

CAR DEKHO

-----Exploratory Analysis -----

1). Overall distribution of cars by their manufacturing year?

Query:

```
SELECT year, COUNT(*) AS num_cars
FROM Car_dekho
GROUP BY year
ORDER BY num_cars DESC;
```

Result:

	year	num_cars
▶	2017	1010
	2016	856
	2018	806
	2015	775
	2013	668

2). Selling price variation based on the number of kilometers driven?

Query:

```
SELECT
    CASE
        WHEN km_driven < 50000 THEN 'Less than 50k km'
        WHEN km_driven BETWEEN 50000 AND 100000 THEN '50k - 100k km'
        ELSE 'More than 100k km'
    END AS km_range,
    AVG(selling_price) AS avg_selling_price
FROM Car_dekho
GROUP BY km_range;
```

Result:

	km_range	avg_selling_price
▶	Less than 50k km	967561.3288
	50k - 100k km	486789.2361
	More than 100k km	416156.9095

3). Most common fuel type among the listed cars?

Query:

```
SELECT fuel, COUNT(*) AS num_cars
FROM Car_dekho
GROUP BY fuel
ORDER BY num_cars DESC
LIMIT 1;
```

Result:

	fuel	num_cars
▶	Diesel	4304

4). Average mileage of cars?

Query:

```
SELECT AVG(CAST(REPLACE(mileage, ' kmp1', '') AS DECIMAL)) AS avg_mileage
FROM Car_dekho;
```

Result:

	avg_mileage
▶	19.4452

5). Distribution of cars based on the number of seats?

Query:

```
SELECT seats, COUNT(*) AS num_cars
FROM Car_dekho
GROUP BY seats
ORDER BY num_cars DESC;
```

Result:

	seats	num_cars
▶	5	6274
	7	1120
	8	236
	4	133
	9	80

6). Number of cars listed by individual sellers vs dealers?

Query:

```
SELECT seller_type, COUNT(*) AS num_cars
FROM Car_dekho
GROUP BY seller_type;
```

Result:

	seller_type	num_cars
▶	Individual	6578
	Dealer	1113
	Trustmark Dealer	236

Insights

Exploratory Analysis:

- The highest number of cars, 1010 in total, were manufactured in the year 2017.
- The average selling price tends to be higher for cars driven less than 50,000 kilometres. As the number of kilometres driven increases, the average selling price of the car decreases.
- The most common fuel type among cars is diesel.
- The average mileage of cars is 19.4 km.
- There are 6274 cars with 5 seats.
- individual cars are 6578.

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-----Price Analysis-----

1). What is the average selling price of cars for each manufacturing year?

Query:

```
SELECT year, AVG(selling_price) AS avg_selling_price
FROM car_dekho
GROUP BY year
ORDER BY year;
```

Result:

	year	avg_selling_price
▶	1994	72000.0000
	1995	55000.0000
	1996	41000.0000
	1997	86111.0000
	1998	57888.8889

2). How does the selling price vary based on different fuel types?

Query:

```
SELECT fuel, AVG(selling_price) AS avg_selling_price
FROM car_dekho
GROUP BY fuel;
```

Result:

	fuel	avg_selling_price
▶	Petrol	474468.1706
	Diesel	804352.4082
	Electric	2650000.0000
	CNG	313415.0377
	LPG	210885.7143

3). Is there a correlation between transmission type and selling price?

Query:

```
SELECT transmission, AVG(selling_price) AS avg_selling_price
FROM car_dekho
GROUP BY transmission;
```

Result:

	transmission	avg_selling_price
▶	Manual	727000.0000
	Automatic	2626714.2857
	Automatic	1882972.1268
	Manual	462763.3692

4). What is the average selling price of cars based on the number of previous owners?

Query:

```
SELECT owner, AVG(selling_price) AS avg_selling_price
FROM car_dekho
GROUP BY owner
ORDER BY avg_selling_price DESC;
```

Result:

	owner	avg_selling_price
▶	Test Drive Car	4403800.0000
	First Owner	792202.0352
	Second Owner	401825.8535
	Third Owner	293187.2804
	Fourth & Above Owner	233196.8250

Insights

Price Analysis:

- average selling price varies each year
- selling price depends upon the fuel type of the cars, deisael cars having highest selling price around 8 lakhs
- Manual transmission cars have the highest average selling price compared with automatic
- Test drive cars having the highest average selling price

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-----Marketing Analysis-----

1). Evolution of Number of Cars Listed Over the Years?

