Rio de Janeiro

Relationship between guns captured by the police in the city of Rio de Janeiro and the number of thefts, robberies, threats and reports to the police

Contents

Introduction

- I have decided to deal with the relationship between guns captured by the police in the city of Rio de Janeiro and the number of thefts, robberies, threats and reports to the police, as Rio de Janeiro is known for being one of the most violent cities in the world.

- In my opinion many might be interested in the problem, but most likely people involved with security of citizens in Rio de Janeiro, so police and politicians mostly.

Data

- The data I used was taken from the public security portal. The files I used were the top three, those are monthly statistics for almost all things public security related and then statistics for guns apprehended. All statistics I got went from 2003 all through 2019.

	CISP	mes	vano	mes_ano	AISP	RISP	munic	mcirc	Regiao	hom_doloso	...	pessoas_desaparecidas	encontro_cadaver	encontro_ossad
0	1	1	2003	2003m1	5	1	Rio de Janeiro	3304557	Capital	0	...	2	0	0
1	4	1	2003	2003m1	5	1	Rio de Janeiro	3304557	Capital	3	...	6	0	1
2	5	1	2003	2003m1	5	1	Rio de Janeiro	3304557	Capital	3	...	2	1	0
3	6	1	2003	2003m1	1	1	Rio de Janeiro	3304557	Capital	6	...	2	1	0
4	7	1	2003	2003m1	1	1	Rio de Janeiro	3304557	Capital	4	...	1	3	0

	Year	Month	Robberies	Thefts	Threats	Reports	Guns
0	2003	1	10296	10483	6127	44793	1154
1	2003	2	10634	10335	6047	45403	1324
2	2003	3	9976	10976	5793	45417	1344
3	2003	4	10222	10409	5626	44184	1336
4	2003	5	10875	10414	5436	45572	1292

