Analysis of City of Essex: Street Crime

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ABSTRACT

This report examines the total number of crimes reported in Essex Constabulary during the years 2019 and 2020, with particular attention to the potential impact of the COVID-19 lockdown in 2020. Through an analysis of crime statistics, it provides insights into the distribution of various crime types and their temporal and geographical variations. The comparison between 2019 and 2020 allows for an assessment of any significant changes in crime rates, considering the influence of the pandemic-induced restrictions. By categorizing crimes into major groups and examining their occurrence over time, this report offers a detailed perspective on how crime patterns evolved amidst the lockdown measures. Additionally, it explores the geographical differentiation of crime, investigating variations across urban, suburban, and rural areas within Essex

Constabulary's jurisdiction. Factors influencing crime rates, such as socio-economic conditions and policing strategies, are also discussed to provide context for the observed trends. The findings contribute to a better understanding of the dynamics of crime in the region and offer insights that can inform future research directions and policy interventions.

Keywords: Essex Constabulary; Crime Statistics; COVID-19 lockdown; Geographical Analysis; Crime Prevention; Public Safety.

INTRODUCTION

The outbreak of the COVID-19 pandemic in late 2019 prompted governments worldwide to implement stringent measures aimed at curbing the virus's spread. These measures included lockdowns, stay-at-home orders, and social distancing mandates, which significantly altered daily life and societal dynamics. In the UK, Essex Constabulary, like many other law enforcement agencies, faced the dual challenge of enforcing these public health directives while maintaining overall public safety.

The lockdowns, although essential for public health, were expected to impact crime rates. Reduced public movement and increased home occupancy were anticipated to decrease certain crimes, such as street crime and burglary. However, extended periods of home confinement and heightened online activity were likely to increase incidents of domestic violence and cybercrime. The varied nature of these anticipated changes presents an intriguing area of study, particularly in understanding how such a significant disruption influenced crime dynamics.

This report aims to analyze the crime data from Essex Constabulary for the years 2019 and 2020 to assess the impact of the COVID-19 lockdown. By examining total crime counts, the distribution of different crime types, and their temporal and geographical variations, the study seeks to provide a comprehensive understanding of how the lockdown measures affected crime rates. The findings from this study are intended to inform law enforcement strategies, policy-making, and future research in the context of public

health crises and their broader societal impacts.

The COVID-19 pandemic, which began in late 2019, led to unprecedented global disruptions, including widespread lockdowns and restrictions aimed at controlling the virus's spread. In the UK, these measures included stay-at-home orders, social distancing mandates, and the closure of non-essential businesses. Essex Constabulary, like other police forces, faced new challenges in maintaining public order and safety during this period. (Foundation, 2016).

METHODS

The data wellspring of this report is from information from the "police.uk/data/", an organization site that gives information and data gotten from each division of the part of police for public use, this report will investigate as well as access the information which conventional residents can bring about the revelation of bits of knowledge with the possibility to build the effectiveness of policing activities. The data inside this report is restricted to the crimes recorded by Essex police that were gotten from the police website (DATA.POLICE.UK, 2019). The source has the datasets given to the workspace by the UK's 43 geographic police powers. Its annals are as far back as 2013, while its custom downloads range from 2019 February to January 2022. The police datasets show up in a month-to-month appropriation. (Aparna et al., 2016).

Data Preparation

Every one of the information handlings on the datasets was done with Apache Spark, a brought together investigation motor for huge scope information handling that incorporates significant level devices for SQL, AI, chart handling, and stream handling (Apache docs). The datasets were acquired as a compressed record including a wrongdoing comma-isolated esteem (CSV) for West Midlands police and a text document giving limit data, and afterwards positioned in the nearby catalogue utilizing Jupyter before being distributed to Hadoop Distributed File System (Rester, 2008).

Data Upload

The first step was to download the Essex crime data (February 2019-December 2020) from the police site, the zip file which contains CSV files was extracted and imported to Jupyter, it was then converted into HDFS files through Web Console.

