END SEMESTER EXAMINATION
DATA VISUALIZATION REPORT

DASHBOARD
ON
USED CAR PRICES

DEVELOPED BY

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Title:

Used car dataset analysis and visualization

Objective

The main objective is to fabricate a dashboard that can analyze the trends in the used vehicle data based on the following aspects: -

- Brand and model of the vehicle
- Kilometers driven.
- Owner of the vehicle
- Selling price of the vehicle
- Physical aspects such as engine type, Fuel type, transmission, drivetrain and number of seats it can provide.

Scope

This project will focus on analysing vehicle sales from Car Dekho. The analysis will be conducted at the level of the vehicle configuration to the type of owners selling the vehicles.

Dataset Description

Domain- Business

The data set is obtained from the website www.cardekho.com to retrieve the sales of the vehicles between 2007 and 2019.

The dataset consists of continuous numeric values like the year, categorical values like engine type, selling price and text values like vehicle brand name and the state the vehicle is sold in.

The below figure represents the first few rows of data related to the used vehicle details. The columns include the following:

- Make – Brand of the vehicle sold.
- Model – Variant of the vehicle sold.
- Selling price – Price at which vehicle is sold.
- Year – Year of vehicle.
- Kilometers – Kilometers run by vehicle.

- Fuel Type – Type of Fuel used (Petrol, Diesel, Hybrid, CNG, LPG).
- Transmission – Type of gearing used (Automatic and Manual).
- Location – Location from which vehicles are sold.
- Color – Color variant of vehicle.
- Owner – Type of owner (Unregistered, 1st, 2nd, 3rd owner and so on).
- Seller Type – Seller type of the vehicle (Individual and Dealer)
- Engine – Cubic Capacity of vehicle.
- Max Power – Maximum power delivered from crankshaft of vehicle in brake horsepower(bhp).
- Max Torque - Maximum torque delivered from crankshaft of vehicle in Newton Meters (Nm).
- Drive Train – Type of drive train (FWD, RWD and AWD).
- Length – Length of vehicle.
- Width – Width of vehicle.
- Height – Height of vehicle.
- Seating Capacity – Seating Capacity of vehicle (2-seater, 4 seater, 5 seater and 7 seater).
- Fuel Tank Capacity – Volumetric fuel capacity of vehicle.

The table below describes the types of vehicles present in the Indian used car market.

