Venue : Gym
3rd Most Common Venue : Vegetarian / Vegan Restaurant
4th Most Common Venue : Pizza Place
5th Most Common Venue : Park

Public transport venues near to this collision street
- Bus Stop | Metro 4 Bustop Wilcox | 293 Metres
- Bus Line | Metro 210 | 321 Metres
- Bus Station | Santa Monica / Vine Metro 4/704/210 stop | 321 Metres
- Bus Station | Metro 4 & 704 Bus Stop | 331 Metres

LAPD Division	Collision Street
Hollywood	1400 BELFAST DR

1st Most Common Venue : Boutique
2nd Most Common Venue : Gym
3rd Most Common Venue : Italian Restaurant
4th Most Common Venue : French Restaurant

4th Most Common Venue : French Restaurant
5th Most Common Venue : Shipping Store

Public transport venues near to this collision street
Bus Line | The City Line Westbound | 444 Metres
Bus Line | Metro 2/302 Stop - Sunset & La Cienega/Miller | 458 Metres
Bus Line | LA Metro Bus Line 2 / Pacific Coast Highway | 472 Metres

LAPD Division | Collision Street

Hollywood | 1400 VINE ST
1st Most Common Venue : Coffee Shop
2nd Most Common Venue : Pizza Place
3rd Most Common Venue : Bar
4th Most Common Venue : Vegetarian / Vegan Restaurant
5th Most Common Venue : Mexican Restaurant

Public transport venues near to this collision street
Intersection | Sunset Boulevard & Vine Street | 200 Metres
Bus Station | Metro 2/302 Stop: Sunset and Vine | 206 Metres
Bus Line | DASH - Hollywood | 259 Metres
Bus Stop | FlyAway - Hollywood to LAX | 425 Metres
Intersection | Sunset Boulevard & Gower Street | 444 Metres
Intersection | El Centro Avenue & Selma Avenue | 479 Metres

LAPD Division | Collision Street

West LA | 10 FY
1st Most Common Venue : Furniture / Home Store
2nd Most Common Venue : Mexican Restaurant
3rd Most Common Venue : Liquor Store
4th Most Common Venue : Ice Cream Shop
5th Most Common Venue : Asian Restaurant

Public transport venues near to this collision street
Bus Line | Metro bus line 210 | 66 Metres

LAPD Division | Collision Street

West LA | 10200 GALAXY WY
1st Most Common Venue : Food Truck
2nd Most Common Venue : Movie Theater
3rd Most Common Venue : Café
4th Most Common Venue : Restaurant
5th Most Common Venue : Gift Shop

Public transport venues near to this collision street
Bus Line | CIG Bus | 82 Metres
Bus Line | Bus Stop | 218 Metres
Intersection | Olympic Boulevard & Century Park East | 388 Metres
Bus Line | Metrolink Century Park East Olympic Bus Stop | 408 Metres
Bus Stop | Metro Bus - 28/728 (Century Park E & W Olympic Blvd) | 427 Metres
Bus Line | Bus Stop - Green Crossrown | 536 Metres

LAPD Division | Collision Street

West LA | 10200 SANTA MONICA BL
1st Most Common Venue : Mexican Restaurant
2nd Most Common Venue : Italian Restaurant
3rd Most Common Venue : Ice Cream Shop
4th Most Common Venue : Salad Place
5th Most Common Venue : Coffee Shop

Public transport venues near to this collision street
Bus Line | Santa Monica / Avenue of the Stars Bus Stop #5917 | 101 Metres
Bus Station | Metro 704 Stop at Santa Monica and Ave of the Stars | 137 Metres
Bus Line | Santa Monica Boulevard and Avenue Of The Stars | 167 Metres
Bus Line | Bus Stop - Route 316/16/28/728 | 337 Metres
Bus Station | Metro Bus Stop #16 | 367 Metres
Bus Station | MTA Constellation/Century Park West L/O | 454 Metres
Bus Station | 573 Commuter Express Bus Stop | 480 Metres
Bus Station | 704/4 Bus Stop | 524 Metres
Bus Stop | Metro Bus - 28/786/534/573 (Century Park East & Constellation Blvd) | 534 Metres

LAPD Division	Collision Street
West LA	10200 SANTA MONICA BL

1st Most Common Venue : Mexican Restaurant
2nd Most Common Venue : Italian Restaurant
3rd Most Common Venue : Ice Cream Shop
4th Most Common Venue : Salad Place
5th Most Common Venue : Coffee Shop

Public transport venues near to this collision street
- Bus Line | Santa Monica / Avenue of the Stars Bus Stop #5917 | 101 Metres
- Bus Station | Metro 704 Stop at Santa Monica and Ave of the Stars | 137 Metres
- Bus Line | Santa Monica Boulevard and Avenue Of The Stars | 167 Metres
- Bus Line | Bus Stop - Route 316/16/28/728 | 337 Metres
- Bus Station | Metro Bus Stop #16 | 367 Metres
- Bus Station | MTA Constellation/Century Park West L/O | 454 Metres
- Bus Station | 573 Commuter Express Bus Stop | 480 Metres
- Bus Station | 704/4 Bus Stop | 524 Metres
- Bus Stop | Metro Bus - 28/786/534/573 (Century Park East & Constellation Blvd) | 534 Metres

LAPD Division	Collision Street
West LA	10200 SANTA MONICA BL

1st Most Common Venue : Mexican Restaurant
2nd Most Common Venue : Italian Restaurant
3rd Most Common Venue : Ice Cream Shop
4th Most Common Venue : Salad Place
5th Most Common Venue : Coffee Shop

Public transport venues near to this collision street
- Bus Line | Santa Monica / Avenue of the Stars Bus Stop #5917 | 101 Metres
- Bus Station | Metro 704 Stop at Santa Monica and Ave of the Stars | 137 Metres
- Bus Line | Santa Monica Boulevard and Avenue Of The Stars | 167 Metres
- Bus Line | Bus Stop - Route 316/16/28/728 | 337 Metres
- Bus Station | Metro Bus Stop #16 | 367 Metres
- Bus Station | MTA Constellation/Century Park West L/O | 454 Metres
- Bus Station | 573 Commuter Express Bus Stop | 480 Metres
- Bus Station | 704/4 Bus Stop | 524 Metres
- Bus Stop | Metro Bus - 28/786/534/573 (Century Park East & Constellation Blvd) | 534 Metres

LAPD Division	Collision Street
Van Nuys	13500 SHERMAN WY

1st Most Common Venue : Coffee Shop
2nd Most Common Venue : Mexican Restaurant
3rd Most Common Venue : Pharmacy
4th Most Common Venue : Thai Restaurant
5th Most Common Venue : Supermarket

Public transport venues near to this collision street
- Bus Line | Bus Stop 158 | 280 Metres
- Bus Stop | Metro Bus Stop #6242 - 162, 163 | 509 Metres

LAPD Division	Collision Street
Van Nuys	13600 VICTORY BL

1st Most Common Venue : Mediterranean Restaurant
2nd Most Common Venue : Ramen Restaurant
3rd Most Common Venue : Fast Food Restaurant
4th Most Common Venue : Massage Studio
5th Most Common Venue : Beer Store

Public transport venues near to this collision street
- Intersection | Colbath Ave & Victory Blvd | 710 Metres

LAPD Division	Collision Street
Van Nuys	13700 BURBANK BL

1st Most Common Venue : Pub
2nd Most Common Venue : Fast Food Restaurant
3rd Most Common Venue : Liquor Store
4th Most Common Venue : Bakery

4th Most Common Venue : Bakery
5th Most Common Venue : Pizza Place

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

Van Nuys | 14000 RIVERSIDE DR
1st Most Common Venue : Accessories Store
2nd Most Common Venue : Cosmetics Shop
3rd Most Common Venue : Clothing Store
4th Most Common Venue : Coffee Shop
5th Most Common Venue : Lingerie Store

Public transport venues near to this collision street
Bus Line | MTA 155 E (Riverside/Hazeltine) | 163 Metres
Bus Stop | MTA 155 E | 168 Metres
Bus Line | Hollywood Bowl Bus #651 | 539 Metres

