

Data Visualization for Vehicle Selection Process

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Abstract - Data visualization makes big or small data easier to interpret for human brain to understand and it will help in determining patterns, trends and outliers in groups of data. Color selection in presenting the data visually plays a vital role. With the help of advanced data visualization tools such as tableau we are going to interpret the best car from the data set with average weighted score calculated which helps us to identify the best car that can be added to the fleet of cars.

Keywords - Data visualization, Data Analytics, Tableau, Data analysis.

I. INTRODUCTION

The concept of using pictures to understand data has been around for centuries, from maps and graphs in the 17th century to the invention of the pie chart in the early 1800s. Due to the evolution of technology and cloud based solutions there is significant amount of data gathered across and interpreting them and converting to human readable format is plays vital role in key decision making process. Computers with latest technologies and software's helps to process large chunks of data at lightning fast speeds. Data visualization is rapidly evolving and it's an art that is certain to change the corporate world over the next few years.

II. DATA VISUALIZATION FACTS AND IMPORTANCE

Data visualization is taking information or data in the required format and presenting into visual context by creating maps and graphs or it's a story telling process which grabs the targeted audience attention and conveys the message clearly by presenting the data in patterns and colors which is easily decoded by the human brain.

It also presents the areas that need immediate attention or improvements by using color coding or patterns. It highlights which factors can influence or predict customer behavior. Helps to understand product placement and forecast or predict sales volumes. There are multiple areas where data can be used to increase the productivity.

III. DATA VISUALIZATION TYPES

The most frequently used data presenting types will be bar graph or pie charts. This is most integral part of visualizing data and most common baseline for many graphical data representation. There is much more types which can be used by pairing to present the right set of data in the right format. Some of the examples include and not limited to

- Charts
- Tables
- Maps
- Dashboards
- Pie chart

- Bar chart
- Levelled bar chart
- Stacked bar chart

We will use some of them to interpret the data which is use for this research of car selection process.

IV. SELECTION OF CAR USING DATA VISUALIZATION AND WEIGHTED AVERAGE SCORE METHOD

Business needs to choose a car in order to add to their fleet of cars based on certain criteria by calculating its weighted average score by defining criteria for selection process. And once the score is calculated it has to be presented with user readable format and create a dashboard to differentiate different cars based on the defined criteria and make a final decision on which car is best suited for the current need.

There are multiple criteria which will be used in this paper. The first criteria is defined by the company and second criteria is determined by the researcher.

Criteria 1 (Company Criteria):

Safety features – weighted at 10
Maintenance cost – weighted at 5
Price point – weighted at 7

Criteria 2 (Researcher Criteria):

Insurance – weighted at 10
Fuel Economy – weighted at 5
Resale Value – weighted at 7

Let's look at an example by choosing the category values for each car brand from the websites [1], [2].

“Fig. 1” provides the assumed weightage in order to score each car model for defined criteria 1&2.

Weightage	
Safety Features	10
Maintenance cost	5
Price point	7
Insurance	10
Fuel Economy	5
Resale Value	7

Fig.1 Assumed weightage for Criteria 1&2.

“Fig.2” is calculated by using the defined criteria 1 and calculating the score for each car brand by category using range multiplied by weight to get the score and then sum up score of each car brand.

Criteria 1					
Car Brand	category	Value	Range	Weight	Score
2017 Ford Escape	Safety features	Good	4.5	10	45
2017 Ford Escape	Maintenance cost	88000	4	5	20
2017 Ford Escape	Price point	24474	5	7	35

2017 Honda CRV	Safety features	Good	4.5	10	45
2017 Honda CRV	Maintenance cost	100000	6	5	30
2017 Honda CRV	Price point	25566	4	7	28

2017 Hyundai Santa Fe	Safety features	Good	4.5	10	45
2017 Hyundai Santa Fe	Maintenance cost	94420	5	5	25
2017 Hyundai Santa Fe	Price point	31595	2	7	14

2017 Toyota Rav 4	Safety features	excellent	5	10	50
2017 Toyota Rav 4	Maintenance cost	82000	7	5	35
2017 Toyota Rav 4	Price point	27790	3	7	21

Fig.2 Calculated score based for criteria 1

“Fig.3” gives the final calculated weighted score by summing up the scores for each category by car brand. The highlighted record shows the car model with highest weighted score for criteria 1.

