

MSc BUSINESS INTELLIGENCE & ANALYTICS

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MODULE LEADER: PROF. ROLF BANZIGER

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CRIME STATISTICS – WESTERN AUSTRALIA POLICE FORCE

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STUDENT ID: w1873971

STUDENT NAME: MANJISHA MOHAN

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➤ **Data Visualisation & Dashboarding - Crime**

Crime in Western Australia is generally consistent with national trends, with the majority of offences being non-violent property crimes. However, there are some differences in crime patterns between metropolitan and regional areas in the state.

In metropolitan areas, such as Perth, the most common crimes are burglary and theft. These offences often occur in residential areas and are typically committed by individuals with drug addiction or mental health issues. There is also a higher incidence of drug-related crime in metropolitan areas, particularly in relation to the use and distribution of methamphetamine.

In regional areas, the most common crimes are also property-related, but there is a higher incidence of rural crime, including livestock theft and machinery theft. There is also a higher incidence of alcohol-related crime in regional areas, particularly in relation to domestic violence and disorderly conduct.

Overall, crime rates in Western Australia have been trending downward in recent years. However, the state government has identified areas of concern, including the high rate of methamphetamine use, and is implementing strategies to address these issues.

➤ **About the Western Police Force**

The Western Australia Police Force (WAPOL) is responsible for maintaining law and order in the state, and works to prevent, detect and investigate crime. They use a number of strategies and techniques to tackle crime, including community policing, intelligence-led policing, and crime prevention campaigns.

According to the WAPOL's annual crime statistics report, overall crime rates in Western Australia have been decreasing in recent years. In the 2019-2020 financial year, the total number of offenses decreased by 2.5% compared to the previous year. The report also showed that there were decreases in the number of burglaries, thefts, and motor vehicle thefts.

However, the report also highlighted some areas of concern, including an increase in the number of drug offenses and an increase in the number of fraud and deception offenses.

The report also showed that there is a higher incidence of crime in the metropolitan area compared to the regional areas.

To combat these trends, the WAPOL has been implementing a number of strategies, including increased patrols in high-crime areas, targeted enforcement operations, and community engagement initiatives. They also have a specialized unit to deal with drug-related offences, and work closely with other agencies, such as the Australian Federal Police and the Australian Border Force, to combat organized crime.

In addition to their crime-fighting efforts, the WAPOL also places a strong emphasis on community engagement and building trust with the communities they serve. This includes working with community groups, youth organizations and other stakeholders to address the underlying social issues that can contribute to crime.

➤ **Research Question**

Main Research Question: crime statistics for Western Australia Police and Any improvement in their Crime Statistics

Sub-Research Question: We attempt to answer our main research questions through a few sub research questions, which are as follows:

1. What are the crime statistics for Western Australia Police?
2. What is the most common type of crime committed in Western Australia Regions?
3. What are the trends in property crime in Western Australia?

➤ **Data Understanding & Preparation**

Website Link to Dataset - <https://www.police.wa.gov.au/Crime/CrimeStatistics>

The Western Australia Police Force (WAPOL) crime statistics dataset is a valuable resource for understanding crime patterns and trends in the region. It is organized by local government area, which allows users to see crime rates and trends in specific regions and compare them with other areas. This can be useful for identifying high-crime areas and target efforts to reduce crime in those areas.

The dataset also includes information on the types of crime, which can be used to understand the most common types of crime in the region and target efforts to prevent and reduce those types of crime. For example, if the data shows that burglary is a particularly common type of crime in a specific area, local authorities may prioritize efforts to prevent burglaries in that area.

Additionally, the dataset provides information on the time of day when crimes occurred, which can be used to understand when crimes are most likely to occur and target efforts to prevent and reduce crime during those times. For example, if the data shows that crimes are more likely to occur at night, authorities may increase patrols during those hours.

The dataset also includes information on the age and gender of victims and offenders, which can be used to understand who is most likely to be victimized or to commit crimes. This information can be used to target efforts to prevent and reduce crime among specific groups of people.

Overall, The WAPOL crime statistics dataset allows researchers, policymakers, and community members to better understand crime patterns and trends in Western Australia and can inform efforts to prevent and reduce crime in the region.

Below are the offences which are mentioned in the dataset.