LAPD Division | Collision Street

Harbor | 100 SWINFORD ST
1st Most Common Venue : Boat or Ferry
2nd Most Common Venue : Baseball Field
3rd Most Common Venue : Cruise
4th Most Common Venue : Coffee Shop
5th Most Common Venue : Port

Public transport venues near to this collision street
Light Rail Station | Red Car Line - Cruise Ship Terminal Station | 64 Metres
Bus Line | Shuttle Bus | 169 Metres
Train Station | Downtown Station | 407 Metres

LAPD Division | Collision Street

Harbor | 100 N GAFFEY ST
1st Most Common Venue : Fast Food Restaurant
2nd Most Common Venue : Hot Dog Joint
3rd Most Common Venue : Diner
4th Most Common Venue : Wings Joint
5th Most Common Venue : Convenience Store

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

N Hollywood | 10600 MAGNOLIA BL
1st Most Common Venue : Pizza Place
2nd Most Common Venue : Furniture / Home Store
3rd Most Common Venue : Pharmacy
4th Most Common Venue : Diner
5th Most Common Venue : Mexican Restaurant

Public transport venues near to this collision street
Bus Line | 183 Stop. Riverton/Magnolia | 422 Metres

LAPD Division | Collision Street

N Hollywood | 10700 BURBANK BL
1st Most Common Venue : Thai Restaurant
2nd Most Common Venue : Flower Shop
3rd Most Common Venue : Church
4th Most Common Venue : Dog Run
5th Most Common Venue : Dive Bar

Public transport venues near to this collision street
Bus Line | noho 5656 | 362 Metres

LAPD Division | Collision Street

```
-------------   ----------------
 N Hollywood    |  10900 BURBANK BL
 1st Most Common Venue : Gay Bar
 2nd Most Common Venue : Theater
 3rd Most Common Venue : Intersection
 4th Most Common Venue : Latin American Restaurant
 5th Most Common Venue : Korean Restaurant

 Public transport venues near to this collision street
  Intersection | Burbank Boulevard & Vineland Avenue | 202 Metres
  Bus Line | Metro #152 Bus Stop | 406 Metres
  Intersection | Vineland blvd. and Chandler | 429 Metres
  Bus Line | Metro 156 | 519 Metres


LAPD Division | Collision Street
-------------   ----------------
 N Hollywood    |  10900 MAGNOLIA BL
 1st Most Common Venue : Coffee Shop
 2nd Most Common Venue : Park
 3rd Most Common Venue : Pizza Place
 4th Most Common Venue : Gym / Fitness Center
 5th Most Common Venue : Theater

 Public transport venues near to this collision street
  Intersection | Magnolia Boulevard & Lankershim Boulevard | 50 Metres
  Bus Station | Greyhound: Bus Station | 87 Metres
  Bus Line | Commuterlink Bus #249 From Burbank To Encino | 140 Metres
  Bus Station | NoHo MetroHub Line 154  Bay #10 | 294 Metres
  Bus Line | Metro bus line 156 | 370 Metres
  Intersection | Bruce T. Hinman Memorial Interchange (US-101/CA-134/CA-170) | 420 Metres
  Bus Line | metro bay 8 | 420 Metres
  Bus Station | Metro Bus Bay 9 | 420 Metres
  Bus Line | 224 Bus Stop | 420 Metres
  Bus Line | Line 549 Glendale | 437 Metres
  Bus Station | Metro 152 | 444 Metres
  Bus Line | 224 - Noho Stop | 447 Metres
  Bus Line | 224 | 448 Metres
  Metro Station | North Hollywood Station | 453 Metres
  Metro Station | North Hollywood MTA Metro Red Line Bike Lockers | 453 Metres
  Bus Station | NoHo MetroHub Bay #6 | 454 Metres
  Bus Line | Bay 6 Bus 156 | 454 Metres
  Bus Line | Burbank Bus - Burbank Airport | 455 Metres
  Bus Station | Burbank Bus Stop -media District | 457 Metres
  Bus Line | Bus Stop 152 | 458 Metres
  Bus Line | Bay 5 Bus 156 | 462 Metres
  Bus Line | Metro Line 154 | 464 Metres
  Bus Line | Metro 353 | 466 Metres
  Bus Station | North Hollywood Orange Line Station | 489 Metres
  Train Station | Old Town Train Station | 514 Metres
  Bus Line | ca shuttle bus | 516 Metres


LAPD Division | Collision Street
-------------   ----------------
 N Hollywood    |  11000 VICTORY BL
 1st Most Common Venue : Pharmacy
 2nd Most Common Venue : Sushi Restaurant
 3rd Most Common Venue : Thai Restaurant
 4th Most Common Venue : Convenience Store
 5th Most Common Venue : Coffee Shop

 Public transport venues near to this collision street
  Bus Line | Metro 164 | 23 Metres
  Bus Line | 152 bus line | 39 Metres
  Bus Line | Metro 152- Bus Stop | 389 Metres
  Bus Stop | Metro 164 | 486 Metres


LAPD Division | Collision Street
-------------   ----------------
 Olympic    |  10 FY
 1st Most Common Venue : Pizza Place
 2nd Most Common Venue : Intersection
 3rd Most Common Venue : Convenience Store
 4th Most Common Venue : Dance Studio
 5th Most Common Venue : Donut Shop
```

Public transport venues near to this collision street
Intersection | Western Ave & Washington Blvd | 435 Metres
Bus Line | Metro Bus Stop | 645 Metres
Bus Line | Metro Bus Stop 33/733 Venice & Western | 686 Metres
Bus Line | Metro Bus Stop 207 | 739 Metres

LAPD Division | Collision Street

Olympic | 100 S VIRGIL AV
1st Most Common Venue : Art Gallery
2nd Most Common Venue : Candy Store
3rd Most Common Venue : Burger Joint
4th Most Common Venue : Mexican Restaurant
5th Most Common Venue : Convenience Store

Public transport venues near to this collision street
Bus Line | metro 37 | 88 Metres
Bus Line | Metro Bus Line 14 | 131 Metres
Bus Line | metro 201 | 204 Metres
Bus Stop | Metro Bus - 14 (Beverly Blvd & N Virgil Ave) | 227 Metres
Bus Line | metro 14 | 241 Metres
Bus Station | Metro Bus Stop 204 | 331 Metres
Intersection | Temple Street & Hoover Street | 419 Metres
Intersection | Vermont Avenue & West 1st Street | 456 Metres
Bus Line | BROADWAY & Temple Commuter Express 422 Bus Stop | 474 Metres
Bus Line | 3rd & Virgil | 480 Metres
Bus Line | Temple/Robinson Bus (10) Stop | 505 Metres
Bus Station | Metro Bus Stop 14 - Beverly/Reno | 515 Metres
Intersection | Beverly Boulevard & Vermont Avenue | 550 Metres
Bus Line | Metro Bus 204 | 553 Metres
Intersection | Temple St. And Dillon | 559 Metres
Bus Stop | Metro stop #15659 3rd/Vermont | 565 Metres

LAPD Division | Collision Street

Olympic | 100 S WESTERN AV
1st Most Common Venue : Korean Restaurant
2nd Most Common Venue : Coffee Shop
3rd Most Common Venue : Chinese Restaurant
4th Most Common Venue : Cocktail Bar
5th Most Common Venue : Bar

Public transport venues near to this collision street
Bus Station | Metro bus stop 207 | 274 Metres
Bus Line | Metro Bus Line 14 (Beverly/Western) | 339 Metres
Bus Line | Metro 207 Hollywood | 343 Metres
Bus Line | Metro 14 | 347 Metres
Intersection | Beverly Boulevard & Western Avenue | 350 Metres
Bus Line | DASH - Hollywood/Wilshire | 385 Metres
Bus Line | Metro 14 Beverly/pico | 387 Metres
Bus Line | Metro Bus 16 | 457 Metres
Intersection | St. Andrews Square | 471 Metres
Bus Station | Dash Bus stop | 492 Metres
Bus Station | Metro Bus Stop 757 | 508 Metres
Bus Station | Metro Bus Stop 206 | 520 Metres
Bus Line | Dash Bus Stop 3rd & Kingsley | 544 Metres
Bus Station | Metro bus stop 16 | 574 Metres
Bus Station | Metro bus line 207 | 650 Metres