Car Brands	Weighted Score
2017 Ford Escape	100
2017 Honda CRV	103
2017 Hyundai Santa Fe	84
2017 Toyota Rav 4	106

Fig.3 Weighted score for Criteria 1

“Fig.4” is calculated by using the defined criteria 2 and calculating the score for each car brand by category using range multiplied by weight to get the score and then sum up score of each car brand.

Criteria 2					
Car Brand	category	Value	Range	Weight	Score
2017 Ford Escape	Insurance	2136	3	10	30
2017 Ford Escape	Fuel Economy	26	4	5	20
2017 Ford Escape	Resale Value	15981	3.5	7	24.5

2017 Honda CRV	Insurance	2364	2	10	20
2017 Honda CRV	Fuel Economy	28	4.5	5	22.5
2017 Honda CRV	Resale Value	16789	4	7	28

2017 Hyundai Santa Fe	Insurance	1256	3.5	10	35
2017 Hyundai Santa Fe	Fuel Economy	24	3.5	5	17.5
2017 Hyundai Santa Fe	Resale Value	21225	5	7	35

2017 Toyota Rav 4	Insurance	1405	4.5	10	45
2017 Toyota Rav 4	Fuel Economy	30	5	5	25
2017 Toyota Rav 4	Resale Value	17302	4.5	7	31.5

Fig.4 Calculated score based for criteria 2

“Fig.5” gives the final calculated weighted score by summing up the scores for each category by car brand. The highlighted record shows the car model with highest weighted score for criteria 2.

Car Brands	Weighted Score
2017 Ford Escape	74.5
2017 Honda CRV	70.5
2017 Hyundai Santa Fe	87.5
2017 Toyota Rav 4	101.5

Fig.5 Weighted score for Criteria 2

Now we have the calculated data ready and this can be represented in the data visualization types to see how this is easy to interpret by using different visual elements.

“Fig.6” provides the “Levelled bar chart” for criteria 1 calculated score from Fig.2 using tableau.

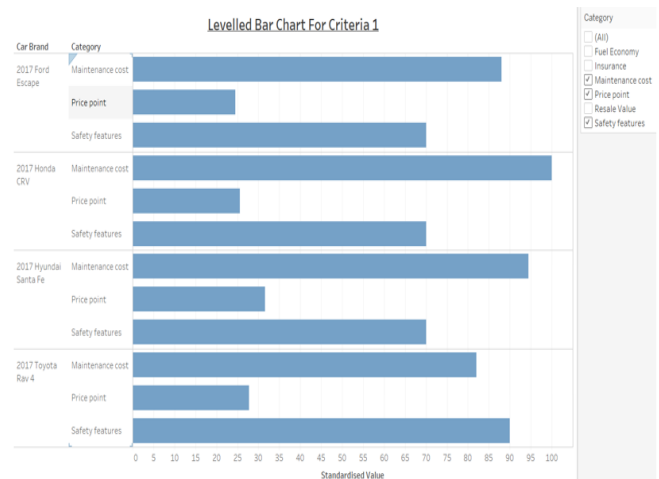


Fig.6 Levelled bar chart for criteria 1

“Fig.7” provides the “Stacked bar chart” for criteria 1 calculated score from Fig.2 using tableau.

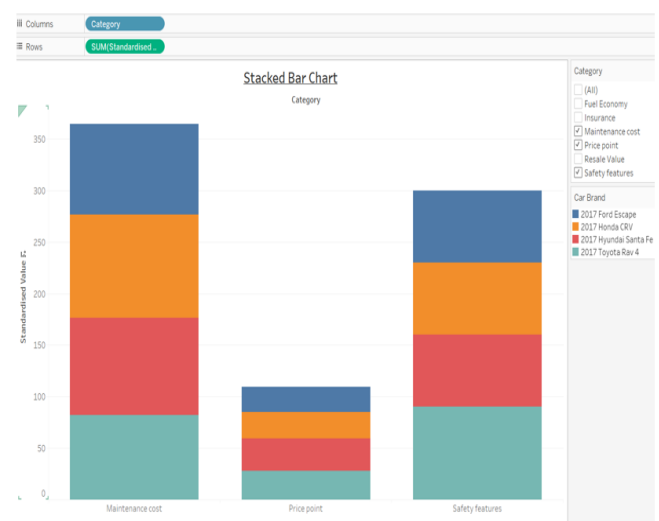


Fig.7 Stacked bar chart for criteria 1

“Fig.8” provides the “Multiple pie chart” for criteria 1 calculated score from Fig.2 using tableau.