Methodology

- Regression to figure out any relationship between guns captured and crimes
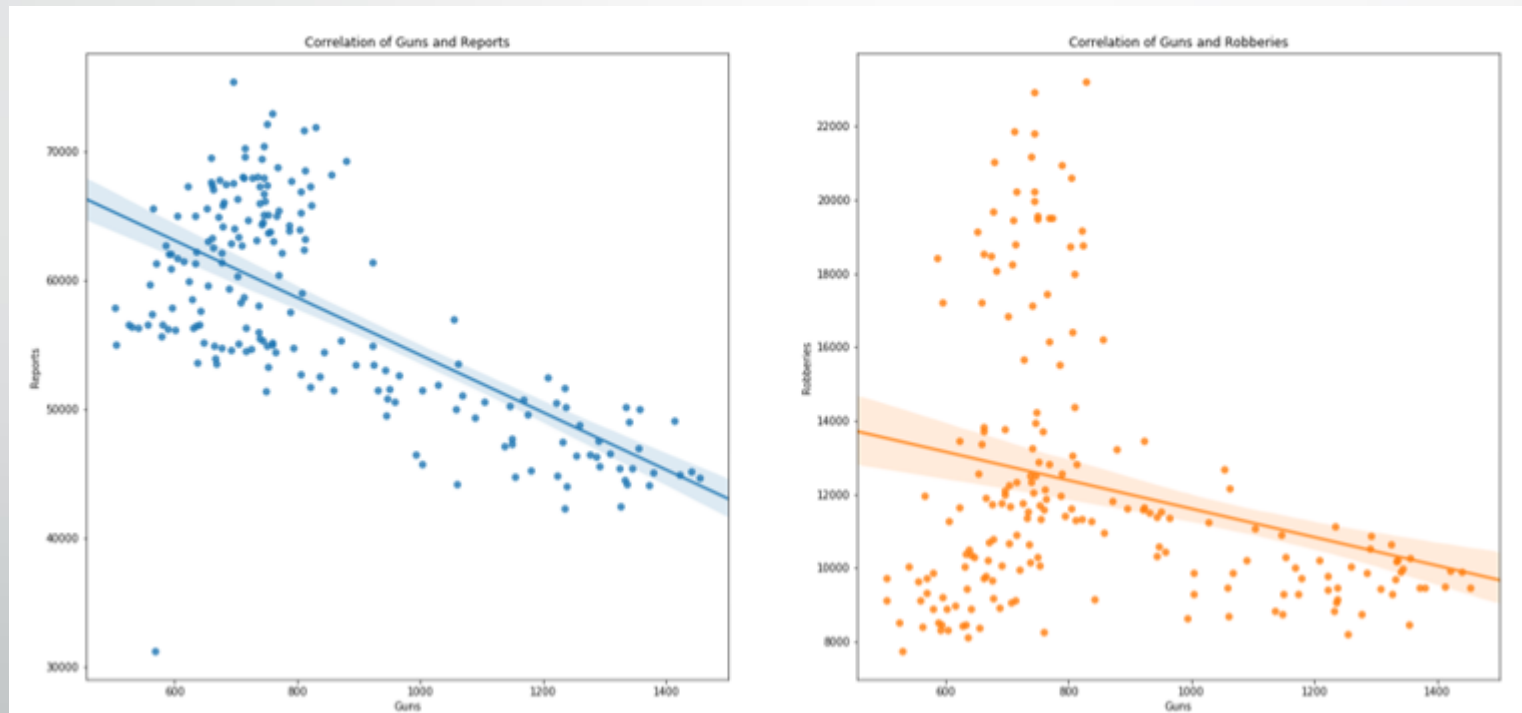
Methodology
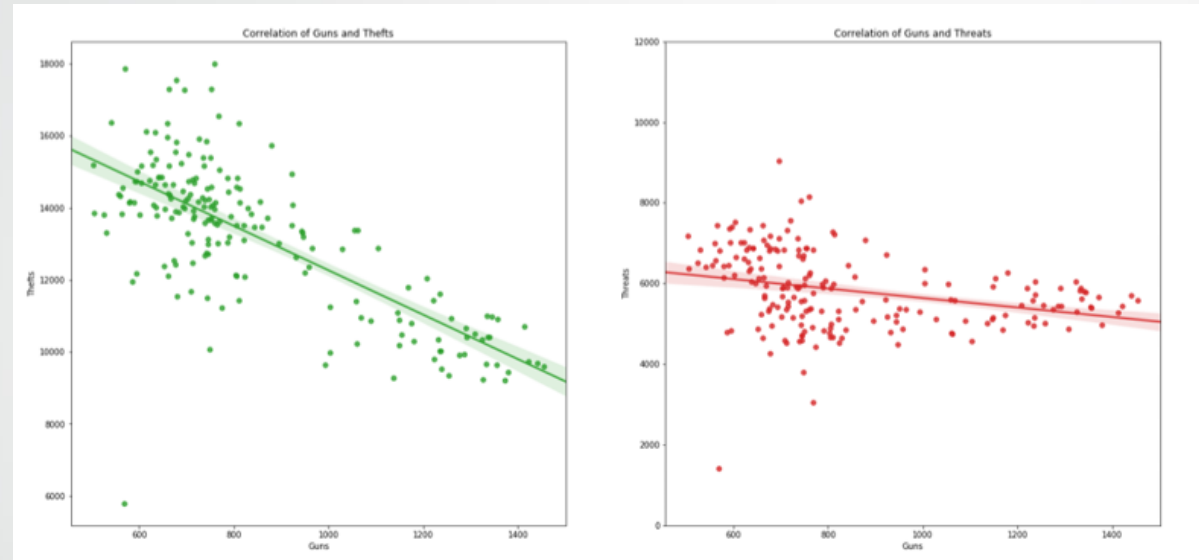
- As we can see, there is an obvious correlation between the apprehension of guns and crimes committed. There is a negative line which means that the more guns are apprehended the fewer crimes are committed, which was to be expected. To be sure we will check out the correlation between all variables.

