Crime Variability During Lockdown

1. Introduction

As most of the nations are under Lockdown due to COVID-19, the world is undergoing many changes in every walk of life. One of such aspect is Crime, that sees opportunities as Crime Science and Environmental Criminology research studies oversee. The emerging signs of these opportunities are various, such as Domestic Violence, online fraud and more new contextual offences like malicious coughing (Farrell and Tilley, 2020), who also say that anticipating and preventing crime along with quick movement and reinforcing crime reductions is necessary.

The reports say that the overall crime rate has reduced in global cities. Peru has observed 84% decrease in crime rate last month while Chicago 42% in a few weeks of time and likewise, as compared to same period last year (Dazio, Briceno and Tarm, 2020). Just as around the world, states in Australia have also reported decrease in overall crime rate as the movement of people is restricted and guarding their properties staying at home. Noting the Victoria state observed the lowest in past six years and Western Australia statistics show reduce in as much as 40% in some areas (Koob & Mills, 2020 and Kagi, 2020).

As mentioned above, the Lockdown has effected in various ways of crime and a simple decrease in overall crime rate is insufficient and is missing integral aspects like domestic violence, which is noticed to have risen attention. As Mortan, 2020 has reported in the Saturday Paper that the Family Violence is expected to rise. This effect can also be observed in the rise in 11% of calls received by the 1800-RESPECT of Australia and 15% rise in the MensLine Australia (Haffenden, 2020).

To study these variations and anticipate to support the decision makers, we require a detailed designed processes to assess each aspect of the crime to draw insights required by the police and policymakers.

2. Aim and Methodology

The aim of this study is to generate functions that help analysing the crime datasets available. The case study chosen for the current analysis is Greater Adelaide Metropolitan Region. The datasets are obtained from South Australian Data Directory. These datasets details are as below.

Dataset	File Type	Description	Source
Crime Statistics	Comma Separated Values files	CSVs for each financial year	https://data.sa.gov.au/data/dataset/crime-statistics
Suburbs	Shape File	All suburbs of South Australia in polygons with Suburb name and postcode in attribute	https://data.sa.gov.au/data/dataset/suburb-boundaries
Greater Adelaide Planning Region	Shape File	Polygon of Greater Adelaide Planning Region	https://data.sa.gov.au/data/dataset/greater-adelaide-planning-region

The following is the sample of the Crime statistics dataset obtained from the South Australian Data Directory. Every incident is reported with three levels of description and the number of offences of the incident along with the Suburb and postcode where and when the incident occurred. The levels of description are nothing but to simplify the categorization of the incidents. First level is divided

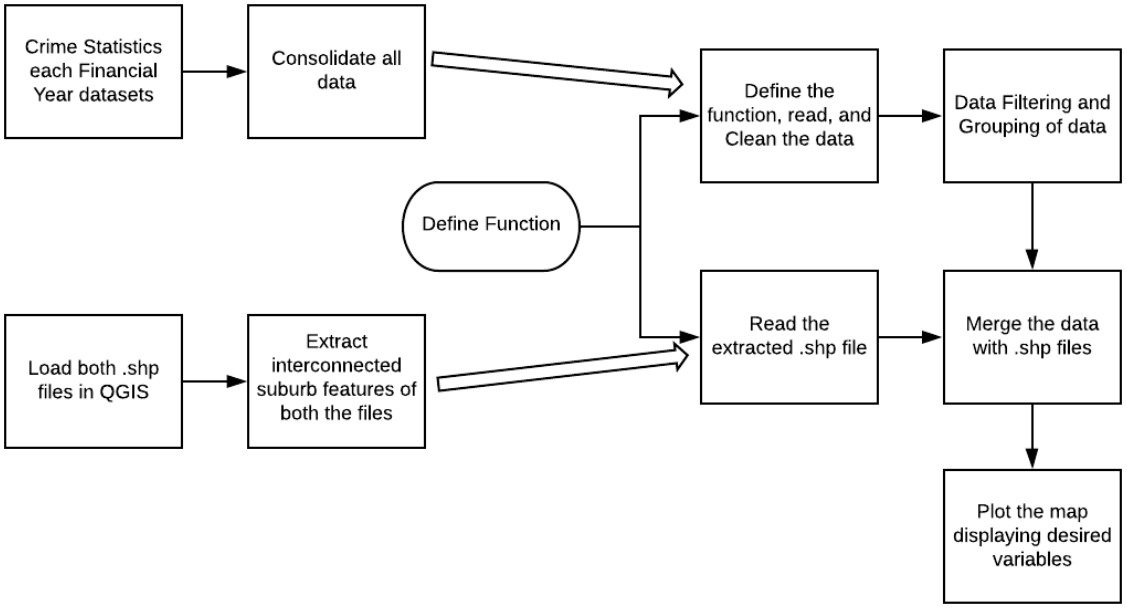
into two categories of offence against property or offence against person, which are further divided into nine categories, i.e., second level of description. The third level of description is used to provided further details of the incident. This categorisation supports the analysis by simplifying the data.

