

Data Science in Criminology : A Decade Analysis of Hong Kong

COMP2501 Project Presentation

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Introduction to Criminology

“What is criminology?”

Criminology is the study of crime and criminal behavior, informed by principles of sociology and other non-legal fields, including psychology, economics, **statistics**, and anthropology. [1]

Beginning of Statistics in Criminology

Adolphe Quetelet

- Crime classification system developed (1820s) to understand social patterns
- Data on civilian social life and crime collected and managed by the government
- → France first country with national statistics in 1826

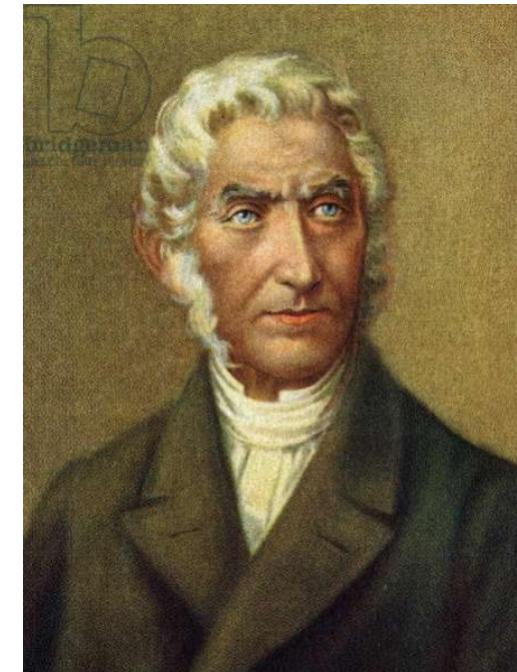


Figure 1: Portrait of Adolphe Quetelet [2]

Early Crime Statistics in Hong Kong

1870 Hong Kong Government Report:

“Serious crimes have increased 78.8%, minor offenses 20.5% and all crimes 32.4 % compared to 1869.”

Problem Definition

- Data Science's Role in Criminology
- Decade Analysis of Crime in Hong Kong

Data Science's Role in Criminology

- Performance evaluation of authorities in combatting crime
- Analysis of government policies
- Underlying causes of crime and victimization
- Public awareness of criminal activities in certain neighborhoods

→ Maintenance of public safety in Hong Kong

Decade Analysis of Crime in Hong Kong

Identify specific crime categories with significant variation and changes in crime rate.

- Efficient allocation of resources through evidence-based methods
- Maintenance of public safety in Hong Kong

Methodology

- Existing Works
- Data Available
- Libraries

Existing Works

“Crime Statistics in Detail” from the Police Official Webpage

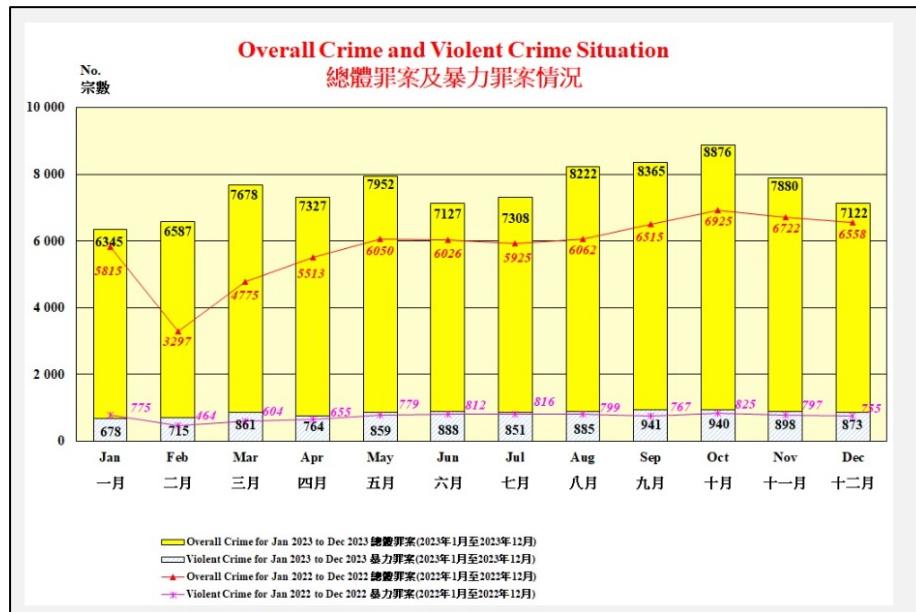


Figure 2a: Overall crime and violent crime situation in 2023 from the Police official webpage



Figure 2b: Trend of Homicide from 2013 to 2023 from the Police official webpage

Data Available

The screenshot displays the Hong Kong Police Force's official webpage for crime statistics. At the top, the Hong Kong Police Force logo and the text "The Government of the Hong Kong Special Administrative Region" are visible. Below the logo, there is a navigation bar with links to "About Us", "Recruitment", "Police Messages", "Crime Prevention", "e-Services", "Information", and "Contact Us". On the right side of the header, there are links for "繁 简 Text Size" and a search icon.