Creating Data frame

A new spark was created through python 3 the required HDFS data's using wildcard (*) to upload multiple files and the header was also created.

Data Pre-processing

After the data-frame was created, a schema was printed in other to take note of the variables. From the schema, it was realised that some variables were written as 2 words so it needed to be tidied by making the variables a word so it can be read properly.

Furthermore, the data was validated by counting the total number of crimes, creating columns for each variable as well as looping the entire table in other get the missing value number and rate each column" A for loop in Python is a control flow statement that is used to repeatedly execute a group of statements as long as the condition is satisfied" (Gadagkar, May 2021). The code in the figure below was used to the effect. The total crime for Essex police constabulary was 402,838 and there no missing values.

RESULTS AND DISCUSSION

Patterns and trends were translated by collecting data based on numerous elements in the dataset. We investigate the pattern of overall crime in Essex versus various crime kinds in late 2019-2020.

Variable Preparation

After creating the month array for visualisation, a SQL query is used to select the month, which is then turned into an RDD. The identical approach is followed for the monthly Total Array, except that this time the monthly total crime is converted to an RDD. Finally, the monthly Average Array is generated using the same technique, which involves selecting the monthly total average and turning it into an RDD.

Data Visualization by month

The required library is first imported, and several variables (v=monthArray, t=monthTotalArray, c=monthAvgArray) have been adjusted to improve visualisation (v=monthArray, t=monthTotalArray, c=monthAvgArray).

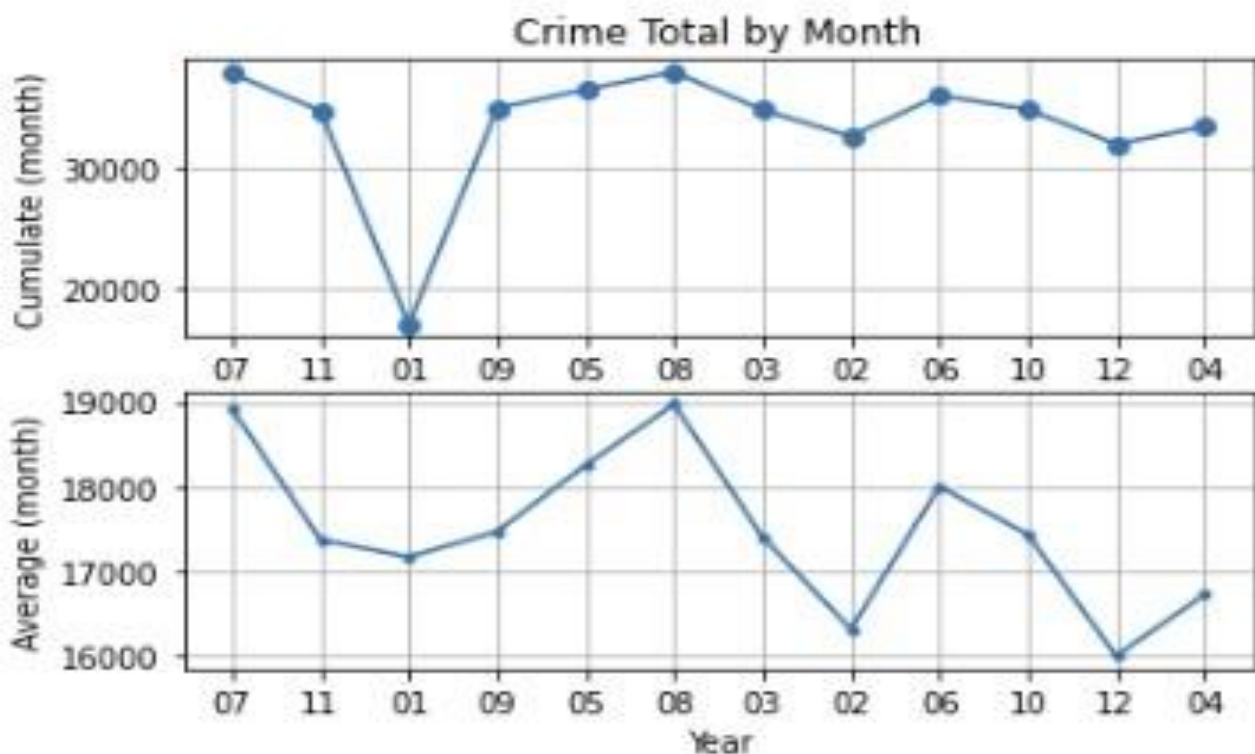Subplots and labels were also generated.

