Traffic Accident Analysis Dashboard

Title: " 🚦 City Traffic Accidents Analysis Dashboard "

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CONTENT

Project Overview

Purpose of the Report:

This project provides a comprehensive analysis of traffic accident patterns, severity, and contributing factors across different districts, times of day, and locations to support data-driven traffic safety and operational planning. It demonstrates the complete data analytics workflow, including data cleaning and preparation, KPI calculation, trend analysis, and the creation of interactive, visually engaging dashboards. Using **Excel, Power BI, and Tableau**, this project showcases the ability to transform raw traffic accident data into actionable insights through clear, intuitive visualizations with slicer-enabled interactivity. Excel was used for foundational KPI tracking and pivot-based visual summaries, Power BI for advanced interactive dashboards with drill-down capabilities and DAX calculations, and Tableau for clean, story-driven dashboards using dynamic charts and map-based analysis. Collectively, this project demonstrates the ability to extract meaningful safety and operational insights while showcasing proficiency with industry-standard data visualization tools for real-world business intelligence readiness.

Dataset Summary

- **Source:** Traffic Accident Dataset
- **Number of Records**: 50,000+ accidents
- **Number of Features:** 15
- **Key Columns:** District Name, Neighborhood Name, Weekday, Month, Hour, Victims, Vehicles Involved, Latitude, Longitude
- **Preprocessing:**
    - Removed duplicates.
    - Ensured numeric columns were correctly typed.
    - Parsed dates and hours for time-based analysis.
    - Cleaned categorical fields for consistency.

Objectives

✅ Track accident counts, severity, and vehicle involvement across districts and time.
✅ Identify peak accident times for safety initiatives.
✅ Analyze the distribution of accident severity by time and location.
✅ Support traffic safety planning with data-backed insights.

Tools Used

Tool	Purpose
Excel	Data cleaning, KPI calculations, pivot charts, structured dashboarding.
Power BI	Interactive dashboards, drill-down analysis, KPI cards, slicers.
Tableau	Visual storytelling with maps, donut charts, time trends, and interactivity.

Key KPIs

✅ **Total Accidents:** Count of reported accidents.

✅ **Total Victims:** Total number of individuals impacted.

✅ **Total Vehicles Involved:** Sum of vehicles in accidents.

✅ **Average Accidents per Day:** Calculated to identify risk periods.

✅ **Total Serious Injuries:** Calculated total serious injuries.

Visuals Implemented

	Visual	Purpose
1.	Map	Show accidents geographically by district using latitude and longitude for spatial analysis of accident hotspots.
2.	Bar Chart	Display accidents by **part of the day** (Morning, Afternoon, Evening, Night) to detect high-risk time periods.
3.	Bar Chart	Compare accident frequency by **weekday** to identify patterns across days of the week.
4.	Line Chart	Visualize **hourly accident trends** throughout the day to pinpoint peak accident hours.
5.	Scatter Plot	Analyze the relationship between **victims and vehicles involved** for severity analysis.
6.	Bar Chart	Highlight top 10 streets with the highest accident rates for targeted interventions..
7.	Heatmap	Show accidents by **hour and weekday** for combined temporal pattern analysis (Power BI).
8.	Donut Chart	Display accident distribution by **part of the day** for an intuitive visual summary (Tableau).
9.	KPI Cards	Track **Total Accidents, Victims, Vehicles Involved, Serious Injuries, Average Vehicles per Accident** at a glance.
10.	Slicers / Filters	Enable interactive filtering by **Month, Weekday, District Name, Part of Day** for dynamic analysis.

Filters and Interactivity

- ✅ **Month filter:** For seasonal trends**.**
- ✅ **Weekday filter:** For day-based analysis**.**
- ✅ **District filter:** For area-specific filtering**.**
- ✅ **Part of Day filter:** For operational safety insights.

Insights & Analysis

- ✅ Accidents peak during **morning and evening rush hours**.
- ✅ Fridays and Mondays show higher accident rates.
- ✅ Night-time accidents, while fewer, often result in higher severity.
- ✅ Specific districts and streets consistently exhibit higher accident frequencies.
- ✅ There is a positive correlation between vehicle count and victims in an accident.