The main content area features a pink gradient background with the title "Crime Statistics Comparison". Below the title, there is a sub-section titled "Statistics" with a three-dot menu icon. A large blue arrow points to a table titled "Comparison of 2023 and 2022 Crime Situation". This table has two columns: "2022" and "2023 Compared with 2022". The "2022" column lists various crime categories with their respective counts. The "2023 Compared with 2022" column shows the change in count (Numerical) and percentage (Percentage). For example, Overall Crime increased from 70 048 to 90 276, a change of +20 228 or 28.9%.

To the right of the table, there is a section titled "Looking for previous Crime Statistics Comparison?". It contains a dropdown menu with options for years from 2001 - 2013 to 2020 - 2021, with "2021 - 2022" selected. A "submit" button is located next to the dropdown. Below the dropdown, there is a link "Download file (Excel Format)". A second blue arrow points to this download link.

	2022	2023 Compared with 2022		
		Numerical	Percentage	
1.	Overall Crime	70 048	90 276	+ 20 228 28.9
2.	Violent Crime	8 830	10 122	+ 1 292 14.6
3.	Homicide (1)	30	28	- 2 6.7
4.	All Robberies (1), including :	77	97	+ 20 26.0
	- Robbery with Firearms	-	-	-
	- Robbery with Arms (Stun Guns)	-	-	-
	- Robbery with Pistol Like Object	2	1	- 1 50.0
	- Bank Robbery	1	-	- 1 100.0
	- Goldsmith/Watch Shop Robberies	3	7	+ 4 133.3

Figure 3: The Police official webpage to view crime data,
https://www.police.gov.hk/ppp_en/09_statistics/csc.html

Libraries

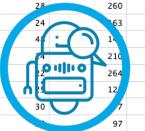
library(dplyr)



library(ggplot2)



library(rvest)



A screenshot of a computer interface showing a table titled "Hong_Kong_Crime_Statistics". The table has columns for Year, Overall Crime, Crime Rate, Violent Crime, Violent Crime Rate, Homicide, All Robberies, and Burglary. The data spans from 2013 to 2023. A blue circle highlights the last row of the table.

	Year	Overall Crime	Crime Rate	Violent Crime	Violent Crime Rate	Homicide	All Robberies	Burglary
1	2013	72911	1016	12153	169	62	500	
2	2014	67740	937	11073	153	27	309	
3	2015	66439	911	10889	149	22	223	
4	2016	60646	827	10103	138	28	260	
5	2017	56017	758	9086	123			
6	2018	54225	728	8884	119			
7	2019	59225	789	9690	129			
8	2020	63232	845	9391	126			
9	2021	64428	869	9587	129			
10	2022	70048	954	8830	120			
11	2023	90276	1204	10122	135			