LAPD Division | Collision Street

Mission | 11300 N SEPULVEDA BL
1st Most Common Venue : Flower Shop
2nd Most Common Venue : Mexican Restaurant
3rd Most Common Venue : Coffee Shop
4th Most Common Venue : Sandwich Place
5th Most Common Venue : Convenience Store

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

```
-------------   ----------------
 Mission    |  11500 INDIAN HILLS RD
 1st Most Common Venue : Farm
 2nd Most Common Venue : Pharmacy
 3rd Most Common Venue : Park
 4th Most Common Venue : Gas Station
 5th Most Common Venue : Automotive Shop

 Public transport venues near to this collision street
  Bus Station | Greyhound Bus Lines | 456 Metres


LAPD Division | Collision Street
-------------   ----------------
 Mission    |  12100 HAVANA AV
 1st Most Common Venue : Convenience Store
 2nd Most Common Venue : Construction & Landscaping
 3rd Most Common Venue : Automotive Shop
 4th Most Common Venue : American Restaurant
 5th Most Common Venue : Train Station

 Public transport venues near to this collision street
  Train Station | Metrolink Sylmar/San Fernando Station | 428 Metres


LAPD Division | Collision Street
-------------   ----------------
 Mission    |  12800 FOOTHILL BL
 1st Most Common Venue : Shipping Store
 2nd Most Common Venue : Bakery
 3rd Most Common Venue : Yoga Studio
 4th Most Common Venue : Flower Shop
 5th Most Common Venue : Fish Market

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Topanga    |  19900 VENTURA BL
 1st Most Common Venue : Sushi Restaurant
 2nd Most Common Venue : Middle Eastern Restaurant
 3rd Most Common Venue : Coffee Shop
 4th Most Common Venue : Hobby Shop
 5th Most Common Venue : Pizza Place

 Public transport venues near to this collision street
  Bus Line | Metro Bus Stop 244/150 | 36 Metres


LAPD Division | Collision Street
-------------   ----------------
 Topanga    |  19900 VENTURA BL
 1st Most Common Venue : Sushi Restaurant
 2nd Most Common Venue : Middle Eastern Restaurant
 3rd Most Common Venue : Coffee Shop
 4th Most Common Venue : Hobby Shop
 5th Most Common Venue : Pizza Place

 Public transport venues near to this collision street
  Bus Line | Metro Bus Stop 244/150 | 36 Metres


LAPD Division | Collision Street
-------------   ----------------
 Topanga    |  20000 ROSCOE BL
 1st Most Common Venue : Hookah Bar
 2nd Most Common Venue : Park
 3rd Most Common Venue : Latin American Restaurant
 4th Most Common Venue : Dive Bar
 5th Most Common Venue : Bubble Tea Shop

 Public transport venues near to this collision street
  -----None-----
```

```
LAPD Division | Collision Street
-------------   ----------------
 Topanga    |  20000 VENTURA BL
 1st Most Common Venue : Sushi Restaurant
 2nd Most Common Venue : Coffee Shop
 3rd Most Common Venue : Pizza Place
 4th Most Common Venue : Thai Restaurant
 5th Most Common Venue : Middle Eastern Restaurant

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Topanga    |  20100 LEADWELL ST
 1st Most Common Venue : Fast Food Restaurant
 2nd Most Common Venue : Gym / Fitness Center
 3rd Most Common Venue : Pizza Place
 4th Most Common Venue : Sandwich Place
 5th Most Common Venue : Restaurant

 Public transport venues near to this collision street
  Bus Station | LA Metro Bus 163 | 287 Metres
  Bus Line | 244 Metro Bus Stop | 324 Metres


LAPD Division | Collision Street
-------------   ----------------
 West Valley    |  15600 ROYAL RIDGE RD
 1st Most Common Venue : Construction & Landscaping
 2nd Most Common Venue : Hill
 3rd Most Common Venue : Gym
 4th Most Common Venue : Trail
 5th Most Common Venue : Ethiopian Restaurant

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 West Valley    |  15900 VANOWEN ST
 1st Most Common Venue : South American Restaurant
 2nd Most Common Venue : Flower Shop
 3rd Most Common Venue : Liquor Store
 4th Most Common Venue : Taco Place
 5th Most Common Venue : Film Studio

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 West Valley    |  16200 VENTURA BL
 1st Most Common Venue : Supermarket
 2nd Most Common Venue : Italian Restaurant
 3rd Most Common Venue : Shipping Store
 4th Most Common Venue : Sushi Restaurant
 5th Most Common Venue : Pharmacy

 Public transport venues near to this collision street
  Bus Station | Encino Park & Ride | 328 Metres
  Bus Station | Ventura & Hayvenhurst 150/240 Bus Stop | 411 Metres
  Bus Station | Metro 150/ 240 East (Petit ave & Ventura blvd) | 519 Metres
  Intersection | Havenhust Ave And Ventura | 530 Metres


LAPD Division | Collision Street
-------------   ----------------
 Wilshire    |  04800 VENICE BL
 1st Most Common Venue : Furniture / Home Store
 2nd Most Common Venue : Sandwich Place
 3rd Most Common Venue : Clothing Store
 4th Most Common Venue : Bank
 5th Most Common Venue : Neighborhood
```

Public transport venues near to this collision street
Bus Station | Rimpau Terminal | 451 Metres
Bus Station | Pico/Rimpau Transit Center | 469 Metres

LAPD Division | Collision Street

Wilshire | 10 FWY FY
1st Most Common Venue : Deli / Bodega
2nd Most Common Venue : Furniture / Home Store
3rd Most Common Venue : Food Truck
4th Most Common Venue : Discount Store
5th Most Common Venue : Falafel Restaurant

Public transport venues near to this collision street
Bus Line | Beach Bus | 445 Metres
Bus Line | Metro Bus 439 | 496 Metres
Bus Line | Metro #105 | 537 Metres
Bus Line | 212/312 Bus Stop | 571 Metres
Bus Line | Bus Stop 312/212 | 656 Metres

LAPD Division | Collision Street

Wilshire | 100 THE GROVE DR
1st Most Common Venue : Italian Restaurant
2nd Most Common Venue : Coffee Shop
3rd Most Common Venue : Bakery
4th Most Common Venue : Furniture / Home Store
5th Most Common Venue : Sandwich Place

Public transport venues near to this collision street
Bus Stop | Bus Stop Beverly & Genesee | 186 Metres
Bus Stop | Metro Bus - 14 (Beverly Blvd & N Fairfax Ave) | 405 Metres
Bus Line | Beverly/Fairfax Metro | 428 Metres
Bus Line | Metro 14 Beverly-Pico | 441 Metres
Light Rail Station | The Trolley At The Grove | 462 Metres
Bus Line | La Metro Bus 217 | 469 Metres
Bus Line | Metro 780 Washington-Fairfax Transit Hub | 470 Metres
Bus Stop | Metro Bus - 217/218/780 (Beverly Blvd & N Fairfax Ave) | 471 Metres
Bus Line | Line 780 Beverly/Fairfax | 479 Metres
Bus Line | 14/37 Metro Bus | 487 Metres
Bus Stop | Metro Bus - 217/218 (S Fairfax Ave & W 1st St) | 504 Metres

LAPD Division | Collision Street

Wilshire | 100 THE GROVE DR
1st Most Common Venue : Italian Restaurant
2nd Most Common Venue : Coffee Shop
3rd Most Common Venue : Bakery
4th Most Common Venue : Furniture / Home Store
5th Most Common Venue : Sandwich Place