Fig.8 Multiple pie chart

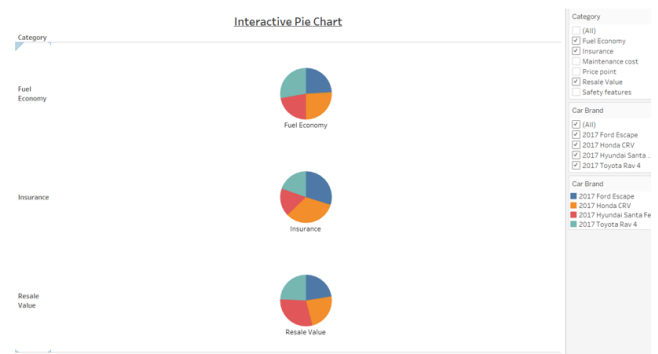


Fig.11 Multiple pie chart for criteria 2

“Fig.9” provides the “Levelled bar chart” for criteria 2 calculated score from Fig.4 using tableau.

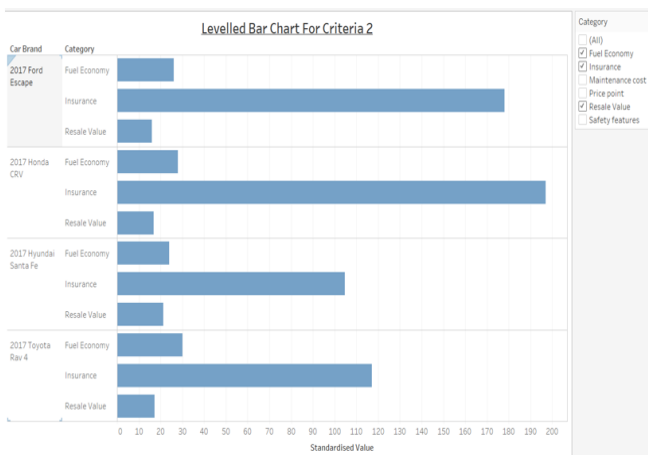


Fig.9 Levelled bar chart for criteria 2

“Fig.10” provides the “Stacked bar chart” for criteria 2 calculated score from Fig.4 using tableau.

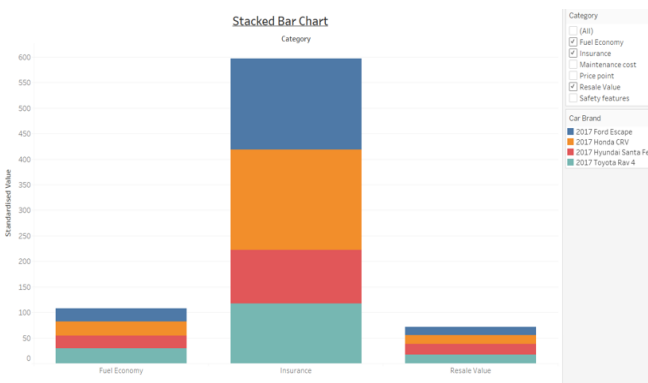


Fig.10 Stacked bar chart for criteria 2

“Fig.11” provides the “Multiple pie chart” for criteria 2 calculated score from Fig.4 using tableau.

The data representation by individual charts gives the information regarding different scores for each category. Now let’s see by combining data visualization for both the criteria’s using pie chart.

“Fig.12” represents the data in “Pie chart” format for both criteria 1 and 2. Data from Fig.2 and Fig.4 set using Tableau.

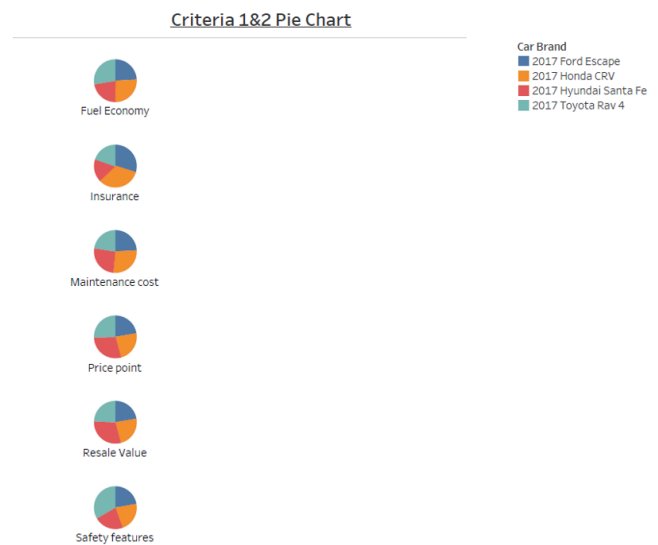


Fig.12 Pie chart for criteria 1&2

“Fig.13” represents the data in “Stacked bar chart” format for both criteria 1 and 2. Data from Fig.2 and Fig.4 set using Tableau.