Make	Model	selling_price	Year	Kilometer	Fuel Type	Transmission	Location	Color	Owner	Seller Type	Engine	Max Power	Max Torque	Drivetrain
Hyundai	Elite i20 Sportz 1.5 MT Diesel	₹ 825,000	2021	43000	Diesel	Manual	Agra	White	First	Individual	1493 cc	99 bhp @ 4000 rpm	240 Nm @ 1500 rpm	FWD
Maruti Suzuki	DZire VXi	₹ 691,000	2019	16652	Petrol	Manual	Ahmedabad	White	First	Individual	1197 cc	89 bhp @ 6000 rpm	113 Nm @ 4400 rpm	FWD
Mahindra	XUV300 W8 (O) 1.5 Diesel	₹ 1,299,000	2020	31348	Diesel	Manual	Bangalore	White	First	Individual	1497 cc	115 bhp @ 3750 rpm	300 Nm @ 1500 rpm	FWD
Hyundai	Elite i20 Asta (O) 1.0 Turbo DCT	₹ 1,050,000	2020	16282	Petrol	Automatic	Pune	White	First	Individual	998 cc	118 bhp @ 6000 rpm	172 Nm @ 1500 rpm	FWD
Hyundai	i20 Magna 1.2	₹ 385,000	2013	79287	Petrol	Manual	Kanpur	White	First	Individual	1197 cc	83 bhp @ 6000 rpm	113.796 Nm @ 4000 rpm	FWD
Hyundai	Xcent S 1.2 (O)	₹ 490,000	2015	23103	Petrol	Manual	Udupi	White	First	Individual	1197 cc	81 bhp @ 6000 rpm	114 Nm @ 4000 rpm	FWD
Maruti Suzuki	Swift DZire ZDI	₹ 550,000	2014	89000	Diesel	Manual	Chennai	White	First	Individual	1248 cc	74 bhp @ 4000 rpm	190 Nm @ 2000 rpm	FWD
Maruti Suzuki	Swift DZire VXI	₹ 470,000	2016	74000	Petrol	Manual	Ranchi	White	First	Individual	1197 cc	83 bhp @ 6000 rpm	115 Nm @ 4000 rpm	FWD
Maruti Suzuki	Vitara Brezza VDi	₹ 725,000	2018	42000	Diesel	Manual	Lucknow	White	First	Individual	1248 cc	89 bhp @ 4000 rpm	200 Nm @ 1750 rpm	FWD
Hyundai	i20 Sportz 1.2	₹ 375,000	2013	29135	Petrol	Manual	Panchkula	White	First	Individual	1197 cc	83 bhp @ 6000 rpm	113 Nm @ 4000 rpm	FWD
Hyundai	Venue SX 1.5 CRDi	₹ 1,097,000	2022	1700	Diesel	Manual	Mumbai	White	First	Individual	1493 cc	99 bhp @ 4000 rpm	240 Nm @ 1500 rpm	FWD
Maruti Suzuki	Vitara Brezza ZDi Plus	₹ 875,000	2018	82000	Diesel	Manual	Ahmedabad	White	First	Individual	1248 cc	89 bhp @ 4000 rpm	200 Nm @ 1750 rpm	FWD
Hyundai	i20 Active 1.4 SX	₹ 725,000	2016	84000	Diesel	Manual	Aurangabad	White	First	Individual	1396 cc	89 bhp @ 4000 rpm	220 Nm @ 1500 rpm	FWD
Maruti Suzuki	Baleno Delta 1.2 AT	₹ 570,000	2017	36000	Petrol	Automatic	Zirakpur	White	First	Individual	1197 cc	83 bhp @ 6000 rpm	115 Nm @ 4000 rpm	FWD
Maruti Suzuki	DZire ZDi Plus AMT	₹ 685,000	2018	92000	Diesel	Automatic	Ludhiana	White	First	Individual	1248 cc	74 bhp @ 4000 rpm	190 Nm @ 2000 rpm	FWD
Hyundai	Elite i20 Sportz 1.2 MT	₹ 775,000	2020	39000	Petrol	Manual	Mumbai	White	First	Individual	1197 cc	82 bhp @ 6000 rpm	115 Nm @ 4200 rpm	FWD
Maruti Suzuki	Vitara Brezza VDi	₹ 710,000	2017	73000	Diesel	Manual	Lucknow	White	First	Individual	1248 cc	89 bhp @ 4000 rpm	200 Nm @ 1750 rpm	FWD
Maruti Suzuki	Vitara Brezza ZDi Plus	₹ 1,025,000	2019	90000	Diesel	Manual	Hyderabad	White	First	Individual	1248 cc	89 bhp @ 4000 rpm	200 Nm @ 1750 rpm	FWD
Hyundai	Venue SX Plus 1.0 Turbo DCT	₹ 1,090,000	2020	26200	Petrol	Automatic	Delhi	White	First	Individual	998 cc	118 bhp @ 6000 rpm	172 Nm @ 1500 rpm	FWD
Maruti Suzuki	Vitara Brezza VDi	₹ 745,000	2018	36000	Diesel	Manual	Patna	White	First	Individual	1248 cc	89 bhp @ 4000 rpm	200 Nm @ 1750 rpm	FWD
Maruti Suzuki	Vitara Brezza VDi AGS	₹ 894,999	2019	46000	Diesel	Automatic	Mumbai	White	First	Individual	1248 cc	89 bhp @ 4000 rpm	200 Nm @ 1750 rpm	FWD
Maruti Suzuki	Vitara Brezza VDi	₹ 825,000	2018	48174	Diesel	Manual	Thane	White	First	Individual	1248 cc	89 bhp @ 4000 rpm	200 Nm @ 1750 rpm	FWD
Maruti Suzuki	Swift DZire VDI	₹ 400,000	2014	64000	Diesel	Manual	Agra	White	First	Individual	1248 cc	74 bhp @ 4000 rpm	190 Nm @ 2000 rpm	FWD
Hyundai	Elite i20 Sportz 1.2 iVT	₹ 795,000	2022	4000	Petrol	Automatic	Kanpur	White	First	Individual	1197 cc	87 bhp @ 6000 rpm	115 Nm @ 1500 rpm	FWD
Hyundai	i20 Active 1.2 S	₹ 529,000	2015	57654	Petrol	Manual	Zirakpur	White	First	Individual	1197 cc	82 bhp @ 6000 rpm	115 Nm @ 4000 rpm	FWD
Mahindra	XUV300 1.5 W6 [2019-2020]	₹ 950,000	2020	57400	Diesel	Manual	Agra	White	First	Individual	1497 cc	115 bhp @ 3750 rpm	300 Nm @ 1500 rpm	FWD

The dataset was obtained from Kaggle [1] which was originally obtained from the Car Dekho website [2].