Public transport venues near to this collision street
Bus Stop | Bus Stop Beverly & Genesee | 186 Metres
Bus Stop | Metro Bus - 14 (Beverly Blvd & N Fairfax Ave) | 405 Metres
Bus Line | Beverly/Fairfax Metro | 428 Metres
Bus Line | Metro 14 Beverly-Pico | 441 Metres
Light Rail Station | The Trolley At The Grove | 462 Metres
Bus Line | La Metro Bus 217 | 469 Metres
Bus Line | Metro 780 Washington-Fairfax Transit Hub | 470 Metres
Bus Stop | Metro Bus - 217/218/780 (Beverly Blvd & N Fairfax Ave) | 471 Metres
Bus Line | Line 780 Beverly/Fairfax | 479 Metres
Bus Line | 14/37 Metro Bus | 487 Metres
Bus Stop | Metro Bus - 217/218 (S Fairfax Ave & W 1st St) | 504 Metres

LAPD Division | Collision Street

Wilshire | 100 N FULLER AV
1st Most Common Venue : Coffee Shop
2nd Most Common Venue : Mediterranean Restaurant
3rd Most Common Venue : Mexican Restaurant
4th Most Common Venue : Arts & Crafts Store
5th Most Common Venue : Comedy Club

Public transport venues near to this collision street
Bus Station | Bus Stop Line 316 3rd & Hauser | 420 Metres
Bus Stop | Metro Bus Stop #7276 (16/17) | 524 Metres
Bus Line | 316/16 Bus Stop (3rd and Cochran) | 533 Metres
Bus Station | Metro 14 Bus Stop | 561 Metres
Bus Line | Metro 212 | 580 Metres
Intersection | W3rd and Martel | 585 Metres
Bus Line | Metro Local Line 14 North | 619 Metres

LAPD Division | Collision Street

Pacific | 00 WINDWARD AV
1st Most Common Venue : American Restaurant
2nd Most Common Venue : Poke Place
3rd Most Common Venue : Surf Spot
4th Most Common Venue : Pizza Place
5th Most Common Venue : Ice Cream Shop

Public transport venues near to this collision street
Bus Stop | Pacific Ave & Venice Way | 52 Metres
Bus Line | Big Blue Buss stop at Sunset/Main | 158 Metres
Bus Stop | Bus Stop 2784 | 168 Metres
Bus Line | Metro Bus 33/733 Venice Post Office | 169 Metres
Bus Stop | Big Blue Bus Stop #1 | 347 Metres

LAPD Division | Collision Street

Pacific | 00 WORLD WY
1st Most Common Venue : Coffee Shop
2nd Most Common Venue : Airport Lounge
3rd Most Common Venue : Airport Service
4th Most Common Venue : Fast Food Restaurant
5th Most Common Venue : American Restaurant

Public transport venues near to this collision street
Taxi Stand | Uber pickup @ Terminal 7 (departure L2-07) | 253 Metres
Bus Stop | Supershuttle Stand | 316 Metres
Taxi Stand | Ride Service Pick-up B | 578 Metres
Airport | Los Angeles International Airport (LAX) (Los Angeles International Airport) | 583 Metres

LAPD Division | Collision Street

Pacific | 00 WORLD WY
1st Most Common Venue : Coffee Shop
2nd Most Common Venue : Airport Lounge
3rd Most Common Venue : Airport Service
4th Most Common Venue : Fast Food Restaurant
5th Most Common Venue : American Restaurant

Public transport venues near to this collision street
Taxi Stand | Uber pickup @ Terminal 7 (departure L2-07) | 253 Metres
Bus Stop | Supershuttle Stand | 316 Metres
Taxi Stand | Ride Service Pick-up B | 578 Metres
Airport | Los Angeles International Airport (LAX) (Los Angeles International Airport) | 583 Metres

LAPD Division | Collision Street

Pacific | 00 WORLD WAY
1st Most Common Venue : Coffee Shop
2nd Most Common Venue : Airport Lounge
3rd Most Common Venue : Airport Service
4th Most Common Venue : Fast Food Restaurant
5th Most Common Venue : American Restaurant

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

```
 Pacific    |  100 WORLD WY
 1st Most Common Venue : Coffee Shop
 2nd Most Common Venue : Airport Service
 3rd Most Common Venue : Airport Lounge
 4th Most Common Venue : Airport Terminal
 5th Most Common Venue : American Restaurant

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Northeast    |  100 N AVENUE 59
 1st Most Common Venue : Mexican Restaurant
 2nd Most Common Venue : Fast Food Restaurant
 3rd Most Common Venue : Italian Restaurant
 4th Most Common Venue : Park
 5th Most Common Venue : Burger Joint

 Public transport venues near to this collision street
  Bus Line | DASH - Highland Park / Eagle Rock | 247 Metres
  Intersection | York Blvd & Figueroa St | 502 Metres


LAPD Division | Collision Street
-------------   ----------------
 Northeast    |  1000 W VIN SCULLY AV
 1st Most Common Venue : Baseball Stadium
 2nd Most Common Venue : Baseball Field
 3rd Most Common Venue : Bar
 4th Most Common Venue : Hot Dog Joint
 5th Most Common Venue : General Entertainment

 Public transport venues near to this collision street
  Taxi Stand | Uber Staging Lot Dodger Stadium | 66 Metres


LAPD Division | Collision Street
-------------   ----------------
 Northeast    |  1000 W VIN SCULLY AV
 1st Most Common Venue : Baseball Stadium
 2nd Most Common Venue : Baseball Field
 3rd Most Common Venue : Bar
 4th Most Common Venue : Hot Dog Joint
 5th Most Common Venue : General Entertainment

 Public transport venues near to this collision street
  Taxi Stand | Uber Staging Lot Dodger Stadium | 66 Metres


LAPD Division | Collision Street
-------------   ----------------
 Northeast    |  1000 W VIN SCULLY AV
 1st Most Common Venue : Baseball Stadium
 2nd Most Common Venue : Baseball Field
 3rd Most Common Venue : Bar
 4th Most Common Venue : Hot Dog Joint
 5th Most Common Venue : General Entertainment

 Public transport venues near to this collision street
  Taxi Stand | Uber Staging Lot Dodger Stadium | 66 Metres


LAPD Division | Collision Street
-------------   ----------------
 Northeast    |  110 FWY
 1st Most Common Venue : Playground
 2nd Most Common Venue : Baseball Field
 3rd Most Common Venue : Furniture / Home Store
 4th Most Common Venue : Shoe Store
 5th Most Common Venue : Scenic Lookout

 Public transport venues near to this collision street
  Bus Line | 2 Bus Stop | 477 Metres
```

LAPD Division	Collision Street
Devonshire	10000 DE SOTO AV

1st Most Common Venue : Pizza Place
2nd Most Common Venue : Rental Car Location
3rd Most Common Venue : Sushi Restaurant
4th Most Common Venue : Building
5th Most Common Venue : Sandwich Place

Public transport venues near to this collision street
Bus Line | 244 - Bus Stop | 232 Metres

LAPD Division	Collision Street
Devonshire	10500 FORBES AV

1st Most Common Venue : Fast Food Restaurant
2nd Most Common Venue : Pizza Place
3rd Most Common Venue : Convenience Store
4th Most Common Venue : Japanese Restaurant
5th Most Common Venue : Mexican Restaurant

Public transport venues near to this collision street
Bus Line | 236 bus stop | 449 Metres

LAPD Division	Collision Street
Devonshire	11000 BALBOA BL

1st Most Common Venue : Chinese Restaurant
2nd Most Common Venue : Grocery Store
3rd Most Common Venue : Coffee Shop
4th Most Common Venue : Bakery
5th Most Common Venue : Smoothie Shop

Public transport venues near to this collision street
-----None-----

LAPD Division	Collision Street
Foothill	10100 TELFAIR AV

1st Most Common Venue : Burger Joint
2nd Most Common Venue : Convenience Store
3rd Most Common Venue : Thai Restaurant
4th Most Common Venue : Rental Service
5th Most Common Venue : Supermarket

Public transport venues near to this collision street
Bus Station | MTA Bus 166/364 | 498 Metres

LAPD Division	Collision Street
Rampart	100 N LAKE ST

1st Most Common Venue : Convenience Store
2nd Most Common Venue : Fast Food Restaurant
3rd Most Common Venue : Donut Shop
4th Most Common Venue : Café
5th Most Common Venue : Mexican Restaurant

