Behavioral Analysis of the Used Car Dataset

1. Objective

The aim of this analysis is to understand the patterns and trends influencing the pricing and conditions of used cars. We explore how different attributes such as year, mileage, fuel type, accident history, and condition affect the resale value of vehicles.

2. Dataset Overview

The dataset contains the following attributes for more than 500 used cars:

- Car Make & Model: Brand and specific vehicle type.
- Year: Manufacturing year of the vehicle.
- Mileage: Total kilometers/miles driven.
- **Price:** Current listed price.
- Fuel Type: Petrol, Diesel, Electric, Hybrid, etc.
- Color: External color of the vehicle.
- **Transmission:** Automatic or Manual.
- Options/Features: Includes special equipment (e.g., Sunroof, Navigation).
- **Condition:** Rating such as Excellent, Good, Fair, or Poor.
- Accident: Whether the car has been in an accident.

3. Key Findings

3.1 Price vs Year

- Newer cars (post-2015) consistently show higher market prices.
- Vehicles manufactured between 2010–2014 show mid-range prices depending on • mileage and condition.
- Older models (pre-2010) have lower resale value unless they are in exceptional • condition or vintage.



Car Price by Year and Condition

3.2 Mileage vs Price

- There is a **negative correlation** between mileage and price. •
- Cars with lower mileage (< 50,000 km) are valued significantly higher. •
- High-mileage vehicles (> 100,000 km) show substantial depreciation regardless of • make or model.



3.3 Condition vs Price

- Cars in **Excellent** condition sell for **25–30% higher** than those in **Fair or Poor** condition.
- The **Condition** variable is one of the most important determinants of resale price.
- Even newer vehicles are significantly affected by poor condition ratings.



3.4 Accident History

- Cars with accident history show an average price drop of 15–25%.
- Buyers are less inclined toward vehicles marked with prior damage, regardless of repair work.





Impact of Accident History on Price

3.5 Fuel Type Analysis

- Petrol cars are the most commonly listed, followed by Diesel and Hybrid.
- Electric vehicles (EVs) are emerging but are fewer in number.
- EVs have higher initial prices but are preferred in urban areas for efficiency and environmental benefits.



4. Visualizations Summary

- Scatter plots were used to assess relationships between price and year, as well as mileage.
- Box plots illustrated the impact of accident history and condition on price distribution.
- **Count plots** helped visualize the frequency of fuel types across listings.

5. Management Insights

• **Pricing Strategy:** Dealers should focus on highlighting accident-free history and "Excellent" condition in listings to justify higher pricing.

- **Inventory Management:** Preference should be given to newer vehicles with mileage under 60,000 km and no accident records.
- **Marketing Suggestions:** EVs and hybrids can be promoted as eco-friendly options in premium segments.
- **Customer Trust:** Clearly listing accident history and condition helps increase buyer confidence and lead to quicker sales.

6. Conclusion

The analysis reveals clear behavioral trends in the used car market. Buyers prioritize vehicle **condition**, **accident-free history**, and **low mileage** above all else. These patterns can inform better pricing, marketing, and acquisition strategies for both individual sellers and dealerships.