Measures/KPIs

There are several measures used upon the dataset which are present in the following table below:

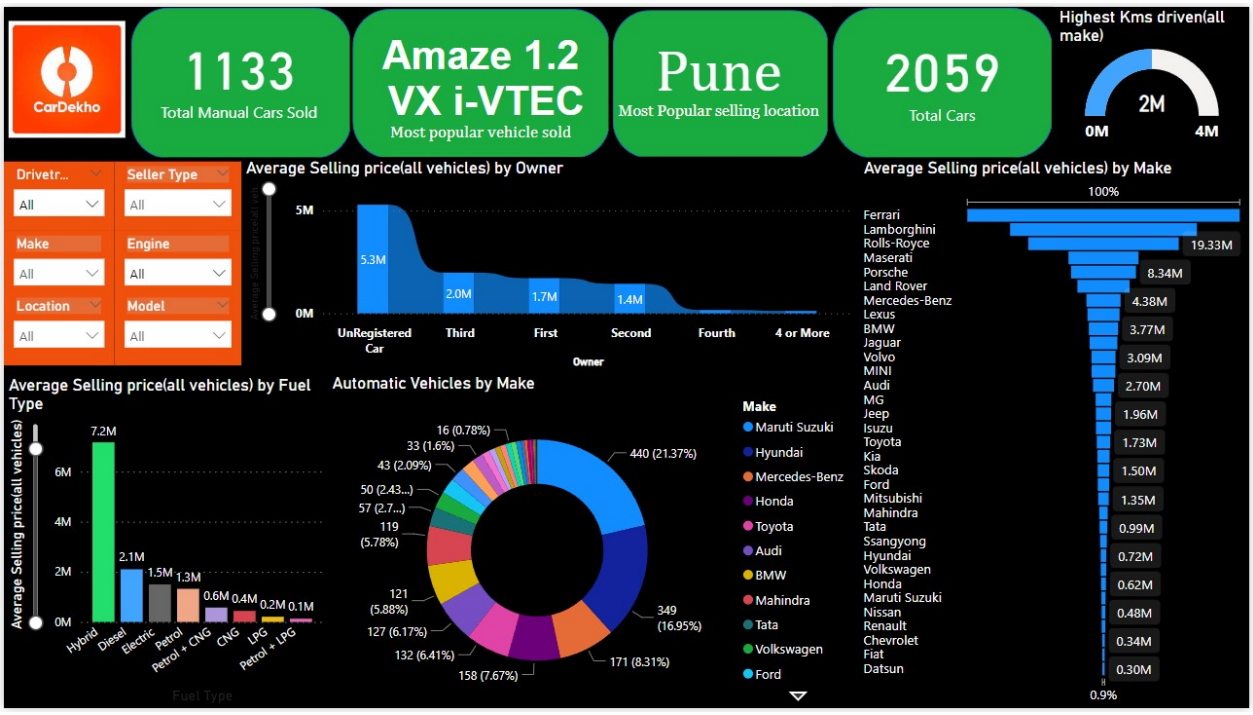
DAX Measures	Description
`Automatic Vehicles = COUNT('car details v4'[Automatic])`	Total number of automatic vehicles sold (all makes)
`Average Kms = AVERAGE('car details v4'[Kilometer])`	Average kilometers of vehicles sold
`Average Selling price(all vehicles) = AVERAGE('car details v4'[selling_price])`	Average selling price of the vehicles
`Avg bhp = AVERAGE('car details v4'[Max horsepower])`	Average brake horsepower delivered from the crank shaft of the vehicles
`Avg Fuel Tank Capacity = AVERAGE('car details v4'[Fuel Tank Capacity])`	Average fuel tank capacity of the vehicles
`Avg Length Width > 150 = CALCULATE( AVERAGE('Car Details v4'[Length]), 'Car Details v4'[Width] > 150 )`	Average Length and width of the vehicles
`Avg Price-Dealer = CALCULATE(AVERAGE('car details v4'[selling_price]), 'car details v4'[Seller Type] = "Dealer")`	Average price stated by the owner (dealer) while selling vehicles
`Avg Price-Individual = CALCULATE(AVERAGE('car details v4'[selling_price]), 'car details v4'[Seller Type] = "Individual")`	Average price stated by the owner (individual) while selling vehicles
`Avg Seating capacity = AVERAGE('car details v4'[Seating Capacity])`	Average seating capacity of the vehicles

