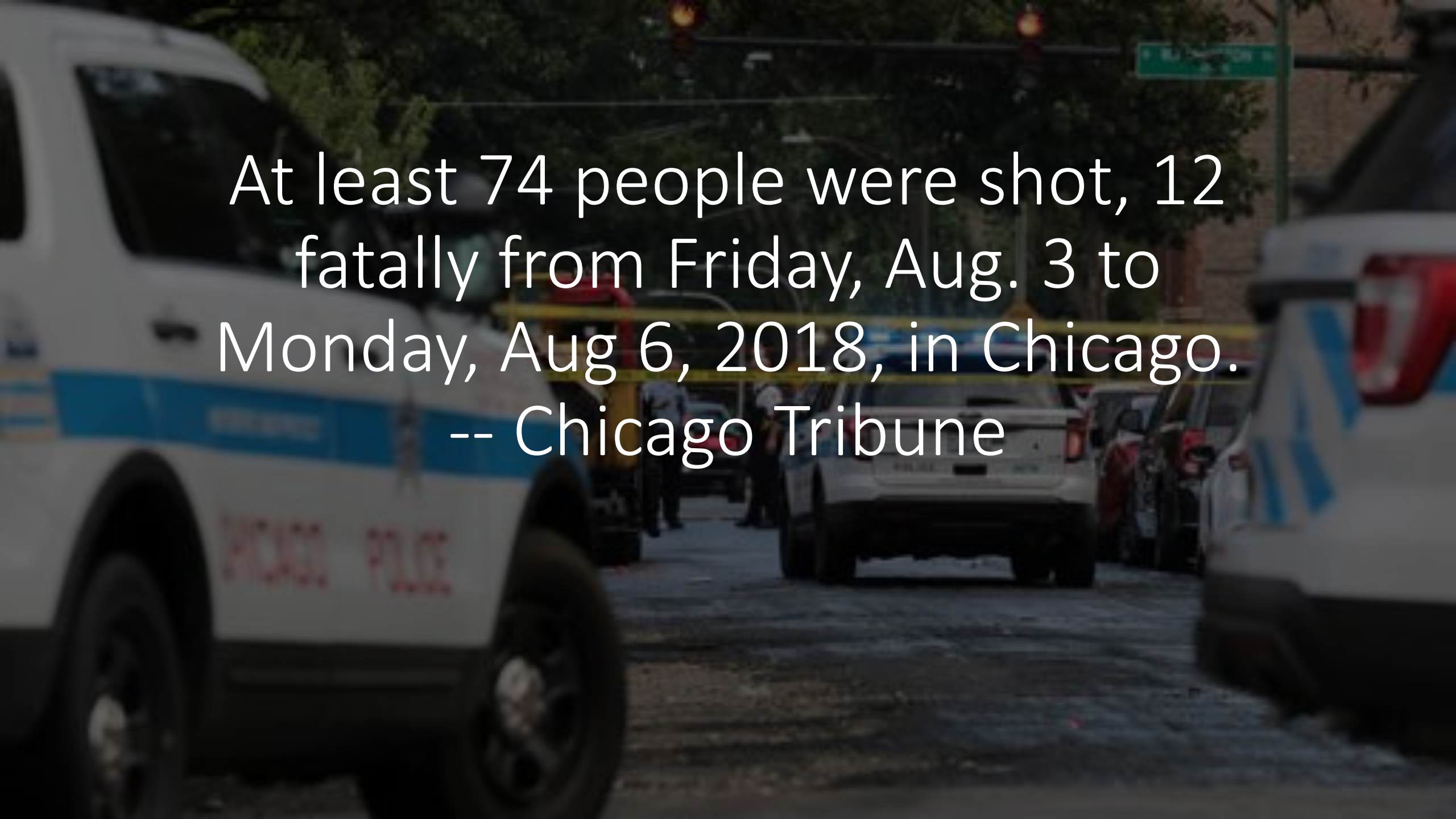


At least 74 people were shot, 12 fatally from Friday, Aug. 3 to Monday, Aug 6, 2018, in Chicago.
-- Chicago Tribune

Gun Violence Analysis

Group 1: Cuiting Zhong, Shuyuan Sun, Sichun Zuo

Contents

- Project goals
- Data Overview
- Time Series
- Location
- Suspect and Victim
- Conclusion

project goals

- Description:
  - Exploratory analysis
  - Different perspectives
  - Traits and trends of incidents
  - Forecast
- Importance of the problem:
  - International students
  - All of us who live here
  - Signals for unsafe place, time and people

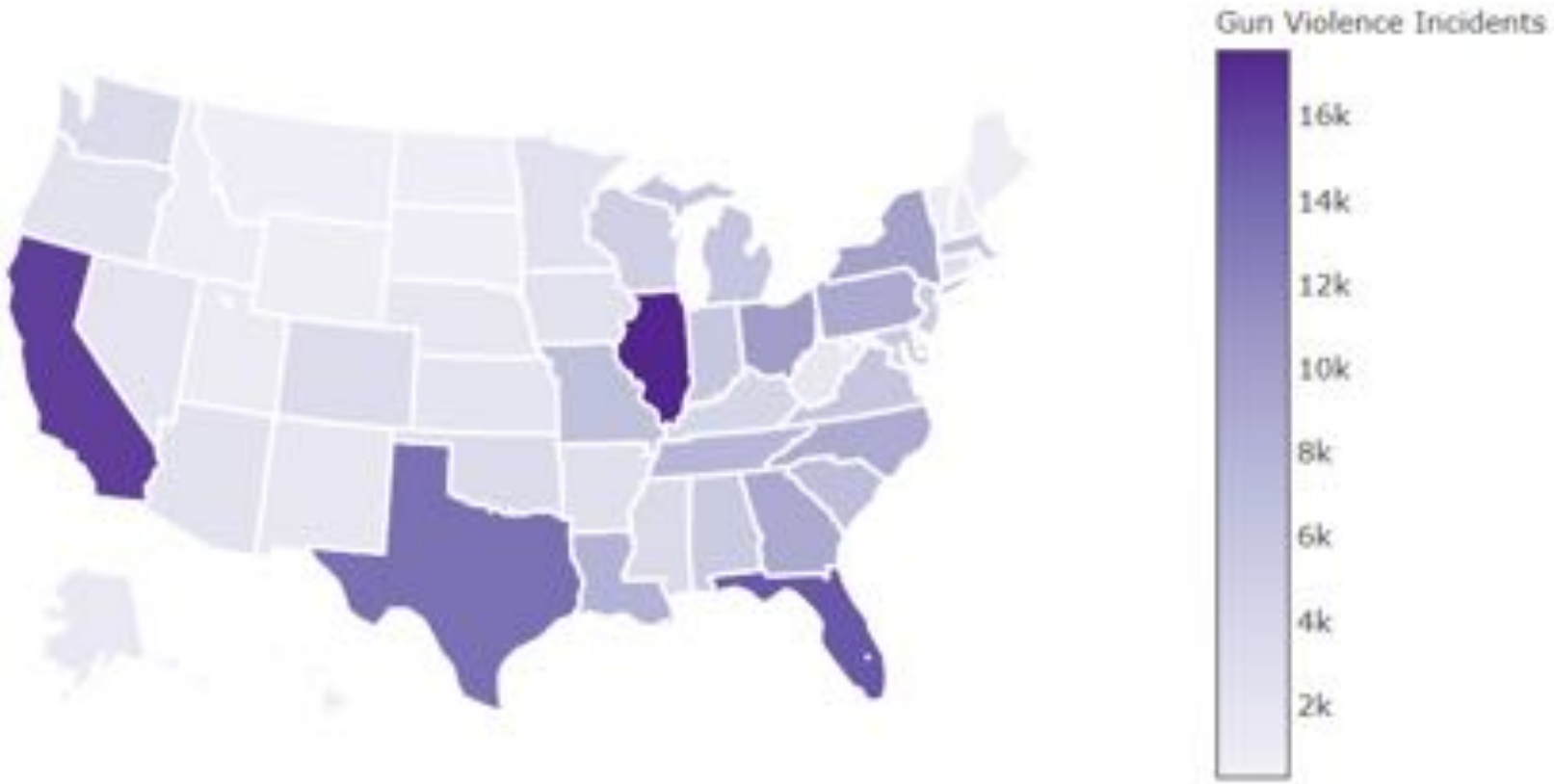
Data Overview

- Name: gun-violence-data_01-2013_03-2018
- Observations: 239768
- Texas observations: 13577
- Variables: 29
  - Removed: 10
  - Date: 1
  - Numerical: 7
  - Classification: 11

Variable Chosen	Variable Chosen	Variable Removed
incident_id, Date, city_or_county, Address, n_killed, n_injured , congressional_district, incident_characteristics, Latitude, location_description, Longitude,	Notes, participant_age, participant_age_group, participant_gender, participant_name, participant_status, participant_type, state_house_district state_senate_district	State, incident_url, source_ur, incident_url, fields_missing, gun_stolen, gun_type, n_guns_involved, participant_relationship, sources

Variables List

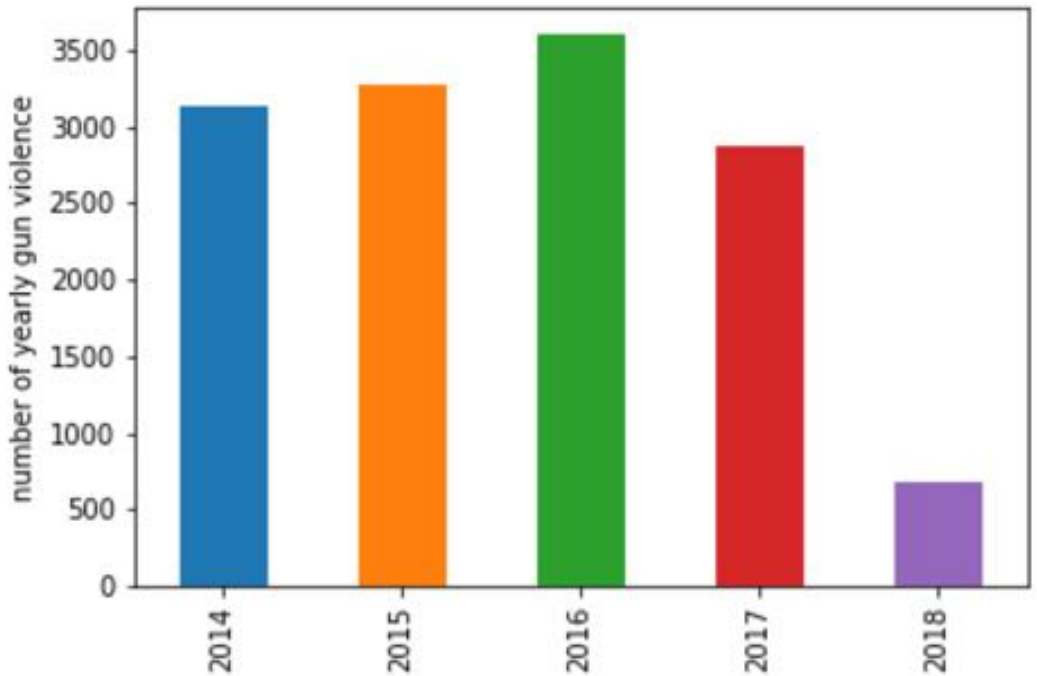
State Wise Number of Gun Violence Incidents