Methodology

- We plot up the variables to see if there is an obvious visual correlation:
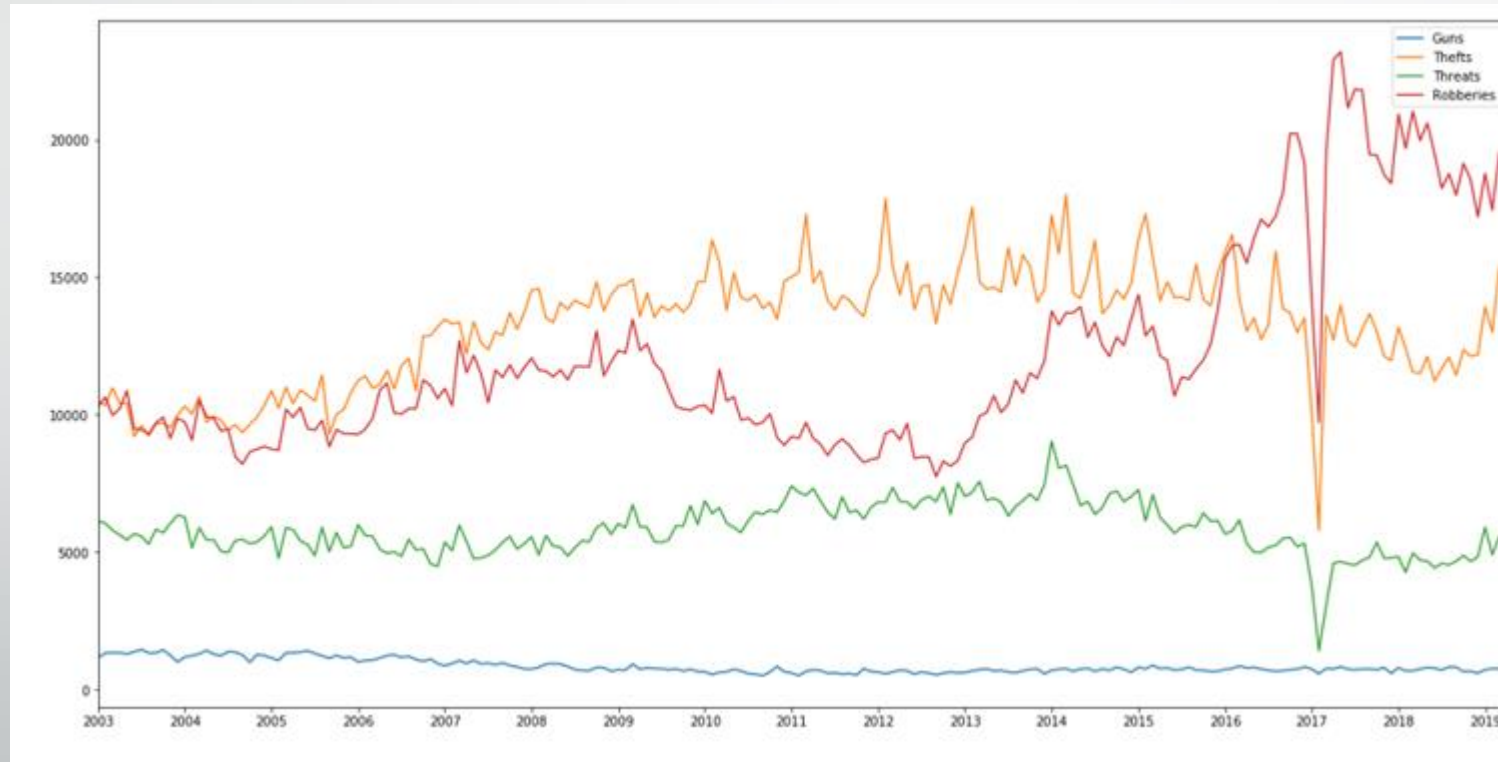
Methodology
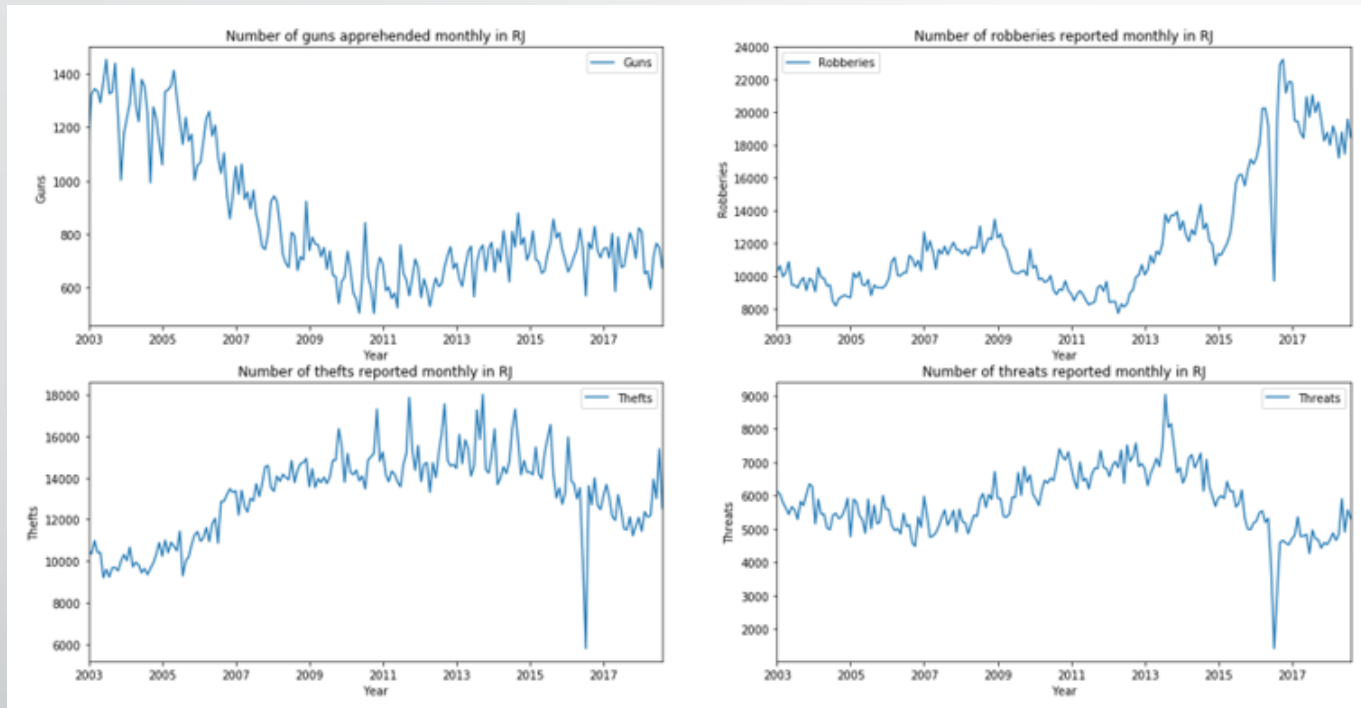
The Pearson Correlation Coefficient is -0.7311007989079222 with a P-value of P = 4.775783191642987e-34
The Pearson Correlation Coefficient is -0.3010673224077392 with a P-value of P = 1.803769320742312e-05
The Pearson Correlation Coefficient is -0.25582274994672677 with a P-value of P = 0.0002957215346176379
The Pearson Correlation Coefficient is -0.6718014009591574 with a P-value of P = 4.382898870449731e-27