Findings

Overall Crime in Hong Kong in the Past Decade

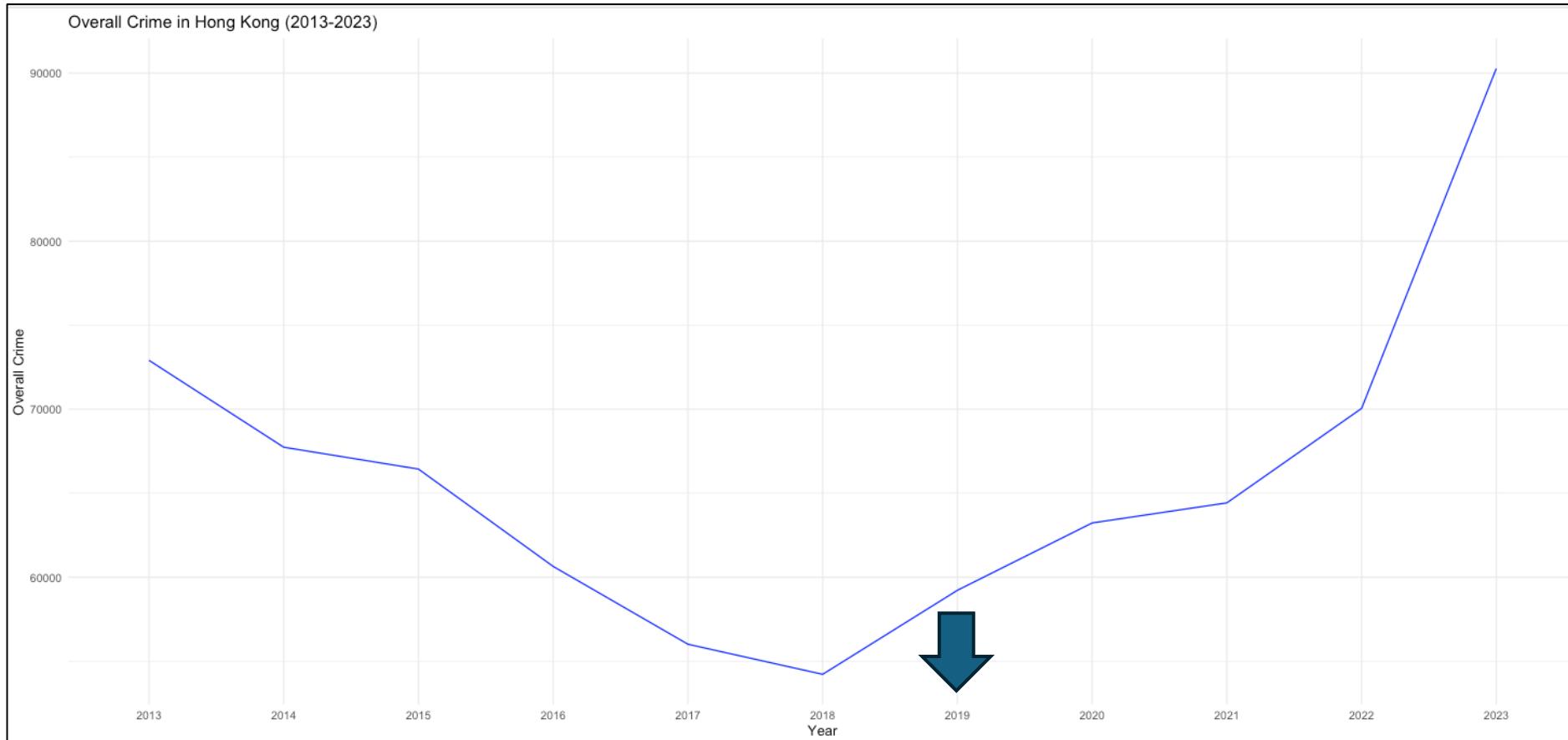


Figure 4: Chart showing overall crime in Hong Kong from 2013 to 2023 from the program R