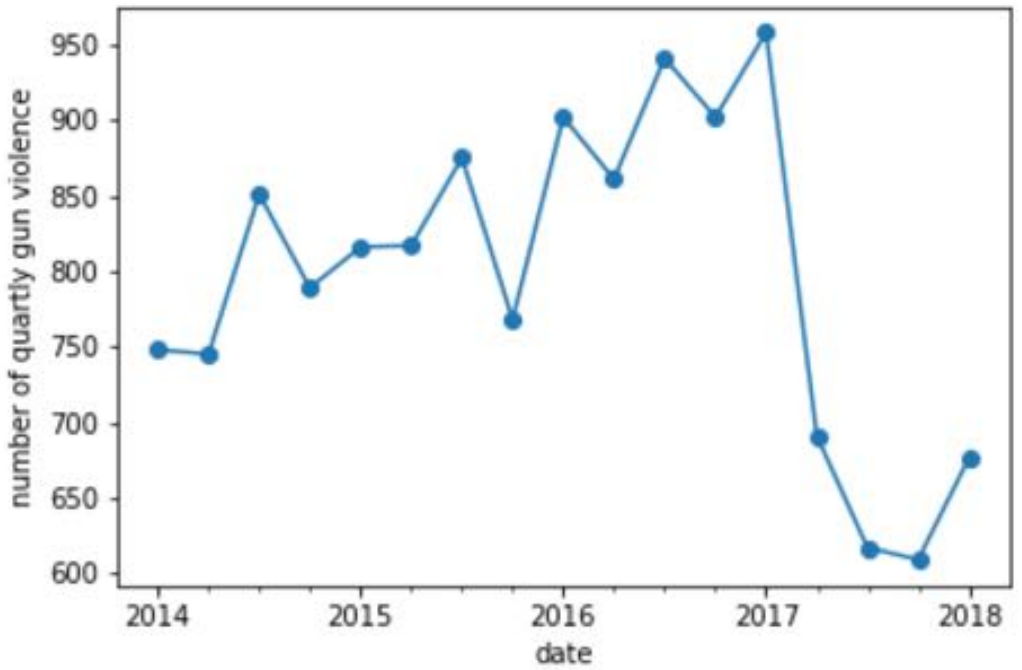
Time Series

Time Series

Yearly number of gun violence

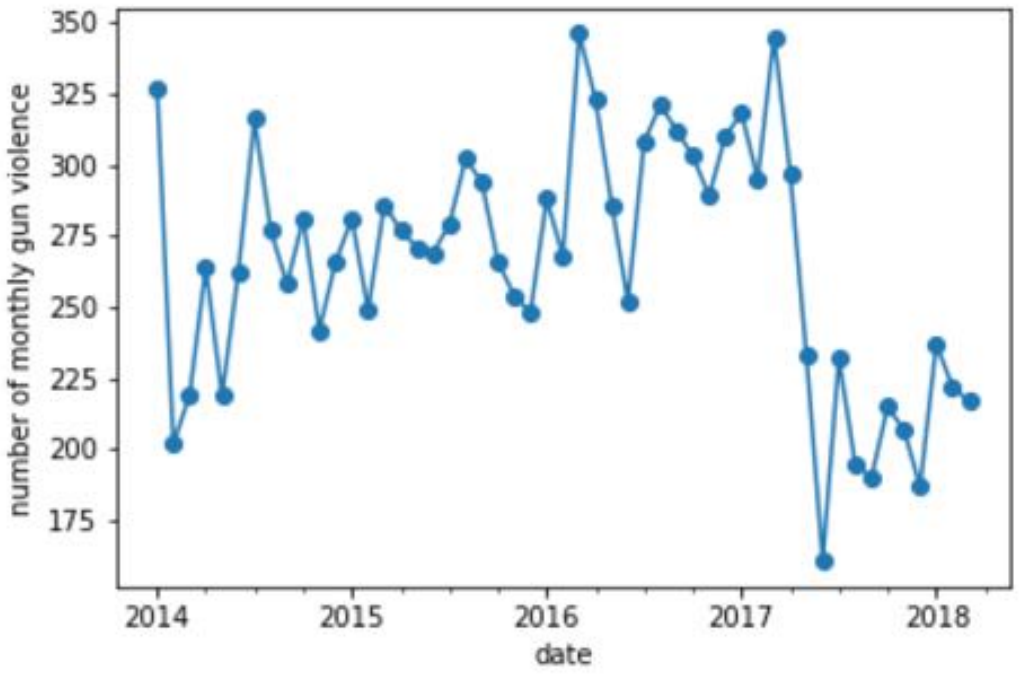


Quarterly number of gun violence

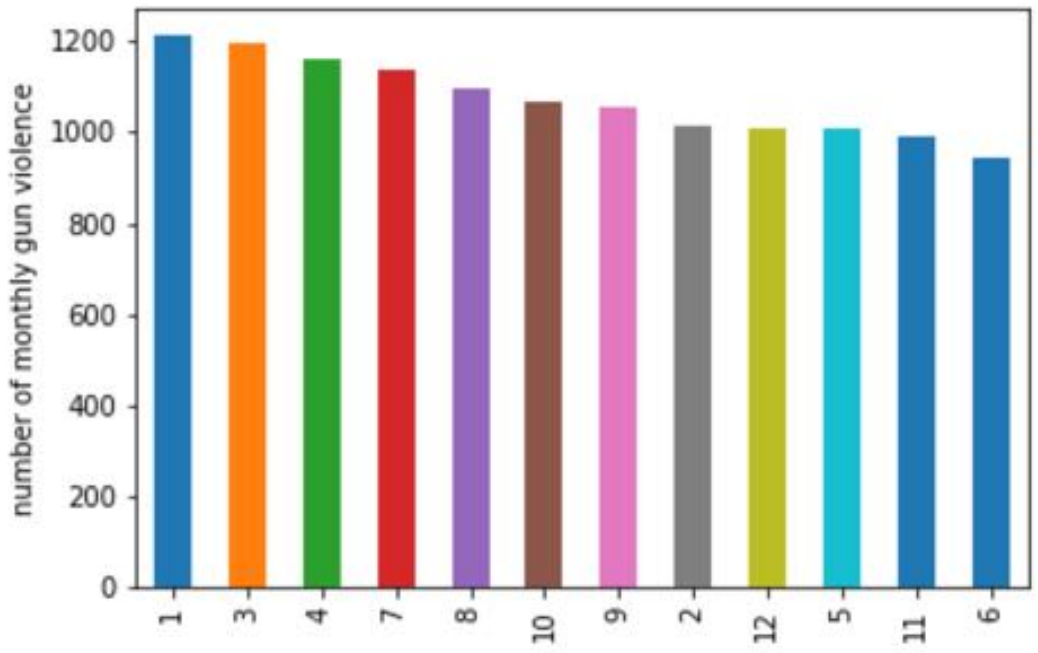


Time Series

Monthly number of gun violence

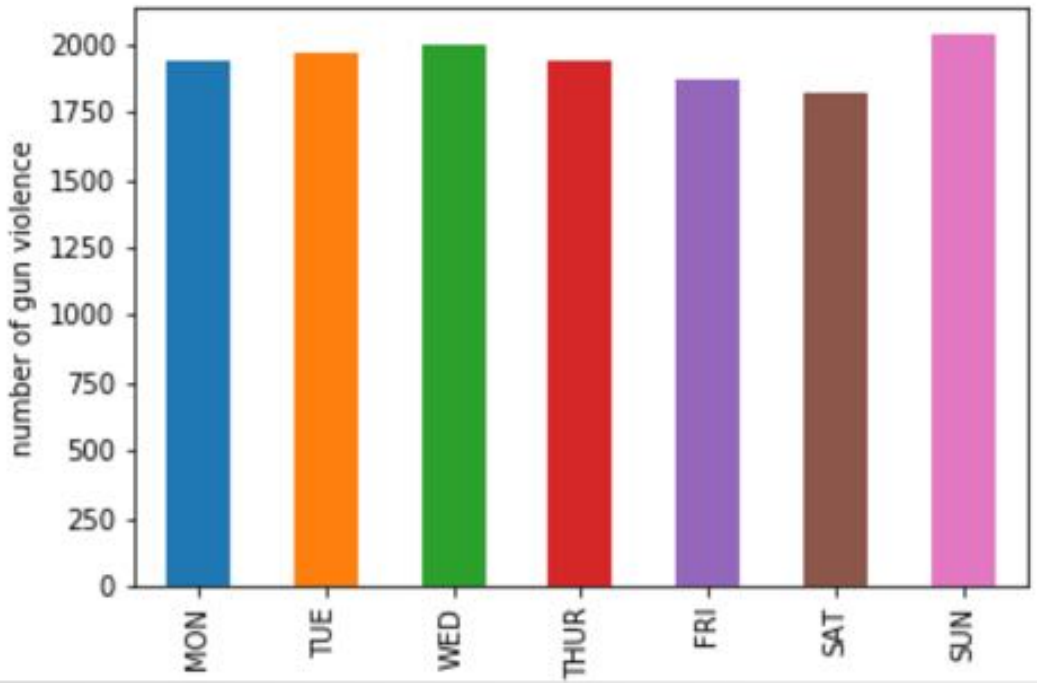


Monthly number of gun violence

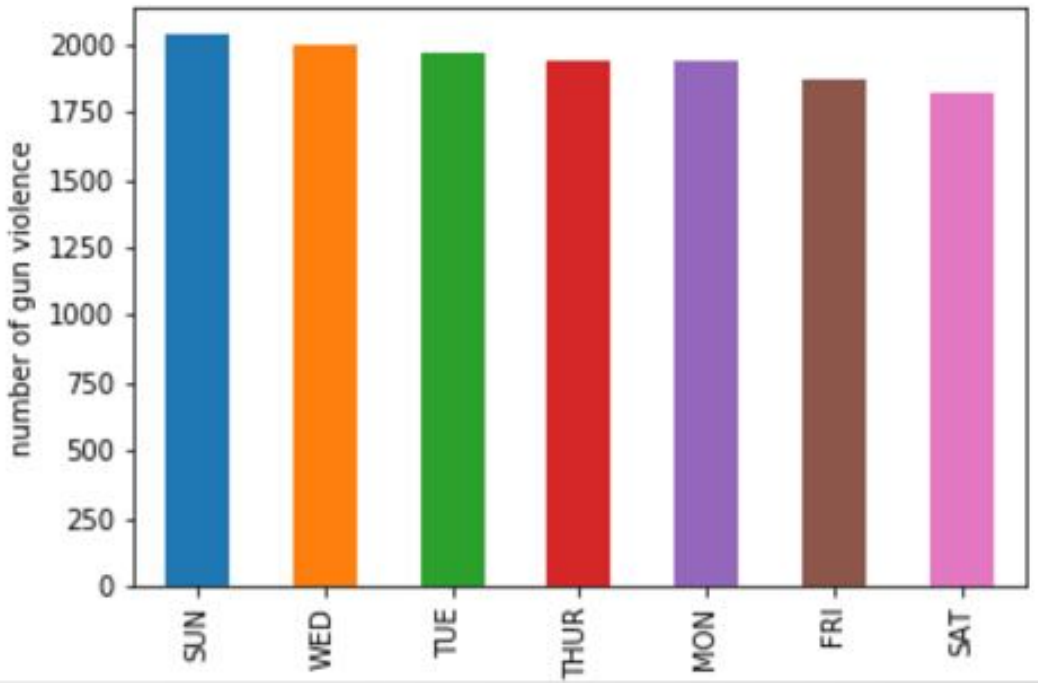


Time Series

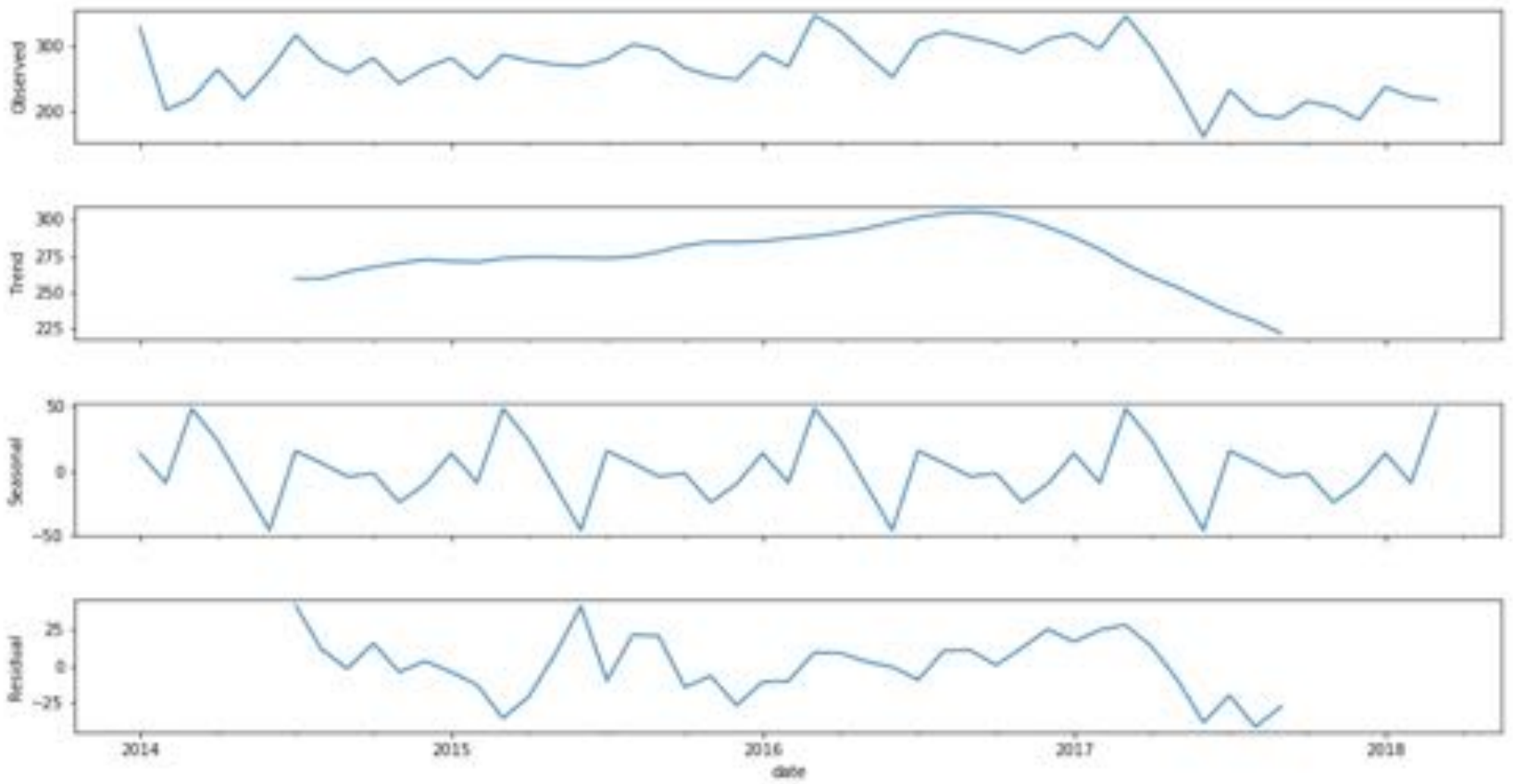
Dayofweek number of gun violence



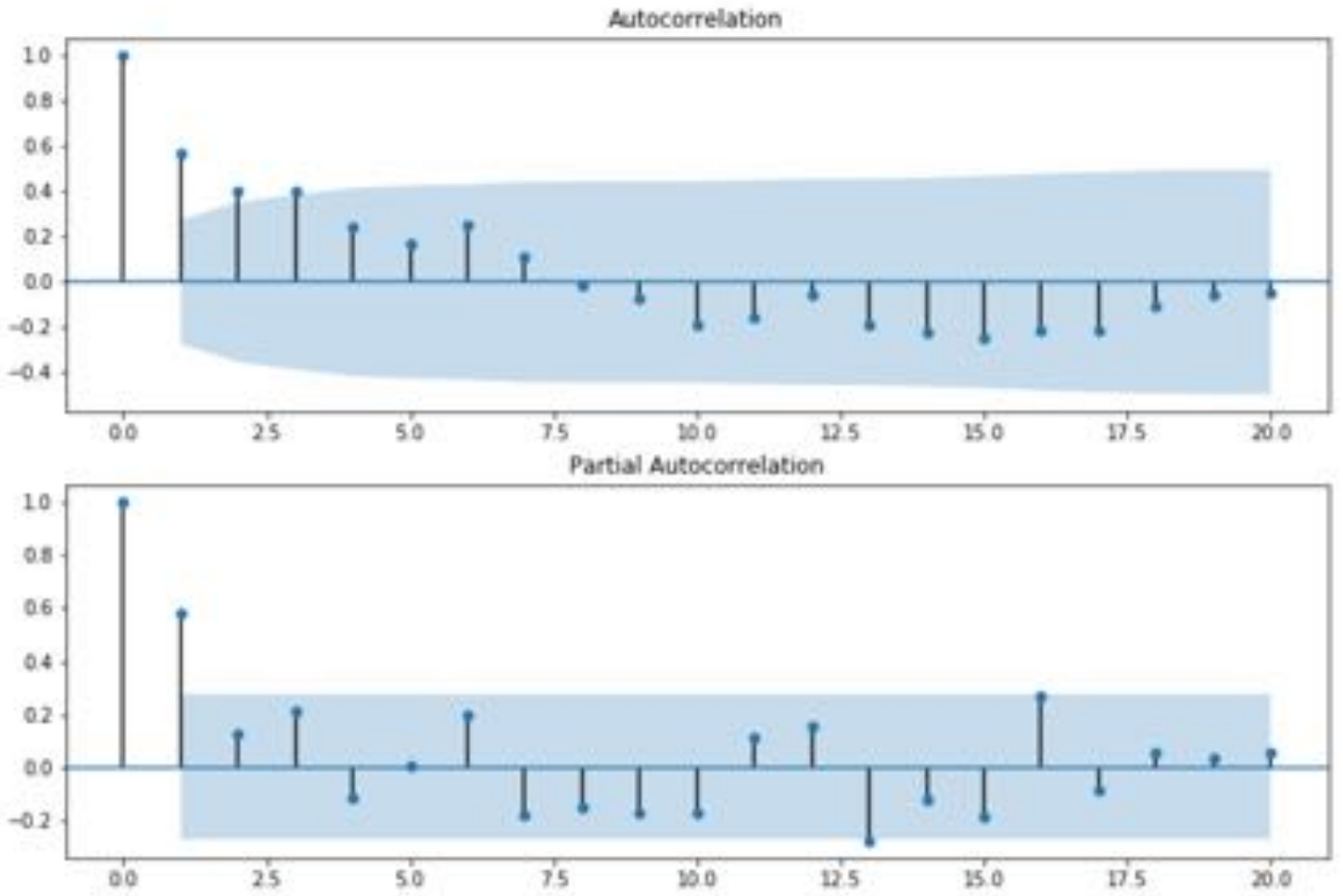
Dayofweek number of gun violence



Forecast


Observed
300
200
Trend