Public transport venues near to this collision street
Bus Station | metro bus stop 16 | 187 Metres
Bus Stop | 200 bus stop/ Alvarado & Maryland | 215 Metres
Bus Line | 14 Bus Stop | 254 Metres
Intersection | Alvarado Street & Temple Street | 464 Metres
Bus Line | Metro Bus Stop Line 10 | 465 Metres
Intersection | Alvarado Street & West 3rd Street | 478 Metres
Bus Line | Metro 16/316 | 478 Metres
Bus Stop | Meto 10 Temple and Alvarado | 509 Metres
Bus Line | 3rd St & Carondelet Bus Stop | 522 Metres

LAPD Division	Collision Street
Rampart	100 S BONNIE BRAE ST

1st Most Common Venue : Convenience Store

2nd Most Common Venue : Grocery Store
3rd Most Common Venue : Filipino Restaurant
4th Most Common Venue : Fast Food Restaurant
5th Most Common Venue : Bubble Tea Shop

Public transport venues near to this collision street
Intersection | Temple Street & Burlington Avenue | 493 Metres
Bus Line | Loma Dr. & Beverly Blvd. Bus Stop | 523 Metres

LAPD Division | Collision Street

Rampart | 100 S DILLON ST
1st Most Common Venue : Art Gallery
2nd Most Common Venue : Candy Store
3rd Most Common Venue : Pharmacy
4th Most Common Venue : Filipino Restaurant
5th Most Common Venue : Lounge

Public transport venues near to this collision street
Bus Station | metro bus line 316 | 438 Metres
Bus Line | Bus 14 Beverly/benton | 567 Metres

LAPD Division | Collision Street

Rampart | 100 S RAMPART BL
1st Most Common Venue : Asian Restaurant
2nd Most Common Venue : Food Truck
3rd Most Common Venue : Pizza Place
4th Most Common Venue : Food
5th Most Common Venue : Café

Public transport venues near to this collision street
Bus Line | metro 603 | 33 Metres
Bus Line | 603 10 Bus Stop | 418 Metres
Bus Station | Rampart/3rd St. Bus Stop | 422 Metres

LAPD Division | Collision Street

Rampart | 1000 ALBANY ST
1st Most Common Venue : Hotel Bar
2nd Most Common Venue : Bar
3rd Most Common Venue : Gym / Fitness Center
4th Most Common Venue : Latin American Restaurant
5th Most Common Venue : Movie Theater

Public transport venues near to this collision street
Bus Line | Loyola Law School Shuttle | 140 Metres
Bus Line | Metro 330 | 203 Metres
Intersection | Olympic Boulevard & Union Avenue | 325 Metres
Bus Line | Metro Line 30 Little Tokyo | 418 Metres
Bus Line | Metro Bus Line 51/52 | 536 Metres
Bus Line | DASH - Pico Union/Echo Park | 549 Metres
Bus Line | Bus 8 To Hollywood | 589 Metres

LAPD Division | Collision Street

77th Street | 100 E 84TH ST
1st Most Common Venue : Pizza Place
2nd Most Common Venue : Taco Place
3rd Most Common Venue : Southern / Soul Food Restaurant
4th Most Common Venue : Fast Food Restaurant
5th Most Common Venue : Marijuana Dispensary

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

77th Street | 1000 W 56TH ST
1st Most Common Venue : Fast Food Restaurant
2nd Most Common Venue : Grocery Store
3rd Most Common Venue : Mobile Phone Shop

4th Most Common Venue : Pharmacy
5th Most Common Venue : Fried Chicken Joint

Public transport venues near to this collision street
Bus Line | mta 754 vermont & slauson | 235 Metres
Bus Station | MTA #108 Slauson/Vermont | 243 Metres

LAPD Division | Collision Street

77th Street | 1000 W 60TH ST
1st Most Common Venue : Fast Food Restaurant
2nd Most Common Venue : Grocery Store
3rd Most Common Venue : Pharmacy
4th Most Common Venue : Shoe Store
5th Most Common Venue : Food

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

Newton | 100 E VERNON AV
1st Most Common Venue : Fried Chicken Joint
2nd Most Common Venue : Food Truck
3rd Most Common Venue : Pizza Place
4th Most Common Venue : Food
5th Most Common Venue : Taco Place

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

Central | 10 FWY WB ON
1st Most Common Venue : Clothing Store
2nd Most Common Venue : Fast Food Restaurant
3rd Most Common Venue : Pharmacy
4th Most Common Venue : Marijuana Dispensary
5th Most Common Venue : Middle Eastern Restaurant

Public transport venues near to this collision street
Bus Station | 94 Bus Stop | 283 Metres
Bus Station | Terminal 28 | 318 Metres
Bus Line | Metro bus line 91 | 347 Metres
Bus Station | 33/733 Bus Stop West | 350 Metres
Bus Line | Metro Bus Station | 381 Metres
Bus Stop | Metro Bus 14/70/71/76/78/79 (Olive & 14th) | 386 Metres
Bus Line | LA Metro 40 Broadway And Washington Bus Stop | 388 Metres
Intersection | Broadway & Pico Boulevard | 409 Metres
Bus Stop | Metro Bus - 40/45/745 (S Broadway & W Washington Blvd) | 439 Metres
Bus Line | Metro 94/794 | 442 Metres
Bus Line | LA Metro 740 Rapid Broadway And Washington Southbound Bus Stop | 449 Metres
Intersection | E Pico Blvd and Maple Ave | 451 Metres
Bus Station | Metro stop #20139 | 452 Metres
Bus Line | Gardena Municipal Bus Line # 1 | 617 Metres

LAPD Division | Collision Street

Central | 100 E ANN ST
1st Most Common Venue : Bakery
2nd Most Common Venue : Diner
3rd Most Common Venue : State / Provincial Park
4th Most Common Venue : Café
5th Most Common Venue : Coffee Shop

Public transport venues near to this collision street
Bus Stop | Xe Do Hoang | 327 Metres
Bus Station | Veolia Transportation - Div. 98 | 418 Metres
Light Rail Station | Metro Gold Line - Chinatown Station | 442 Metres
Train Station | Metrolink M O W Los Angeles | 444 Metres
Train Station | Mission Tower | 455 Metres
Bus Station | LAMTA OCI | 560 Metres
Bus Line | Metro 45/83/84/409 | 581 Metres

LAPD Division | Collision Street

Hollenbeck | 100 N EVERGREEN AV
1st Most Common Venue : Pizza Place
2nd Most Common Venue : ATM
3rd Most Common Venue : Grocery Store
4th Most Common Venue : Mobile Phone Shop
5th Most Common Venue : Taco Place

Public transport venues near to this collision street
Intersection | Eugene A. Obregon Memorial Interchange (I-5/I-10/CA-60/US-101) | 64 Metres
Intersection | Cesar E. Chavez Avenue & Mott Street | 549 Metres

LAPD Division | Collision Street

Hollenbeck | 100 S MISSION RD
1st Most Common Venue : Coffee Shop
2nd Most Common Venue : Comic Shop
3rd Most Common Venue : Vegetarian / Vegan Restaurant
4th Most Common Venue : Fruit & Vegetable Store
5th Most Common Venue : Furniture / Home Store

Public transport venues near to this collision street
Light Rail Station | The LA River Bridge | 160 Metres
Light Rail Station | Metro Rail - Pico / Aliso | 161 Metres
Train Station | Metro Div. 20 - Red Line Yard | 540 Metres
Train Station | Solano Train station | 623 Metres
Light Rail Station | MTA Division 20 | 633 Metres

---- Cluster 2 ----
LAPD Division | Collision Street

West Valley | 15900 SHERMAN WY
1st Most Common Venue : Latin American Restaurant
2nd Most Common Venue : Bus Line
3rd Most Common Venue : Sandwich Place
4th Most Common Venue : Mexican Restaurant
5th Most Common Venue : Food Truck

Public transport venues near to this collision street
Bus Line | LAX FlyAway Bus Terminal | 379 Metres

