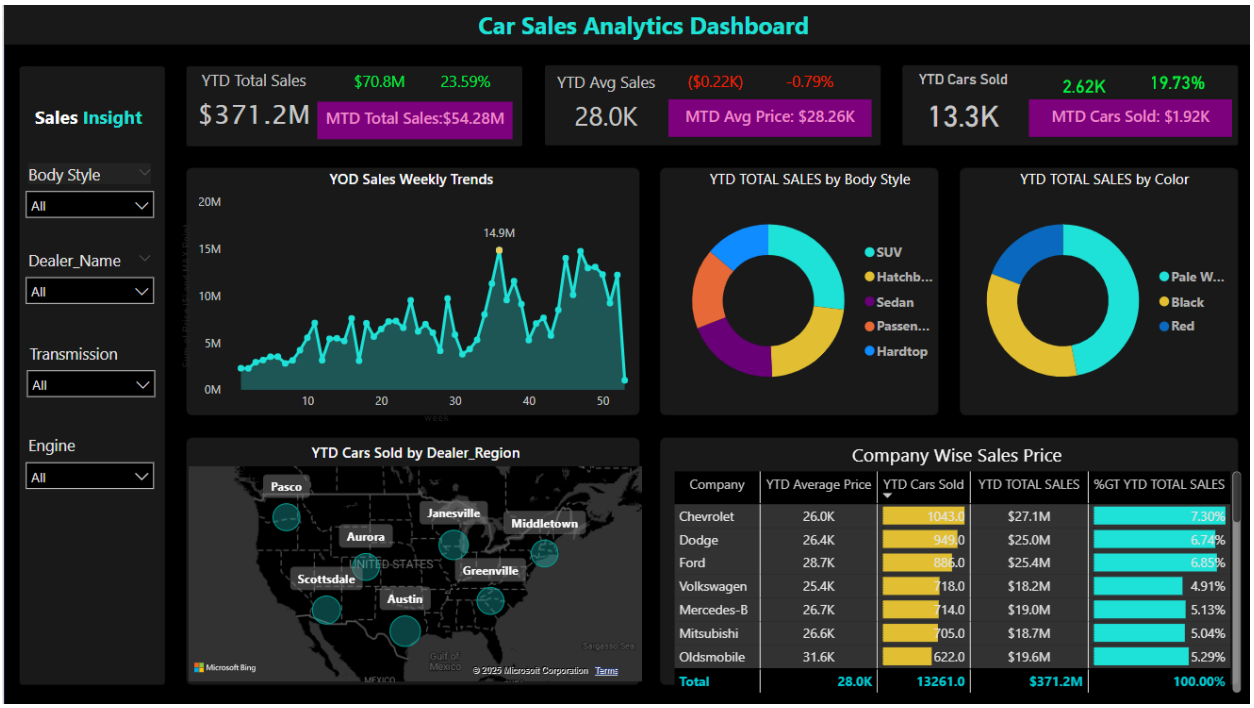
Exploratory Data Analysis (EDA) and Development Process Documentation

Car Sales Analytics Dashboard



The goal of this dashboard is to provide actionable insights into car sales performance, trends, and breakdowns by various dimensions (body style, color, region, company, etc.) for business stakeholders.

1. Data Understanding and Collection

- Data Sources:
  - Sales transaction records (including date, price, dealer, car details)
  - Car inventory/master data (body style, color, engine, transmission)
  - Dealer information (region, name)
- Key Fields Identified:
  - Sale Date, Sale Price, Car Model, Body Style, Color, Engine Type, Transmission, Dealer Name, Dealer Region

2. Data Cleaning and Preparation

- Missing Values:
    - Checked for nulls in key columns (e.g., Sale Price, Dealer Name) and handled via imputation or row removal as appropriate.
- Data Types:
    - Ensured correct data types (dates for Sale Date, numeric for Sale Price, categorical for Body Style, etc.).
- Data Consistency:
    - Standardized categorical values (e.g., color names, body style).
- Derived Columns:
    - Created Year-To-Date (YTD) and Month-To-Date (MTD) flags using Sale Date.
    - Calculated total sales, average sales price, and cars sold per period.

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3. Exploratory Data Analysis (EDA)

A. Descriptive Statistics

- Total Sales:
    - YTD Total Sales: $371.2M
    - MTD Total Sales: $54.28M
- Average Sales Price:
    - YTD: $28.0K
    - MTD: $28.26K
- Total Cars Sold:
    - YTD: 13.3K
    - MTD: 1.92K

B. Trend Analysis

- Weekly Sales Trends:
    - Analyzed sales volume over each week to identify seasonality and peak weeks (e.g., week 40 with 14.9M sales).

C. Categorical Analysis

- Body Style Distribution:

        - Visualized YTD sales by body style (SUV, Hatchback, Sedan, Passenger, Hardtop).
- Color Distribution:
    - Analyzed sales by car color (Pale White, Black, Red, etc.).

D. Geographic Analysis

- Regional Sales:
    - Mapped YTD cars sold by dealer region to identify high-performing areas (e.g., Austin, Greenville, Aurora).

E. Company Performance

- Company-wise Sales:
    - Compared average price, cars sold, and total sales across car companies (Chevrolet, Dodge, Ford, etc.).
    - Calculated each company's contribution to total sales.

4. Dashboard Design and Development Steps

A. Layout Planning

- Decided on a dark theme for clarity and focus.
- Structured dashboard into key insight panels: KPIs, trends, categorical breakdowns, geographic map, company comparison.

B. Visual Selection

- KPIs: Card visuals for YTD/MTD sales, average price, and cars sold.
- Trends: Line chart for weekly sales.
- Categorical: Donut/pie charts for body style and color.
- Geographic: Map visual for regional sales.
- Comparison: Table/bar chart for company-wise metrics.

C. Interactivity

- Added slicers for:

        - Body Style
        - Dealer Name
        - Transmission
        - Engine
- Enabled cross-filtering between visuals for dynamic analysis.

D. Measures and DAX Calculations

- Created DAX measures for:
    - YTD and MTD aggregations (sales, cars sold, average price)
    - % change calculations for performance indicators
    - Company-wise and region-wise breakdowns

E. Validation and Testing

- Cross-checked totals and averages with source data.
- Tested slicer interactions and visual responsiveness.
- Ensured all visuals update correctly based on filter selections.

5. Insights and Recommendations

- Identified peak sales periods and best-performing regions.
- Noted the most popular body styles and colors.
- Highlighted top-performing companies by sales volume and revenue.

Summary:
This Power BI dashboard was developed following a structured EDA and development process, ensuring clean, reliable data, insightful analysis, and an interactive, user-friendly interface for car sales analytics.