CAR

PRICE PREDICTION-

POWER BI

INTRODUCTION:

This project aims to build a car price prediction model using Power BI, utilizing a range of metrics to assess the factors influencing car prices. By analyzing the relationship between features such as engine size, fuel type, mileage, and car condition, we will provide valuable insights that can assist both consumers and sellers in determining a fair market price for vehicles.

The dataset used in this project includes essential car attributes such as **Car ID, Brand, Year, Engine Size, Fuel Type, Transmission, Mileage, Condition, Price, Model,** and **Custom Date.** Using these attributes, Power BI will enable us to create interactive visualizations and dashboards that highlight key trends and correlations between car characteristics and their prices.

Through this project, we aim to demonstrate how Power BI’s advanced data visualization capabilities can be leveraged to gain deeper insights into the automotive market and assist in making more accurate price predictions. The model will also facilitate trend analysis, allowing users to track changes in car prices over time, ensuring they can make data-driven decisions whether they are buying, selling, or evaluating cars in the market.

DESCRIPTION:

The dataset used in this project contains several attributes that are crucial for predicting the price of cars in the market. These attributes provide important insights into the characteristics of the cars, which will be analyzed to understand their influence on pricing. Below is a breakdown of the key fields included in the dataset:

1. **Car ID**: A unique identifier assigned to each car in the dataset. Ensures that each car is distinct and can be referenced accurately in analyses and visualizations.
2. **Brand**: The manufacturer of the car (e.g., Toyota, Ford, BMW, etc.). The brand plays a significant role in determining the car's value. Higher-end brands such as BMW or Mercedes typically have higher prices compared to other brands.
3. **Year**: The year in which the car was manufactured (e.g., 2015, 2018). A critical factor in pricing, as newer cars tend to have higher prices. Older cars generally lose value over time due to depreciation.
4. **Engine Size**: The size of the car’s engine. Larger engines are often associated with better performance and can result in higher prices. This feature helps in understanding how engine size correlates with car pricing.
5. **Fuel Type**: The type of fuel the car uses, such as petrol, diesel, electric, or hybrid. Different fuel types impact the price. Electric and hybrid vehicles are often priced higher due to their advanced technology and fuel efficiency compared to conventional petrol or diesel cars.
6. **Transmission**: The type of transmission the car uses (e.g., manual or automatic). Cars with automatic transmissions tend to have higher prices due to greater convenience and higher demand compared to manual transmission cars.
7. **Mileage**: The total distance the car has traveled, usually measured in kilometers or miles. Higher mileage is generally associated with more wear and tear on the vehicle, which lowers its price. Lower mileage cars typically retain more value.
8. **Condition**: The overall condition of the car, often categorized as excellent, good, or poor. A car's condition significantly influences its price. Cars in excellent condition are priced higher, while cars in poor condition are priced lower.
9. **Price**: The price at which the car is listed or sold. This is the target variable for the price prediction model. It represents the dependent variable that will be predicted based on other features in the dataset.
10. **Model**: The specific model of the car, such as Corolla, Mustang, or X5. The model can affect a car’s price, with high-performance models and limited-edition variants generally priced higher than standard models.
11. **Custom Date**: Additional date-related information, such as when the car was listed for sale. This can be used to analyze market trends over time and understand how car prices fluctuate based on factors such as seasonality or economic conditions.

The dataset is essential for providing a comprehensive view of how multiple factors work together to influence car pricing, making it an invaluable resource for both buyers and sellers looking to make data-driven decisions.

OBJECTIVE:

The main objective of this project is to a predicting a car price and provide a dynamic and interactive way of predicting and visualizing car prices. The specific objectives are:

* **Utilize Power BI's Data Visualization Capabilities**:  
  Leverage Power BI's interactive visualization features to create compelling reports and dashboards. These visualizations will highlight the relationships between various car attributes (e.g., engine size, fuel type, mileage, condition, etc.) and car prices, making it easy to explore and analyze pricing trends.
* **Apply DAX Functions for Data Modeling and Analysis**:  
  Use DAX functions to calculate key metrics such as price averages, price ranges, and correlations between features. DAX will also be used to create calculated columns and measures.
* **Predictive Pricing Model**:  
  By using DAX to aggregate and analyze data, the model will allow users to see how different variables, such as car condition, year, brand, and mileage, affect pricing.
* **Trend and Seasonal Analysis**:  
  Use Power BI to track and visualize car price fluctuations over time. Using charts for analysing trends and seasonal variations in car prices, offering insights into how factors like the car's age or market conditions influence pricing trends.
* **Create Interactive Dashboards for Decision Support**:

Design interactive dashboards that provide real-time, data-driven insights to both car buyers and sellers. These dashboards will enable users to filter and drill down into the dataset, providing a user-friendly interface to understand and predict car prices.

