Motor Vehicle Theft Analysis - Excel Documentation

1. Overview

This document provides a structured guide to the Excel file used for analyzing motor vehicle theft data for TDI consultants. It covers the dataset structure, formulas, pivot tables, and slicers used for interactive analysis.

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2. Datasets & Sheet Structure

The Excel file contains the following sheets:

a. Stolen Vehicles

- This sheet contains the primary dataset listing stolen vehicles along with their details.
- **Key Columns:**
  - Vehicle_ID: Unique identifier for each stolen vehicle.
  - Vehicle_Type: Type of vehicle (SUV, Sedan, Truck, etc.).
  - Color: Color of the stolen vehicle.
  - Location_ID: Location where the theft occurred.
  - Date_Stolen: Date of theft.

b. Make Details

- Contains information about vehicle manufacturers.
- **Key Columns:**
  - Make_ID: Unique identifier for each make.
  - Make_Name: Name of the vehicle manufacturer.

c. Locations

- Contains details about the locations where thefts occurred.
- **Key Columns:**
  - Location_ID: Unique identifier for each location.
  - Location_Name: Name of the city/region.

d. Dashboard

- This sheet contains pivot tables and charts for data visualization.

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3. Merging Data Using Excel Formulas

Since the dataset is split across multiple sheets, the following formulas were used to merge information into a single analysis sheet:

a. VLOOKUP to Get Make Name

Used in stolen_vehicles sheet to fetch vehicle make details:

=VLOOKUP(C2, make_details!A:B, 2, FALSE)

- C2 = Make_ID
- Searches in Make_Details sheet (Column A:B)
- Returns Make_Name from Column 2

b. VLOOKUP to Get Location Name

=VLOOKUP(E2, locations!A:B, 2, FALSE)

- E2 = Location_ID
- Searches in Locations sheet (Column A:B)
- Returns Location_Name from Column 2

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4. Pivot Tables & Data Analysis

a. Top 5 High-Theft Locations

- Created using a **Pivot Table**
- **Rows:** Location_Name
- **Values:** Count of Vehicle_ID
- **Filter:** Top 5 based on highest theft count

b. Yearly Theft Trends

- **Rows:** Year (Extracted from Date_Stolen using =YEAR(A2))
- **Columns:** Location_Name
- **Values:** Count of Vehicle_ID

- **Visualization:** Line Chart for yearly trends

c. Most Stolen Vehicle Type

- **Rows:** Vehicle_Type
- **Values:** Count of Vehicle_ID
- **Sort:** Largest to Smallest

d. Most Common Stolen Vehicle Color

- **Rows:** Color
- **Values:** Count of Color

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5. Adding Slicers for Interactive Analysis

Slicers were added to allow easy filtering in the dashboard.

a. How to Add Slicers:

1. Click inside a Pivot Table.
2. Go to **Insert** → **Slicer**.
3. Select fields like:
    - Year_Stolen
    - Location_Name
    - Vehicle_Type
    - Color
4. Click **OK** → Resize and format slicers.

b. Connecting Slicers to Multiple Pivot Tables

1. Click on a slicer.
2. Go to **Slicer Tools** → **Report Connections**.
3. Check all relevant Pivot Tables.
4. Click **OK**.

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6. Key Performance Indicators (KPIs) Calculated

- **Total Vehicles Stolen:** =COUNT(A:A)
- **Most Stolen Vehicle Type:** Pivot Table (Vehicle_Type & Count of Vehicle_ID)
- **Top Theft Locations:** Pivot Table (Location_Name & Count of Vehicle_ID)
- **Yearly Theft Trends:** Pivot Table with Line Chart
- **Theft by Color:** Pivot Table (Color & Count of Vehicle_ID)

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7. Final Recommendations & Next Steps

- Use slicers to analyze trends dynamically.
- Compare theft trends across different years.
- Identify high-risk locations for law enforcement focus.
- Improve vehicle security based on common theft trends.