CRIMES IN RIO DE JANERIO

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INTRODUCTION

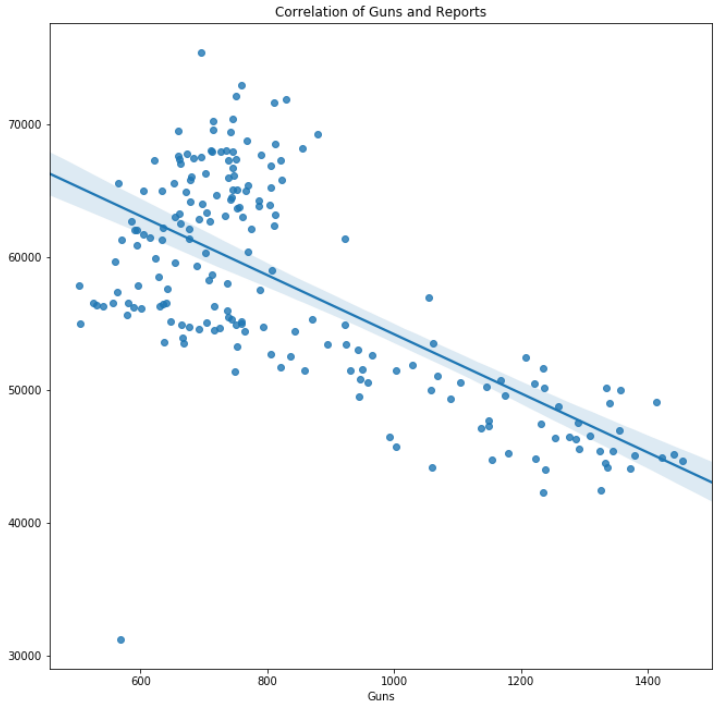
- The business problem I decided to tackle was to figure out if there was any correlation between guns apprehended by the police in Rio de Janeiro and the amount of thefts, robberies, threats and reports to the police.
- I figured this would be an interesting problem to tackle as Rio de Janeiro is one of the most violent cities in the world and is famous for its police. 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.

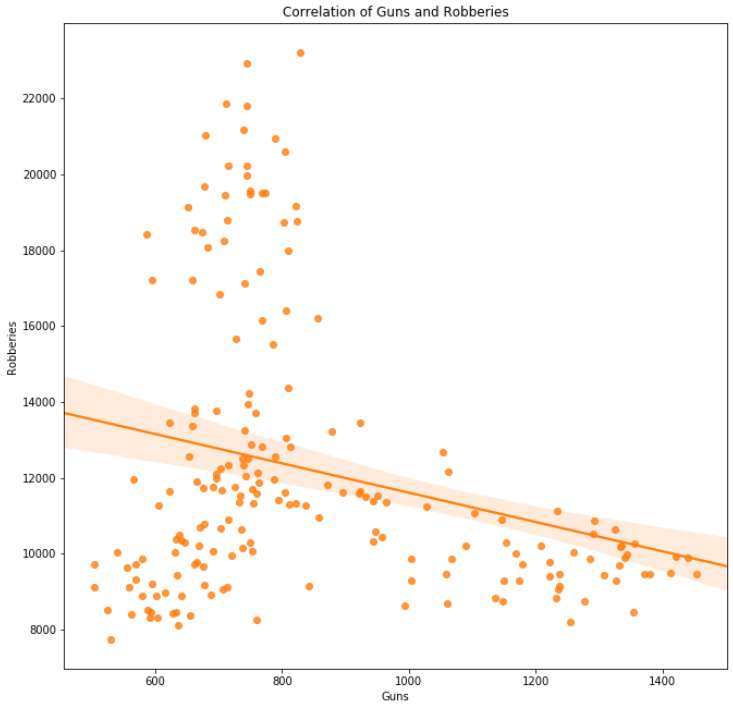
DATA

- The data I used was taken from the public security portal here Stats.
- 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. The data was cleaned up and most of the columns left out. I only used total number of guns to have the guns apprehended databases the same.
- In all stats I removed most of the columns, only keeping the total number of thefts, robberies, threats and reports