<p>Homicide</p> <ul style="list-style-type: none"> • Murder • Attempted/Conspiracy to Murder • Manslaughter • Driving Causing Death <p>Recent Sexual Offences</p> <ul style="list-style-type: none"> • Recent Sexual Assault • Recent Non-Assaultive Sexual Offences <p>Historical Sexual Offences</p> <ul style="list-style-type: none"> • Historical Sexual Assault • Historical Non-Assaultive Sexual Offences <p>Assault (Family)</p> <ul style="list-style-type: none"> • Serious Assault (Family) • Common Assault (Family) <p>Assault (Non-Family)</p> <ul style="list-style-type: none"> • Serious Assault (Non-Family) 	<p>Deprivation of Liberty</p> <ul style="list-style-type: none"> • Kidnapping/Child Stealing • Deprivation of Liberty <p>Robbery</p> <ul style="list-style-type: none"> • Business • Non-Business <p>Burglary</p> <ul style="list-style-type: none"> • Dwelling • Non-Dwelling <p>Stealing of Motor Vehicle</p> <p>Stealing</p> <ul style="list-style-type: none"> • Stealing From Motor Vehicle (Contents or Parts) • Stealing From Retail Premises (Shoplift) • Stealing From Dwelling • Stealing From Other Premises or Place • Stealing as a Servant 	<p>Drug offences</p> <ul style="list-style-type: none"> • Drug Dealing • Cultivate or Manufacture Drugs • Drug Possession • Possession of Drug Paraphernalia • Other Drug Offences <p>Receiving and Possession of Stolen Property</p> <ul style="list-style-type: none"> • Possess Stolen Property • Receiving Stolen Property <p>Regulated Weapons Offences</p> <p>Graffiti</p> <p>Fraud and Related Offences</p> <ul style="list-style-type: none"> • Forgery • Fraud (Credit Card) • Fraud (Not Elsewhere Classified)
<ul style="list-style-type: none"> • Common Assault (Non-Family) • Assault Police Officer <p>Threatening Behaviour (Family)</p> <ul style="list-style-type: none"> • Threatening Behaviour (Family) • Possess Weapon to Cause Fear (Family) <p>Threatening Behaviour (Non-Family)</p> <ul style="list-style-type: none"> • Threatening Behaviour (Non-Family) • Possess Weapon to Cause Fear (Non-Family) 	<ul style="list-style-type: none"> • Stealing (Not Elsewhere Classified) <p>Property Damage</p> <ul style="list-style-type: none"> • Criminal Damage • Damage <p>Arson</p> <ul style="list-style-type: none"> • Cause Damage by Fire • Cause Bushfire • Other Fire Related Offences 	<p>Breach of Violence Restraint Order</p> <ul style="list-style-type: none"> • Breach of Family Violence Restraint Order • Breach of Violence Restraint Order • Breach of Police Order <p>For WA Police Force purposes a family relationship includes:</p> <ul style="list-style-type: none"> • Partners; • Ex-partners; • Parents; • Guardians of children; and • Children who reside or regularly stay with involved parties.

➤ **Data Cleaning**

Cleaning data from a dataset is an important step in preparing it for analysis. When working with a dataset taken from the Western Australia Police Force (WAPOL) crime statistics, there may be a number of issues that need to be addressed before the data can be effectively used.

When cleaning data in Excel, some common tasks that may need to be performed include: -

Removing duplicates: This is important to ensure that the data is accurate and that there are no duplicate records.

Removing missing values: This is important to ensure that the data is complete and that there are no missing values that could affect the analysis.

Formatting data: This is important to ensure that the data is consistent and in the correct format. For example, making sure that dates are in a consistent format or that numbers are formatted correctly.

Data validation: This is important to ensure that the data is accurate and that it meets certain criteria. For example, checking that a date is within a certain range or that a number is within a certain range.

Data transformation: This is important to ensure that the data is in a format that can be used for analysis. For example, converting a date to a specific format or converting text to a numerical value.

It's important to note that the exact steps that need to be taken to clean the data will depend on the specific dataset and the analysis that is being performed. It may require a bit of experimentation to find the right approach.

After the data is cleaned, it can be used for further analysis. This could include looking for patterns and trends, creating visualizations, or running statistical models by using Tableau. And it's important to keep the cleaned data set as a separate file or version in case further cleaning or analysis is needed in the future.

