An exploration of London Crime

By Crime-fighters
Mahima and Tom

Introduction

- 918,000 reported crimes across London boroughs between Feb 2018 and 2019
- Marks an increase of 20,000 crimes from 2018 and 150,000 crimes since 2014/15
- Law enforcement, policy-makers, police and general public - all large stakeholders

Driver in Case of 39 Bodies in Truck Appears in U.K. Court

Maurice Robinson was charged with 39 counts of manslaughter, conspiracy to traffic people, conspiracy to assist unlawful immigration and money laundering.

Our approach

- Searching for data
  - Easily available APIs - https://data.police.uk/docs/,
  - CSV files by the Met police : Returned crimes at a particular location, month and year
  - Our sample : 33 boroughs of London, from Jan 2011 - Dec 2014
  - Data on unemployment, NEETs to explore what leads to crime
- Data cleaning and EDA
- Hypothesis testing and conclusions

Our Hypotheses

With such massive data, it was hard to know where to start!

1. Bicycle crime is less common in 2016 than it was in 2015 in London

2. Crime got proportionately less violent in Camden in October to November 2011

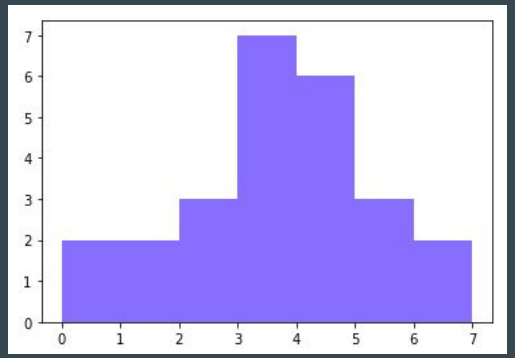
3. Unemployment improved between 2009 and 2010 in London

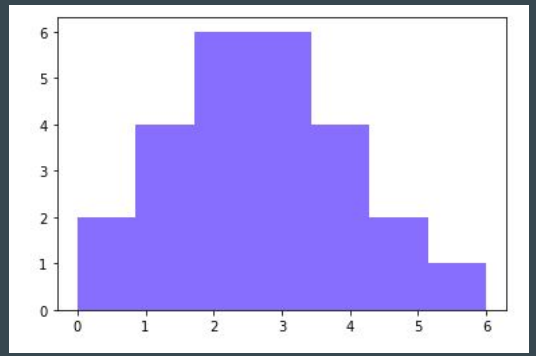
4. Robberies in Lambeth and Lewisham remain unchanged over time

5. Anti-social behaviour in Westminster and Croydon increased over time

(H0: p1=p2 for all, where p1 and p2 are the means for the two samples)

Hypothesis 1 - Bicycle Crime





1 - Ran API over a loop, to get a random selection of crimes occurring at different locations in London, for both 2011 and 2013

