**Technical Report: Auto Intel 360 - Interactive Automotive Insights**

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**2. Introduction**

**Objective of the Project:**  
To develop a dynamic automotive dashboard for exploring car pricing, performance, and fuel characteristics across various brands. The dashboard enables users to analyse average price, mileage, MPG, and tax based on filters like model, transmission type, fuel type, and brand.

**Problem Being Addressed:**  
The automobile industry has vast offerings that vary by manufacturer and configuration. Buyers and dealers need better visibility into which configurations offer the best performance-to-price trade-off. This dashboard provides a compact view of key automotive metrics to help guide decisions.

**Key Datasets and Methodologies:**  
A structured vehicle specification dataset was imported into Power BI. Visuals and filters were designed to provide brand-specific and transmission-specific breakdowns of key performance metrics.

**3. Story of Data**

**Data Source:**  
The dataset includes manufacturer data covering various brands including BMW, Audi, Hyundai, Toyota, Skoda, Ford, and Volkswagen.

**Data Collection Process:**  
Compiled from structured listings of vehicle features such as price, MPG, mileage, fuel type, and tax values. Year of release and drivetrain transmission details were also included.

**Data Structure:**

* Each row represents a unique car variant.
* Columns include Model, Transmission, Fuel Type, MPG, Price, Mileage, and Tax.

**Important Features and Their Significance:**

* **Avg. Price ($):** Indicates affordability and brand tier.
* **Avg. Mileage (mi):** Highlights how used a vehicle is.
* **MPG:** A direct measure of fuel efficiency.
* **Avg. Tax:** A cost consideration for buyers.
* **Fuel Type / Transmission Type:** Influence driving experience and cost.

**Data Limitations or Biases:**  
Data may reflect regional pricing or availability bias. Vehicle condition (e.g., cosmetic or accident history) is not included.

**4. Data Splitting and Preprocessing**

**Data Cleaning:**  
All entries were validated for completeness and consistency. Brand icons and model images were linked with car specifications for better visual representation.

**Handling Missing Values:**  
Records with null price or MPG were excluded. Uniform formatting applied for brand and fuel type names.

**Data Transformations:**  
Several DAX measures and calculated columns were created:

* **Average Price, Mileage, MPG, and Tax**
* Groupings by Transmission and Fuel Type for donut and bar charts
* Brand-specific filter slicers with interactive icons

**Data Splitting:**

* **Dependent Variables:** Price, Mileage, MPG, Tax
* **Independent Variables:** Brand, Model, Year, Transmission, Fuel Type

**Industry Context:**  
Automotive retail analytics

**Stakeholders:**  
Vehicle dealerships, buyers, marketers, and brand comparison analysts

**Value to the Industry:**  
Offers a single-view breakdown of brand offerings to inform pricing, marketing, and inventory decisions.

**5. Pre-Analysis**

**Key Metrics Across All Brands:**

* **Avg. Price Range:** $18K – $33K
* **Avg. Mileage Range:** 1.35K – 3.67K
* **Avg. MPG:** Between 41 – 53
* **Avg. Tax:** Between $144 – $147

**Observations by Transmission:**

* Manual and Semi-Auto dominate entry-level and mid-range vehicles
* Automatic transmissions more common in premium or hybrid models

**Observations by Fuel Type:**

* Hybrid cars are the most expensive across all brands
* Diesel options offer higher mileage
* Petrol cars dominate availability but are least fuel efficient

**6. In-Analysis**

**Key Comparisons by Brand:**

* **Volkswagen (Tiguan L PHEV):** High MPG, low tax, mid-tier price
* **BMW (M4):** Premium pricing and automatic transmission skew
* **Audi:** Highest mileage on average
* **Hyundai:** Budget-friendly, with MPG and price balance
* **Skoda:** Most balanced across metrics, ideal for mid-tier buyers

**Dashboard Features Utilized:**

* Interactive filters by model, fuel type, and transmission
* Donut and bar charts for distribution of mileage and prices
* Large image visuals tailored to brand with overlaid metrics

**Recommendations:**

* Promote diesel and hybrid variants where MPG is a priority
* Use pricing vs mileage scatter plots for personalized recommendations (future expansion)
* Integrate colour, trim, or warranty options to enhance buyer targeting

**7. Post-Analysis and Insights**

**Key Insights:**

* Hybrid models consistently sit at the top of the pricing spectrum
* Mileage tends to be lowest for more expensive brands (e.g., BMW, Audi)
* Volkswagen and Toyota are strong mid-market contenders with balance of tax, price, and MPG

**Unexpected Observations:**

* Several premium models with high average prices still showed surprisingly efficient MPG (e.g., Skoda EV variants)

**8. Data Visualizations & Charts**

* **Hero Visuals:** Brand-specific car images with overlay KPIs
* **Bar Graphs:** Transmission vs. mileage comparison
* **Donut Charts:** Fuel type share and avg. mileage distribution
* **Line Chart:** Fuel Type vs. Avg. Price
* **KPI Tiles:** Avg. Price, Mileage, MPG, and Tax per brand

A car on a screen

AI-generated content may be incorrect.*Volkswagen Dashboard*

A car with a black stripe

AI-generated content may be incorrect.*BMW Dashboard*

A car on a screen

AI-generated content may be incorrect.*Audi Dashboard*

A car on the road

AI-generated content may be incorrect.*Hyundai Dashboard*

A yellow car with text on it

AI-generated content may be incorrect.*Toyota Dashboard*

A white car with text on it

AI-generated content may be incorrect.*Skoda Dashboard*

A silver convertible car with infographics

AI-generated content may be incorrect.*Ford Dashboard*

**9. Recommendations and Observations**

**Actionable Recommendations:**

* For economy-focused consumers, prioritize Hyundai and Skoda
* For luxury-focused audiences, highlight MPG efficiency of Audi and BMW
* Expand filters to include year-over-year comparisons or maintenance cost insights

**Optimization Ideas:**

* Integrate dealership stock levels for inventory views
* Include environmental emissions score for eco-conscious shoppers

**10. Conclusion**

**Key Learnings:**  
Power BI enabled real-time, filterable insights into vehicle pricing and performance across major brands. Image-driven dashboards improve usability for retail showrooms and car buyers.

**Limitations:**

* Model condition, resale value, and financing terms were not included

**Future Research:**

* Include longitudinal analysis (price change over time)
* Add vehicle resale or depreciation index per brand

**11. References & Appendices**

**References:**

* Automotive manufacturer specs (public sources)
* Dashboard powered by Power BI interactive model

**Appendices:**

* 7 dashboard image exports
* Model source file (.pbix)
* Visual breakdown of fuel and mileage stats