Figure 3.2.0: monthly plot visualisations

According to the plot, the monthly cumulative has its maximum in July and August with a crime count of 40,000 each, which is unsurprising given that people are out more at this time of year, and its lowest in January with a crime count of 15,000. However, the average monthly crime rate is lowest in December, at 16,000, and greatest in July and August, at 19,000 each. Although the lack of data for January 2019 had an influence on the month of January, the trend of both plots was affected.

Grouping by year and crime types

Grouping by the year shows the trends of the total crime types for February 2019 to December 2020.
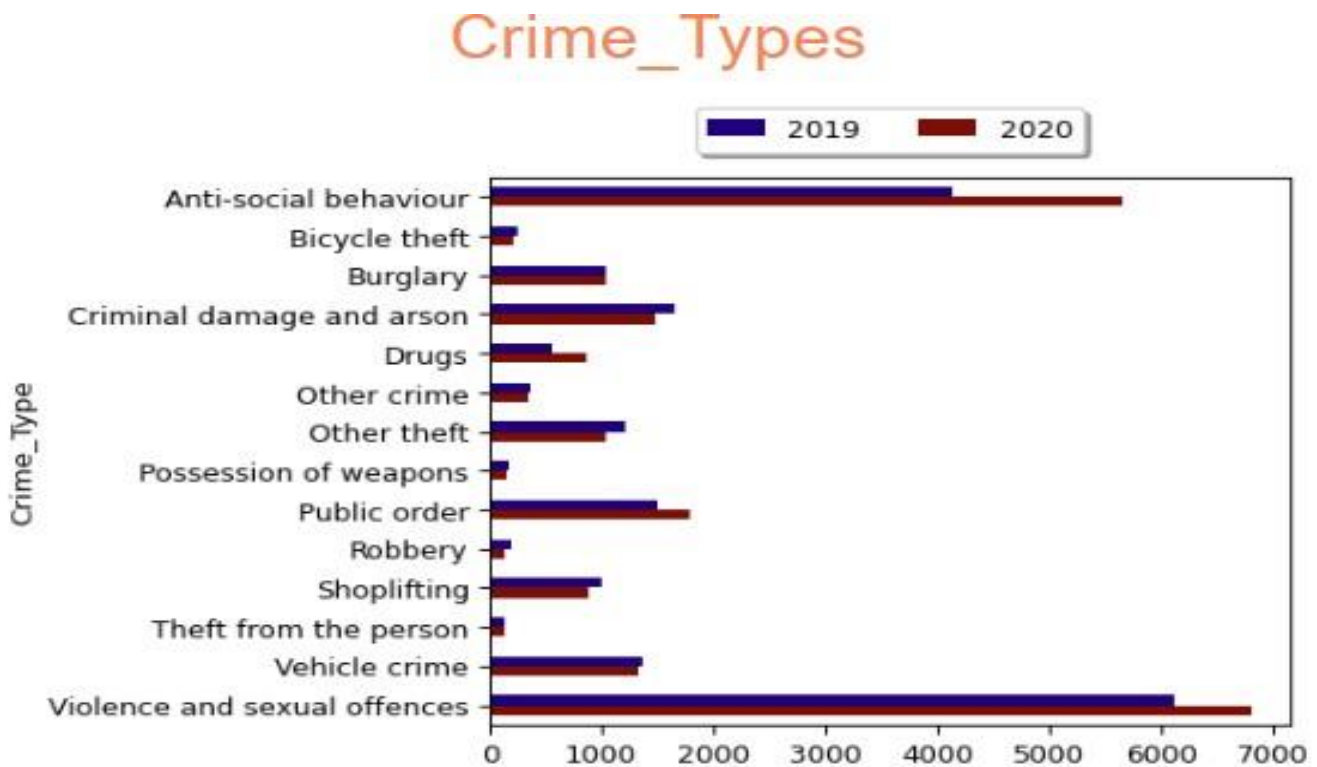

