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AutoMobiles Data Analysis Prices & Preformance using SQL

Project Story

Introduction:

The **Automobile industry** is one of the most **dynamic and competitive markets** in the world.

Car prices are influenced by multiple factors, including:
Performance → engine size, horsepower, RPM
Design & Features → body style, number of cylinders
Technical Specs → fuel type, aspiration, fuel system

 # This project aims to explore how these factors affect **automobile pricing** using **SQL-based exploratory data analysis (EDA)**.

Our Approach(Overview)

We analyzed a dataset containing **205 cars** & **25 attributes** to understand:

- **How performance features** like **engine size** & **horsepower** affect price ?
- **How design factors** like **body style** & **drive wheels** influence value ?
- **Whether fuel type** impacts pricing
- **Which brands** dominate the **luxury** vs **budget** segments ?

By using **SQL queries**, we uncovered **hidden patterns and insights** that explain why some cars are **budget-friendly** while others command **premium prices**.

Project Goal

analyze the automobile dataset to identify the key factors that influence car pricing and performance. Using SQL queries on the dataset, we aim to:

1- **Discover** patterns and trends in car specifications (engine size, horsepower, body style, etc.).

2- **Compare** manufacturers to understand differences in design and pricing strategies.

3- **Evaluate** how technical specifications affect fuel efficiency and safety ratings.

4- **Provide** insights that can help automobile companies, dealers, and customers make data-driven decisions regarding pricing, marketing, and car selection.

DataSet Overview

Attribute	Description
make	Car manufacturer
price	Price in USD
horsepower	Engine power
enginesize	Engine capacity
fueltype	Gas or Diesel
carbody	Sedan, hatchback, convertible, etc.
drivewheel	FWD, RWD, or 4WD
peakrpm	Peak engine RPM
citympg	Fuel efficiency in city
highwaympg	Fuel efficiency on highways

Key Analytical Questions & Insights

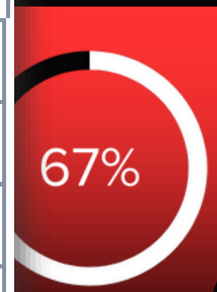
Basic Insights:

1. List the top 5 most expensive cars with their make, body style, horsepower, and price.

	make	carbody	horsepower	price
1	buick regal sport coupe (turbo)	hardtop	184	45400
2	bmw x5	sedan	182	41315
3	buick century special	sedan	184	40960
4	porsche boxter	convertible	207	37028
5	bmw x3	sedan	182	36880

2. Find the average price of cars grouped by carbody.

	carbody	AVG_PRICE
1	hardtop	22208
2	convertible	21890
3	sedan	14344
4	wagon	12371
5	hatchback	10376



3. Which fuel type gas vs diesel has the higher average price?

	FUEL_TYPE	AVG_PRICE
1	diesel	15838
2	gas	12999

4. Show the top 5 car brands with the highest average price.

	CAR_BRAND	AVG_PRICE
1	buick regal sport coupe (turbo)	45400
2	bmw x5	41315
3	buick century special	40960
4	porsche boxter	37028
5	jaguar xk	36000

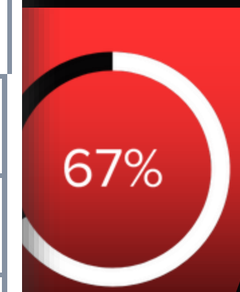
Feature Relationships:

5. Find the relationship between different horsepower range and avg price.

	Horsepower_Range	AVG_PRICE
1	250+	33700
2	201-250	34528
3	151-200	23596
4	101-150	15383
5	<=100	8766

6. Which drivewheel type has the highest average price?

	drivewheel	AVG_PRICE
1	rwd	19910
2	4wd	11087
3	fwd	9239

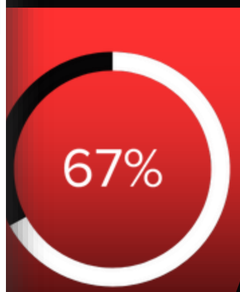


7. Compare different engine size ranges to fuel efficiency in city and highway.

	Engine_Size_Range	Fuel_Efficiency_City_Driving	Fuel_Efficiency_High_Way
1	Very Large (>300)	13	16
2	Small (<=100)	30	36
3	Medium (101-200)	23	28
4	Large (201-300)	15	20