Query:

```
SELECT year, COUNT(*) AS num_cars_listed
FROM car_dekho
GROUP BY year
ORDER BY num_cars_listed DESC;
```

Result:

	year	num_cars_listed
▶	2017	1010
	2016	856
	2018	806
	2015	775
	2013	668
	2012	621
	2014	620
	2019	583
	2011	570
	2010	375
	2009	231

2). Trend in Selling Prices Over the Years?

Query:

```
SELECT year,
       (SELECT AVG(selling_price)
        FROM car_dekho AS sub
        WHERE sub.year = main.year) AS avg_selling_price
FROM (SELECT DISTINCT year FROM car_dekho) AS main
ORDER BY year;
```

Result:

	year	avg_selling_price
▶	1994	72000.0000
	1995	55000.0000
	1996	41000.0000
	1997	86111.0000
	1998	57888.8889
	1999	76928.5714
	2000	76682.1250
	2001	46500.0000
	2002	103789.4211
	2003	101572.9189
	2004	109408.9216

3). Patterns in Distribution of Cars Based on Fuel Type Over Time?

Query:

```
SELECT year, fuel, num_cars
FROM (
    SELECT year, fuel, COUNT(*) AS num_cars
    FROM car_dekho
    GROUP BY year, fuel
) AS subquery
ORDER BY year, fuel;
```

Result:

	year	fuel	num_cars
▶	1994	Diesel	1
	1994	Petrol	1
	1995	Petrol	1
	1996	Petrol	2
	1997	Petrol	9
	1998	Petrol	9
	1999	Diesel	3
	1999	Petrol	11
	2000	CNG	1
	2000	Diesel	3
	2000	Petrol	12

4). Variation in Distribution of Cars Based on Seller Type Across Different Years?

Query:

```
SELECT year, seller_type,
       COUNT(*) OVER(PARTITION BY year, seller_type) AS num_cars
FROM car_dekho
ORDER BY year, seller_type;
```

Result:

[illegible]

Insights:

Marketing Analysis

- The highest number of cars are manufactured in the year 2017.
- Price varies year to year

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-----Customer Preference Analysis-----

1).Preferred Transmission Type Among Buyers?

Query:

```
WITH TransmissionCounts AS (  
    SELECT transmission, COUNT(*) AS num_cars  
    FROM car_dekho  
    GROUP BY transmission  
)  
SELECT * FROM TransmissionCounts;
```

Result:

	transmission	num_cars
▶	Manual	13
	Automatic	7
	Automatic	1041
	Manual	6866

2). Selling Price Variation Between Cars Sold by Individual Sellers vs. Dealers?

Query:

```
SELECT  
    CASE WHEN seller_type = 'Individual' THEN 'Individual'  
    ELSE 'Dealer'  
    END AS categorized_seller_type,  
    AVG(selling_price) AS avg_selling_price  
FROM car_dekho  
GROUP BY categorized_seller_type;
```

Result:

	categorized_seller_type	avg_selling_price
▶	Individual	508850.1551
	Dealer	1347760.5315

3). Correlation between number of seats and selling price ?

Query:

```
SELECT seats, AVG(selling_price) AS avg_selling_price
FROM car_dekho
GROUP BY seats
ORDER BY avg_selling_price;
```

Result:

	seats	avg_selling_price
▶	14	235000.0000
	10	344105.1053
	4	486764.6617
	9	500074.9375
	6	581596.7742
	8	583711.8263
	5	632473.1634
	2	700500.0000
	7	812923.1848

4). Most Common Owner Type Among the Listed Cars?

Query:

```
SELECT owner, num_cars
FROM (
    SELECT owner, COUNT(*) AS num_cars
    FROM car_dekho
    GROUP BY owner
    ORDER BY num_cars DESC
    LIMIT 1
) AS top_owner;
```

Result:

	owner	num_cars
▶	First Owner	5232

Insights:

Customer Preference Analysis:

- The average selling price sold by dealers are highest compared with individual
- The 7 seated cars have a highest average selling price
- The first owner cars having highest numbers 5232

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----- Comparative Analysis -----

1). Compare the average selling prices of cars with different fuel types?

