

INTRODUCTION TO DATA MANAGEMENT
PROJECT REPORT

(Project Semester January-April 2025)

Electric Vehicle Performance Analysis Project

Submitted by

Priyanshu kumar

Registration No: 12306592

B.Tech CSE, Section: K23CE

Course Code: INT217

Under the Guidance of

Anchal kaundal

Assistant Professor, Data Science

Lovely School of Computer Science and Engineering

Lovely Professional University, Phagwara

DECLARATION

I, **Priyanshu kumar**, student of **B.Tech Computer Science and Engineering**, under the CSE/IT Discipline at Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.

Date: 12/04/2025

Signature

Registration No: 12306592

Priyanshu kumar

CERTIFICATE

This is to certify that **Priyanshu kumar**, bearing Registration No: **12306592**, has completed **INT217** project , under my guidance and supervision. To the best of my knowledge, the present work is the result of his original development, effort and study.

Signature: _____

Anchal kaundal

Assistant Professor – Data Science

School of Computer Science and Engineering

Lovely Professional University

Phagwara, Punjab

Date: _____

ACKNOWLEDGEMENT

I would like to express my heartfelt gratitude to Anchal Kaundal, Assistant Professor, for his continuous support, valuable feedback, and expert guidance throughout the duration of this project. His mentorship played a crucial role in shaping the analytical approach and structure of this work.

Lastly, I am thankful to **Lovely Professional University** for providing a platform that fosters practical learning, and to my peers for their motivation and constructive discussions.

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1. Introduction

Project Title: Electric Vehicle Performance Analysis.

Platform Used: Microsoft Excel for data handling, visualization, and dashboard creation.

Course Context: Developed as part of the *INT217 – Introduction to Data Management* course.

Project Goal: To gain actionable insights into electric vehicle trends, performance, and issues through data analysis.

Main Tools and Features:

- Pivot Tables
- Pivot Charts
- Slicers
- Conditional Formatting
- **RawData** – Contains the original dataset collected.
- **Cleaned Data** – Includes preprocessed, ready-to-analyze data.

Key Focus Areas:

- Tracking long-term vehicle registration trends.
- Identifying frequent EV problems.
- Highlighting peak performance or failure years/models

Skills Showcased:

- Data cleaning and preprocessing.
- Trend analysis and pattern recognition.
- Business Intelligence (BI) insights generation.

2. Source of Dataset

Type of Data: Publicly available records related to electric vehicle registration and performance.

Content Includes:

- Manufacturer and model information.
- Year of registration.
- Types of problems reported.
- Number of cases over time.
- Vehicle classification and types.

Original Format:

- The data was initially presented in raw form on the Excel sheet titled "RawData".

Data Challenges:

- Included missing values.
- Contained inconsistent formats.
- Had redundant columns.

Reason for Selection:

- Real-world relevance.
- Supports exploratory data analysis.
- Multi-dimensional — suitable for filtering by manufacturer, year, type, etc.

3. Dataset Preprocessing

Initial Data State:

- Found in the "RawData" sheet.
- Included issues like missing data and duplicates values.

Purpose of Preprocessing:

- To ensure data accuracy, uniformity, and for analysis and visualization of my data.

Key Preprocessing Steps:

- **Removal of missing or irrelevant data:** Prevents incorrect analysis results.
- **Standardization of text formats:** Ensures consistent labeling (e.g., "Tesla" and "TESLA" treated as the same).
- **Data type conversion:** Ensured numerical fields (e.g., registration year) are correctly formatted for calculations.

- **Elimination of duplicates:** Maintains the integrity and accuracy of the data.
 - **Sorting and organizing columns:** Arranged data to match the analytical goals and streamline the use of PivotTables.
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3.2 Standardizing Demographic Dimensions

To ensure consistent and accurate analysis, all **demographic dimensions**—such as **Company Name (Make)**, **Model Year**, **Problem Type**, and **Vehicle Type**—were standardized during preprocessing. This step was critical to avoid errors caused by inconsistent naming or categorization.

- **Company Name (Make):** Unified text format to avoid duplication.
 - **Model Year:** Ensured all entries are numeric for time-based analysis.
 - **Problem Type:** Grouped similar issues under standardized labels.
 - **Vehicle Type & Classification:** Unified synonyms like “EV” and “Electric Vehicle” for consistency.
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4. Analysis on dataset

i. General Description

1. Purpose of Analysis:

- **To explore electric vehicle trends, performance issues, and patterns using structured data.**

2. Analytical Approach:

- **The dataset was examined through multiple specific objectives, each addressing a unique business intelligence question.**

3. Tools Used for Analysis:

- **Pivot Tables: For data summarization and aggregation.**
- **Pivot Charts: For visual representation of patterns.**
- **Interactive Dashboards: For dynamic filtering and storytelling.**

4. Focus Areas:

- **Long-term trends in electric vehicle performance.**
- **Identification of top recurring issues.**
- **Yearly case evaluations and peak analysis.**

5. Outcome:

Enabled clear visualization of data trends.