➤ **Crime Statistics for Western Australia Police**

After meticulously cleaning the data, we were able to extract valuable insights that would help us understand crime patterns and trends in Western Australia. The dataset was organized into four categories: Parent category, Offence- Subcategory, Offence category, and count of offences. It covered a period of one year, from July 19 to June 20, which allowed us to examine the crime patterns over a specific period. With this data, we could analyse the most common types of crime, their frequency, and the specific areas where they occurred, which could inform efforts to prevent and reduce crime in the region.

Armed with the cleaned and organized data, we were able to perform an in-depth analysis to uncover key insights. One of the key areas of focus was identifying which Parent category had the highest count from the Crime statistics data. By analysing the count of offences for each Parent category, we were able to identify which category had the most occurrences and where it was most prevalent. This information provided a clear understanding of the crime patterns in the region and helped us to focus our efforts on the areas that needed the most attention. To do this, we turned to Tableau, a powerful data visualization tool, to help us gain a clear understanding of the data. This was a crucial step in our analysis and helped us to gain a deeper understanding of the crime trends and patterns in Western Australia.

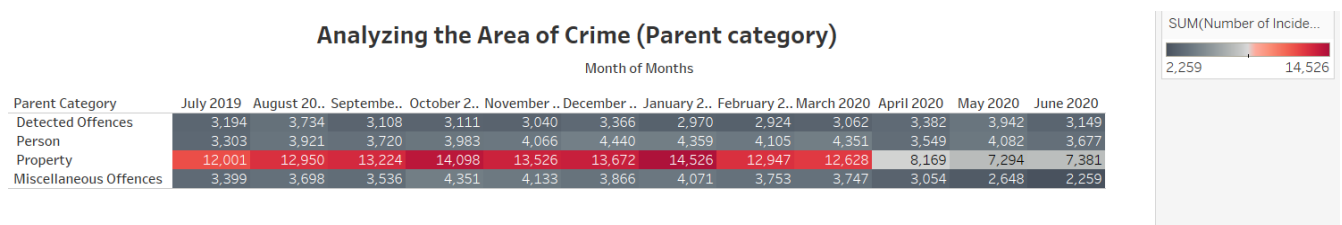


Figure-1

In addition to using text tables, we also utilized an unstacked bar chart in Tableau to further analyse and gain a better understanding of the Parent category. The unstacked bar chart is a useful visualization tool that allows us to compare the count of offences for different categories, in this case, the Parent category.

By using Tableau's unstacked bar chart, we were able to clearly see the relative proportions of offences for each category and identify which categories had the highest count. This helped us to understand which types of crimes were most prevalent in the region, and it provided a clear picture of the crime patterns and trends.

Furthermore, the unstacked bar chart allowed us to filter the data by different dimensions such as time, location, and demographic, which gave us a more detailed understanding of crime patterns. We could also group the data to have a better understanding of the sub-categories and their counts, which helped us to identify specific areas that needed attention.

Overall, the use of Tableau's unstacked bar chart in conjunction with the line graph provided a comprehensive understanding of crime patterns and trends in Western Australia and helped us to identify areas that needed attention. It allowed us to analyse the data in a more flexible and interactive way, and it helped us to get better insights from the data.