METHODOLOGY

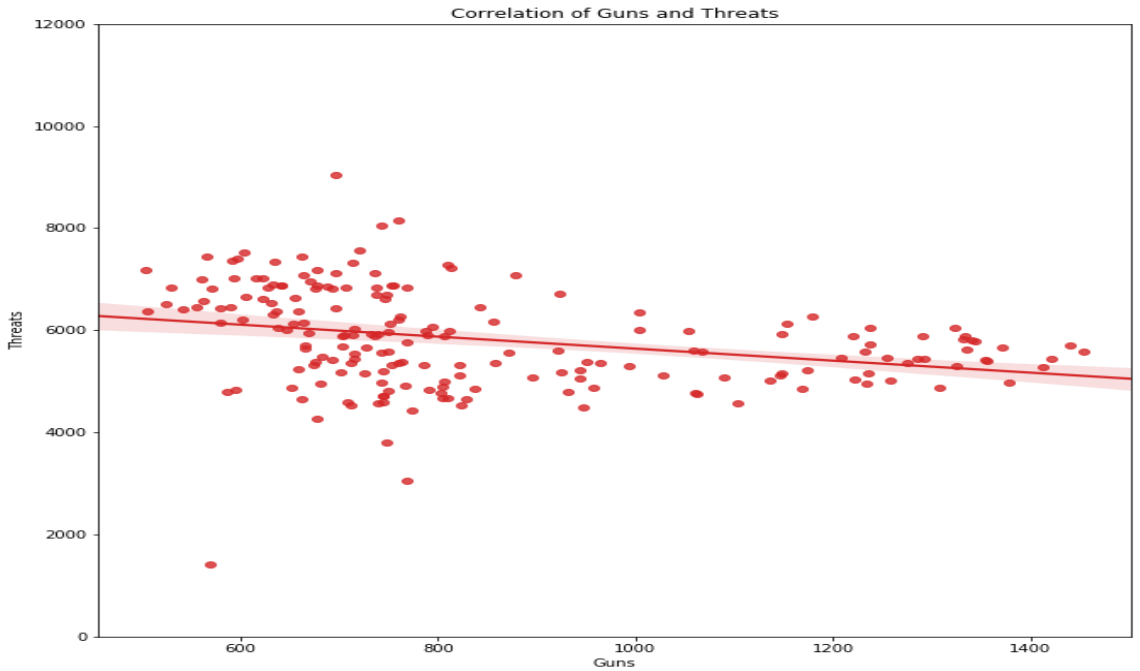
- Used regression to figure out a connection between guns apprehended and crimes.





METHDOLOGY

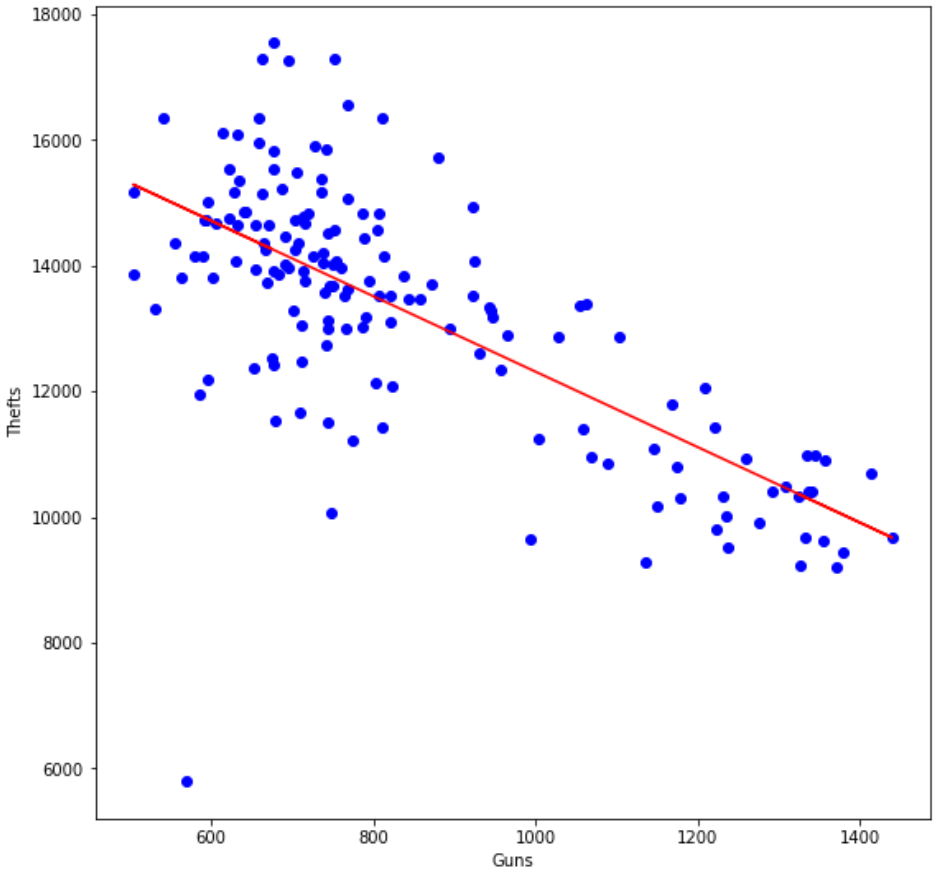

Correlation of Guns and Thefts
Thefts
Guns
18000
16000
14000
12000
10000
8000
6000
600
800
1000
1200
1400