Overall Crime in Hong Kong in the Past Decade

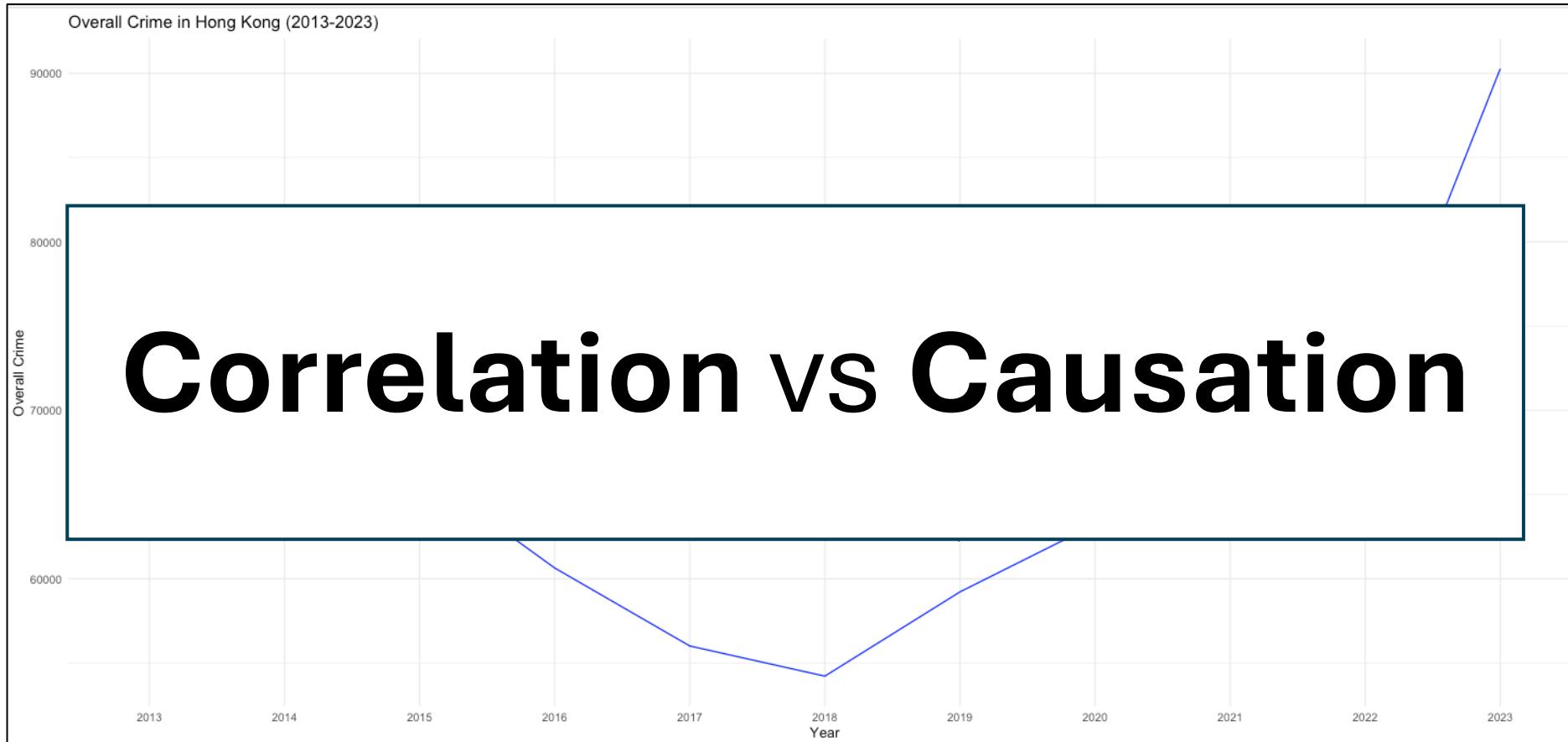


Figure 4: Chart showing overall crime in Hong Kong from 2013 to 2023 from the program R