Reported Date	Suburb - Incident	Postcode - Incident	Offence Level 1 Description	Offence Level 2 Description	Offence Level 3 Description	Offence count
11-08-2019	MOUNT GAMBIER	5290	OFFENCES AGAINST PROPERTY	PROPERTY DAMAGE AND ENVIRONMENTAL	Other property damage and environmental	58
06-11-2019	BLACK FOREST	5035	OFFENCES AGAINST PROPERTY	PROPERTY DAMAGE AND ENVIRONMENTAL	Other property damage and environmental	33
06-11-2019	ROSEWATER	5013	OFFENCES AGAINST PROPERTY	FRAUD DECEPTION AND RELATED OFFENCES	Obtain benefit by deception	24
02-03-2020	WEST LAKES	5021	OFFENCES AGAINST PROPERTY	THEFT AND RELATED OFFENCES	Other theft	18
06-03-2020	ADELAIDE	5000	OFFENCES AGAINST PROPERTY	THEFT AND RELATED OFFENCES	Other theft	18

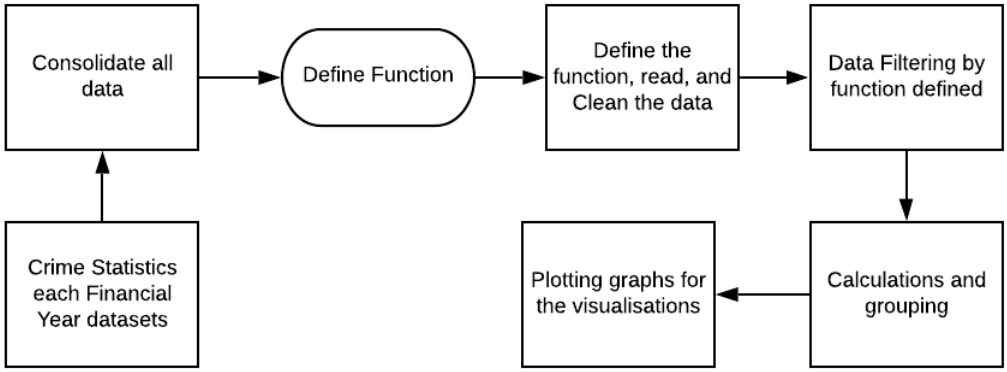
The other two datasets are shapefiles. The suburbs shapefile has attribute data of suburb names and postcode and the Greater Adelaide Metropolitan Region is a simple one polygon .shp dataset.

3. Analysis

The above mentioned datasets are processed through a set of steps to establish functions that support in generating meaningful insights from the data. For the purpose of the aim of the report, it would basically require two functions to perform. One, to perform geographical analysis over a year and the offence description to identify the suburbs performing worst at that moment for that offence category. A brief process of establishing the function is presented in the flowchart below. This process of establishing the function is a three-part process. In the first section, all the crime statistics data files of each financial year are consolidated to one file which is saved in the directory. Second input to establish this function is by extracting only suburbs polygon data of that falls in Greater Adelaide Metropolitan Planning Area (Metropolitan Region). This data is obtained by processing these two datasets in QGIS with 'interconnected' geoprocessing tool for vector data. These two dataframes are read in the defined function to merge by Suburb name which is then used to show the map or the results. Finally, at the end, by providing only the year and the offense category gives the resultant map highlighting the most and least performing suburbs.