300
275
250
225
Seasonal
50
0
−50
Residual
25
0
−25
2014
2015
2016
2017
2018
date

Forecast


Autocorrelation
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
Partial Autocorrelation
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0

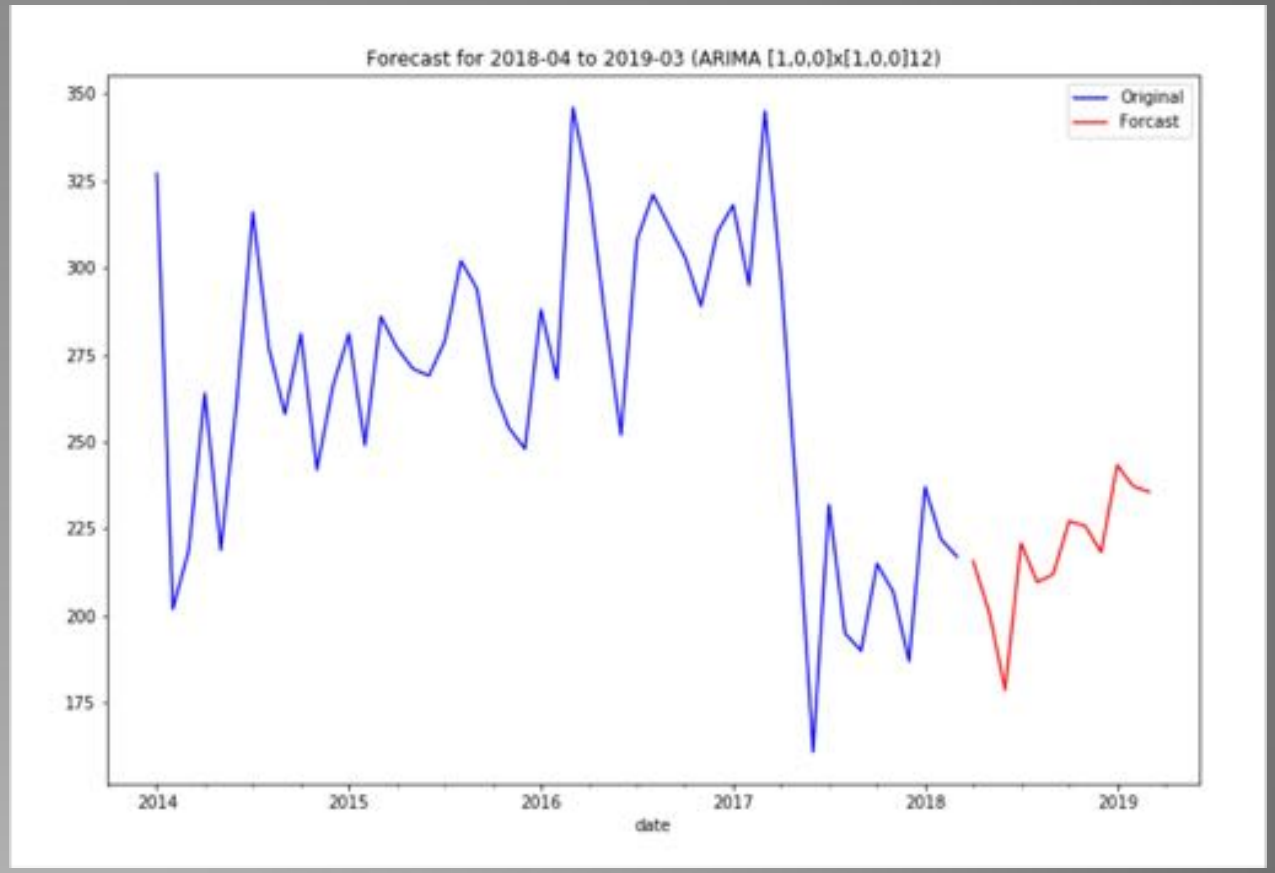
Forecast

ARIMA (1,0,0) x (1,0,0) $_{12}$ model:

$Y_t = 35.6038 + 0.7362 * Y_{t-1} + 0.4732 * Y_{t-12}$
$- 0.7362 * 0.4732 * Y_{t-13} + e_t$
Where $e_t \sim (0, 993.8709)$

Date	2018								
	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
#of gun violence	216	201	179	221	210	212	227	226	218