Homicide in Hong Kong in the Past Decade

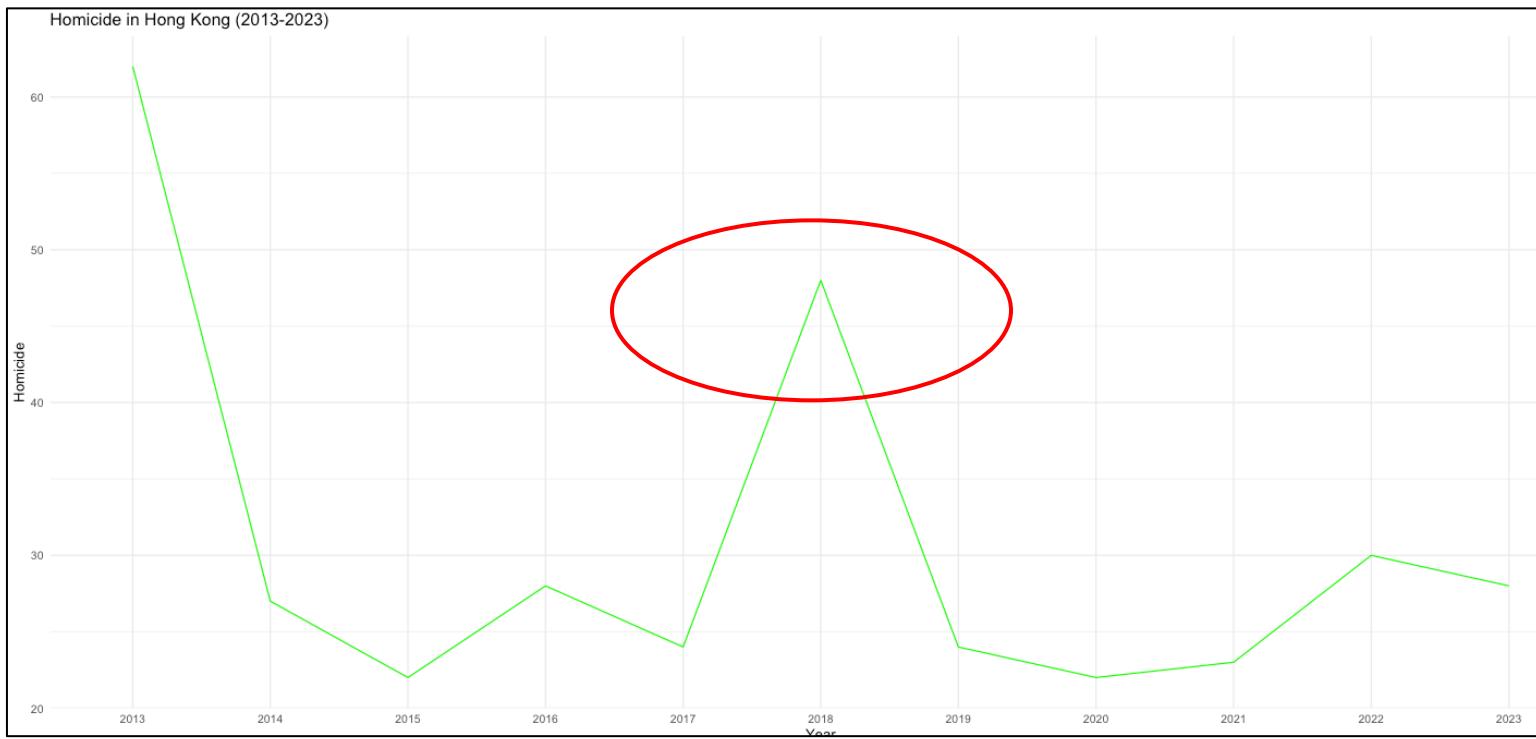


Figure 5: Chart showing homicide in Hong Kong from 2013 to 2023 from the program R

Violent Crime and Homicide in Hong Kong in the Past Decade

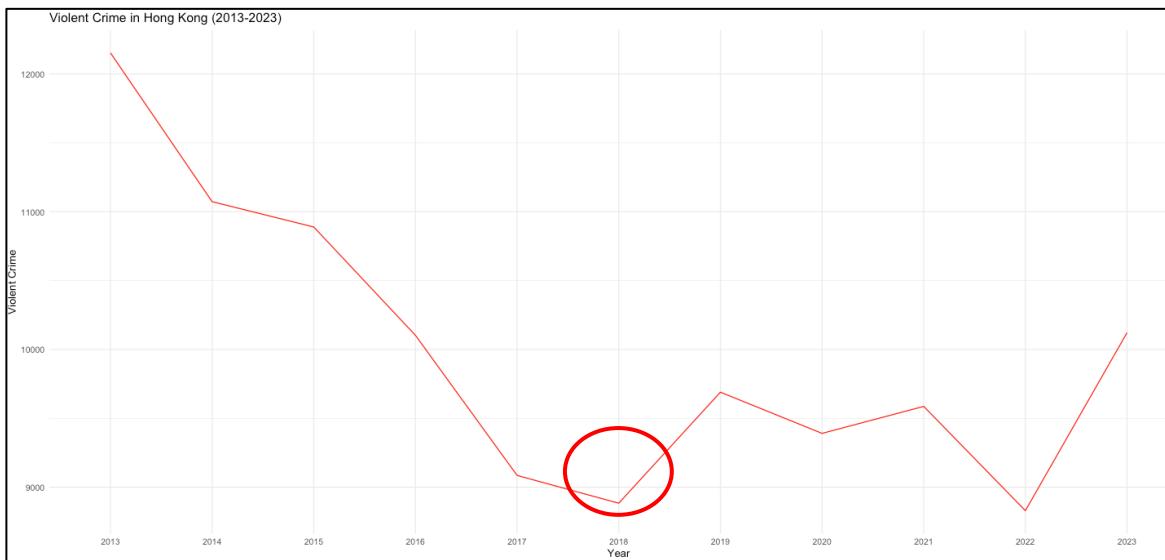


Figure 6: Chart showing violent crime in Hong Kong from 2013 to 2023 from the program R