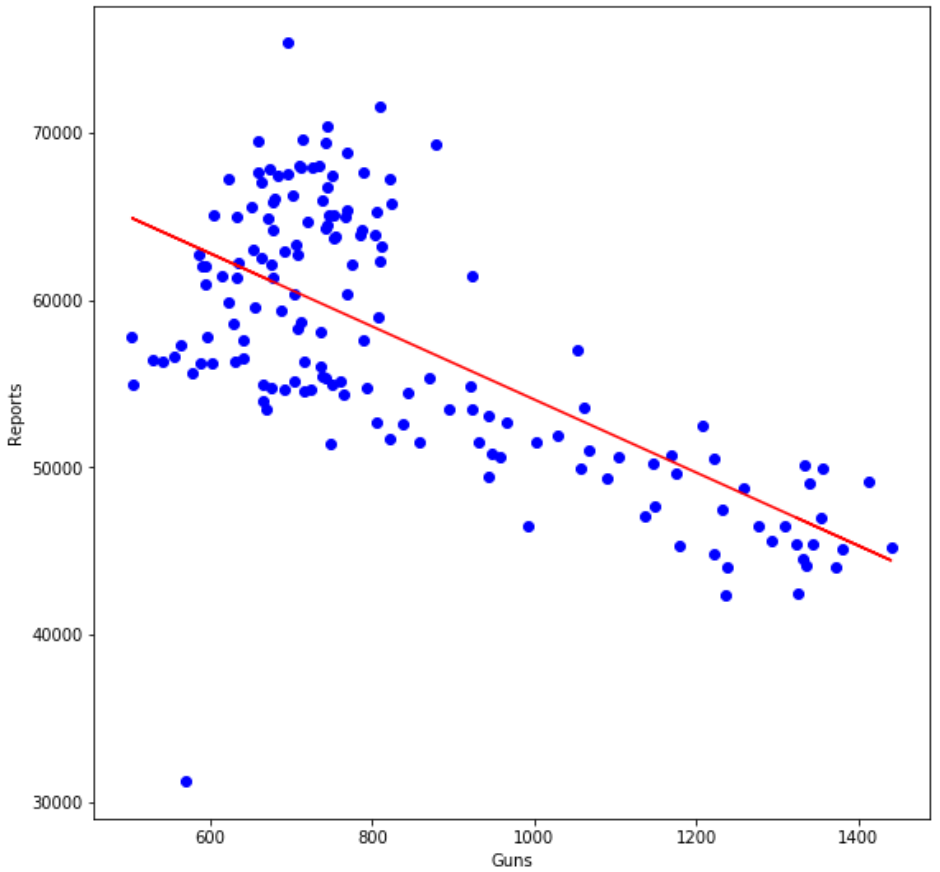

Correlation of Guns and Threats
Threats
Guns
12000
10000
8000
6000
4000
2000
0
600
800
1000
1200
1400