LAPD Division | Collision Street

West Valley | 16000 SHERMAN WY
1st Most Common Venue : Latin American Restaurant
2nd Most Common Venue : Bus Line
3rd Most Common Venue : Sandwich Place
4th Most Common Venue : Mexican Restaurant
5th Most Common Venue : Food Truck

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

77th Street | 100 W 79TH ST
1st Most Common Venue : Mexican Restaurant
2nd Most Common Venue : Food Truck
3rd Most Common Venue : Taco Place
4th Most Common Venue : Yoga Studio
5th Most Common Venue : Drugstore

Public transport venues near to this collision street
-----None-----

---- Cluster 3 ----
LAPD Division | Collision Street

Southeast | 100 E 109TH PL

1st Most Common Venue : Marijuana Dispensary
2nd Most Common Venue : Gym
3rd Most Common Venue : Yoga Studio
4th Most Common Venue : Drugstore
5th Most Common Venue : Fish Market

Public transport venues near to this collision street
-----None-----

---- Cluster 4 ----
LAPD Division | Collision Street
---   ---
Foothill | 10100 JANETTA WY
1st Most Common Venue : Farm
2nd Most Common Venue : Yoga Studio
3rd Most Common Venue : Donut Shop
4th Most Common Venue : Fish Market
5th Most Common Venue : Film Studio

Public transport venues near to this collision street
-----None-----

---- Cluster 5 ----
LAPD Division | Collision Street
---   ---
Devonshire | 10000 CANOGA AV
1st Most Common Venue : Gym
2nd Most Common Venue : Train Station
3rd Most Common Venue : Yoga Studio
4th Most Common Venue : Event Space
5th Most Common Venue : Dumpling Restaurant

Public transport venues near to this collision street
Bus Station | Metro Orange Line Station - Chatsworth | 160 Metres
Bus Line | Hollywood Bowl Shuttle - Chatsworth | 204 Metres
Train Station | Metrolink Chatsworth Station | 249 Metres
Train Station | Chatsworth Amtrak Station | 258 Metres

LAPD Division | Collision Street
---   ---
Central | 00 GATEWAY PA
1st Most Common Venue : Train Station
2nd Most Common Venue : Travel Lounge
3rd Most Common Venue : Platform
4th Most Common Venue : Yoga Studio
5th Most Common Venue : Drugstore

Public transport venues near to this collision street
Bus Line | FlixBus Stop at Union Station | 107 Metres
Taxi Stand | Union Station East | 253 Metres
Metro Station | Union Station Red / Purple Line Metro Station | 276 Metres
Bus Station | Patsaouras Transit Plaza - Union Station | 277 Metres
Bus Line | USC Union Station to UPC Shuttle Stop | 280 Metres
Taxi Stand | Union Station Pick-Up/Drop-Off | 296 Metres
Bus Station | Megabus L.A. Union Station | 302 Metres
Train Station | Track 13 | 310 Metres
Light Rail Station | Metro Gold Line - Union Station | 326 Metres
Bus Line | FlyAway - Union Station to LAX | 357 Metres
Train Station | Union Station | 394 Metres
Bus Line | Amtrak Bus Thruway | 395 Metres
Bus Station | BoltBus Los Angeles | 430 Metres
Train Station | Metrolink Services | 463 Metres
Train Station | Lot B Union Station | 487 Metres
Bus Line | Dodger Stadium Express | 520 Metres
Bus Station | Foothill Transit Union Station Stop- El Monte Busway | 589 Metres
Bus Line | El Monte Busway | 626 Metres
Intersection | US-101 at Exit 2A | 684 Metres

LAPD Division | Collision Street
---   ---
Central | 00 GATEWAY PA
1st Most Common Venue : Train Station
2nd Most Common Venue : Travel Lounge

2nd Most Common Venue : Travel Lounge
3rd Most Common Venue : Platform
4th Most Common Venue : Yoga Studio
5th Most Common Venue : Drugstore

Public transport venues near to this collision street
Bus Line | FlixBus Stop at Union Station | 107 Metres
Taxi Stand | Union Station East | 253 Metres
Metro Station | Union Station Red / Purple Line Metro Station | 276 Metres
Bus Station | Patsaouras Transit Plaza - Union Station | 277 Metres
Bus Line | USC Union Station to UPC Shuttle Stop | 280 Metres
Taxi Stand | Union Station Pick-Up/Drop-Off | 296 Metres
Bus Station | Megabus L.A. Union Station | 302 Metres
Train Station | Track 13 | 310 Metres
Light Rail Station | Metro Gold Line - Union Station | 326 Metres
Bus Line | FlyAway - Union Station to LAX | 357 Metres
Train Station | Union Station | 394 Metres
Bus Line | Amtrak Bus Thruway | 395 Metres
Bus Station | BoltBus Los Angeles | 430 Metres
Train Station | Metrolink Services | 463 Metres
Train Station | Lot B Union Station | 487 Metres
Bus Line | Dodger Stadium Express | 520 Metres
Bus Station | Foothill Transit Union Station Stop- El Monte Busway | 589 Metres
Bus Line | El Monte Busway | 626 Metres
Intersection | US-101 at Exit 2A | 684 Metres

LAPD Division | Collision Street

Central | 00 GATEWAY PA
1st Most Common Venue : Train Station
2nd Most Common Venue : Travel Lounge
3rd Most Common Venue : Platform
4th Most Common Venue : Yoga Studio
5th Most Common Venue : Drugstore

Public transport venues near to this collision street
Bus Line | FlixBus Stop at Union Station | 107 Metres
Taxi Stand | Union Station East | 253 Metres
Metro Station | Union Station Red / Purple Line Metro Station | 276 Metres
Bus Station | Patsaouras Transit Plaza - Union Station | 277 Metres
Bus Line | USC Union Station to UPC Shuttle Stop | 280 Metres
Taxi Stand | Union Station Pick-Up/Drop-Off | 296 Metres
Bus Station | Megabus L.A. Union Station | 302 Metres
Train Station | Track 13 | 310 Metres
Light Rail Station | Metro Gold Line - Union Station | 326 Metres
Bus Line | FlyAway - Union Station to LAX | 357 Metres
Train Station | Union Station | 394 Metres
Bus Line | Amtrak Bus Thruway | 395 Metres
Bus Station | BoltBus Los Angeles | 430 Metres
Train Station | Metrolink Services | 463 Metres
Train Station | Lot B Union Station | 487 Metres
Bus Line | Dodger Stadium Express | 520 Metres
Bus Station | Foothill Transit Union Station Stop- El Monte Busway | 589 Metres
Bus Line | El Monte Busway | 626 Metres
Intersection | US-101 at Exit 2A | 684 Metres

---- Cluster 6 ----
LAPD Division | Collision Street

Olympic | 100 N WESTERN AV
1st Most Common Venue : Intersection
2nd Most Common Venue : Food Truck
3rd Most Common Venue : Park
4th Most Common Venue : Sandwich Place
5th Most Common Venue : Fast Food Restaurant

Public transport venues near to this collision street
Intersection | Beverly Boulevard & Van Ness Avenue | 416 Metres
Bus Station | Metro Bus Stop 14 Downtown LA Via Beverly Bl | 431 Metres
Bus Line | Bus Stop - Route 16/316 | 523 Metres
Bus Line | Beverly / Windsor 14 | 576 Metres

LAPD Division | Collision Street

Olympic | 100 S VAN NESS AV

Olympic | 100 S VAN NESS AV
1st Most Common Venue : Intersection
2nd Most Common Venue : Food Truck
3rd Most Common Venue : Park
4th Most Common Venue : Sandwich Place
5th Most Common Venue : Fast Food Restaurant

Public transport venues near to this collision street
-----None-----

---- Cluster 7 ----
LAPD Division | Collision Street

Van Nuys | 13700 VANOWEN ST
1st Most Common Venue : Mexican Restaurant
2nd Most Common Venue : Pharmacy
3rd Most Common Venue : Convenience Store
4th Most Common Venue : Bagel Shop
5th Most Common Venue : Video Store

Public transport venues near to this collision street
Bus Line | metro Bus Stop 158 (woodman/Oxnard) | 38 Metres
Bus Line | Metro Bus Line-165 | 554 Metres