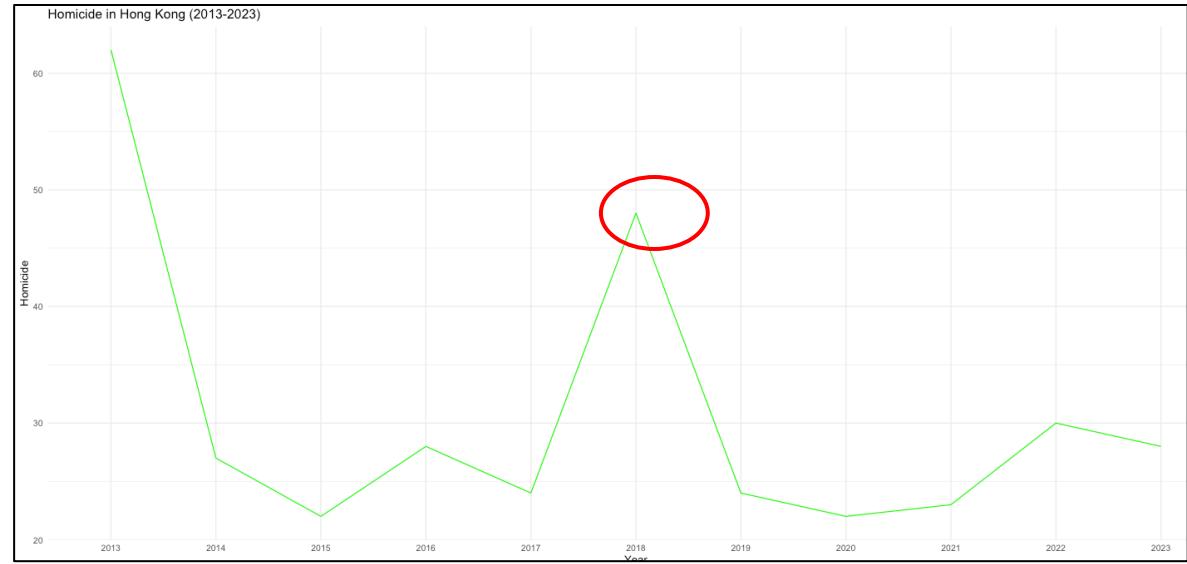


Figure 5: Chart showing homicide in Hong Kong from 2013 to 2023 from the program R

Overall Crime vs Violent Crime vs Homicide



Figure 7: Chart showing overall crime, violent crime and homicide in Hong Kong from 2013 to 2023 from the program R

Percentage Changes for each Crime Category in the Past Decade

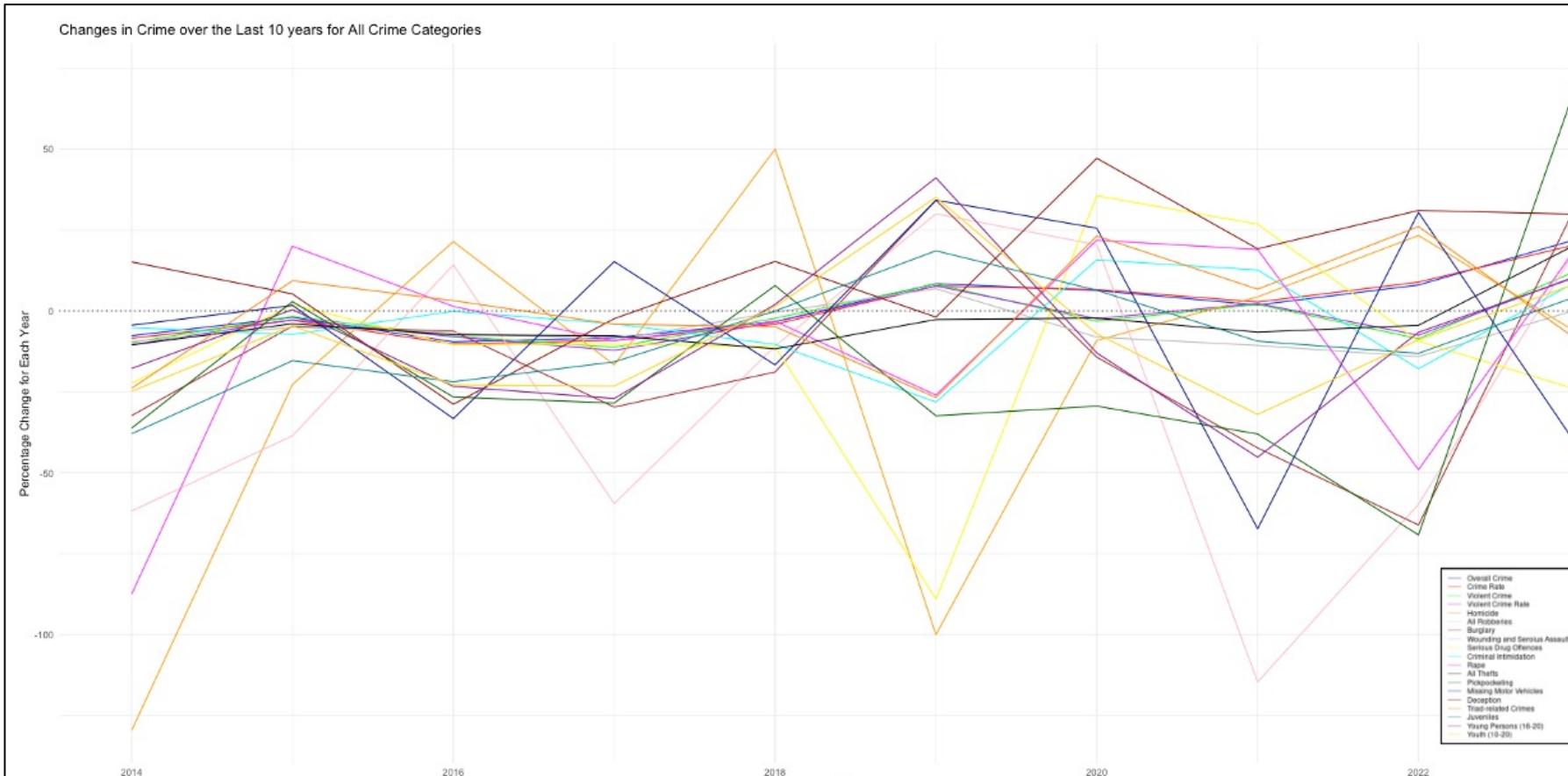


Figure 8: Chart showing percentage changes for all crime categories in Hong Kong from 2013 to 2023 from the program R