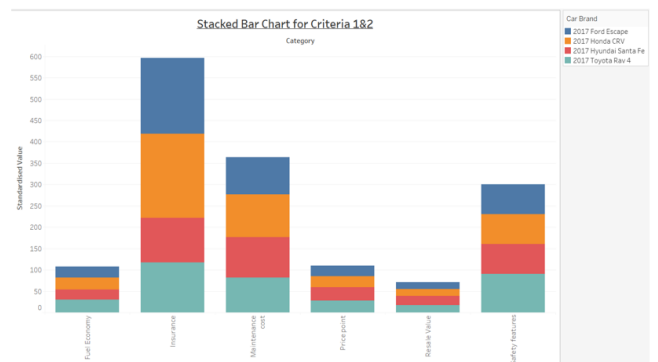


Fig.13 Stacked bar chart for criteria 1&2

“Fig.14” represents the data in “Levelled bar chart” format for both criteria 1 and 2. Data from Fig.2 and Fig.4 set using Tableau.

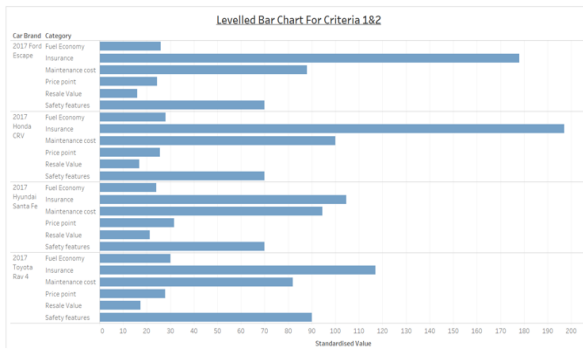


Fig.14 Levelled bar chart for criteria 1&2

“Fig.15” represents the data in dashboard by using data from Fig.2 and Fig.4 set using Tableau. Dashboard provides holistic view of data and user can view in a better way to make decision wisely.

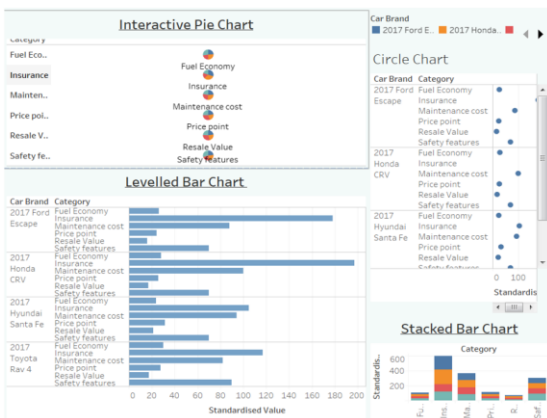


Fig.15 Dashboard for criteria 1&2

V. DECISION MAKING USING DATA VISUALIZATION

Based on the presented information, decision making is rapid and easier by seeing different segment values on dashboard for each category and brand of car without going through each and every data point. This helps in saving time and making decision quickly and easily.

VI. DECISION MAKING USING DATA VISUALIZATION

Data representation is achieved by using different visual elements and types of charts to represent the calculated data and helps in solving the use case for selection of car.

After considering calculated weightage score data and visual data, “2017 Honda Toyota Rav4” provides enough information to convince the person to choose this car for their fleet.

VII. RESULT AND DISCUSSION

Data representation is achieved by using different visual elements and types of charts to represent the calculated data and helps in solving the use case for selection of car.

After considering calculated weightage score data and visual data, “2017 Honda Toyota Rav4” provides enough information to convince the person to choose this car for their fleet.

REFERENCES

- [1] Sample Car Data obtained from Kelly Blue Book. Available online at <https://www.kbb.com>
- [2] Different insurance data for each car model obtained from Cars.com. Available online at <https://www.cars.com>