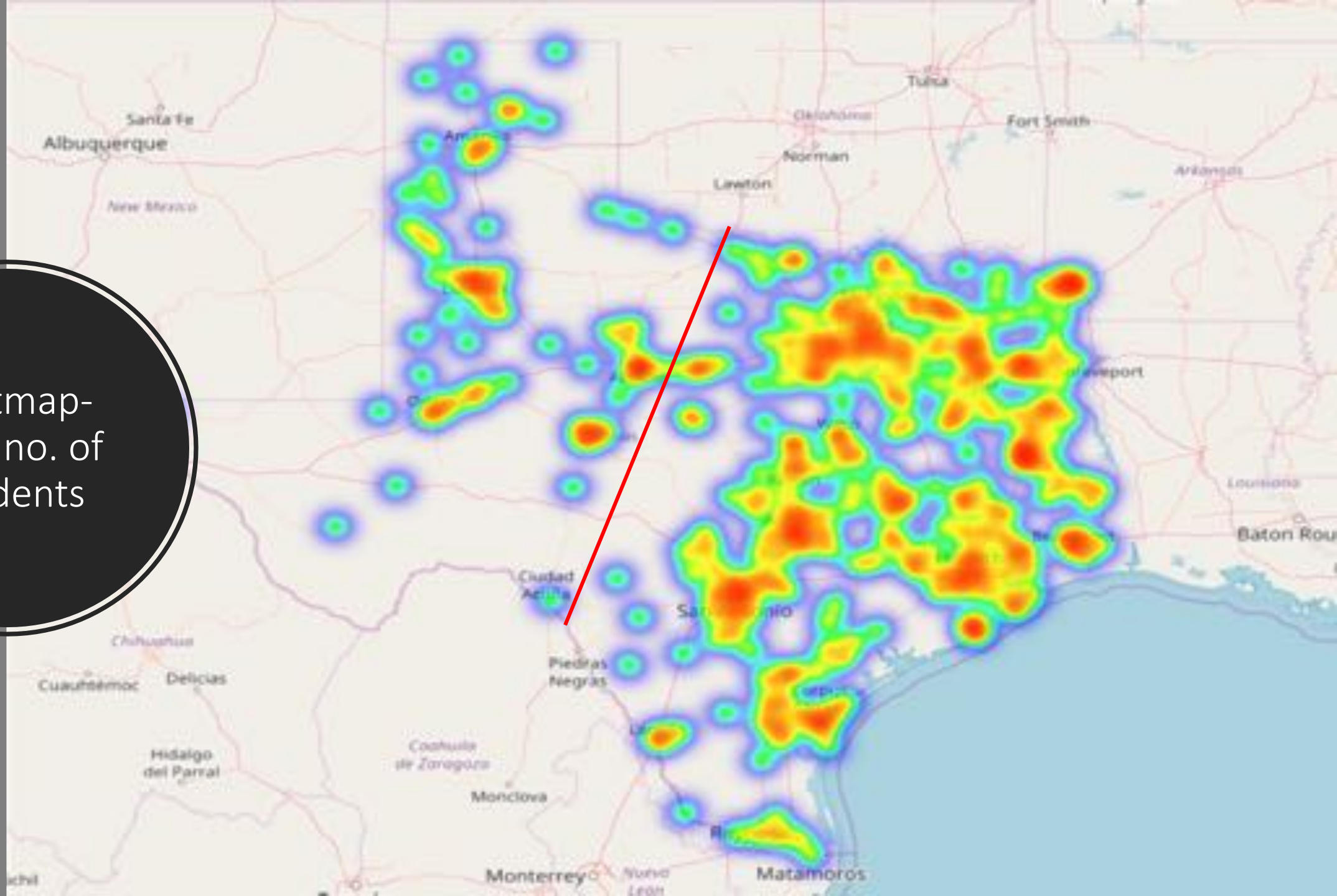
Date	2019		
	Jan	Feb	Mar
#of gun violence	243	237	236



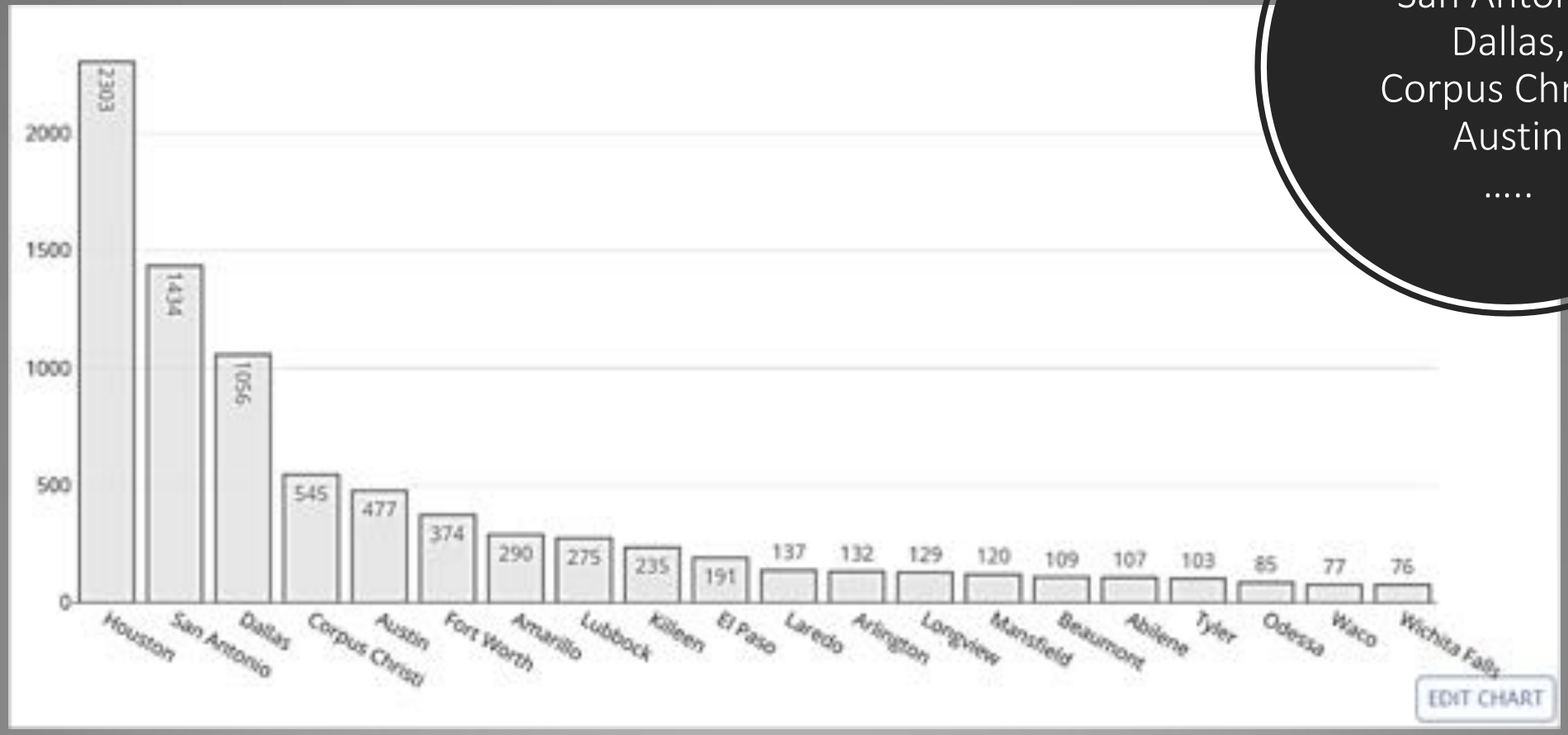
Location

Incidents by city

Heatmap- Total no. of incidents

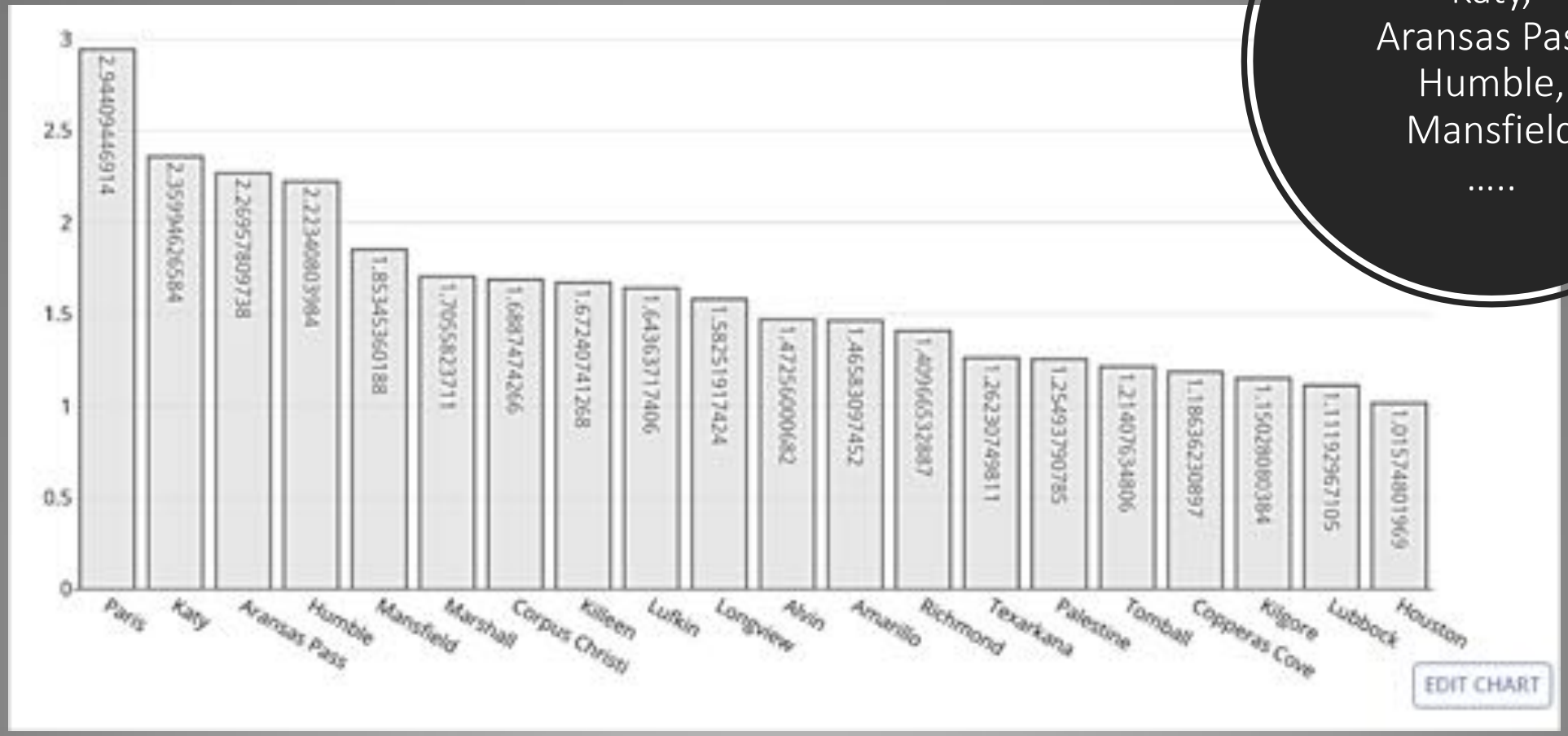


Total no. of incidents by city-TOP20



Houston,
San Antonio,
Dallas,
Corpus Christi,
Austin
.....