Figure 3.5.1.0: Average yearly rate

The figure above shows that the total number of crimes committed in each year changes. Violence and sexual offences, anti-social behaviour, drugs, and public order were all greater in 2020 than in 2019, while bicycle theft, criminal damage and arson, other theft, weapon possession, robbery, shoplifting, and vehicle crime were all higher in 2019 than in 2020. Finally, for both years, burglary and stealing from a person were nearly the same. In 2020, the largest total number of crimes was an average of over 7000, which were violence and sexual offences.

Grouping by month

We can see a similar quarterly pattern in the monthly breakdown in the figure below for the years 2019 and 2020.

For 2019, data for January isn't available, but it rose to 18500 from 16200 in the first quarter, then fell to 17500 in the second quarter before rising to about 18700 and ending at 18000, the third quarter started high, which happens to be the highest in the year at about 18800, which may be due to the start of summer, and ended low at about 17400, and the fourth quarter recorded the lowest in the year, starting with 17500 and ending as low as 16000, winter.

In terms of the year 2020, it began at 17200 and then decreased to 16200, the second quarter began at the lowest point of the year, less than 16000, and then rose to 18300, the third quarter began at 19000 and rose to the highest point of the year, 19500, due to COVID lockdown during the summer, there was a spike in the crime rate in Essex, and the fourth quarter began at 17500 and then decreased to 16000.
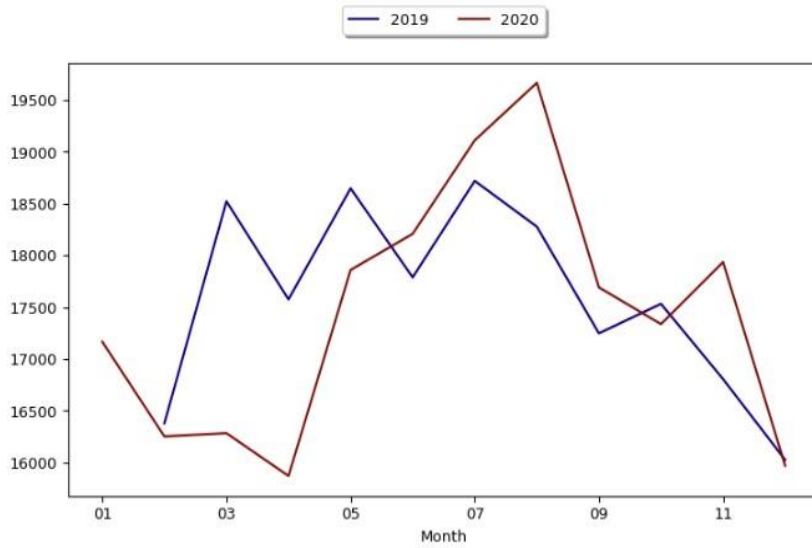
Figure 3.5.2.0: Monthly average crime count

Grouping by the percentage of the total crime count

The pie chart below gives the details of the total rates of the crime types by grouping them into percentages. The pie chart below it shows that violence and sexual offences have the highest rate with 34% this could be due to the lockdown of most of 2020 which meant people would be at home and idle then leading to a partner wanting more intercourse than usual, which could then lead to violence when the partner isn't interested. Some people might be cluster phobic and not be aware of it until the lockdown thus continuous staying indoors could affect them psychologically and it could lead to being violence.