8. Which body style tends to have the highest horsepower on average.

	carbody	AVG_HORSEPOWER
1	hardtop	142
2	convertible	131
3	sedan	103
4	hatchback	101
5	wagon	97



9. Correlation-like comparison: avg price vs avg curbweight grouped by brand (TOP 5).

	BRAND	AVG_PRICE	AVG_CURBWEIGHT
1	jaguar	34600	4027
2	buick	33647	3696
3	peugeot	15489	3221
4	volvo	18063	3037
5	bmw	26118	2929

Business-Oriented:

10. Make, fuel type and horsepower of luxury cars (price > 20,000)

	make	fueltype	horsepower	price
1	buick regal sport coupe (turbo)	gas	184	45400
2	bmw x5	gas	182	41315
3	buick century special	gas	184	40960
4	porsche boxter	gas	207	37028
5	bmw x3	gas	182	36880

11. Cheapest and most expensive price for a car in each brand.

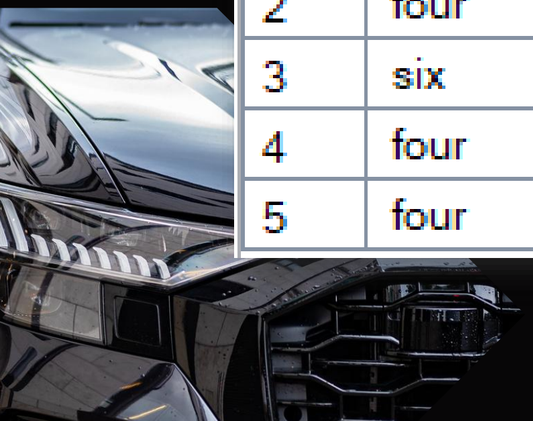
	CAR	MOST_EXPENSIVE_CAR	CHEAPEST_CAR
1	buick	45400	25552
2	bmw	41315	16430
3	porsche	37028	22018
4	jaguar	36000	32250
5	audi	23875	13950
6	volvo	22625	12940
7	Nissan	19699	5499
8	saab	18620	11850
9	mazda	18344	5195
10	peugeot	18150	11900

12. Which features (cylindernumber, aspiration, fuel system) are most common among expensive cars (price > 25,000)?

	cylindernumber	aspiration	fuelsystem	price
1	eight	std	mpfi	45400
2	six	std	mpfi	41315
3	eight	std	mpfi	40960
4	six	std	mpfi	37028
5	six	std	mpfi	36880

13. Which features (cylindernumber, aspiration, fuel system) are most common among Budget cars (price < 15,000)?

	cylindernumber	aspiration	fuelsystem	price
1	four	turbo	spdi	14869
2	four	turbo	spdi	14489
3	six	std	mpfi	14399
4	four	std	mpfi	13950
5	four	turbo	idi	13860



14. What is the relationship between engine horsepower and the peak RPM?

	RPM_RANGE	AVG_HORSEPOWER
1	High RPM (>5500)	119
2	Medium RPM (4500-5500)	102
3	Low RPM (<4500)	99

Conclusion & Recommendations

Conclusion: Engine size & horsepower are the main factors affecting car prices.

Luxury brands (Porsche, BMW, Jaguar) dominate the high-price segment.

Diesel cars are usually more expensive, while gas cars dominate mid-range prices.

Sporty body styles cost more; sedans & hatchbacks are more affordable.

Recommendations: Manufacturers: Focus on high-performance features for premium buyers.

Dealers: Market diesel luxury models to wealthy customers and gas sedans to budget buyers.

Customers: Choose luxury cars for performance, or sedans/hatchbacks for affordability & efficiency.