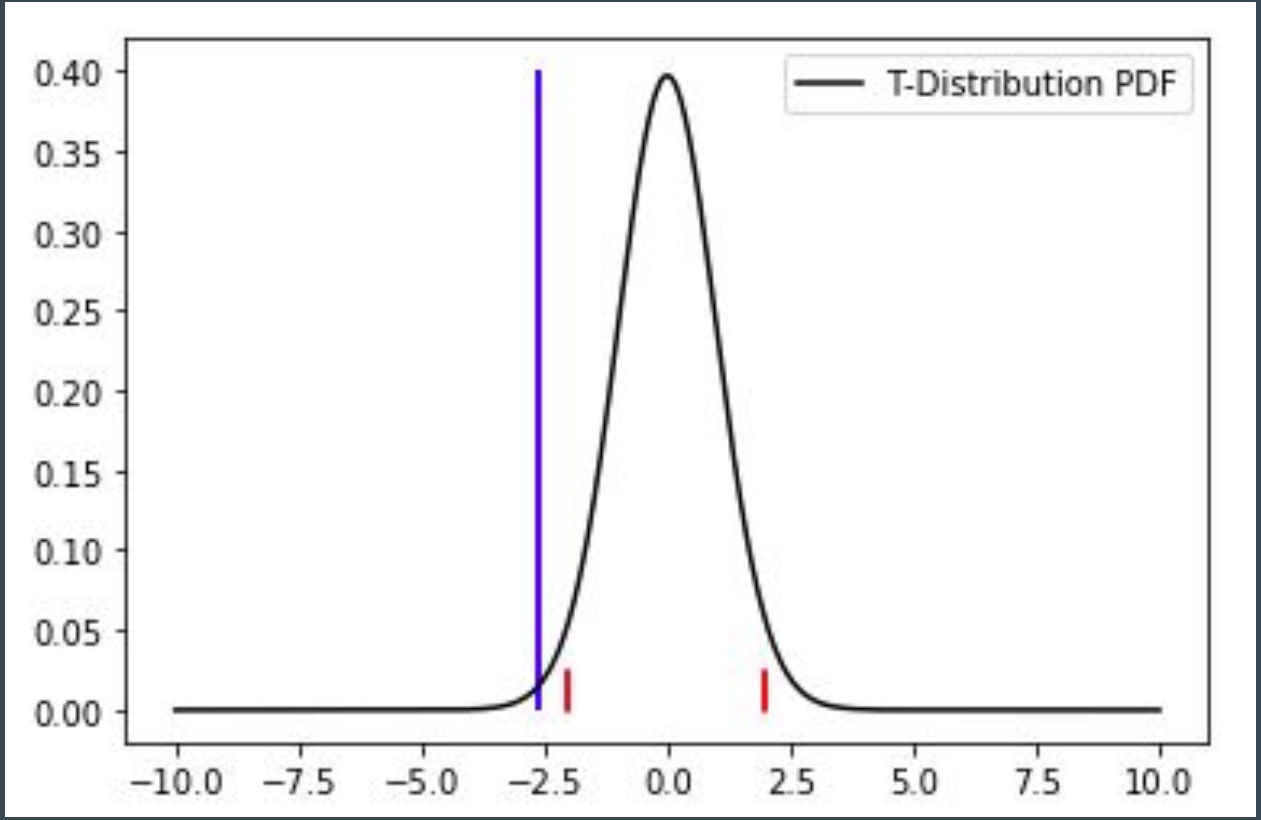
2 - Conducted Welch's T Test to see if the change in prevalence in Bicycle theft was genuine:

We first checked for normality of our data, which was confirmed

Calculated the t statistic and compared it to the t distribution

3 - We have evidence to suggest bicycle theft is improved in London!

T-Distribution for our bicycle crime comparison



Hypothesis 2 - Unemployment

1 - We cleaned up and extracted data on unemployment in London, and how it changed over the last few years

2 - We ran a Two Sample Paired T Test to see if there was a genuine change in unemployment from 2009 to 2010:

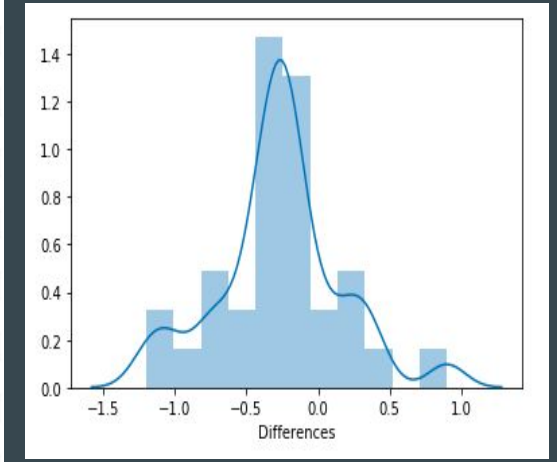
We calculated the t statistic and p value for the differences between the years, using the relevant stats python library

Such a small p value is plenty of evidence to reject the null hypothesis at the 0.05 level

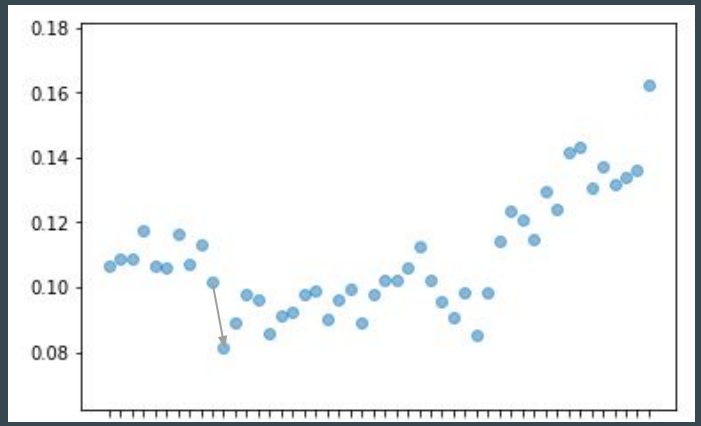
Cohen's d came out as -0.28, suggesting a small/medium effect size, which was successfully picked up on by this sample size

3 - We have evidence to suggest Unemployment genuinely improved in London!

