Automated LAPD Crime Data Analysis Dashboard

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# Problem Statement

**Executive Summary:**The Automated LAPD Crime Data Analysis Dashboard project aimed to analyze crime trends across Los Angeles over a five-year period (2020-2024). The objective was to clean, process, and analyze crime data from the Los Angeles Police Department (LAPD) to gain insights into crime patterns, identify key contributing factors, and present this information in an automated dashboard. This dashboard was designed to provide stakeholders, such as law enforcement agencies, policy-makers, and the public, with a comprehensive view of crime trends, hot spots, and possible areas for intervention.  
  
**The project involved two primary phases:**  
1. Cleaning and preprocessing crime data to ensure accuracy and consistency.  
2. Developing an interactive dashboard using Power Query and Power Pivot in Excel to visualize key crime metrics, enabling data-driven decision-making.

# Data Description

The datasets used for this project were sourced from LAPD's public crime reports, including data on crime types, locations, times, and outcomes from the years 2020 through 2024. The data features columns such as Crime ID, Date, Crime Type, Location Description, and Outcome.  
  
**Key data columns include:**  
- Crime\_ID: Unique identifier for each crime record.  
- Date: The date when the crime occurred.  
- Crime\_Type: The category of crime (e.g., assault, burglary, robbery).  
- Location\_Description: The description of where the crime occurred (e.g., street, residential area).  
- Outcome: The resolution of the crime (e.g., solved, unsolved).  
  
The data cleaning process included:  
- Removing duplicates and handling missing values.  
- Ensuring consistency in crime type classifications.  
- Correcting location descriptions to standard formats.

# Process of Analysis Using Power Query and Power Automate in Excel

The analysis process for this project involved using Power Query and Power Automate in Excel to streamline the data cleaning, transformation, and reporting process. Below are the detailed steps:  
  
**Step 1: Importing Data using Power Query**  
- Power Query was used to import the 2020-2024 LAPD crime data from CSV files into Excel.  
- Multiple files (2020-2024) were loaded into Power Query to combine and process them in a single, unified data model.  
- Data Transformation: Power Query allowed for easy transformation of data by removing unwanted columns, filtering out irrelevant data, and renaming fields for consistency across all years of data.  
- Merging Files: All years of data were merged into a single table for easier comparison and analysis, using the "Append Queries" function in Power Query.  
 **Step 2: Cleaning and Transforming Data**  
- Removing Duplicates: Power Query was used to identify and remove duplicate entries based on combinations of key columns, such as Crime ID and Date.  
- Handling Missing Values: Missing or null values in critical columns (like Crime Type, Location, and Outcome) were addressed.  
- Standardizing Data: Data fields like "Crime Type" and "Location Description" were standardized to ensure consistency.  
- Time-Based Data: The "Date" column was parsed into individual components, such as Year, Month, and Day.  
  
**Step 3: Data Modeling and Analysis with Power Pivot**- After cleaning, the data was loaded into Power Pivot for further analysis.  
- Relationships between tables were established to allow for more dynamic analysis.  
- Calculated fields were created to help understand trends and compare crime frequencies.  
  
**Step 4**: **Automation of Data Updates Using Power Automate**  
- Power Automate was used to trigger automatic refreshes of Power Query queries in Excel whenever new data (such as 2024) is added.  
- Email alerts were set up to notify the team when the data has been updated.  
 **Step 5:** **2024 Data Analysis**  
For the 2024 data, the following steps were applied:  
- Trend comparison to identify shifts in crime patterns.  
- Crime hot spot identification using location description.  
- Outcome analysis to compare solved vs unsolved crime rates.  
- Temporal analysis to identify peak times for crime occurrences.  
  
**Step 6: Visualizing Results in Power Pivot & Power BI (Optional)**  
- Dashboards in Power Pivot were used to visualize key crime metrics.  
- An interactive dashboard was created, with filters for year, crime type, and location.  
- Power BI could be used for more advanced visualizations.

# Findings and Recommendations

Based on the data cleaning and analysis, the following findings and recommendations were made:  
  
1. **Crime Trends:** The analysis revealed fluctuating trends in crime rates over the past five years, with some crime types showing a decrease while others increased, potentially influenced by external factors such as economic conditions or public health crises.  
2. **Crime Hot Spots:** Certain neighborhoods exhibited higher crime rates, particularly in urban vs. suburban areas. This highlights the need for targeted interventions and resource allocation in these high-crime areas.  
3. **Temporal Patterns**: Crime occurrences showed clear temporal patterns, with certain types of crime spiking during particular seasons or times of day. These patterns suggest the potential for more strategic policing during high-risk times.  
4. **Policy Recommendations**: Data-driven decisions can be made to address crime patterns by implementing policies that focus on prevention in high-risk neighborhoods, improving community policing, and enhancing public safety efforts.  
5. **Future Enhancements:** Future analysis could involve integrating additional datasets, such as demographic data or economic indicators, to identify more granular factors that influence crime trends. Further enhancement of the dashboard could include real-time data feeds to make the tool more actionable for law enforcement agencies.