Percentage Changes for each Crime Category in the Past Decade

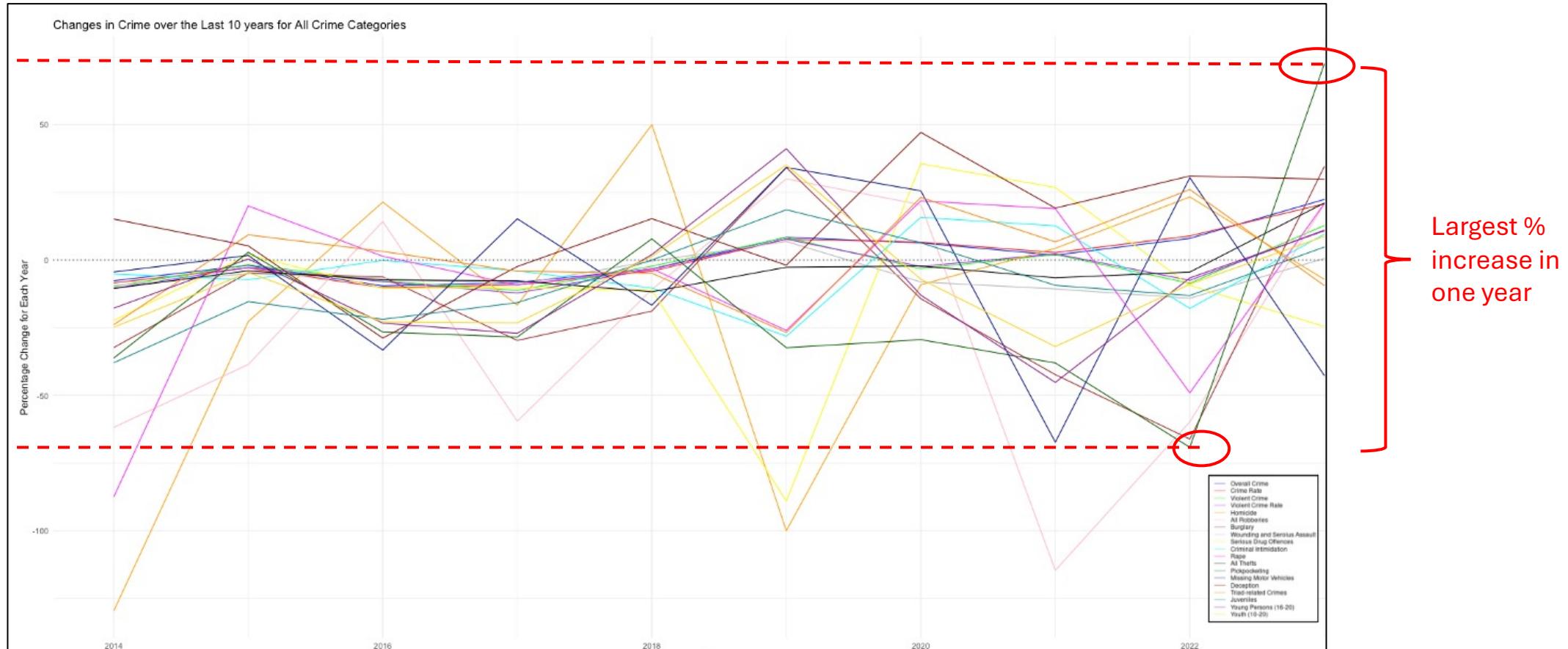


Figure 8: Chart showing percentage changes for all crime categories in Hong Kong from 2013 to 2023 from the program R