- Now we can see the visual correlation that when gun apprehension was very high in the early 2000's crime rate was lower. When gun apprehension went down, crime rate went up.

Results

Theft Mean absolute error: 897.21
Theft Residual sum of squares (MSE): 1560877.39
Theft R2-score: 0.37
Reports Mean absolute error: 5616.36
Reports Residual sum of squares (MSE): 45685358.54
Reports R2-score: -0.39
Robbery Mean absolute error: 3141.24
Robbery Residual sum of squares (MSE): 18707405.69
Robbery R2-score: -16.96
Threat Mean absolute error: 686.88
Threat Residual sum of squares (MSE): 728326.47
Threat R2-score: -7.00
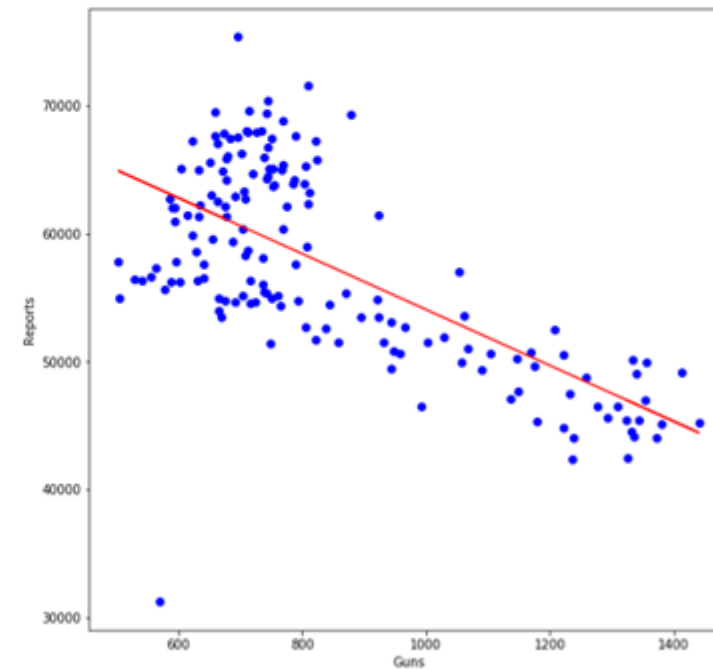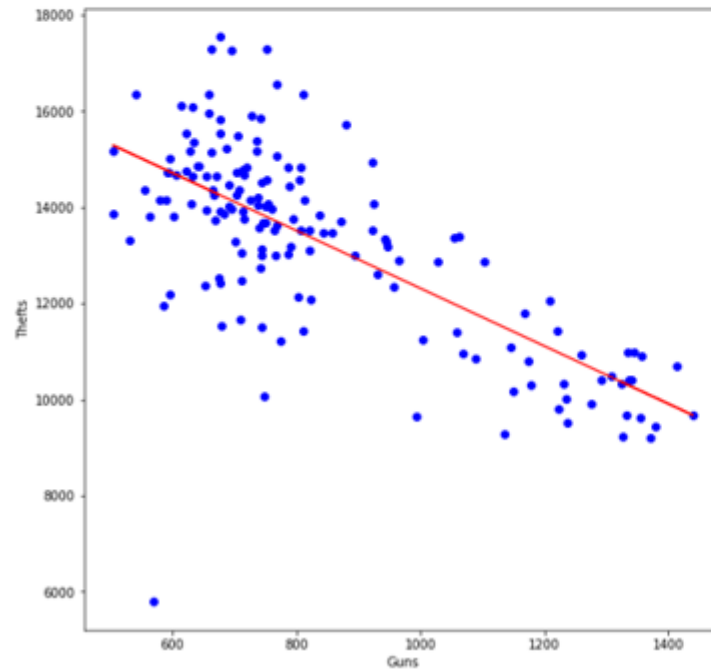
Results
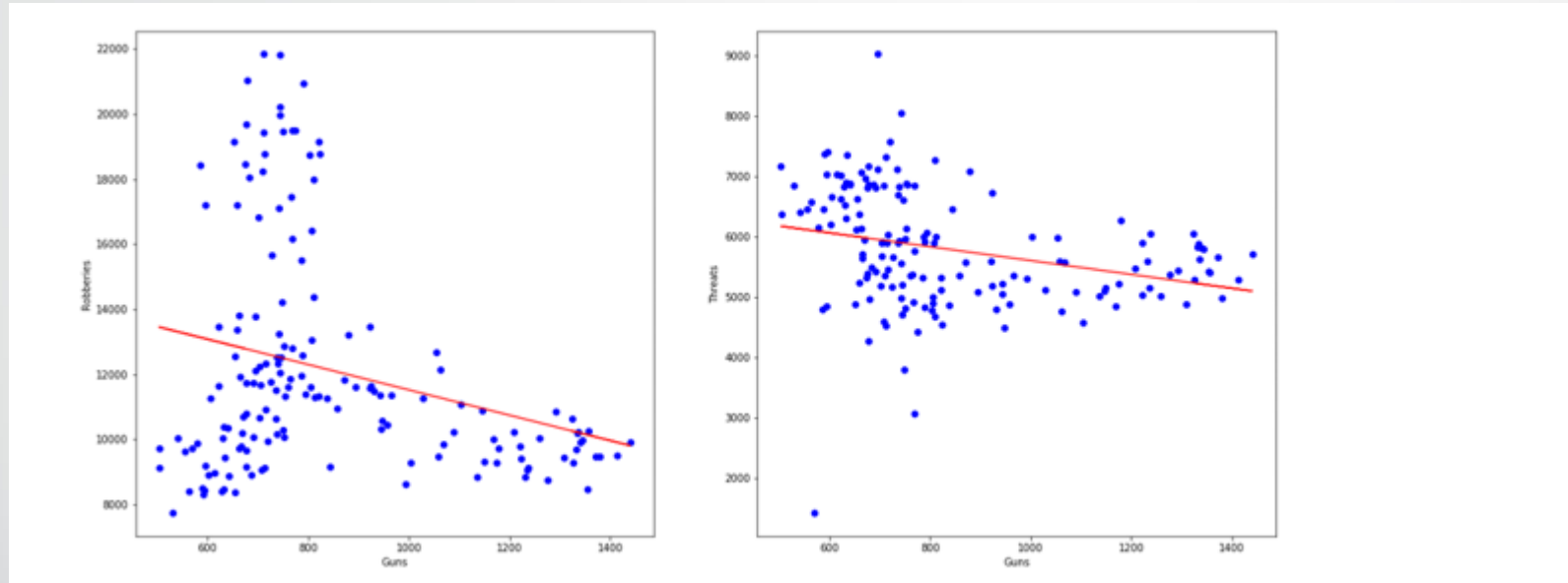
→ We can easily see that there is a good correlation for Thefts and Reports. But not as good for robberies and threats.
The results show a correlation and do give a decent estimation with the learned formula from the single linear regression.

Discussion

- There was a correlation with guns apprehended and crimes committed in Rio de Janeiro, but the results did still not confirm my suspicion in all areas as I had initially expected. There is definitely room for improvement, possibilities to check the data with other ML techniques as well as getting data from other times as well as looking at other crimes committed. The dataset seemed mostly good except a fall in the beginning of 2017 of crimes committed which may have affected the learning a bit. I think this is definitely a problem worth looking into but it does seem like an obvious answer, that if police is working harder on cleaning the street of guns (instead of politicians pushing guns into everyone's hands), crime rate will go down.

- It would also be interesting to compare the data with other states/cities and also it would be interesting to include police mortality in the numbers as gun apprehension can be a dangerous feat.

Conclusion

- In this study, I analyzed the correlation between guns captured by police in Rio de Janeiro and the effect on crimes committed in the city. I have setting up the dataset with total number of crimes and guns captured and analyzed it. I also built both regression models and classification models to predict whether gun apprehension had any effect on crime rate.

- These models can be useful in helping police force focus their attention.