Incidents per 1k people by city-TOP20

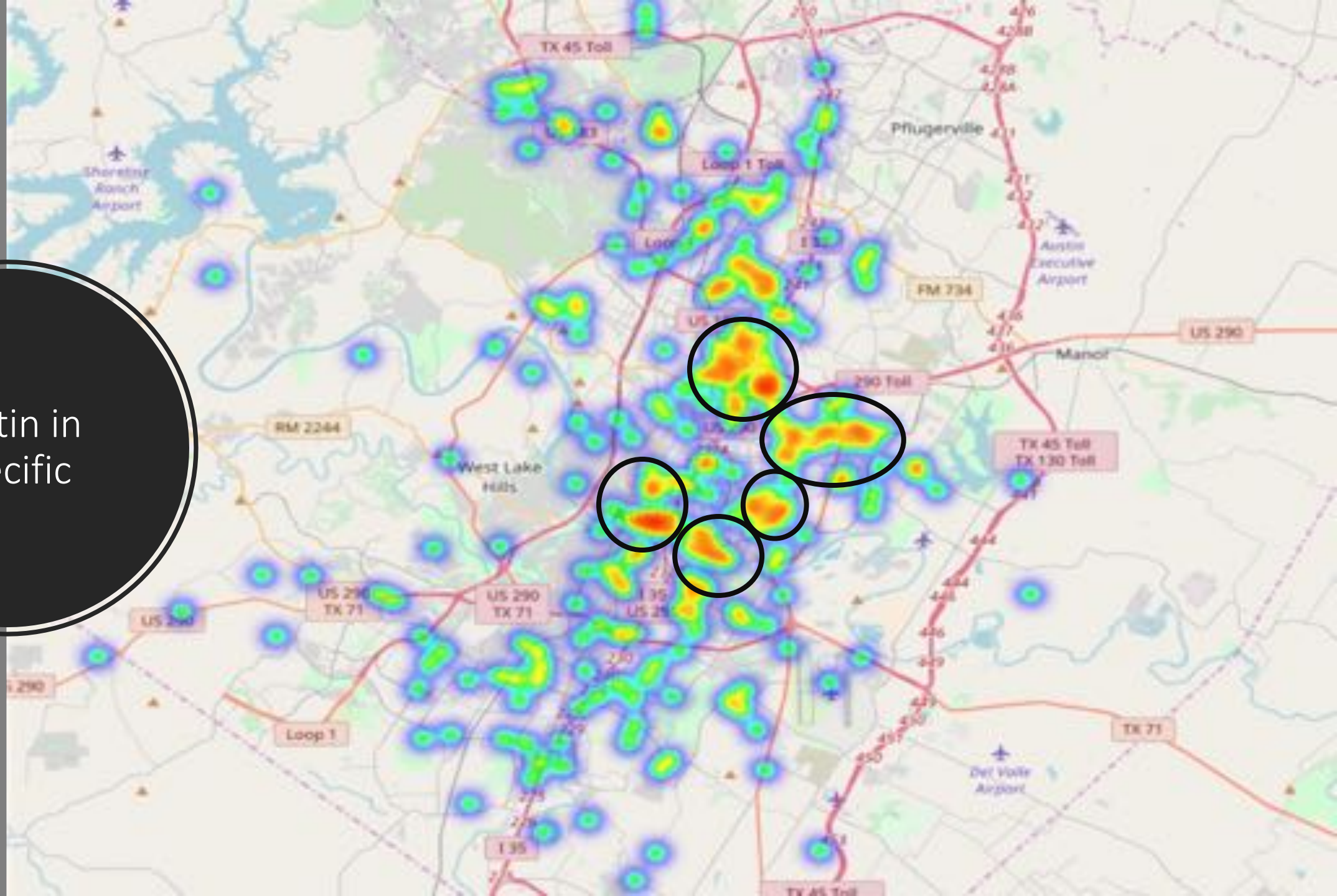


Paris,
Katy,
Aransas Pass,
Humble,
Mansfield
…..

Cities in both TOP20

	PLACE	per1k_vio_x	Total_vio_x	AVGpop_x
0	Mansfield	1.853454	120	64744.0
1	Corpus Christi	1.688747	545	322724.4
2	Killeen	1.672407	235	140516.0
3	Longview	1.582519	129	81515.6
4	Amarillo	1.465831	290	197840.0
5	Lubbock	1.111930	275	247317.8
6	Houston	1.015748	2303	2267294.6

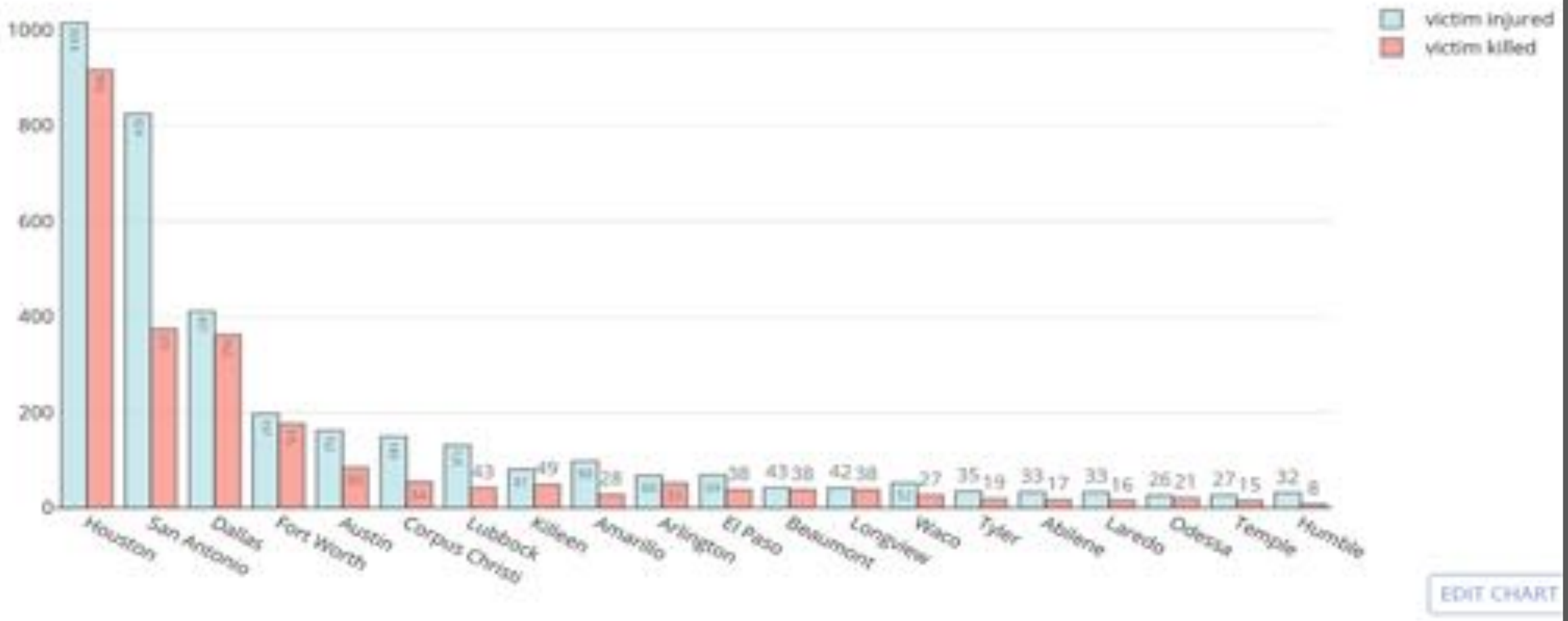
Austin in specific



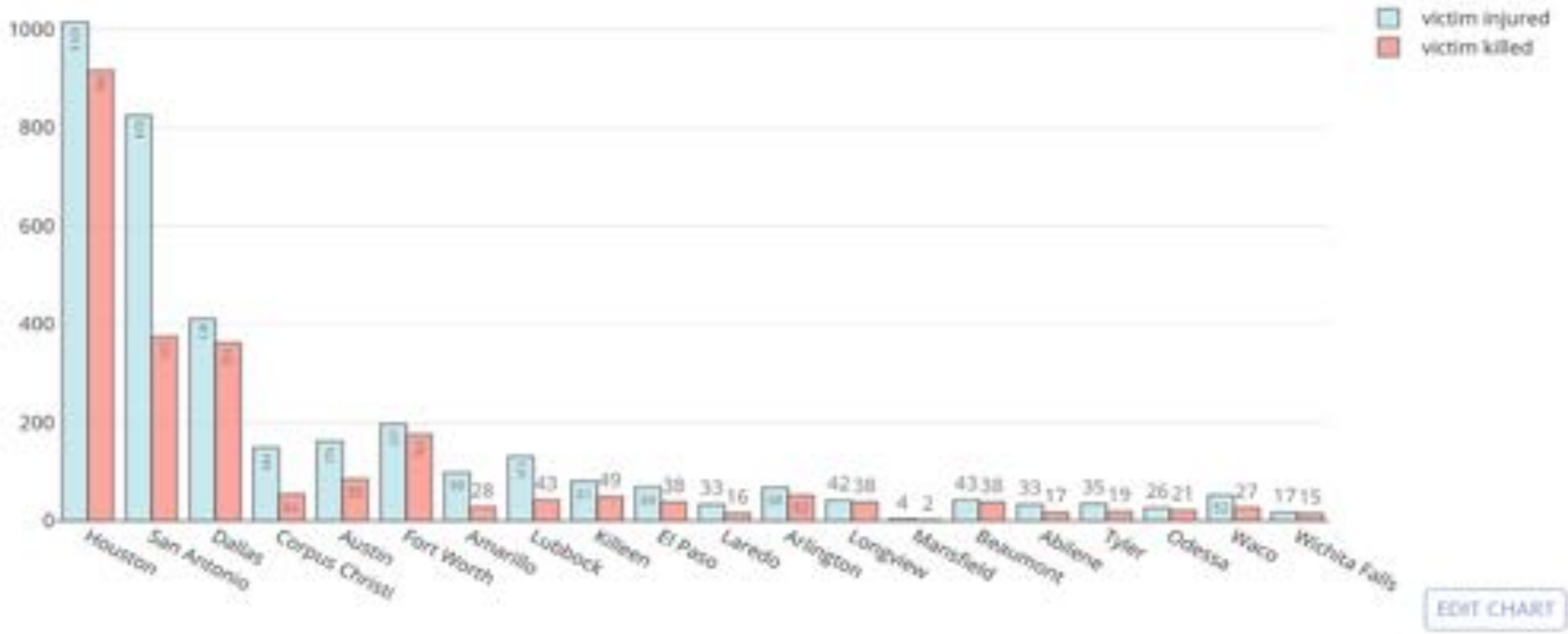
Location

Victims by city

Total no. of victims killed and injured by city (rank by total loss)