Query:

```
SELECT DISTINCT fuel,  
AVG(selling_price) OVER (PARTITION BY fuel) AS avg_selling_price  
FROM car_dekho  
ORDER BY avg_selling_price DESC;
```

Result:

	fuel	avg_selling_price
▶	Electric	2650000.0000
	Diesel	804352.4082
	Petrol	474468.1706
	CNG	313415.0377
	LPG	210885.7143

2). Compare the average mileage of cars with different engine types?

Query:

```
SELECT engine, AVG(CAST(REPLACE(mileage, ' kmpl', '') AS DECIMAL)) AS  
avg_mileage  
FROM car_dekho  
GROUP BY engine  
ORDER BY avg_mileage DESC;
```

Result:

	engine	avg_mileage
▶	793 CC	28.0000
	1047 CC	26.4444
	936 CC	25.0000
	624 CC	24.8400
	799 CC	24.5696
	1186 CC	24.2459
	1120 CC	24.0000
	909 CC	24.0000
	1498 CC	23.6507
	1248 CC	23.4867
	1364 CC	23.3889

Insights:

Comparative Analysis:

- Electric fuel-type cars have the highest average selling price.
- 793 CC engines give the highest mileage of 28.0 km.

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----- Trend Forecasting -----

1). Identifying Emerging Trends in Fuel Preferences?

Query:

```
SELECT year, fuel, COUNT(*) AS num_cars
FROM car_dekho
WHERE year >= (SELECT MAX(year) - 5 FROM car_dekho) -- Consider recent 5 years
GROUP BY year, fuel
ORDER BY year, fuel;1
```

Result:

	year	fuel	num_cars
▶	2018	CNG	5
	2018	Diesel	407
	2018	Petrol	394
	2019	CNG	7
	2019	Diesel	224
	2019	Petrol	352
	2020	CNG	3
	2020	Diesel	20
	2020	Petrol	51
	2021	Diesel	2
	2021	Petrol	5

2).Trend Towards Higher Selling Prices for Certain Car Models Over Time?

Query:

```
SELECT name, year, ROUND(AVG(selling_price),2) AS avg_selling_price
FROM car_dekho
GROUP BY name, year
ORDER BY name, year;
```

Result:

	name	year	avg_selling_price
▶	BMW 3 Series Gran Limousine 320Ld Luxury Line	2023	5800000.00
	Hyundai Creta SX Diesel AT	2021	1950000.00
	Hyundai Creta SX Turbo	2022	1895000.00
	Hyundai i20 Sportz Diesel	2021	977000.00
	Hyundai Tucson Platinum AT	2021	2975000.00
	Mahindra XUV300 W8 Diesel Sunroof	2022	1197000.00
	Mahindra XUV700 AX5 Diesel AT	2022	2275000.00
	Maruti Alto 800 LXI Opt	2021	358000.00
	Maruti Alto 800 LXI Opt	2023	410000.00
	Maruti S-Presso LXI	2022	425000.00
	Maruti S-Presso VXI Plus	2023	450000.00

3). Predicting Future Demand for Cars?

Query:

```
WITH yearly_sales AS (  
    SELECT year, COUNT(*) AS num_cars  
    FROM car_dekho  
    GROUP BY year  
)  
SELECT  
    year,  
    num_cars,  
    LAG(num_cars) OVER (ORDER BY year) AS prev_year_sales,  
    (num_cars - LAG(num_cars) OVER (ORDER BY year)) / LAG(num_cars) OVER  
    (ORDER BY year) AS yoy_growth_rate  
FROM yearly_sales;
```

Result:

	year	num_cars	prev_year_sales	yoy_growth_rate
▶	1994	2	NULL	NULL
	1995	1	2	-0.5000
	1996	2	1	1.0000
	1997	9	2	3.5000
	1998	9	9	0.0000
	1999	14	9	0.5556
	2000	16	14	0.1429
	2001	6	16	-0.6250
	2002	19	6	2.1667
	2003	37	19	0.9474
	2004	51	37	0.3784

Insights:

Trend Forecasting:

- Most customers prefer diesel and petrol cars every year
- The average selling price varies every year based on car models