`Avg Selling Price AWD = CALCULATE(AVERAGE('car details v4'[selling_price]), 'Car Details v4'[Drivetrain] = "AWD")`	Average selling price of all-wheel-drive (AWD) vehicles only
`Avg Selling Price FWD = CALCULATE(AVERAGE('car details v4'[selling_price]), 'Car Details v4'[Drivetrain] = "FWD")`	Average selling price of front-wheel-drive vehicles only
`Highest Kms driven = CALCULATE(MAX('car details v4'[Kilometer]))`	The highest kilometers a vehicle has travelled before selling it
`Maruti Suzuki vehicles sold = CALCULATE(COUNT('car details v4'[Make]),FILTER('car details v4','car details v4'[Make]="Maruti Suzuki"))`	Number of vehicles sold that belong to the Maruti Suzuki brand
`Max BHP = MAX('car details v4'[Max horsepower])`	Maximum brake horsepower present in a vehicle out of the whole dataset
`Most Popular selling location = TOPN(1, VALUES('car details v4'[Location]))`	Location with the highest number of vehicles sold
`Most popular vehicle sold = TOPN(1, VALUES('car details v4'[Model]))`	Vehicle model with the highest number of vehicles sold
`Perc. Cars Seating Capacity > 5 = DIVIDE( CALCULATE( COUNTROWS('Car Details v4'), 'Car Details v4'[Seating Capacity] > 5 ), COUNTROWS('Car Details v4') )`	Percentage of seating capacity that is greater than 5 seats in the vehicle dataset
`Total Automatic = COUNT('Car details v4'[Automatic Transmission])`	Total number of automatic vehicles
`Total Cars = COUNTROWS('Car Details v4')`	Total number of cars that are sold on Car Dekho
`Total Cars Sold Dealer = CALCULATE( COUNTROWS('Car Details v4'), 'Car Details v4'[Seller Type] = "Dealer" )`	Total dealer-owned cars sold

Total Manual Cars Sold = CALCULATE(COUNTROWS('car details v4'), 'car details v4'[Transmission] = "Manual")	Total number of manual vehicles sold

Visual Representation of the dashboard

The below dashboard represents the outcome of the DAX measures and the various visualization tools from the report view menu.



It is depicted that various types of visualizations are performed using charts, plots, slicers, cards, logo etc. which will be described below:

1. Donut Chart

The donut chart illustrates the number of vehicles sold on the basis of the transmission used i.e., automatic transmission and the brands such as Maruti Suzuki, Hyundai, Honda etc. which helps us in identifying the brands of vehicles that utilize automatic transmission systems.

2. Funnel

The funnel visualization is an illustration that depicts the average selling prices of the vehicles based on the brand they come under. From the dashboard, it can be understood that Ferrari has the most expensive average selling price, while Datsun comes with the most affordable selling price.

3. Gauge

The gauge illustration helps us in knowing the highest number of kilometers that is run by a vehicle out of all the brands in the dataset. It is inferred from the dashboard that the highest kilometers shown on the odometer by a used vehicle is about 2,000,000 kilometers.

4. Clustered Column Chart

This visual depiction allows us to see the average selling price of all vehicles based on the fuel type such as petrol, diesel, CNG, LPG and hybrid. It can be concluded from the visualization that hybrid vehicles are the most expensive ones costing almost thrice that of diesel vehicles.

5. Ribbon chart

This kind of illustration shows the average selling price of the vehicles based on the type of ownership. Unregistered ownership vehicles are sold at a higher price than that of the ones with registered ownership such as 1^{st}, 2^{nd}, 3^{rd} ownership and so on.

6. Cards

Card visualization is one of the most understandable visualizations that exactly depict a specific kind of metrics. In this case I have performed card visualization based on the following metrics:

- Total manual cars sold – The total number of manual cars sold.
- Most popular vehicle sold – The vehicle that is sold the most from the dataset.
- Most popular selling location – The location from where the vehicles are sold the most.
- Total vehicles – The total number of vehicles in the dataset.

It should be noted that the visualizations change as per the selections made in the slicer.

7. Slicer

The slicer is used in the dashboard to help us individually filter the visualization based on the above metrics discussed above. For example, if we would like to know what is the performance of a 1000 cc Maruti Suzuki vehicle that is a FWD drive vehicle with an AWD drive train based in Pune location, we can view them in the previously discussed metrics which is essential in understanding them on a unit level.

Conclusion

In conclusion, the analysis was made in a well intelligible and understandable manner due to the usage of the relevant visualization options such as cards, gauge, column chart, ribbon chart and the choice of using a slicer which can filter the whole dashboard according to our specific requirement. With DAX measures, trends, patterns, and key metrics are uncovered. It's an essential tool for

analysis of vehicle types and their market scenario. This helps in optimizations for improved business outcomes.

References

[1] https://www.kaggle.com/datasets/nehalbirla/vehicle-dataset-from-cardekho

[2] https://www.cardekho.com