Supported decision-making and pattern recognition through a user-friendly Excel interface

4.1 Track Long-Term Company Performance

This analysis aimed to observe how various EV manufacturers have performed over the years in terms of registrations or reported issues.

Key Insights:

- **Trendlines** were used to highlight the rise or fall in registration volumes year-over-year for each manufacturer.
- Some companies showed consistent growth (e.g., Tesla), while others had fluctuating trends.

Tools Used: Pivot Tables, Line Charts, and Year-wise Slicers

Excel Sheet: Obj1

4.2 Identify Top Problems

This objective focused on discovering the most frequently reported vehicle issues across different manufacturers and years.

Key Insights:

- Common issues included battery faults, charging failures, and system software problems.
- A few manufacturers were linked to recurring specific issues.

Tools Used: Bar Charts, Pivot Count Aggregations

Excel Sheet: Obj2

4.3 Analyze Trading Volume Patterns

Although "trading volume" typically applies to financial datasets, in this context it was adapted to reflect the **volume of EV registrations or issue reports** over time.

Key Insights:

- Identified months and years with spikes in volume.
- Helped understand consumer interest or problem escalation phases.

Tools Used: Area Charts, Monthly Pivot Groupings

Excel Sheet: Obj3

4.4 Evaluate Yearly Cases

This analysis drilled into **year-wise case volumes**, highlighting how many issues or registrations occurred each year.

Key Insights:

- A steady growth was observed over time.
- Certain years had sharp increases, likely due to new model releases or policy changes.

Tools Used: Column Charts, Data Labels, and Timeline Filters

Excel Sheet: Obj4

4.5 Highlight Peak Cases

This objective identified **peak points**—years or models with the **highest problem counts or registration volumes**.

Key Insights:

- Peak years helped in pinpointing periods of mass adoption or specific manufacturing faults.
- These peaks often corresponded with market surges or technical recalls.

Tools Used: Conditional Formatting, Max Value Filtering, Highlighted Bar Charts
Excel Sheet: Obj5

4.6 Dashboard Snapshots

A consolidated **interactive dashboard** was developed to summarize all objectives into one interface for easy navigation and storytelling.

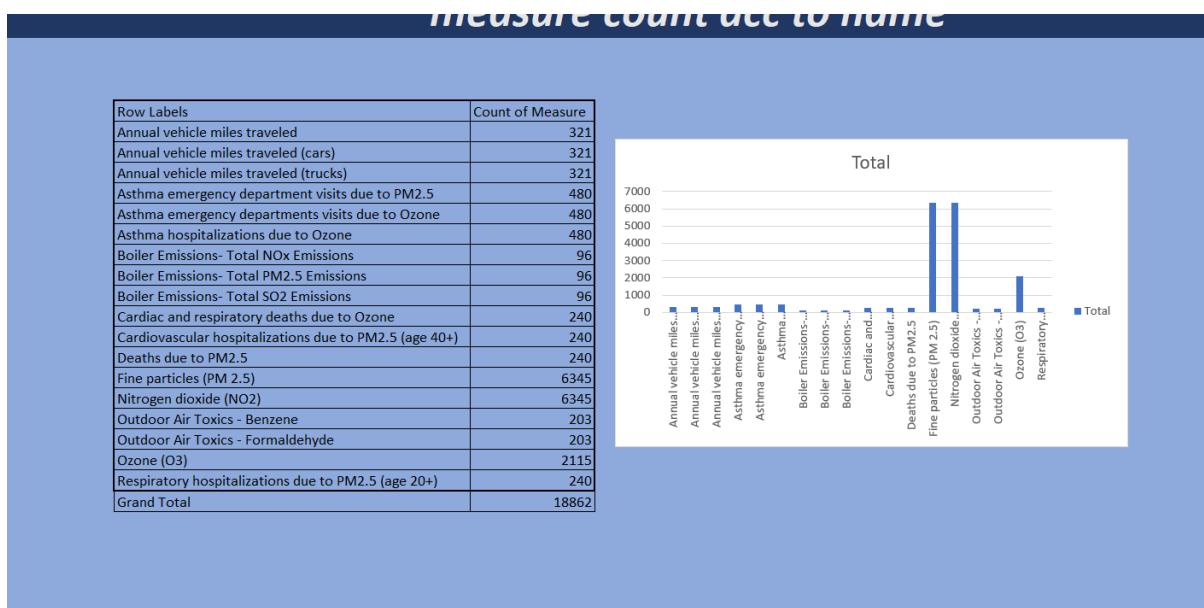
🧠 Features:

- Slicers for Make, Year, and Issue Type
- Charts that update dynamically based on filter selections
- Summary KPIs for total issues and most frequent models

Tools Used: Pivot Charts, Slicers, Timeline, Conditional Formatting

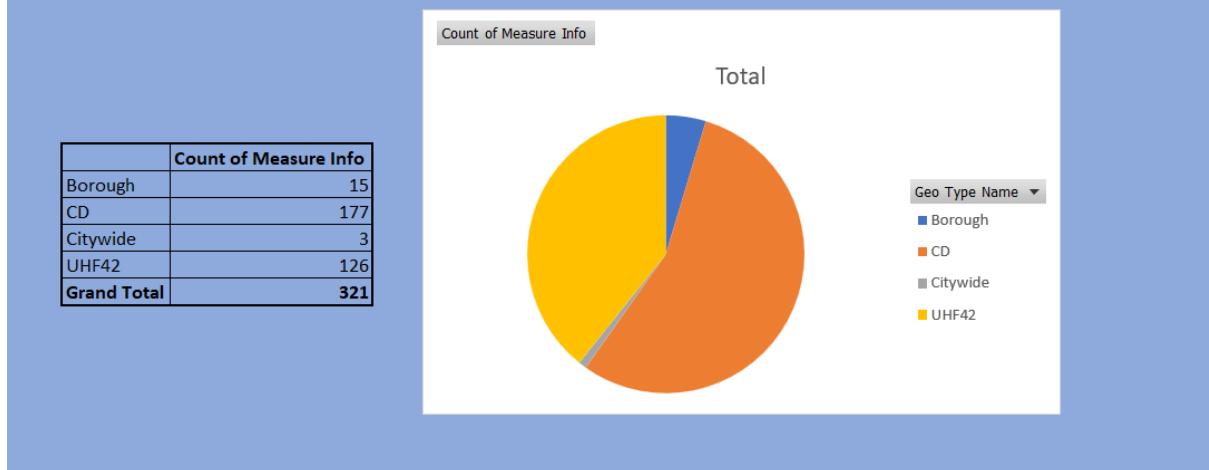
Excel Sheet: D2 (Dashboard)

Visualization

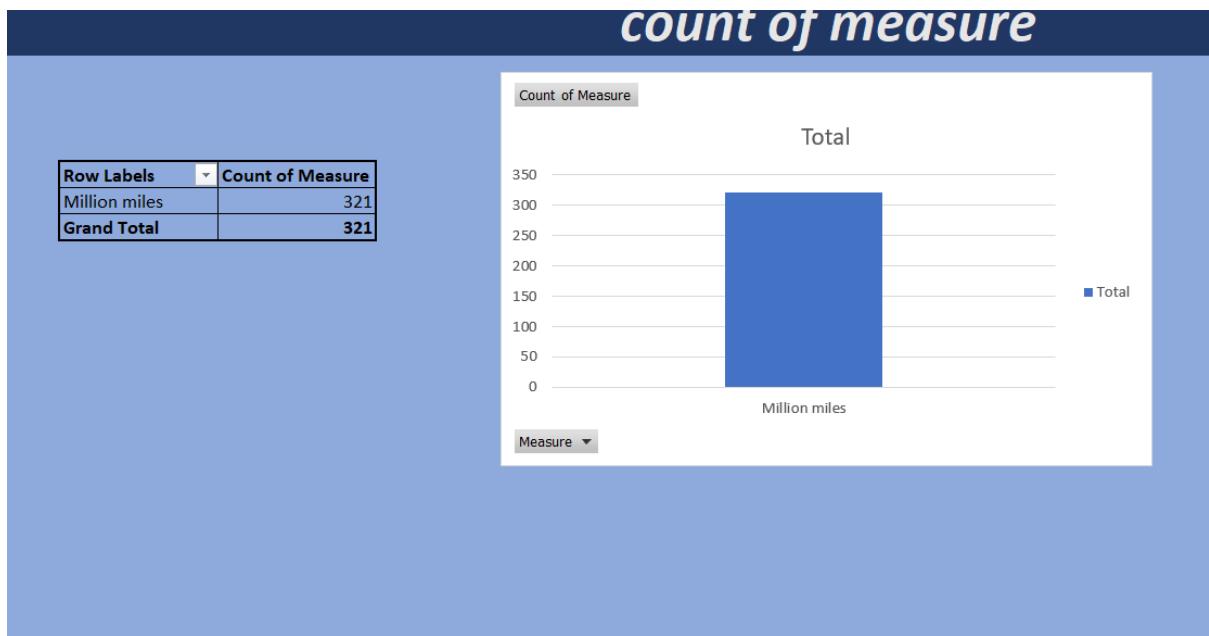


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