The other crime count that is next is Anti-social behaviour 23% which obviously it could be due to the idleness of COVID lockdown and followed by criminal damage and arson and public order which are both 8%.
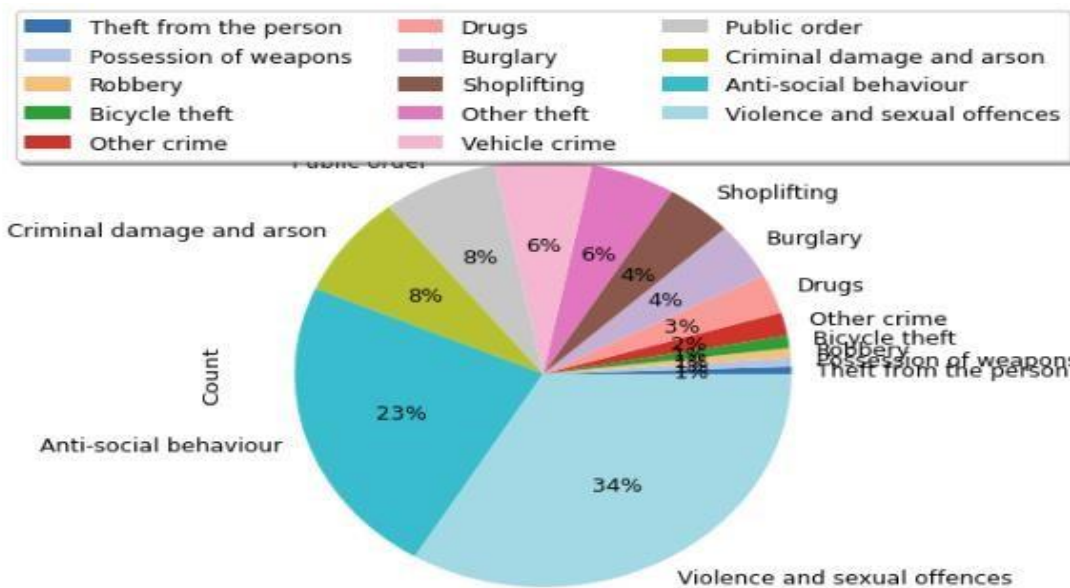

Figure 3.5.3.0: Percentages of the total count of each crime type

Grouping using geographical location

The map below shows the distribution of all the crime types in Essex constabulary, it was deduced from the map that the Southend-on Sea has the highest count of crime which is 11.

Southend-on-Sea is one of the most dangerous cities in Essex, ranking 24th out of 315 towns, villages, and cities in the county. Southend-onoverall Sea's crime rate in 2021 was 109 offences per 1,000 people. This is significantly greater than Essex's general crime rate of 81 per 1,000 residents, which is 26 percent higher. Southendon-Sea is one of the top ten most dangerous cities in England, Wales, and Northern Ireland, and the 442nd most dangerous location of all towns, cities, and villages (**Brighton Analytics Limited, 2022**).