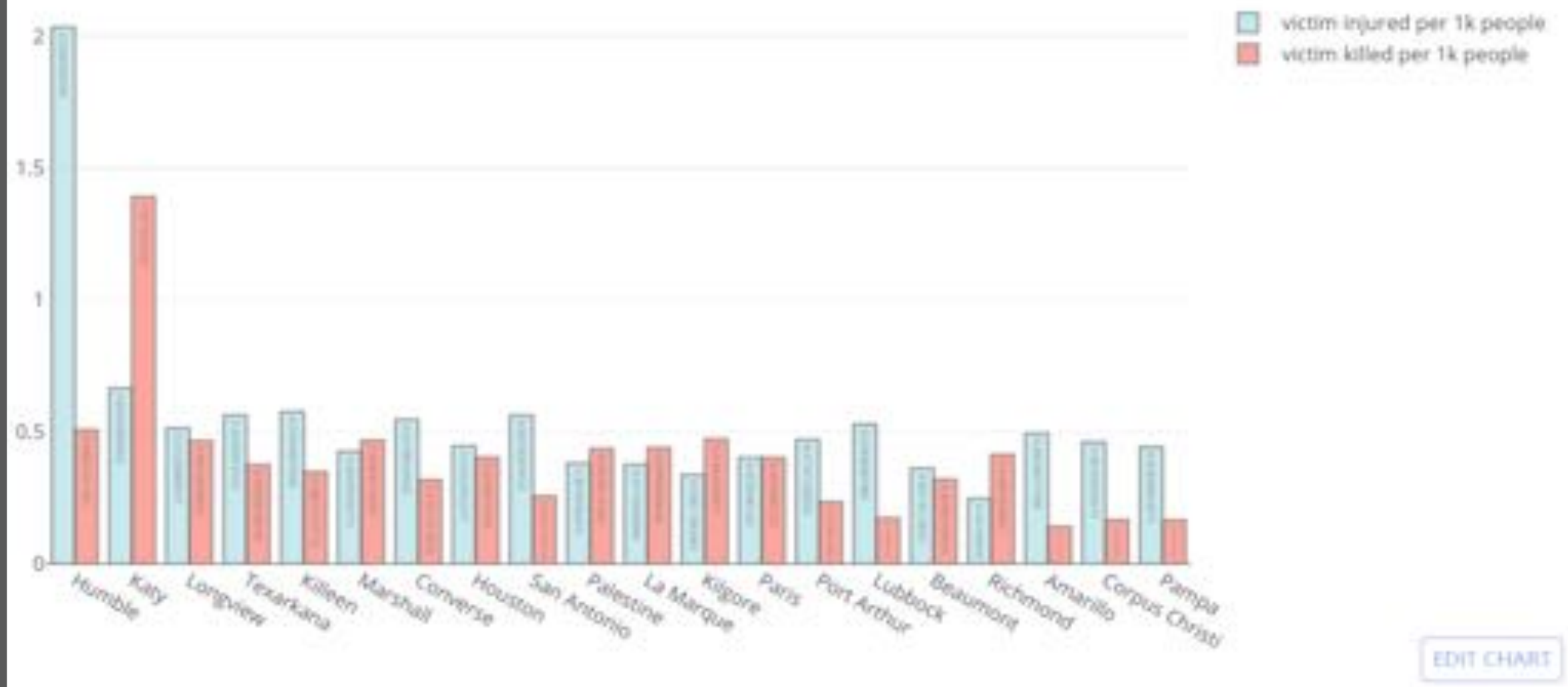
Total no. of victims killed and injured by city (rank by total violence)



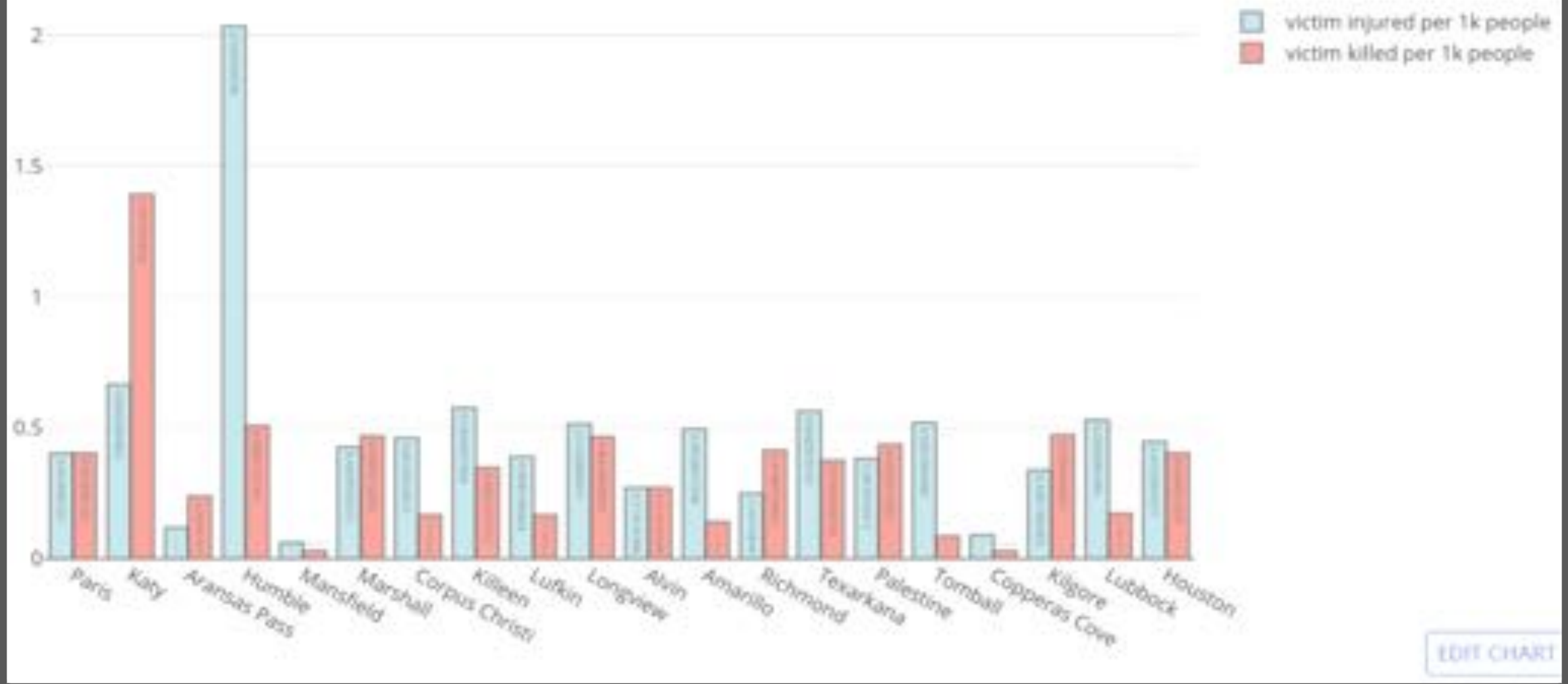
	PLACE	n_injured	n_killed	total_loss	Total_vio
446	Temple	27	15	42	47
255	Humble	32	8	40	35

Cities with more people killed or injured
while fewer number of incidents

No. of victims killed and injured per 1k people by city (rank by total loss per 1k people)



No. of victims killed and injured per 1k people by city (rank by total violence per 1k people)



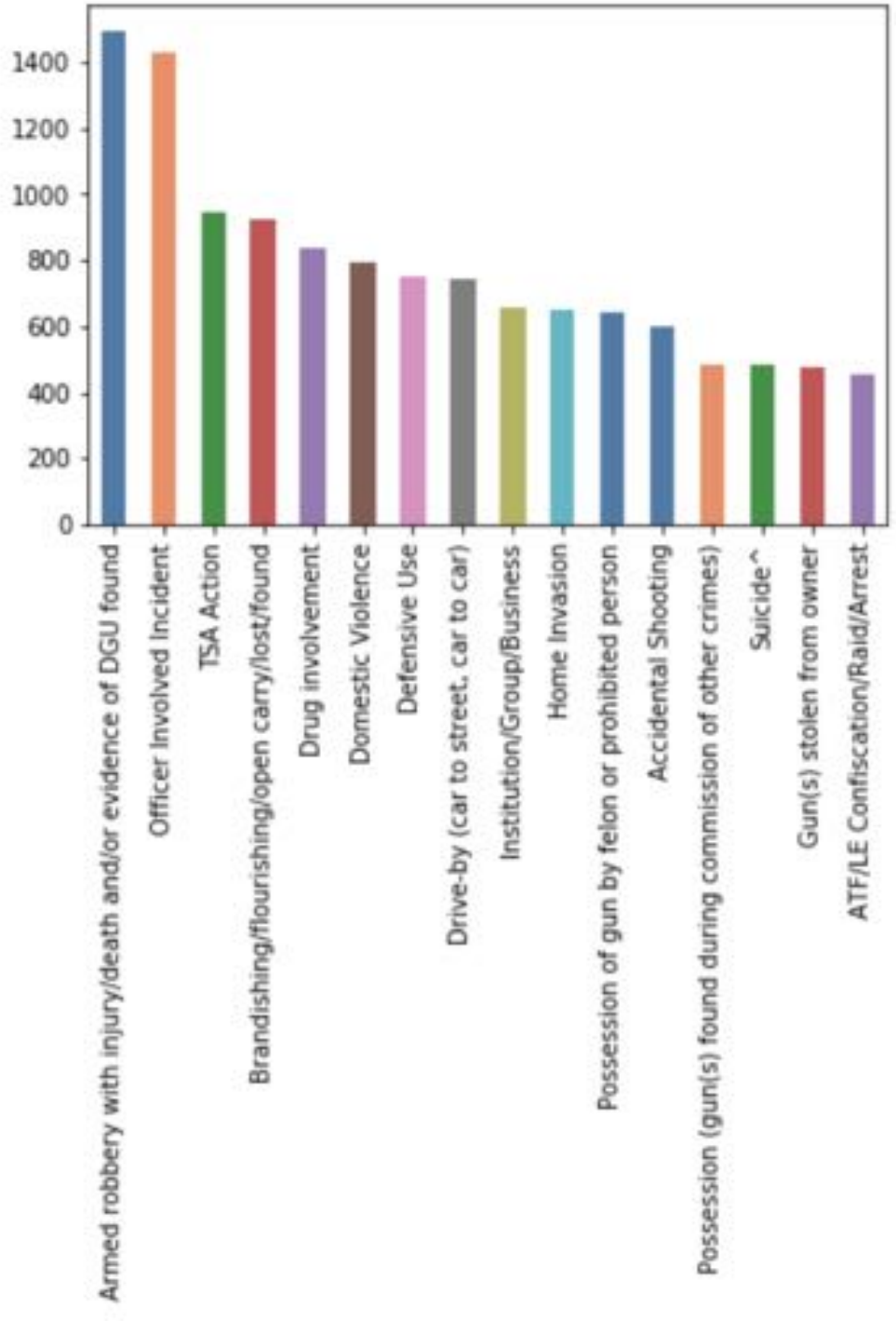
Cities with more people killed or injured per 1k residents while fewer number of incidents per 1k residents

	PLACE	per1k_inj	per1k_kill	total_loss_1k	per1k_vio
157	Converse	0.547390	0.319311	0.866701	0.775470
402	San Antonio	0.563743	0.256558	0.820301	0.981077
289	La Marque	0.377126	0.439980	0.817106	0.879961
375	Port Arthur	0.471477	0.235739	0.707216	0.779751
33	Beaumont	0.363132	0.320907	0.684040	0.920498
360	Pampa	0.443661	0.166373	0.610033	0.720949