LAPD Division | Collision Street

Mission | 12700 SAN FERNANDO RD
1st Most Common Venue : Mexican Restaurant
2nd Most Common Venue : Liquor Store
3rd Most Common Venue : Grocery Store
4th Most Common Venue : Yoga Studio
5th Most Common Venue : Falafel Restaurant

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

Foothill | 10400 LAUREL CANYON BL
1st Most Common Venue : Mexican Restaurant
2nd Most Common Venue : Fast Food Restaurant
3rd Most Common Venue : Pizza Place
4th Most Common Venue : Fried Chicken Joint
5th Most Common Venue : Middle Eastern Restaurant

Public transport venues near to this collision street
-----None-----

LAPD Division | Collision Street

77th Street | 100 W FLORENCE AV
1st Most Common Venue : Mexican Restaurant
2nd Most Common Venue : Convenience Store
3rd Most Common Venue : Fast Food Restaurant
4th Most Common Venue : Grocery Store
5th Most Common Venue : American Restaurant

Public transport venues near to this collision street
Bus Station | Bus Stop | 383 Metres

LAPD Division | Collision Street

Newton | 100 E 60TH ST
1st Most Common Venue : Mexican Restaurant
2nd Most Common Venue : Marijuana Dispensary
3rd Most Common Venue : Bookstore
4th Most Common Venue : Bakery
5th Most Common Venue : Fried Chicken Joint

Public transport venues near to this collision street
Bus Stop | Metro | 514 Metres

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LAPD Division | Collision Street
-------------   ----------------
 Newton    |  100 E 61ST ST
 1st Most Common Venue : Burger Joint
 2nd Most Common Venue : Mexican Restaurant
 3rd Most Common Venue : Bookstore
 4th Most Common Venue : Fried Chicken Joint
 5th Most Common Venue : Food

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Newton    |  100 E 62ND ST
 1st Most Common Venue : Mexican Restaurant
 2nd Most Common Venue : Burger Joint
 3rd Most Common Venue : Food
 4th Most Common Venue : Bookstore
 5th Most Common Venue : Pharmacy

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Newton    |  100 E SLAUSON AV
 1st Most Common Venue : Fried Chicken Joint
 2nd Most Common Venue : Food
 3rd Most Common Venue : Mexican Restaurant
 4th Most Common Venue : Clothing Store
 5th Most Common Venue : Bakery

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Hollenbeck    |  100 N LORENA ST
 1st Most Common Venue : Mexican Restaurant
 2nd Most Common Venue : Convenience Store
 3rd Most Common Venue : Ice Cream Shop
 4th Most Common Venue : Gift Shop
 5th Most Common Venue : Burger Joint

 Public transport venues near to this collision street
  Bus Line | 68 bus | 391 Metres
  Light Rail Station | Metro Rail - Indiana | 404 Metres
  Bus Line | 770 | 557 Metres


LAPD Division | Collision Street
-------------   ----------------
 Hollenbeck    |  100 S CONCORD ST
 1st Most Common Venue : Mexican Restaurant
 2nd Most Common Venue : Taco Place
 3rd Most Common Venue : Food
 4th Most Common Venue : Gift Shop
 5th Most Common Venue : Juice Bar

 Public transport venues near to this collision street
  -----None-----


LAPD Division | Collision Street
-------------   ----------------
 Hollenbeck    |  100 S PECAN ST
 1st Most Common Venue : Mexican Restaurant
 2nd Most Common Venue : Bookstore
 3rd Most Common Venue : Burger Joint
 4th Most Common Venue : Bar
 5th Most Common Venue : Asian Restaurant

 Public transport venues near to this collision street
```

Public transport venues near to this collision street
 Light Rail Station | Metro Rail - Mariachi Plaza | 229 Metres
 Intersection | US-101 at Exit 1C | 401 Metres

---- Cluster 8 ----
LAPD Division | Collision Street
-------------   ----------------
 Devonshire | 10200 VANALDEN AV
 1st Most Common Venue : Cosmetics Shop
 2nd Most Common Venue : Mediterranean Restaurant
 3rd Most Common Venue : Yoga Studio
 4th Most Common Venue : Dumpling Restaurant
 5th Most Common Venue : Flea Market

 Public transport venues near to this collision street
  -----None-----

---- Cluster 9 ----
LAPD Division | Collision Street
-------------   ----------------
 Harbor | 1000 CAPITOL DR
 1st Most Common Venue : Park
 2nd Most Common Venue : Dive Bar
 3rd Most Common Venue : Yoga Studio
 4th Most Common Venue : Drugstore
 5th Most Common Venue : Fish Market

 Public transport venues near to this collision street
  -----None-----

---- Cluster 10 ----
LAPD Division | Collision Street
-------------   ----------------
 Foothill | 10300 TUJUNGA CANYON BL
 1st Most Common Venue : Convenience Store
 2nd Most Common Venue : Outdoors & Recreation
 3rd Most Common Venue : Gym
 4th Most Common Venue : Event Space
 5th Most Common Venue : Dumpling Restaurant

 Public transport venues near to this collision street
  -----None-----

---- Cluster 11 ----
LAPD Division | Collision Street
-------------   ----------------
 Southeast | 100 E 92ND ST
 1st Most Common Venue : Drugstore
 2nd Most Common Venue : Nightlife Spot
 3rd Most Common Venue : Gym / Fitness Center
 4th Most Common Venue : Yoga Studio
 5th Most Common Venue : Fish Market

 Public transport venues near to this collision street
  -----None-----

---- Cluster 12 ----
LAPD Division | Collision Street
-------------   ----------------
 Harbor | 1000 LAKME AV
 1st Most Common Venue : Japanese Restaurant
 2nd Most Common Venue : Mobile Phone Shop
 3rd Most Common Venue : Chinese Restaurant
 4th Most Common Venue : American Restaurant
 5th Most Common Venue : Yoga Studio

 Public transport venues near to this collision street
  Bus Line | 232 Bus Stop | 384 Metres

LAPD Division | Collision Street
-------------   ----------------
 Foothill | 10400 GLENOAKS BL

```
Foothill    |  10400 GLENOAKS BL
1st Most Common Venue : American Restaurant
2nd Most Common Venue : Bus Station
3rd Most Common Venue : Yoga Studio
4th Most Common Venue : Drugstore
5th Most Common Venue : Fish Market

Public transport venues near to this collision street
 Bus Station | Metro Bus Division 15 | 444 Metres
 Bus Line | Metro Bus | 486 Metres
```

In [127]:

```
# Format data to print top recommended venue categories per each cluster regardless of LAPD Divisi
on
LA_grouped2 = LA_grouped.join(neighborhoods_venues_sorted2.set_index(['Area_Name','Street']), on=[
'Area_Name','Street'])
LA_grouped2 = LA_grouped2.drop(['Area_Name','Street','1st Most Common Venue','2nd Most Common Venu
e','3rd Most Common Venue',
                                '4th Most Common Venue','5th Most Common Venue','6th Most Common Ver
ue',
                                '7th Most Common Venue','8th Most Common Venue','9th Most Common Ver
ue',
                                '10th Most Common Venue'],axis=1)
LA_grouped2 = LA_grouped2.groupby(['Cluster_Labels']).mean()
print(LA_grouped2.shape)
LA_grouped2.head(20)
```

```
(13, 253)
```

Out[127]:

Cluster_Labels	ATM	Accessories Store	Adult Boutique	Airport	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Amphitheater	Antique Shop	Aquarium
0	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
1	0.001972	0.002578	0.000698	0.00018	0.004562	0.00528	0.000718	0.010474	0.000579	0.000911	0.001157
2	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
3	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
4	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
5	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
6	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
7	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.011364	0.000000	0.000000	0.000000
8	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
9	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
10	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
11	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000	0.000000
12	0.000000	0.000000	0.000000	0.00000	0.000000	0.00000	0.000000	0.375000	0.000000	0.000000	0.000000

Top 10 recommended venue categories per each cluster during year 2018

To navigate back to results section [Click Here]

In [134]:

```
print("Top 10 recommended venue categories per each cluster during year 2018\n")
for cluster in LA_grouped2.index:
    print("---- Cluster",cluster,"Venues----")
    for i in LA_grouped2.iloc[cluster].sort_values(ascending=False)[:10].index:
        print(i)
    print("\n")
```

```
Top 10 recommended venue categories per each cluster during year 2018

---- Cluster 0 Venues----
Gym / Fitness Center
Liquor Store
Mobile Phone Shop
Hotel
Wine Bar
Fast Food Restaurant
Clothing Store
Boat or Ferry
Harbor / Marina
Grocery Store


---- Cluster 1 Venues----
Coffee Shop
Fast Food Restaurant
Pizza Place
Mexican Restaurant
Convenience Store
Bakery
Sandwich Place
Thai Restaurant
Furniture / Home Store
Food Truck


---- Cluster 2 Venues----
Mexican Restaurant
Food Truck
Latin American Restaurant
Bus Line
Sandwich Place
Taco Place
Ethiopian Restaurant
Dumpling Restaurant
Duty-free Shop
Electronics Store


---- Cluster 3 Venues----
Marijuana Dispensary
Gym
Yoga Studio
Drugstore
Fish Market
Film Studio
Filipino Restaurant
Fast Food Restaurant
Farmers Market
Farm


---- Cluster 4 Venues----
Farm
Yoga Studio
Donut Shop
Fish Market
Film Studio
Filipino Restaurant
Fast Food Restaurant
Farmers Market
Falafel Restaurant
Event Space


---- Cluster 5 Venues----
Train Station
Gym
Travel Lounge
Platform
Yoga Studio
Drugstore
Dumpling Restaurant
```

```
Duty-free Shop
Electronics Store
Ethiopian Restaurant


---- Cluster 6 Venues----
Intersection
Food Truck
Park
Sandwich Place
Fast Food Restaurant
Farmers Market
Filipino Restaurant
Farm
Drugstore
Falafel Restaurant


---- Cluster 7 Venues----
Mexican Restaurant
Bakery
Fried Chicken Joint
Burger Joint
Food
Bookstore
Fast Food Restaurant
Marijuana Dispensary
Grocery Store
Pizza Place


---- Cluster 8 Venues----
Cosmetics Shop
Mediterranean Restaurant
Yoga Studio
Dumpling Restaurant
Flea Market
Fish Market
Film Studio
Filipino Restaurant
Fast Food Restaurant
Farmers Market


---- Cluster 9 Venues----
Park
Dive Bar
Yoga Studio
Drugstore
Fish Market
Film Studio
Filipino Restaurant
Fast Food Restaurant
Farmers Market
Farm


---- Cluster 10 Venues----
Convenience Store
Outdoors & Recreation
Gym
Event Space
Dumpling Restaurant
Duty-free Shop
Electronics Store
Ethiopian Restaurant
Falafel Restaurant
Donut Shop


---- Cluster 11 Venues----
Drugstore
Nightlife Spot
Gym / Fitness Center
Yoga Studio
Fish Market
Film Studio
```

```
Filipino Restaurant
Fast Food Restaurant
Farmers Market
Farm


---- Cluster 12 Venues----
American Restaurant
Bus Station
Chinese Restaurant
Japanese Restaurant
Mobile Phone Shop
Filipino Restaurant
Fast Food Restaurant
Farmers Market
Film Studio
Dumpling Restaurant
```

In [135]:

```
print("Top 10 Recommended Venue Categories among all clusters near to collision locations\n")
for i in LA_grouped2.mean().sort_values(ascending=False)[:10].index:
    print(i)
```

```
Top 10 Recommended Venue Categories among all clusters near to collision locations

Gym
Farm
Park
Mexican Restaurant
Gym / Fitness Center
Marijuana Dispensary
Food Truck
Cosmetics Shop
Dive Bar
Train Station
```

Collision streets which didn't have any public transport venues with in 500 meters radius from collision locations

To navigate back to results section [Click Here]

In [136]:

```
print("Collision streets which doesn't have any public transport venues with in 500 meters radius
from collision points")
LA_merged_no_transport=LA_merged_no_transport.drop_duplicates(subset=['Area_Name','Street']).reset_
index(drop=True)
LA_merged_no_transport
```

```
Collision streets which doesn't have any public transport venues with in 500 meters radius from co
llision points
```

Out[136]:

	Area_Name	Street
0	Southeast	100 E CENTURY BL
1	Southeast	100 E COLDEN AV
2	Southeast	100 W 98TH ST
3	Southwest	1000 W MARTIN LUTHER KING JR BL
4	Van Nuys	13700 BURBANK BL
5	Harbor	100 N GAFFEY ST
6	Mission	11300 N SEPULVEDA BL
7	Mission	12800 FOOTHILL BL

	Area_Name	Street
8	Topanga	20000 ROSCOE BL
9	Topanga	20000 VENTURA BL
10	West Valley	15600 ROYAL RIDGE RD
11	West Valley	15900 VANOWEN ST
12	Pacific	00 WORLD WAY
13	Pacific	100 WORLD WY
14	Devonshire	11000 BALBOA BL
15	77th Street	100 E 84TH ST
16	77th Street	1000 W 60TH ST
17	Newton	100 E VERNON AV
18	West Valley	16000 SHERMAN WY
19	77th Street	100 W 79TH ST
20	Southeast	100 E 109TH PL
21	Foothill	10100 JANETTA WY
22	Olympic	100 S VAN NESS AV
23	Mission	12700 SAN FERNANDO RD
24	Foothill	10400 LAUREL CANYON BL
25	Newton	100 E 61ST ST
26	Newton	100 E 62ND ST
27	Newton	100 E SLAUSON AV
28	Hollenbeck	100 S CONCORD ST
29	Devonshire	10200 VANALDEN AV
30	Harbor	1000 CAPITOL DR
31	Foothill	10300 TUJUNGA CANYON BL
32	Southeast	100 E 92ND ST

Results and Discussion

As per the exploratory data analysis results, it can be determined as follows (Click here to navigate to EDA):

- Every year, collisions and victim rates kept increasing in Los Angeles City and year 2018 has most collisions so far. (Click Here)
- In year 2018, most collisions happened in LAPD Division '77th Street' followed by 'SouthWest' and 'Wilshire' LAPD divisions. (Click Here)
- In year 2018, most collision victims are of descent 'Hispanic' followed by 'Whites' and Blacks'. (Click Here)
- In year 2018, most collisions happened in the month of October followed by 'August' and 'March'.(Click Here)
- In year 2018, most collisions happened on 'Friday' followed by 'Thursday' and 'Wednesday'. (Click Here)
- In year 2018, most collisions happened during hour range '17:00 - 18:00' followed by '15:00 - 16:00' and '16:00 - 17:00'.(Click Here)
- In year 2018, most collision victims are of sex 'Male'.(Click here)
- In year 2018, most collision victims of sex 'Female' and 'Male' belong to same age group '21 - 30'. (Click Here)

As per clustering results, 100+ collisions (5 collisions per 21 LAPD divisions) have been clustered into 13 clusters.

And most recommended venue categories and all transport venues per each cluster is reported in the code block.
Top 5 recommended venue categories and all transport venues per each collision street in each cluster
Note:- Please note that some collision streets doesn't have any public transport venues.

And most recommended venue categories per each cluster is reported in the below code block link.
Top 10 recommended venue categories per each cluster during year 2018

And collision streets which didnt have public transport venues with in 500 meters radius from collision locations.
Collision streets which didn't have any public transport venues with in 500 meters radius from collision locations

Conclusion

As per analyzed results, stakeholder LA department of transportation can become aware of all collision locations and near by recommended venues, which are causing collisions inadvertently. Public transport venues with in 500 meters of collision locations

recommended venues, which are causing collisions inadvertently. Public transport venues with in 500 meters of collision locations are also listed, so that stakeholder can make better decision, if any new public transport venues are needed to setup near to most frequent collision locations. By doing so, LA residents\tourists can make avail of public transport venues to navigate with in the city, there by avoiding traffic congestions and minimizing collisions and thus saving people's lives.