Grouping by highest crime count

'Violence and sexual offences' is the most common crimes in Basildon, with 7,507 offences in 2021, resulting in a crime rate of 64. This is a difference of 7.48 from the crime rate of 56 in 2020, which was 12 percent higher than the previous year's record of 6,627 offences. Bicycle theft is Basildon's least prevalent crime, with 89 offences reported in 2021, down 45 percent from the 129 offences reported in 2020 (Brighton Analytics Limited, 2022). Basildon has the highest rate of crime on the map, which could be due to its status as one of Essex's major cities.
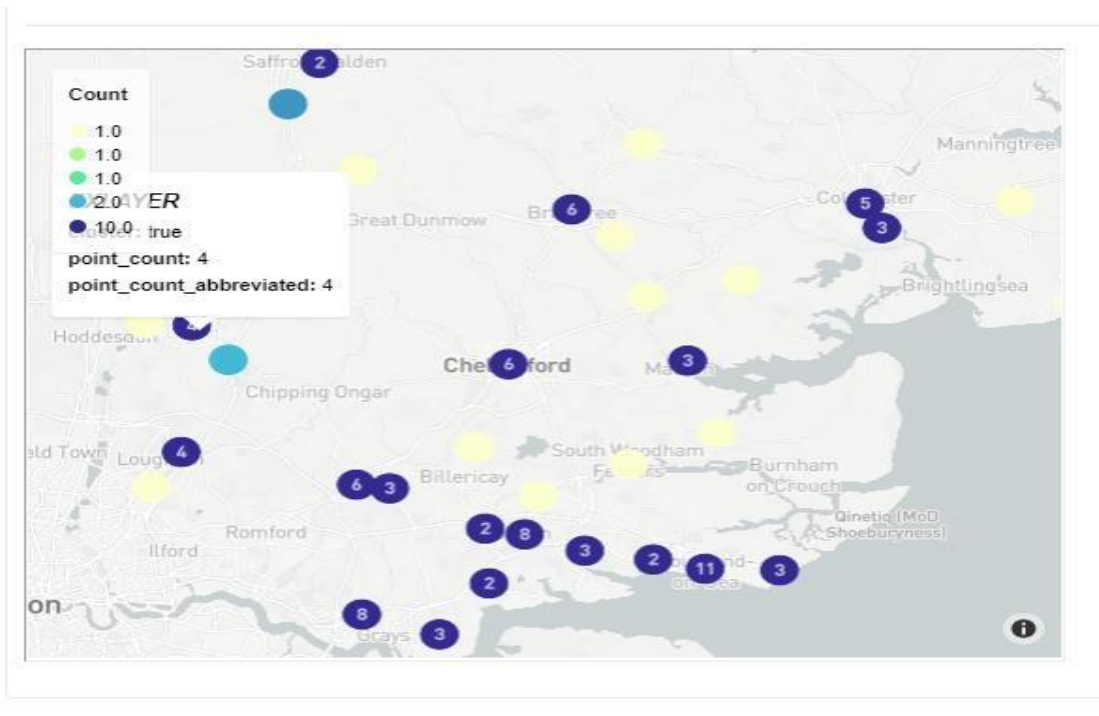

Figure 3.5.5.0: map showing violence and sexual offence

CONCLUSIONS AND SUGGESTION

Conclusion

The COVID-19 lockdown presented a unique natural experiment to study crime trends under severe social restrictions. The unexpected increase in crime during this period highlights the complex relationship between societal disruptions and criminal behaviour. By examining these trends, this study aims to provide a comprehensive understanding of how lockdown measures influenced crime rates in Essex, offering

valuable lessons for managing public safety during future crises.

The key findings and conclusion from the research shows that 2020 has the highest number of crimes in as much as there was a lockdown due to the pandemic during this period which means people must have broken the rules of lockdown in place because it had the highest count during.

LIMITATION AND RECOMMENDATION

Anti-social behaviour, burglary, other crime (including stealing, narcotics, criminal damage and arson, public disorder and weapons, and other theft), robbery, vehicle crime, and violent crime are the only 12 forms of crime stratified by the data. But what happens if a violent burglary occurs? Is it one crime or two? We now have reliable information that there is a hierarchy based on the length of sentence for each crime committed. In this case, if the burglary resulted in homicide, it would be classified as a violent crime rather than a burglary. However, if the criminal delivered a relatively minor and ineffective violent hit to the victim, but a large number of expensive objects were stolen, the crime is classified as a burglary. According to the hierarchy of probable punishment lengths, a combination of different offences is recorded as one crime (UKCrimeStats, 2011).

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