Business Proposal: Analysis of Car Pricing and Sales Trends

1. Introduction

This proposal outlines an analytical review of a car sales dataset containing 8,750 listings. The data includes multiple variables relevant to used car valuation, such as vehicle brand, model, year, engine size, mileage, condition, transmission type, fuel type, and price. The goal is to understand market trends, identify pricing patterns, and provide actionable recommendations for optimizing pricing strategies, inventory sourcing, and customer targeting.

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2. Business Questions

The following business questions were developed to guide this analysis:

1. **What are the key factors that influence car price the most?**
2. **Which car brands and models offer the best value relative to their condition and mileage?**
3. **Is there a noticeable difference in price between manual and automatic transmission vehicles?**
4. **How do fuel types (e.g., petrol, diesel, electric) affect pricing and resale value?**
5. **Are newer vehicles significantly more expensive than older models of the same type or brand?**

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3. Detailed Data Overview

Data source: https://www.kaggle.com/

The dataset contains the following 10 columns:

- **car_id**: Unique identifier for each car.
- **brand**: Manufacturer of the car (e.g., Tesla, BMW, Audi).
- **model**: Specific model of the vehicle.
- **year**: Year of manufacture (ranging from older used vehicles to newer models).
- **engine_size**: Size of the engine in liters (e.g., 2.3, 4.4).
- **fuel_type**: Type of fuel used—Petrol, Diesel, or Electric.
- **transmission**: Either Manual or Automatic.
- **mileage**: Total kilometers or miles driven (indicator of wear and usage).
- **condition**: Describes the vehicle's physical state—categories include New, Used, and Like New.
- **price**: Final price in dollars for which the vehicle is listed.

This data allows for multidimensional analysis of car pricing based on technical specifications, usage history, and brand value.

4. Project process

- **domain Knowledge**
- **data cleaning**
- **Feature engineering**
- **Data analysis**
- **Data visualization**
- **handle outliers**
- **handle categorical data**
- **determine input and output**
- **split into train and test**
- **apply scaling**

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5. Solutions

1. Optimize Pricing Strategy by Car Condition and Features

What to do:

- Use engine size, condition, fuel type, and brand to adjust prices more accurately.
- For example, avoid pricing “Used” vehicles above similar “New” or “Like New” ones.
- Create a dynamic pricing tool that automatically compares similar listings and adjusts accordingly.

Why it matters:
This will help keep pricing fair and competitive, increasing buyer trust and sales.

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2. Target High-Profit Inventory

What to do:

- Focus your marketing and procurement on vehicles with:
  - Engine size above 3.0L
  - Automatic transmission
  - Diesel or electric fuel types
  - Good condition (New or Like New)
- Prioritize brands like Tesla, BMW, and Ford for higher returns.

Why it matters:
These vehicles generate the highest average prices and margins, according to the data.

3. Use Buyer Preferences to Guide Stock and Ads

What to do:

- Create customer profiles based on transmission, fuel type, and brand preferences.
- Promote vehicles differently for:
    - **Performance Seekers** (e.g., Audi, BMW, large engines)
    - **Eco-Conscious Buyers** (e.g., Tesla, electric fuel type)
    - **Budget Buyers** (older models, smaller engines)

Why it matters:
Matching the right vehicles to the right buyer increases conversions and loyalty.

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5. Implement Tiered Promotions for Low-Margin Inventory

What to do:

- Offer special pricing or bundles (e.g., free service) for:
    - High-mileage used vehicles
    - Manual petrol cars with small engines
- Use flash sales or "clearance" tags to help these vehicles sell faster.

Why it matters:
It helps reduce old stock without hurting profits too much.

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6. Develop a Car Recommendation Tool

What to do:

- Build a tool on your website that recommends cars based on budget, year, fuel type, or brand.
- Allow filters like "low mileage," "automatic," or "electric."

Why it matters:
It makes buying easier for customers and leads to quicker decisions.
