Assignment

Report: Presentation of Dashboard & Analysis

-Saurav Pati

Project Details and URL

https://github.com/SauravPati08/NZ-Stolen-Vehicle-Insights-Dashboard-Report

Comprehensive Report on Stolen Vehicle Insights in New Zealand

1. Details of Data

The analysis is based on two primary datasets:

• Locations Dataset: This dataset provides information about regions in New Zealand, including key attributes like:
- Region Names (e.g., Auckland, Wellington).
- Population: The total number of people residing in each region.
- Population Density: A measure of the number of individuals per unit area. (e.g., population / km2)

• Stolen Vehicle Data: This dataset focuses on vehicle theft incidents, covering:
- Count of Stolen Vehicles: The number of vehicles reported stolen.
- Vehicle Type: Type of vehicles.

- Temporal Attributes: Theft data is distributed by month and quarter, enabling time-based trend analysis.

• Additional Dataset - Make Details: Provides supplementary information, such as the name of vehicle makes and their classifications (e.g., Toyota, Honda).

2. Specific Points

• Top 5 regions with most population.

• Top 5 regions with most population density.

• Count of make names:
- Category of make type which has more make names.
- Category of make type which has less make names.

• Count of stolen vehicles by Month:
-Signifies month where the maximum crime happened.

• Count of stolen vehicles by Quarter:
-Signifies quarter where the maximum crime happened.

• Top 5 regions with most vehicle stolen.

• Count of Regions, Count of Vehicles, Total Population and Average Vehicle Count per Region (to find the regions of more or less crime rate than average).

3. Volume Information

This section summarizes the scale and distribution of the data:

• Overall Metrics:
- Total Regions Covered: 16.
- Total Vehicles Stolen: 4,553 incidents reported during the analysis period (07-10-2021 to 06-04-2022).
- Total Population: 5 million individuals across all regions.
- Average Vehicle Count Per Region: 285 vehicles.

• Population and Density Insights:
- Auckland: The most populous region, with over 1.5 million people.
- Other highly populated regions include Canterbury, Wellington, Waikato, and Bay of Plenty.
- Regions with high population density include Auckland, Nelson, and Wellington, indicating urban areas are the most densely inhabited.

• Stolen Vehicle Insights:
- The top regions for vehicle theft include Auckland, Canterbury, and Wellington, with Auckland reporting the highest incidents.
- Temporal data indicates fluctuations in vehicle thefts, peaking between March and April.

• Vehicle Type Breakdown:
 - The majority of stolen vehicles are classified as 'Standard,' likely due to their higher prevalence in the population compared to 'Luxury' vehicles.

4. Assumptions

To interpret the data accurately, the following assumptions were made:

• Data Coverage: It is assumed that the datasets are comprehensive, including all reported vehicle theft incidents in New Zealand during the specified time period.

• Accuracy of Population Data: Population and density data are considered accurate and up-to-date, reflecting the current demographic conditions.

• Regional and Temporal Representations: The regions and timeframes covered are representative of the broader trends in vehicle thefts across New Zealand.

5. Analysis

This section highlights trends, patterns, and insights derived from the data:

• Temporal Trends in Vehicle Theft:
 - Theft incidents show significant variability throughout the year.
 - A noticeable spike in vehicle thefts is observed between March and April, while Q1 has the highest theft count among the quarters.
 - Thefts drop considerably in Q4, possibly indicating seasonal factors or increased preventive measures during this period.

• Geographical Patterns in Theft:
 - Auckland reports the highest number of stolen vehicles, likely linked to its large population and high urban density.
 - Other high-theft regions include Canterbury and Wellington, also densely populated areas with significant urban activity.
 - Regions with lower populations (e.g., Nelson) report fewer incidents, suggesting a strong correlation between theft rates and population size/density.

• Vehicle Make and Type:
 - Standard vehicles account for the majority of thefts, likely due to their availability and broader usage.
 - Luxury vehicles, though less common, may still represent significant financial losses when stolen.

Analysis of Specific Points in Dashboard.

(i) Top 5 Regions with the Most Population

- Auckland has the highest population, significantly surpassing other regions.

- The next four regions are:
  - Canterbury
  - Wellington
  - Waikato
  - Bay of Plenty
- These regions collectively represent the largest population hubs in New Zealand, likely due to urbanization and economic activities.

Insight: High population in these regions could contribute to increased vehicle usage, which may correlate with a higher risk of vehicle theft.

(ii) Top 5 Regions with the Most Population Density

- Auckland leads in population density, indicating a concentrated urban population.
- Other regions with high population density include:
  - Nelson
  - Wellington
  - Bay of Plenty
  - Waikato
- Urban areas with higher population density might face more vehicle thefts due to increased vehicle presence and ease of access for criminals.

Insight: These regions should be the focus of theft prevention efforts, given their urbanization and population density.

(iii) Count of Make Names

- Category of Make Type with More Make Names:
  - The Standard category dominates, with a higher variety of vehicle makes.
- Category of Make Type with Fewer Make Names:
  - The Luxury category has fewer makes, as luxury vehicles are less common and represent a niche market.

Insight: The dominance of standard vehicles aligns with their broader availability and usage, making them a more frequent target for theft.

4. Count of Stolen Vehicles by Month

- Month with Maximum Crime:

- The dashboard shows that March has the highest count of stolen vehicles.
- A rising trend is observed from February to March, suggesting seasonal factors or increased theft activity during this period.

Insight: Theft prevention campaigns and law enforcement efforts should be intensified leading up to March.

5. Count of Stolen Vehicles by Quarter

- Quarter with Maximum Crime:
- Q1 (January to March) records the highest vehicle thefts.
- This aligns with the monthly trend, where thefts peak towards the end of Q1 and into the start of Q2.

Insight: Q1 is the critical period for vehicle theft prevention measures, requiring proactive policing and community awareness programs.

6. Suggestions

Based on the findings, the following recommendations are proposed to address vehicle theft:

• Enhanced Surveillance in High-Theft Regions:
- Deploy additional security measures, such as CCTV and patrols, in regions with high theft counts (e.g., Auckland, Canterbury).
- Target urban centers and densely populated areas for maximum impact.

• Seasonal Prevention Campaigns:
- Launch anti-theft awareness campaigns during high-risk months, such as March and April.
- Educate vehicle owners on using anti-theft devices, secure parking practices, and reporting suspicious activity.

• Data Enrichment and Analysis:
- Incorporate additional variables, such as socio-economic data, recovery rates, and insurance claims, to uncover root causes and trends in vehicle thefts.
- Use predictive analytics to identify emerging theft hotspots.

• Public-Private Collaboration:
- Collaborate with car manufacturers and insurers to promote vehicle security features and incentivize theft-resistant designs.

• Policy and Policing Strategies:
  - Strengthen legal frameworks for vehicle theft prevention and punishment.
  - Equip law enforcement with advanced tools for vehicle tracking and recovery.

7. Summary

The analysis of stolen vehicle data in New Zealand reveals critical insights into the trends and patterns of vehicle theft. The data highlights a strong correlation between urban density and theft rates, with Auckland emerging as the hotspot for incidents. Temporal trends show thefts peaking during certain months and quarters, indicating opportunities for time-targeted prevention strategies. By focusing on high-risk areas, raising public awareness, and enhancing data-driven policing efforts, authorities can significantly reduce vehicle theft incidents. Collaboration between public and private sectors will further strengthen the country's approach to combating this issue.