	Borough	2009	2010	Differences
2	Barking & Dagenham	7.9	6.9	-1
3	Barnet	3.8	3.6	-0.2
4	Bexley	5	4.6	-0.4
5	Brent	4.6	5	0.4
6	Bromley	4.2	4.3	0.1
7	Camden	5.5	6.4	0.9
8	Croydon	6.9	6.6	-0.3
9	Ealing	4.9	4.4	-0.5
10	Enfield	6.1	5.8	-0.3
11	Greenwich	6.6	6.2	-0.4
12	Hackney	7.4	6.2	-1.2
13	Hammersmith & Fulham	5.6	5.2	-0.4
14	Haringey	6.8	6.6	-0.2
15	Harrow	2.9	2.7	-0.2
16	Havering	4.7	4	-0.7
17	Hillingdon	5.4	4.6	-0.8
18	Hounslow	4.7	4.6	-0.1
19	Islington	7.3	6.2	-1.1



Hypothesis 3 - Violent Crime



1 - We ran a function through our massive CSVs on all crime data in London, which returned the proportion of crime that is violent in a particular borough

2 - We had a closer look, as we noticed a substantial drop from October 2012, to November 2012, in Camden

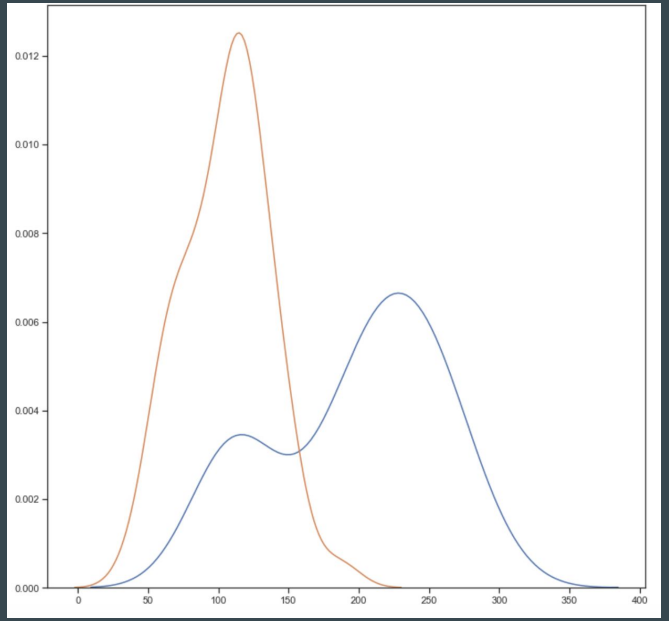
We did a one sample p test, assuming that the October month was the correct mean, to see the likelihood that November was a fluke.

The z value came out at z=3.17, which was well over the z=1.96 we needed to reject the null hypothesis.

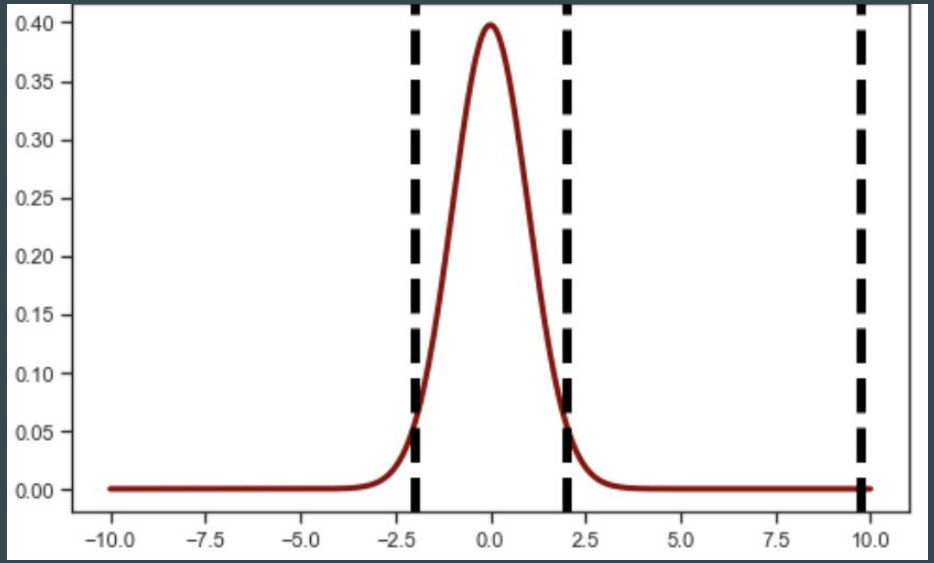
3 - We have evidence to suggest Violent Crime genuinely improved in London!