METHODOLOGY

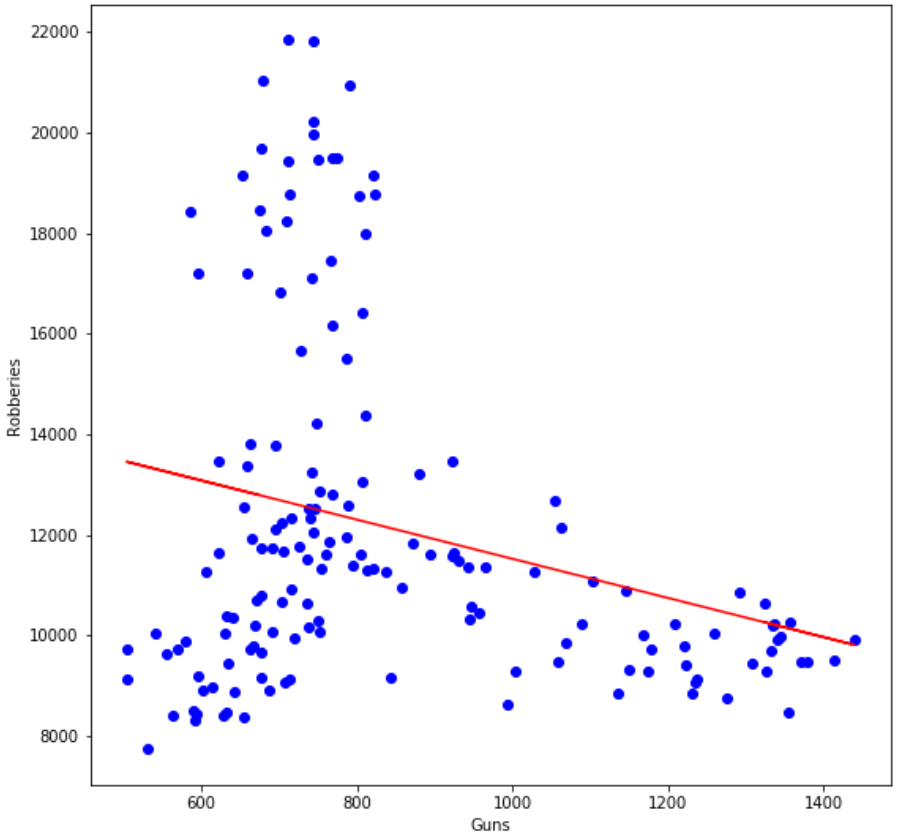
- There is an obvious correlation between the apprehension of guns and crimes committed.
- There is a negative line which means that the more guns are apprehended the fewer crimes are committed, which was to be expected. To be sure we will check out the correlation between all variables.
- It is possible to see an obvious curve on crimes committed but it's not as easy to see change in guns apprehended so we'll plot it on individual graphs. The visual correlation was created and showed 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.

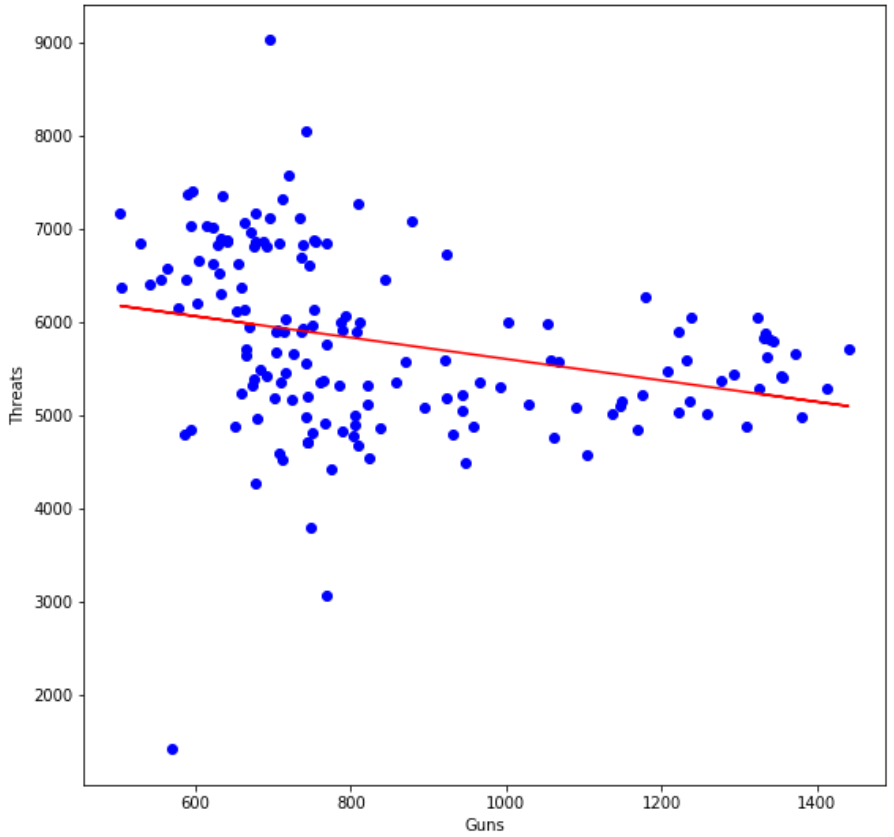
RESULTS


18000
16000
14000
12000
10000
8000
6000
Thefts
600
800
1000
1200
1400
Guns


70000
60000
50000
40000
30000
Reports
600
800
1000
1200
1400
Guns

RESULTS


Robberies
Guns
22000
20000
18000
16000
14000
12000
10000
8000
600
800
1000
1200
1400


Threats
Guns
9000
8000
7000
6000
5000
4000
3000
2000
600
800
1000
1200
1400

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

- The results were 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.

DISCUSSION

- 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 relationship between guns apprehended by police in Rio de Janeiro and the effect on crimes committed in the city.
- I set up the dataset with total number of crimes and guns apprehended and analyzed it.
- I 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.