Percentage Changes for Pickpocketing in the Past Decade

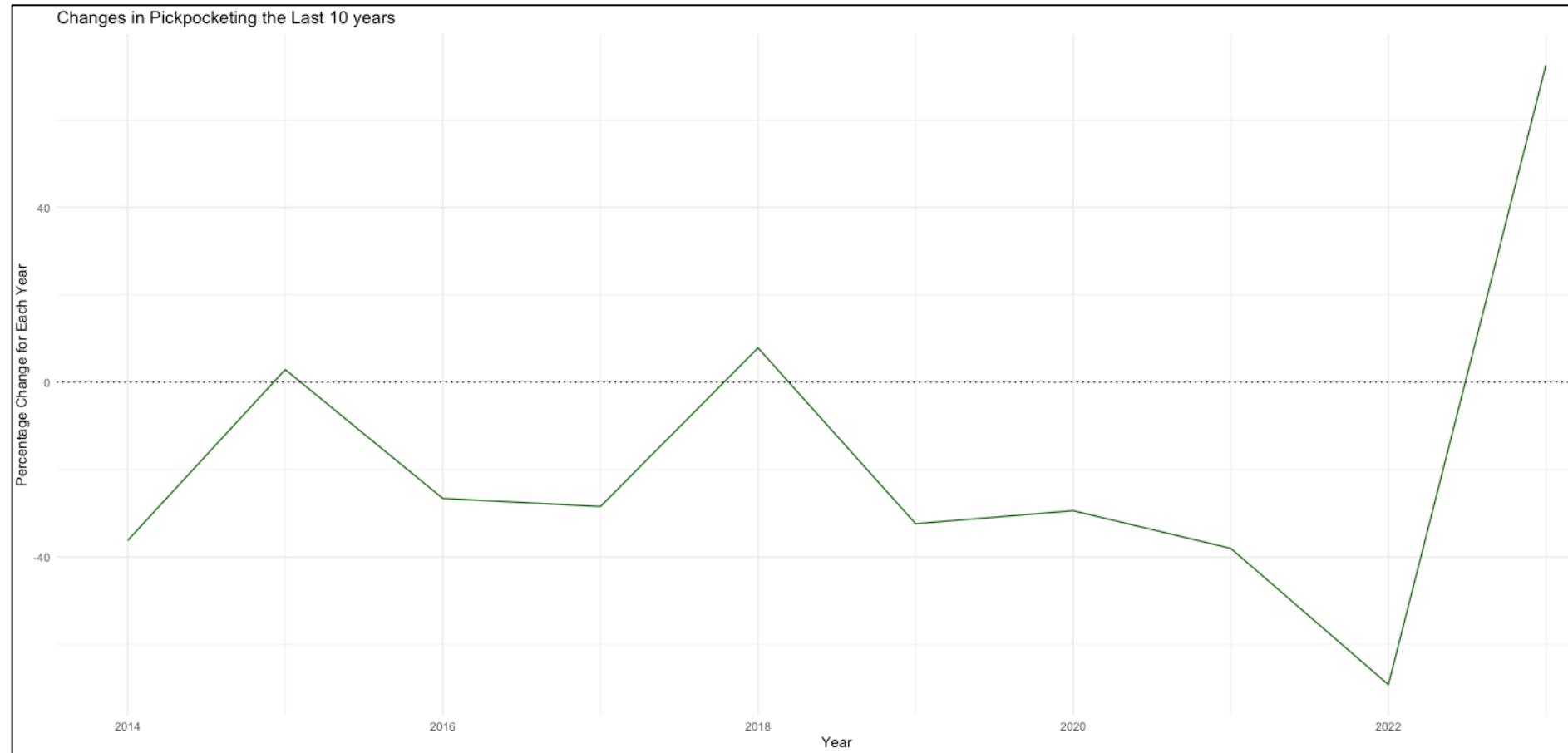


Figure 9: Chart showing percentage changes for pickpocketing in Hong Kong from 2013 to 2023 from the program R

Data Science's Role in Criminology

- Performance evaluation of authorities in combatting crime
- Analysis of government policies
- Underlying causes of crime and victimization
- Public awareness of criminal activities in certain neighborhoods

→ Maintenance of public safety in Hong Kong

Pickpocketing
is a real issue!



Challenges

Challenges

In crime statistics...

- Data collected underrepresent the actual prevalence of crimes
→ Fraud, sexual harassment...
- Non-identifiable offenders in crimes
- Profiling and biased policing
→ Racial profiling

Conclusion

Conclusion

- Introduction of criminology
- Purpose of data science
 - Efficient allocation of resources through evidence-based methods
 - Maintenance of public safety in Hong Kong
- Hong Kong Crime Statistics in the last 10 years
- Challenges

References

- [1] <https://online.maryville.edu/online-bachelors-degrees/criminal-justice/resources/what-is-criminology/#:~:text=Criminology%20definition%20and%20history,economics%2C%20statistics%2C%20and%20anthropology>.
- [2] <https://focusonbelgium.be/en/Do%20you%20know%20these%20Belgians/adolphe-quettelet-father-modern-statistics>

Thank you