Hypothesis 4 - Robbery levels remained unchanged

1. The UK police defines robbery as mugging, theft and snatch theft involving violence or threats
2. To evaluate the incidence of robbery we looked at two boroughs - **Lambeth** and **Lewisham** - and checked if there was any change in the incidence over our time period Jan 2011- Dec 2014
3. Significant variation between the two boroughs



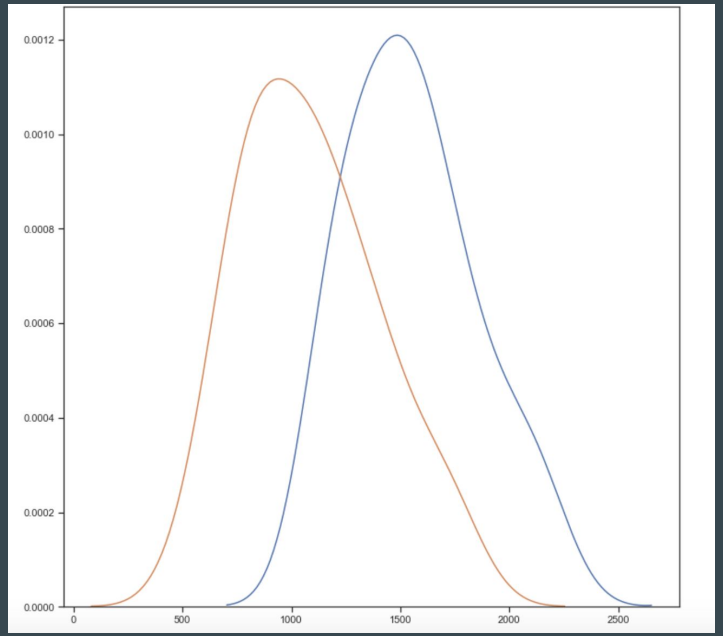
1. Possible that interventions to curb crime in Lambeth were more effective or more in number than those in Lewisham
2. With a p-value (1.04e-14)< alpha, we rejected the null hypothesis and conclude there was a significant difference between the two boroughs



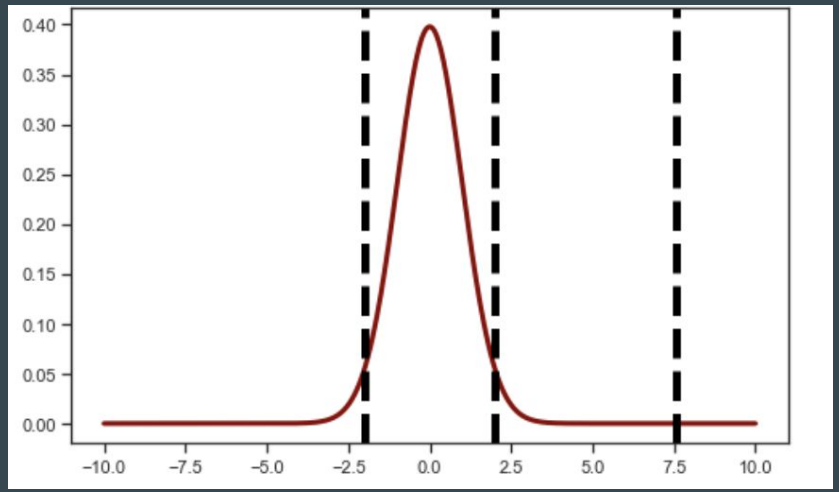
t= 9.75

Hypothesis 5 - Anti-social behaviour remained same over time

1. The UK police defines anti-social behaviour as drunken or threatening behaviour, vandalism, graffiti and playing loud music at night
2. To evaluate the incidence of anti-social behaviour we looked at two boroughs - Westminster and Croydon - and checked if there was any change in the incidence over our time period Jan 2011- Dec 2014



1. With p value(2.58e-11)< alpha, we reject the null hypothesis
2. In conclusion, there is a significant difference between the levels of anti-social behaviour between the two boroughs



t= 7.56