Recommendations

✅ Deploy additional traffic control during identified peak hours.
✅ Focus safety campaigns in districts with high accident rates.
✅ Investigate top accident-prone streets for structural or traffic flow improvements.
✅ Use seasonal trends to plan targeted interventions.

Learnings & Skills Applied

✅ **Excel:**

- Data cleaning, pivot analysis, KPI card creation, dashboard structuring.

✅ **Power BI:**

- Interactive slicers, KPI cards, drill-down visuals, advanced DAX.

✅ **Tableau:**

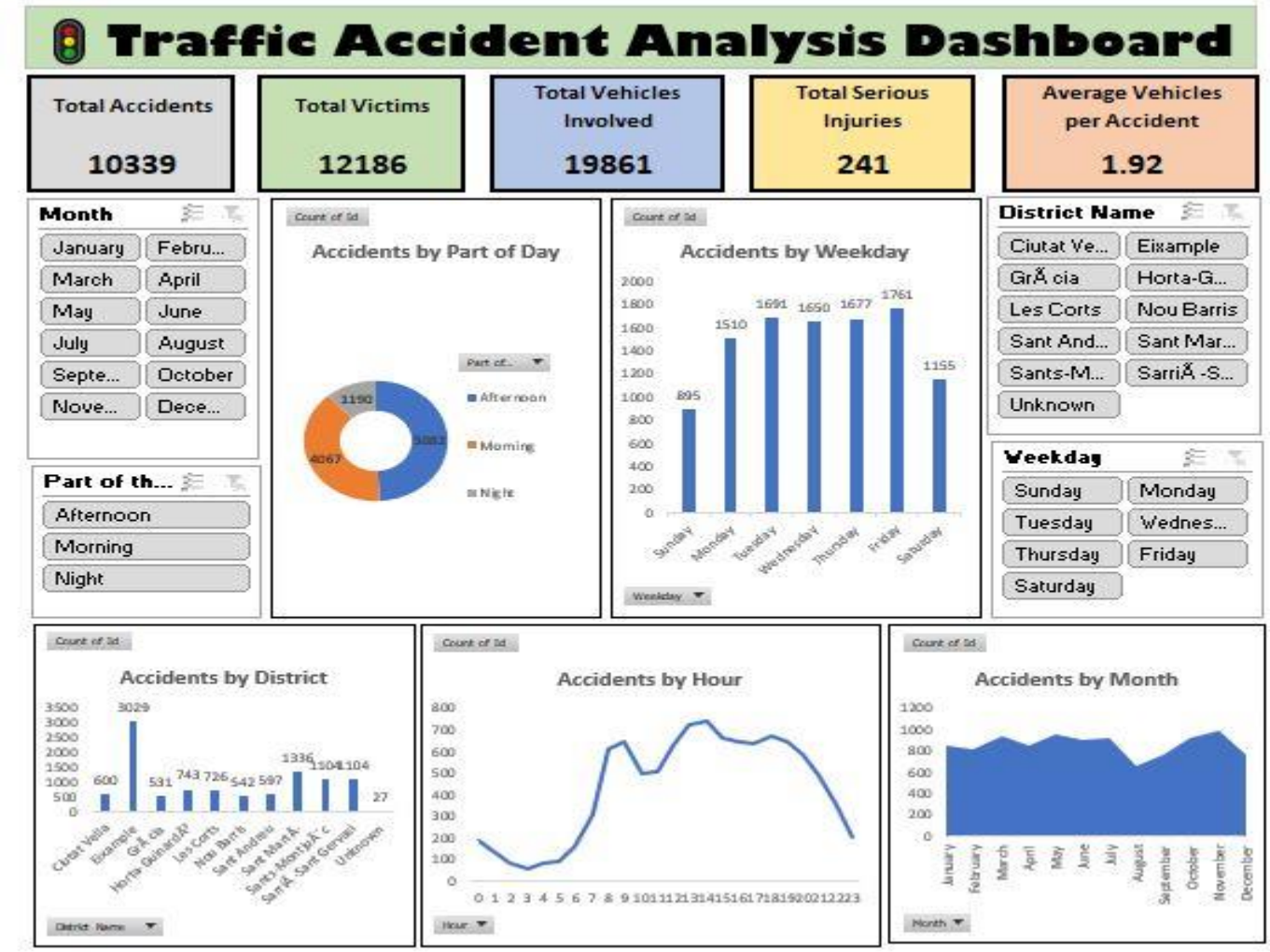
- Map-based accident visualization, donut charts, interactive dashboards.