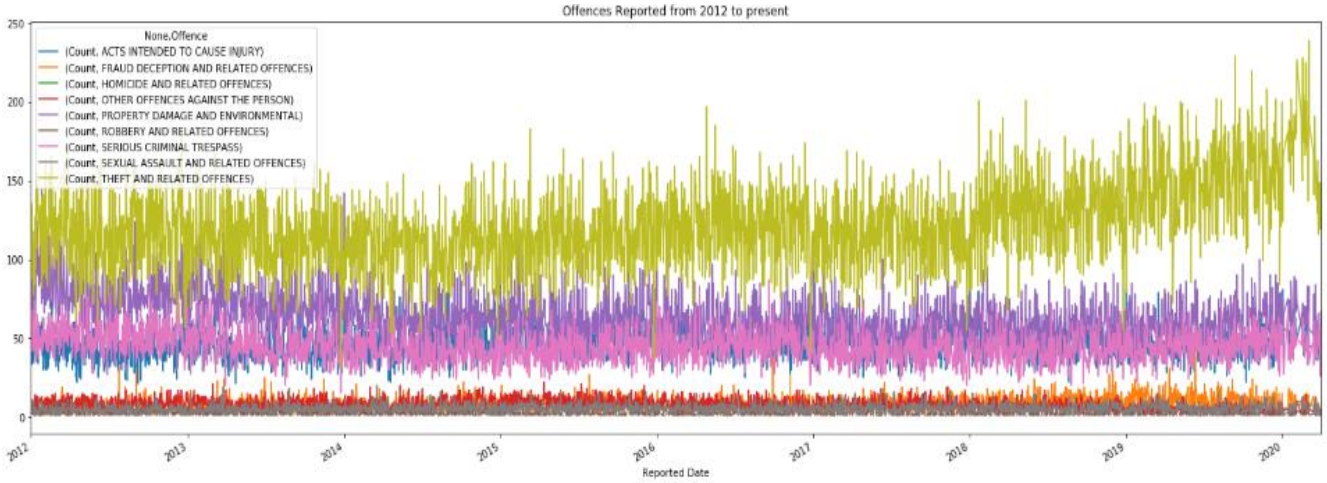


The second function is a simple and straight forward function that uses the same consolidated file of all the crime statistics for each financial year. This function is to determine the performance of selected suburb in a particular (selected) month over the past few years. Inside the function, it is a four step process which is similar to the 1st function, that involves, reading, and cleaning of the data followed by data filtering by the selected variable parameters used in the function defined. This filtered data is then grouped and performed calculations using either 'groupby' or pivot table of pandas. Grouping of the data is further followed by generating graphs and part.



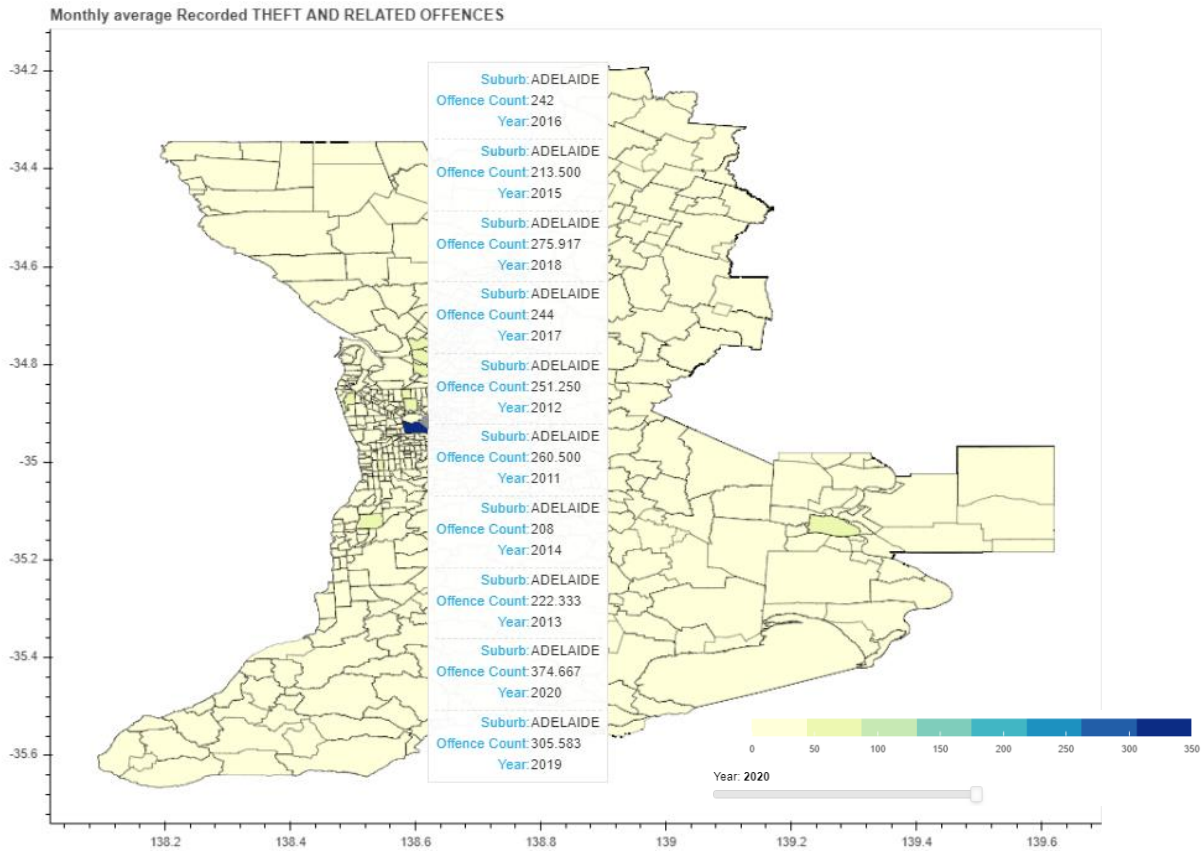
4. Output

For the current scenario in the case of Greater Adelaide Metropolitan Region, the offences reported from 2012 to present are shown in the graph below as reported on each day.