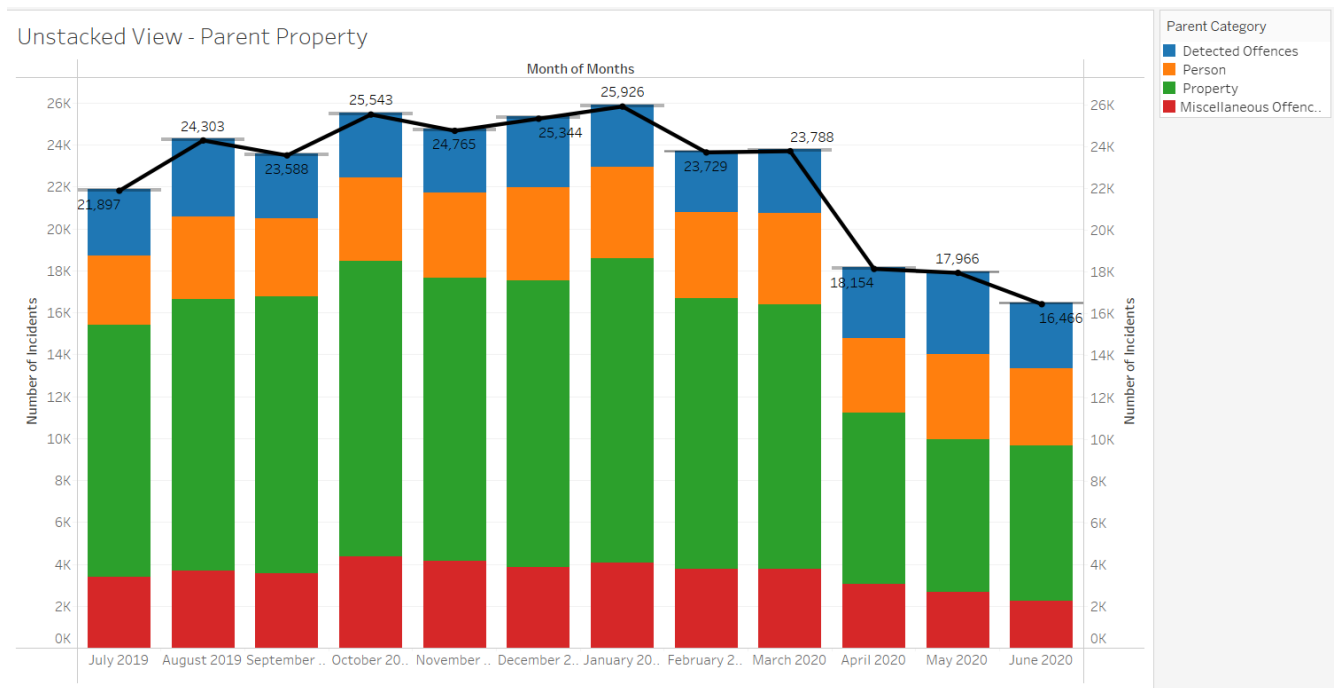


Figure-2

After that, we started our analysis by exploring the crime statistics dataset and identifying which offence category was most frequent or had the highest count. By using horizontal bar charts, we were able to quickly and easily view the count of offences for each category, making it easy to identify which category had the highest count.

This approach allowed us to get a clear and comprehensive picture of the crime statistics and identify the areas that needed more attention. By using Tableau, we were able to present the data in a visually appealing and easy-to-understand format, making it simple to identify the key findings and insights from the data.

Additionally, with Tableau we could also filter the data by time, location and other variables which could provide more insights. And it's also possible to combine it with other data sources to have a more holistic view. Overall, this initial step in our analysis provided a foundation for further examination and helped us to focus our efforts on the areas that were most critical.

Crime Statistics - Offence Category

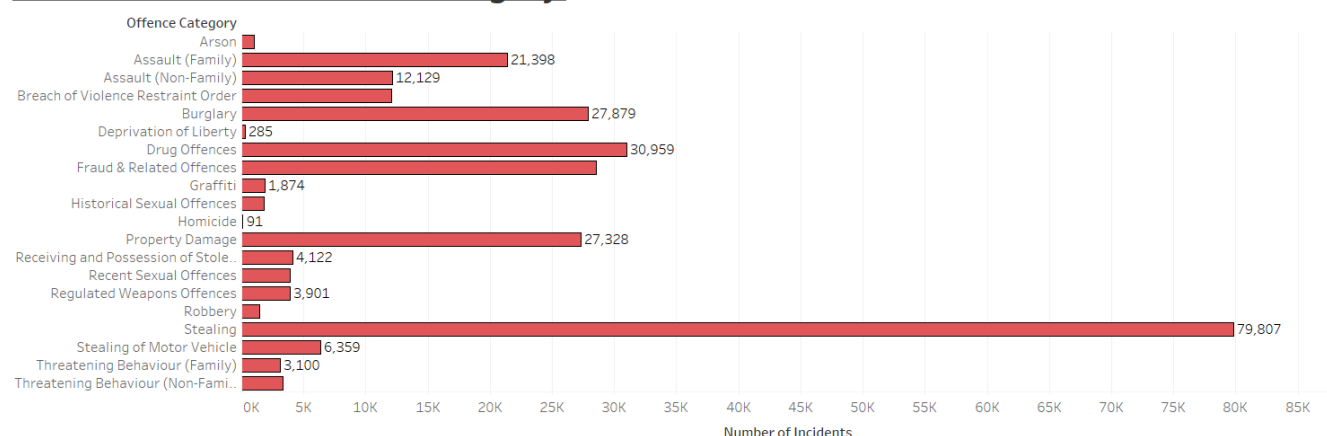


Figure-3

As we delved deeper into crime statistics, using Tableau's horizontal bar charts to visualize the data, a clear trend emerged. The offence category of "Stealing" stood out as having the highest count when compared to the other categories (as shown in the above Bar graph Figure-3). This insight revealed through our data analysis and visualization efforts, allowed us to focus on this specific area and take steps to address the issue.