✅ **General:**

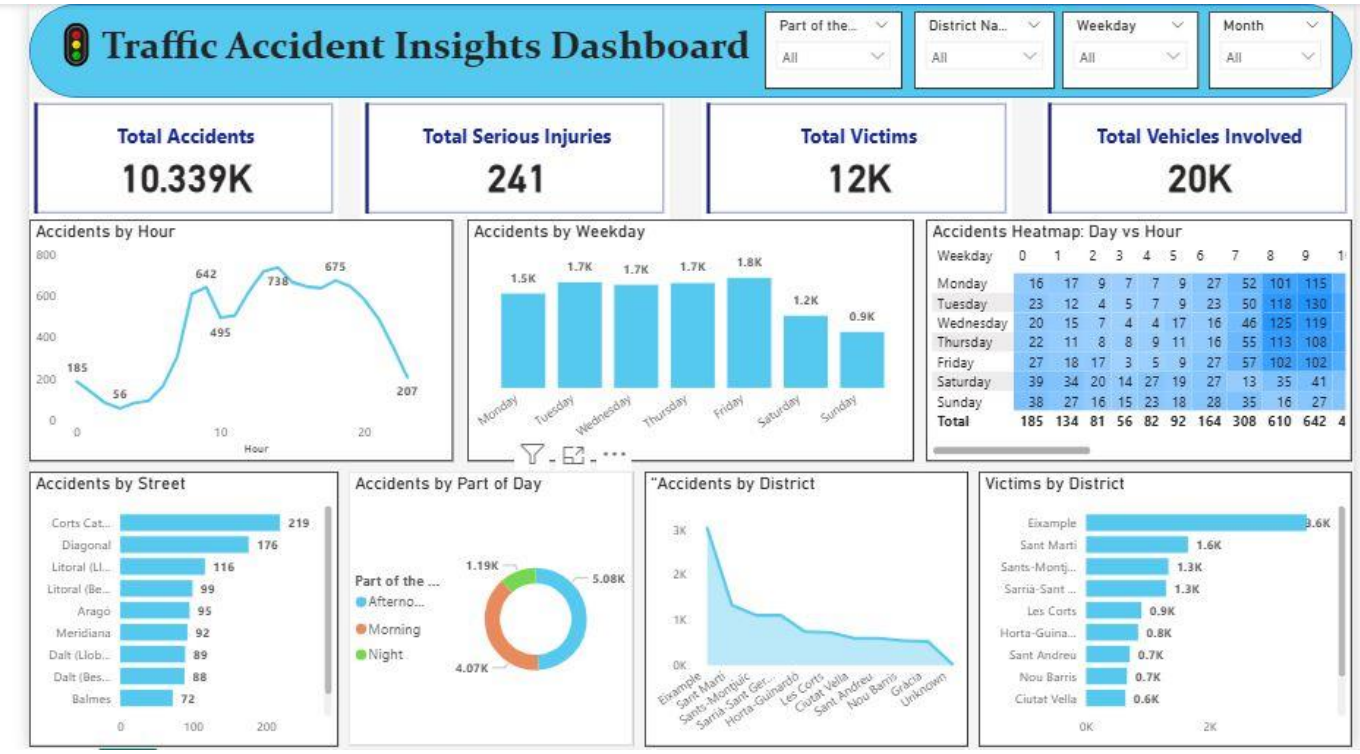
- Business storytelling using data.
- Translating operational and safety data into actionable insights.
- Enhancing interpretation of large datasets for decision-making.

Dashboard Preview

1. **Excel Dashboard: Traffic Accident Analysis**



2. Power BI Dashboard: Traffic Accident Analysis



3. Tableau Dashboard: Traffic Accident Analysis