* **Empower Data-Driven Decisions**:  
  Provide an actionable set of insights through Power BI's rich visualizations and DAX-powered analyses, empowering users to make better-informed decisions regarding car pricing. Whether for consumers seeking value or sellers aiming for competitive pricing, the insights will guide fair and informed decisions.

KEY INSIGHTS:

**1.Popular Brands (Toyota, Audi, etc.):**

* Brands like Toyota and Audi are indeed dominant in the market, likely due to their reputation for reliability, innovation, and customer satisfaction. These companies typically have strong global presence and loyal customer bases.

**2**.**Manual Transmission vs. Automatic Transmission:**

* While manual transmissions used to be more popular, the trend has shifted in favor of automatic transmissions. However, manual transmission cars still have a niche market, often sought after by driving or in certain regions where manual cars are more common.
* This could be a market dynamic where manual cars could have slightly lower prices in some segments or regions but remain popular in specific cases.

**3.Contribution to Total Price:**

* Each brand contributing between 13% and 15% to the total price suggests a balanced pricing structure across different manufacturers, where the price variation is likely due to model differences rather than brand dominance.

**4.Balanced Distribution Across Car Condition:**

* This implies that the condition of cars (new, used, refurbished) is well-distributed, which could mean the market has a healthy mix of new cars and well-maintained used cars, offering variety to different buyers.

**5.Price Peaks in Specific Years (2002, 2012, 2022):**

* Price peaks in specific years suggest that demand spikes around those times, possibly due to new model releases, technological innovations, or shifts in market preferences. These years could also be linked to the release of high-demand models or vehicles with popular features.

**6.Engine Size and Price :**

* Car with larger engine size tends to be higher. The average engine size in the dataset is about 3.4L, suggesting that high performance car or those with larger engine are often afford as brands.

**7.Price Correlation with Car condition:**

* The total price is distributed evenly among cars in different conditions such asc Used, Like New, New Car. This suggesting that dealers can price cars competitively across these categories without significant market hesitation.

RECOMMENDATION:

1. Low mileage cars attract premium prices due to their better condition and longevity. Focus on acquiring well-maintained vehicles with fewer miles for higher profit margins.

2. Leverage these periods to offer discounts or incentives when demand is high.  
3. High-engine size cars typically demand higher prices. Adjust the pricing strategy to reflect the added value and performance these vehicles offer.  
4. Brands attract consistent consumer interest, ensuring quicker sales and high turnover.  
5. Implement strategic pricing tactics to maximize profit while remaining competitive. Analyze market trends and adjust pricing for optimal sales and profitability.

6. Prioritize models from years with consistent high demand, such as 2002, 2012, and 2022. Vehicles from these years are likely to yield higher resale value and attract more buyers.  
7. Use strategic promotional campaigns during price peaks to draw in customers. Offering limited-time discounts or special deals can increase sales during these prime periods.  
8. The market shows stable demand across multiple car brands. Consider diversifying inventory to include a range of options, ensuring broader appeal and continuous sales.

CONCLUSION:

Effective use of data enables informed decision-making, allowing for precise pricing, inventory management, and promotional strategies in the car market. By targeting high-value segments, such as low mileage cars, high-engine size vehicles, and popular brands, businesses can capture premium pricing and maximize profit margins. Future opportunities for optimization include refining pricing strategies during peak years, enhancing promotional efforts, and adjusting inventory based on evolving demand patterns. A strong understanding of the car market's behavior and pricing fluctuations equips businesses with the tools to stay competitive, adapt to market shifts, and capitalize on emerging trends.