Location

Incident characteristic

Incident characteristic in Texas total

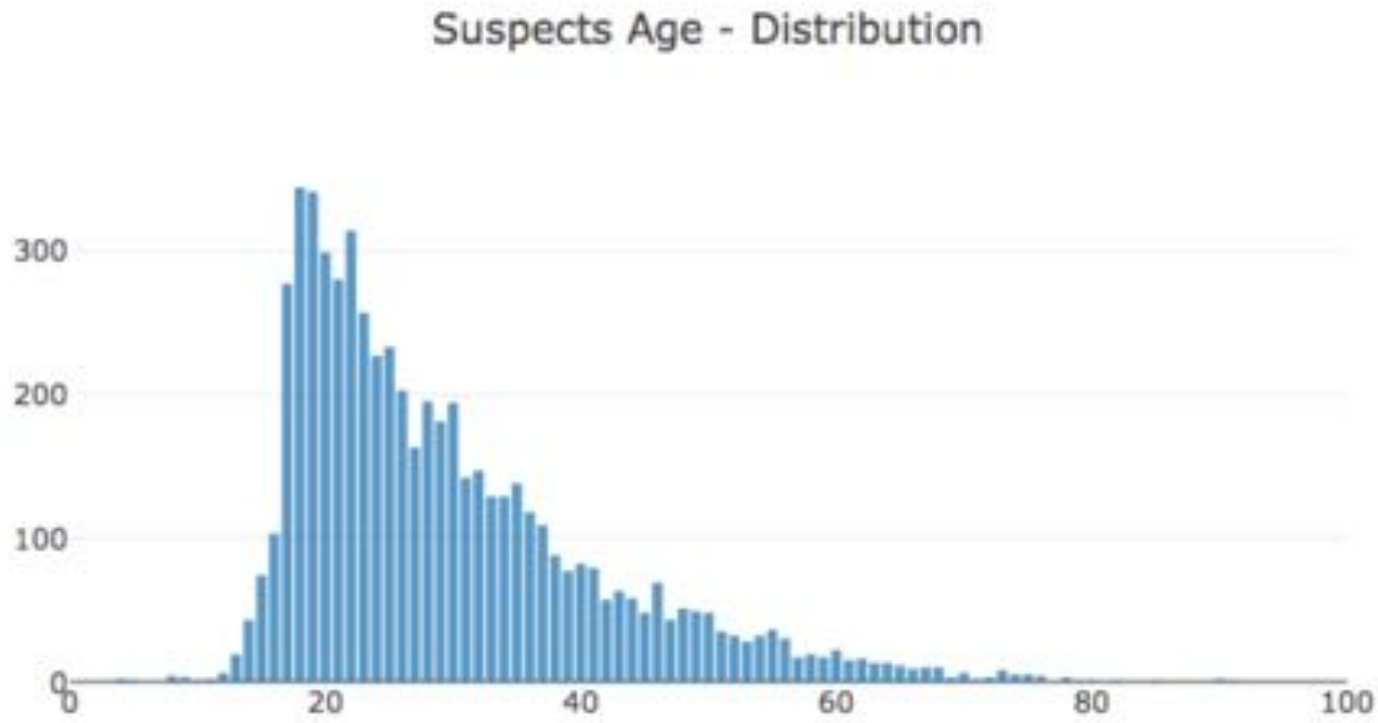


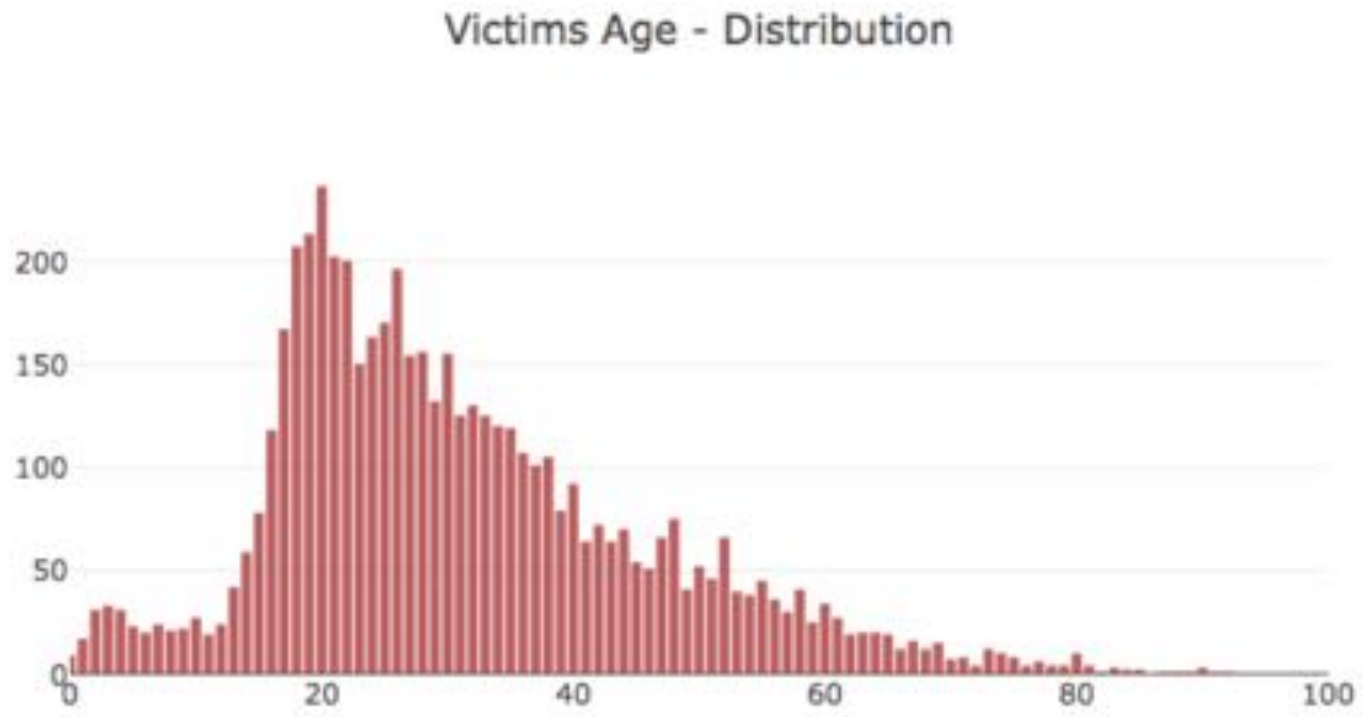
city_or_county	Most common incident	Num incident
Houston	Armed robbery with injury/death and/or evidenc...	394
Dallas	TSA Action	266
San Antonio	Drive-by (car to street, car to car)	182
Austin	TSA Action	108
Corpus Christi	Armed robbery with injury/death and/or evidenc...	68
Fort Worth	Armed robbery with injury/death and/or evidenc...	53
Lubbock	Armed robbery with injury/death and/or evidenc...	42
Irving	TSA Action	40
Amarillo	Armed robbery with injury/death and/or evidenc...	34
El Paso	Officer Involved Incident	31
Arlington	Officer Involved Incident	25
Laredo	Brandishing/flourishing/open carry/lost/found	20
Grand Prairie	Domestic Violence	8
Garland	Armed robbery with injury/death and/or evidenc...	6
Plano	Armed robbery with injury/death and/or evidenc...	5