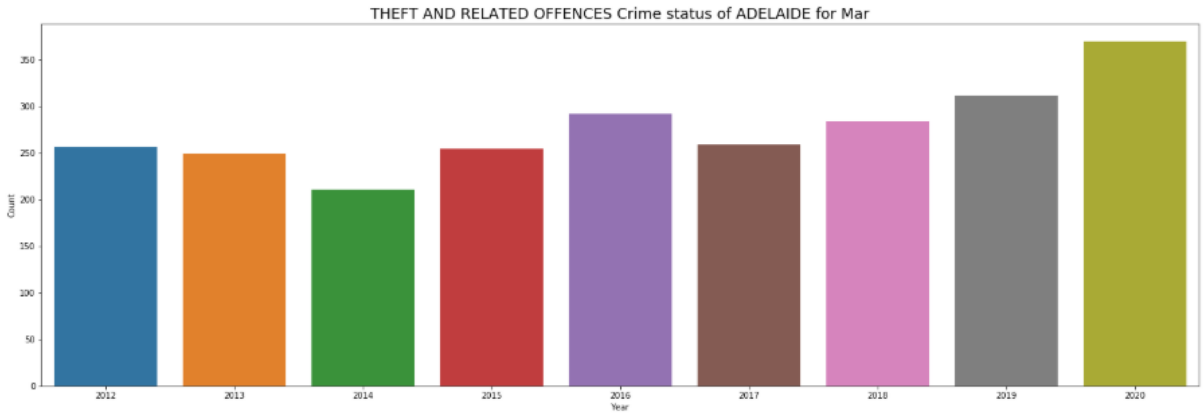


The data presented appears to be increasing since 2018 until present, especially in the case of 'Theft and related offences'. As the news and reports say that there has been decrease in the crime rate after the lockdown, which has started in the late March, 2020. To prove this claim, the above established functions are used to find the same.

The result of the first function is an interactive heat map that is presenting the monthly average recorded offences for 2020. The category of offence chosen here is 'Theft and Related Offences'. It can be interpreted that Adelaide suburb is observing the highest recorded thefts and related offences.



As per the interpreted output from the first function, the Adelaide suburb that is noticed to have highest number of recorded offences can be explored more to on how the numbers have changes for the March month when the lockdown has been started. Therefore, the function 2 is established to explore any category of offences, over a specific month for all the years for the interested suburb. Below is the graph showing the 'Theft and Related Offences' variation for Adelaide suburb for the March month from 2012 to present.



It is clearly visible that the offense recorded in March, 2020 are higher than the previous years, on the contrary to the news and reports, though only the lockdown has started in the late March.

5. Applications and Limitations

The potential of these functions is not limited to only during the times of COVID-19 lockdown but are actually useful for several other emergencies to analyse and anticipate the variations in crime rate and support the policy makers and police in making right decisions in the right now. Such as, the bushfire breakout every year in Australia, while the people from regional areas are evacuated, reports said that their homes were attacked by burglars and other incidents. Other emergencies where this function can be implemented is during the floods, and other disasters.

These functions are not even limited to only during the times of emergencies but can be used for regular frequent analysis, to identify the patterns of incidents based on the category and geographical spread out.

There are few limitations to these functions. The first to note is related to the second function, it is a monthly averaged no. of offences recorded and not exploring the variation on daily basis to actually study the graphical representation for the March month. Also, the functions are only based on the no. of offences and not the incidents, this could potentially mislead the data interpretation, as some of incidents are recoded to have committing as many as 50 offences.

On the other hand, data until March, 2020 is too early to actually come to a conclusion about the effects if lockdown in the criminology and the three levels of simplified description is losing the necessary 'thick' data of the incidents.

6. Conclusion

Studying the variability of Crime is important as the criminology too works on the basis of opportunities. As the changes happen to the lifestyle and routine, the crime scenario too changes accordingly. Therefore, to study this variability of crime requires specific functions that analyse the crime statistics generated. These functions established in this report are one way to analyse and draw interpretations based on geography and category of the offence.

The applications of these functions are plenty including the times of emergencies and regular analysis although the limitations of the datasets and the parameters used in the functions are present.

References

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