After identifying that the Parent category "Property" had the highest count in the Crime statistics data, we delved deeper into its category to understand the specific types of offences that were included. We analysed the Offence Sub-category and Offence category within the Parent category to see which specific types of offences were most common, and their frequency. This provided a more detailed understanding of the crime patterns within the "Stealing" category and helped us to identify specific areas that needed attention. With this information, we could take targeted action to prevent and reduce the specific types of stealing offences that were most prevalent. This analysis helped us to gain a more granular

understanding of the crime trends and patterns in Western Australia, and it was an essential step in our efforts to combat crime in the region.

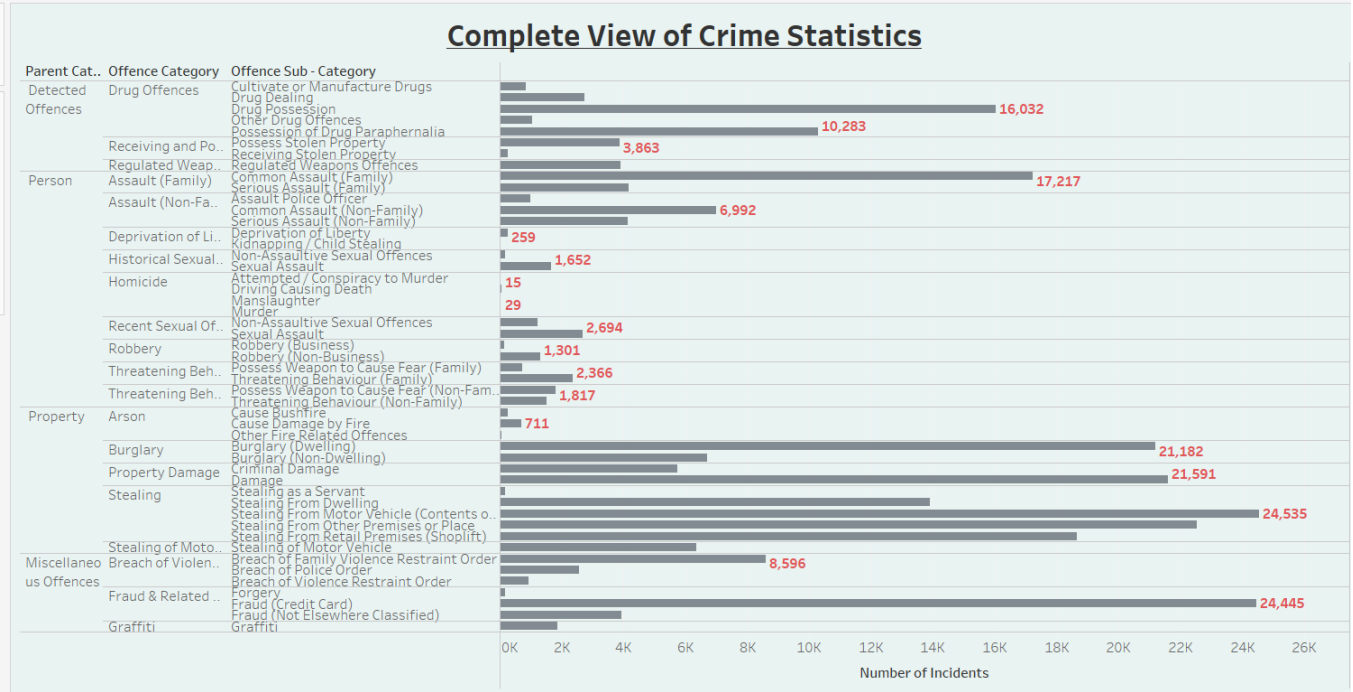


Figure-4

➤ **The most common type of crime committed in Western Australia Regions**

In the Parent category - Property is the most common crime committed

Our analysis and visualization of the Parent category - Property and its Offence Sub-category was an important step in understanding crime patterns and trends in Western Australia. By using a line graph, we were able to clearly see how the number of offences for this category changed over time. By segmenting the data by metropolitan and regional areas, we were able to see if there were any differences in crime patterns between these two areas and identify any specific areas that were particularly affected.