Incident characteristic by city

Suspect and Victim

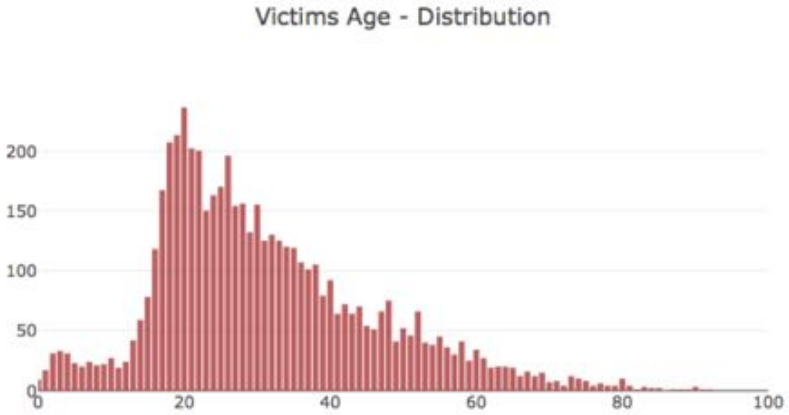
Age Distribution of Suspect

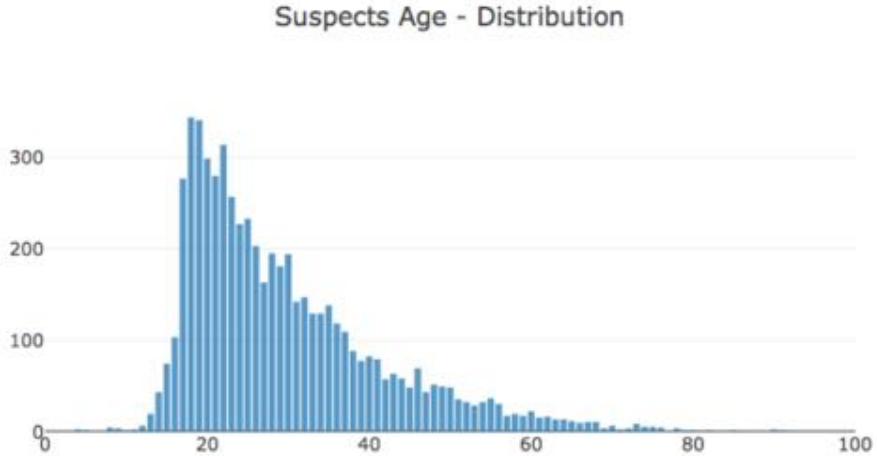




Age Distribution of Victim

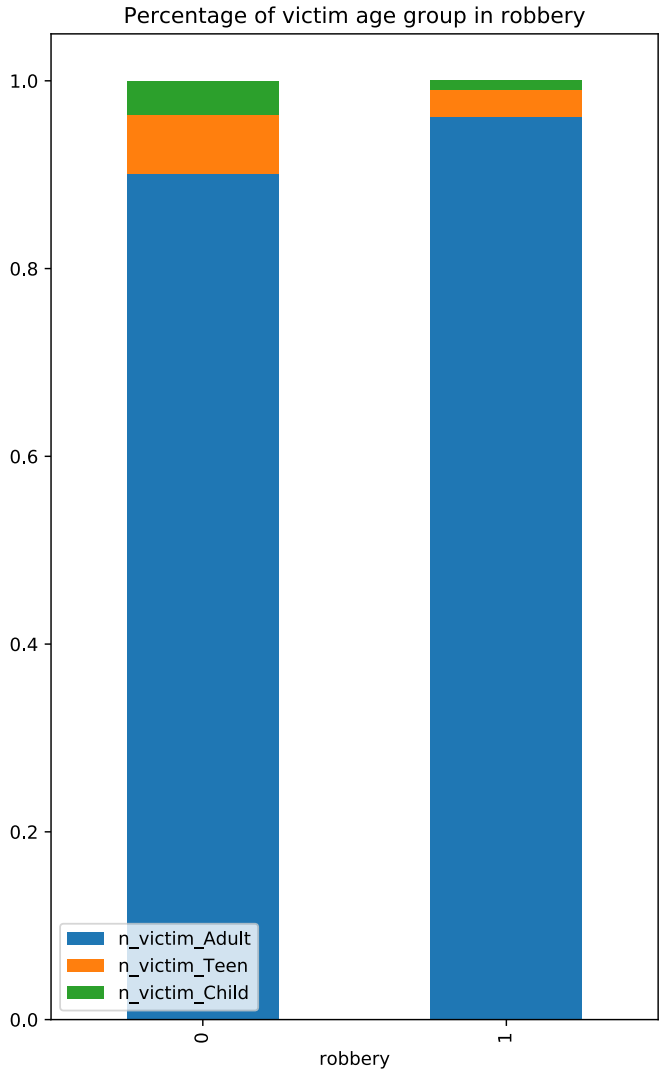
Age Distribution of Suspect and Victim





Victim Age group percentage

- Robbery
- drive by
- mass-shooting



Victim Age group percentage

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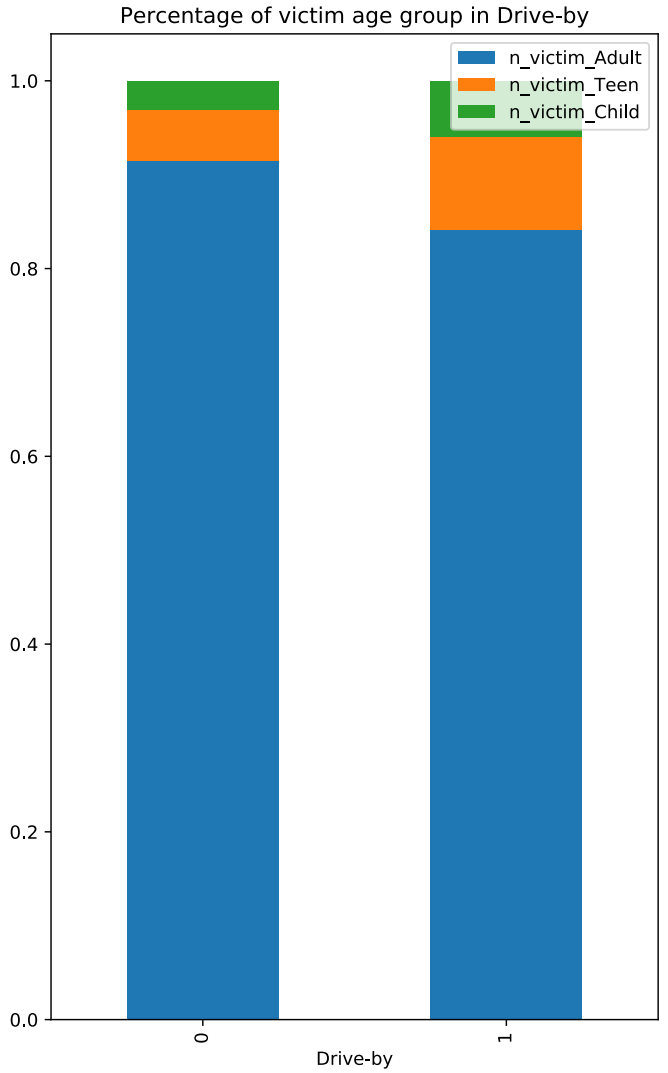

Victim Age group percentage

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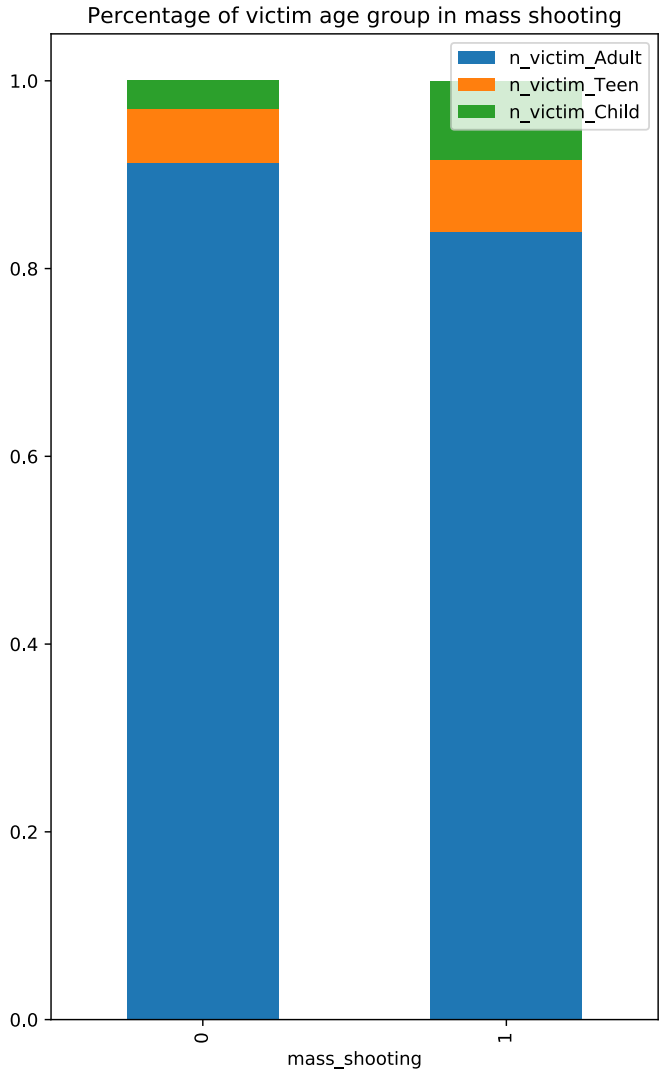
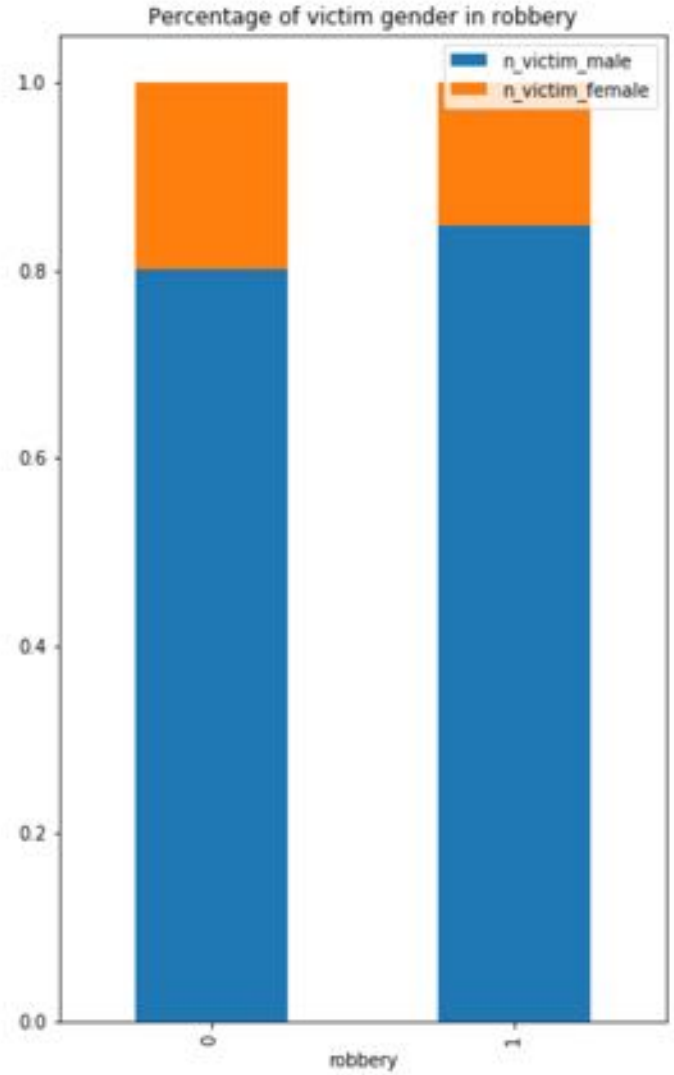


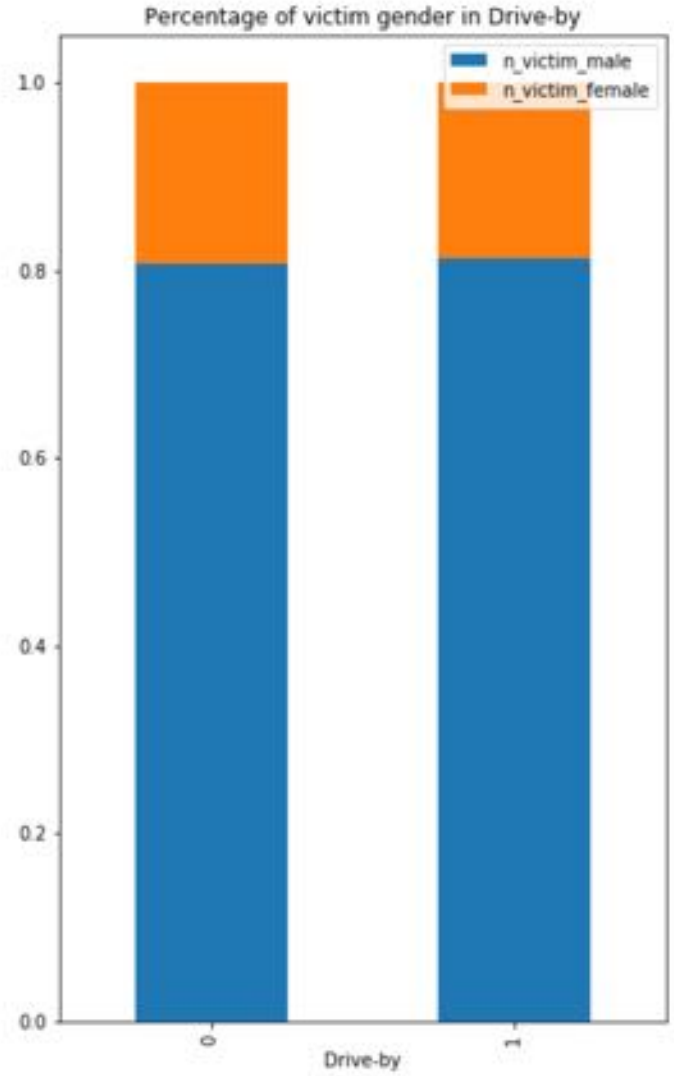
Victim Gender percentage

- Robbery
- drive by
- mass-shooting



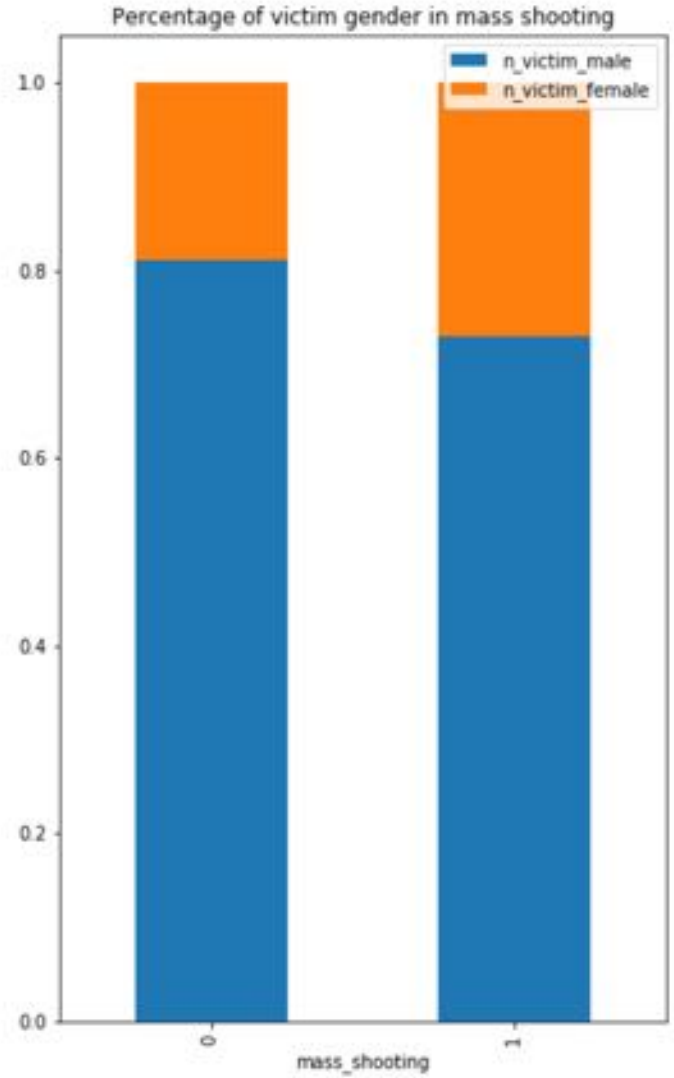
Victim Gender percentage

- Robbery
- drive by
- mass-shooting



Victim Gender percentage

- Robbery
- drive by
- mass-shooting



Conclusion and insights

- Time series and prediction
- “Dangerous” places
- Traits of incidents and participants

Q & A