Toronto Neighbourhood Crime Rates - Analysis

Using Simple Linear Regression Model

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Introduction

Criminal activities or crime rates have always been a serious point of concern for citizens and authorities in a city. In this analysis, we are to investigate the relationship between the population of a city, which, in our case, is Toronto and its crime rates, based off 2016 data, over varying types of crime categories in question, such as assault, auto theft, robbery etc.

The data for this exploration has been sourced from the Open Data Toronto Portal, published by the Toronto Police Services.

Model

The mathematical model which is to be used is simple linear regression (SLR) which will exhibit the relationship between our response variables, *crime rates* and the predictor, *population in Toronto in 2016* by means of the linear equation:

$$Y_i = \alpha + \beta x_i + U_i$$

where Y_i is our response variable, x_i is our predictor, and α and β are the $y-$intercept and the slope of the line respectively.

It should also be mentioned that U_i represents any random fluctuation in the relationship, which, for the benefit of simplification, will be assumed to be independent and have an expectation of zero. Also, it should be considered that the variance is same for each U_i.

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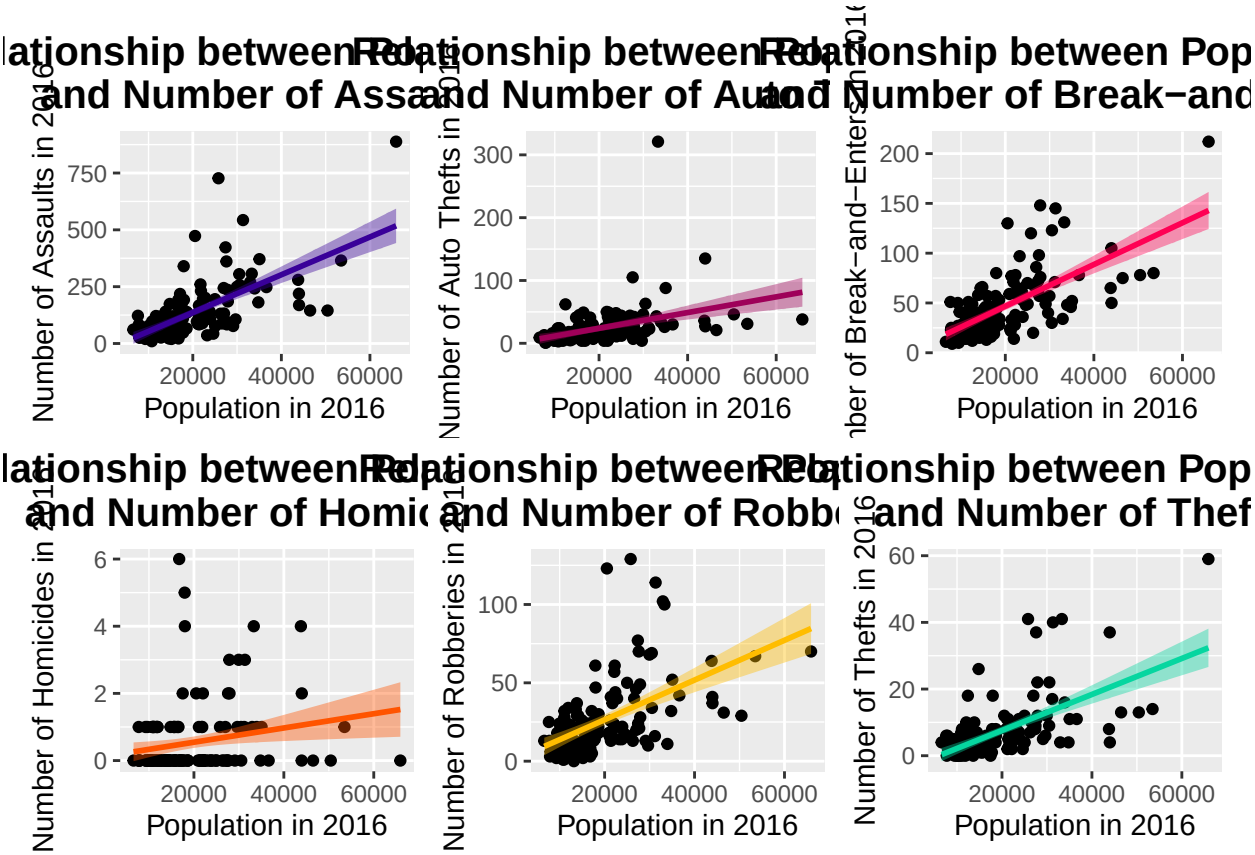
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and Number of Assa
Number of Assaults in 2016
0
250
500
750
20000
40000
60000
Population in 2016
Relationship between Pop
and Number of Auto
Number of Auto Thefts in 2016
0
100
200
300
20000
40000
60000
Population in 2016
Relationship between Pop
and Number of Break−and
nber of Break−and−Enters in 2016
0
50
100
150
200
20000
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60000
Population in 2016
lationship between Pop
and Number of Homic
Number of Homicides in 2016
0
2
4
6
20000
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Population in 2016
Relationship between Pop
and Number of Robb
Number of Robberies in 2016
0
50
100
20000
40000
60000
Population in 2016
Relationship between Pop
and Number of Thef
Number of Thefts in 2016
0
20
40
60
20000
40000
60000
Population in 2016