We found that the metropolitan area had a higher count of offences compared to the regional area, which was a key insight that informed our understanding of crime patterns in Western Australia. This information is important because it helps to identify areas that are more prone

to crime and need more attention. The metropolitan area is generally more densely populated, and thus, more likely to have higher crime rates. By focusing on the metropolitan area, we can take steps to address the issue and reduce crime in this area.

Moreover, the line graph also helped us to see how the trend is changing over time. This is important because it allows us to understand if the count of offences is increasing or decreasing and if there are any specific months, seasons, or years where the count is higher. This information can be used to develop strategies to prevent and reduce crime in the long term.

Overall, our analysis and visualization of the Parent category - Property and its Offence Sub-category, helped us to gain a deeper understanding of crime patterns and trends in Western Australia, and it was an essential step in our efforts to combat crime in the region.

Location with highest Crime ratio

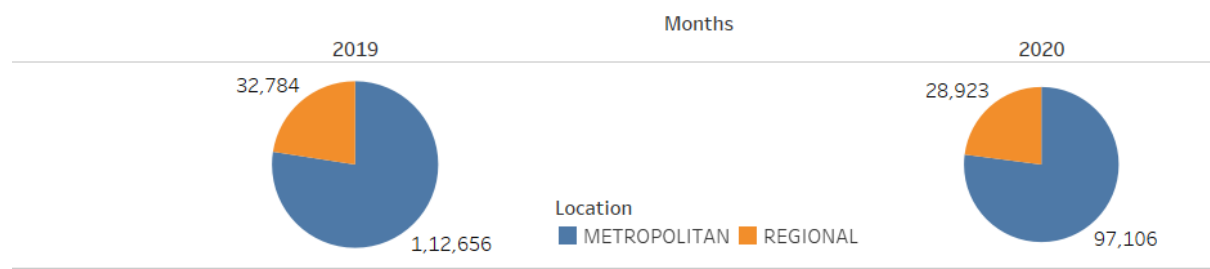


Figure-5

➤ The trends in property crime in Western Australia

The line graph allowed us to see the trends in property crime over time, and it was an effective way to identify patterns and trends in the data. By analysing the data, we were able to see that the Offence Sub-category of "Stealing from a Motor Vehicle" had a consistently high count in the metropolitan regions, indicating that it was a prevalent issue in these areas.

This insight was important because it helped us to focus our efforts on preventing and reducing stealing from a motor vehicle in the metropolitan regions. By understanding the specific type of crime that is prevalent in these areas, we could take targeted action to address the issue and make a positive impact on reducing crime in Western Australia.

Furthermore, by comparing the count of "Stealing from a Motor Vehicle" in metropolitan regions with other categories, we could also see if there are any other types of property crime which are more prevalent in the regional areas. This information can help us to have a more holistic view of the crime patterns and trends in the region and take appropriate actions.

Overall, by using the line graph to visualize the trends in property crime in Western Australia, we were able to gain a deeper understanding of the crime patterns and trends in metropolitan regions and it was an essential step in our efforts to combat crime in the region.

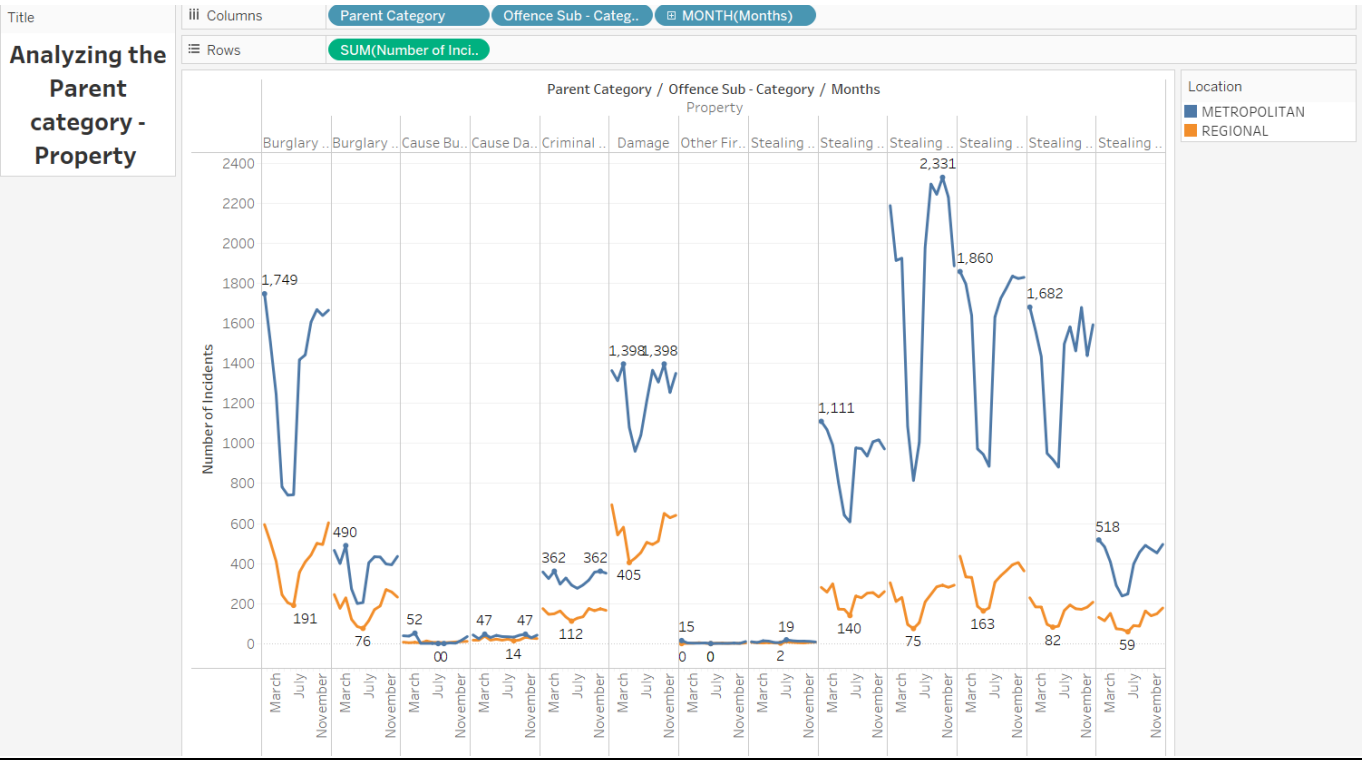


Figure-6

➤ **Conclusion**

In conclusion, our analysis of crime statistics data of the Western Australia police force using Tableau has provided valuable insights that can help to combat crime in the region.

We found that the Parent category "Property" had a high count, which highlights the importance of focusing on this area to prevent and reduce crime. Within the Parent category "Property", the Offence category "Stealing" was identified as the most prevalent, which means that the Western Australia police force should focus more on this area to prevent and reduce crime.

It's important to note that the data also shows that crime in 2020 was less as compared to 2019, this could be due to the impact of the pandemic, but it's important to monitor the trend and take necessary actions if it's increasing. This can help to inform strategies to prevent and reduce crime in the long term.

Overall, by using data visualization tools such as Tableau, we were able to gain a deeper understanding of crime patterns and trends. This information can help to inform efforts to reduce crime in Western Australia. It can also help to identify areas that need more attention and resources and to track the progress of the actions taken to reduce crime. The use of data visualization tools is essential for any crime prevention and reduction efforts as it helps to identify patterns, trends and areas of concern, which can lead to more effective and targeted actions.

➤ **References**

<https://www.police.wa.gov.au/Crime/CrimeStatistics>

<https://link.springer.com/article/10.1007/s41887-018-0022-6>

<https://medium.com/@sj20997/tableau-c9d6962991ca>

https://www.tableau.com/en-gb/trial/tableau-software?utm_campaign_id=2017049&utm_campaign=Prospecting-CORE-ALL-ALL-ALL-ALL&utm_medium=Paid+Search&utm_source=Google+Search&utm_language=EN&ut

m_country=UKI&kw=tableau&adgroup=CTX-Brand-Core-EN-E-control&adused=527781174436&matchtype=e&placement=&d=7013y000000vYhH&nc=7013y0000029zDnAAI&cq_cmp=1674770365&cq_net=g&cq_plac=&gclid=CjwKCAiA5Y6eBhAbEiwA_2ZWIRhUDNSwSV_5WLLi6EclvzKOzj4mEA0WYikGp4Dc_evXqafjZYWjyRoCq4kQAvD_BwE&gclsrc=aw.ds