

C745: Advanced Data Visualization

The task is to collect data, using visualization to decide which vehicle to buy for the company. Options are Honda CRV, 2019 Toyota Rav4, 2019 Ford Escape, 2019 or 2019 Hyundai Santa Fe.

- A. The table below is the data scrapped from the J. D. Power website (“SUV/Car ratings”). It has 3 columns including brand, features, and rating. Its feature has been filtered to keep only Maintenance Cost, Price Point, and Safety which are prepared for Criteria 1 analysis.

Brand	Features	Value
2019 Ford Escape	Maintenance Cost	9
2019 Ford Escape	Price Point	10
2019 Ford Escape	Safety	9
2019 Honda CRV	Maintenance Cost	9
2019 Honda CRV	Price Point	9
2019 Honda CRV	Safety	9
2019 Hyundai Santa Fe	Maintenance Cost	8.5
2019 Hyundai Santa Fe	Price Point	7
2019 Hyundai Santa Fe	Safety	8
2019 Toyota Rav 4	Maintenance Cost	9
2019 Toyota Rav 4	Price Point	8
2019 Toyota Rav 4	Safety	8

- B. The table below is the data scrapped from the J. D. Power website (“SUV/Car ratings”). It has 3 columns including brand, features, and rating. Its feature has been filtered to keep only Fuel Economy, Insurance and Resale Value which are prepared for Criteria 2 analysis.

Brand	Features	Value
2019 Ford Escape	Fuel Economy	8
2019 Ford Escape	Insurance	8
2019 Ford Escape	Resale Value	7
2019 Honda CRV	Fuel Economy	10
2019 Honda CRV	Insurance	9
2019 Honda CRV	Resale Value	9
2019 Hyundai Santa Fe	Fuel Economy	7
2019 Hyundai Santa Fe	Insurance	7
2019 Hyundai Santa Fe	Resale Value	7
2019 Toyota Rav 4	Fuel Economy	8
2019 Toyota Rav 4	Insurance	7
2019 Toyota Rav 4	Resale Value	10

- C. For this section, I created a datasheet with added columns Weight, Weight Value and Weighted Rating for Criteria 1.

$$\text{Weight Value} = \text{Weight} * \text{Value}$$

$$\text{Weighted Rating is calculated by} = \text{Sum of Weight Value} / \text{Sum of Weight}$$

Brand	Features	Value	Weight	Weighted Value	Weighted Rating
2019 Ford Escape	Maintenance Cost	9	10	90	9.32
2019 Ford Escape	Price Point	10	7	70	9.32
2019 Ford Escape	Safety	9	5	45	9.32
2019 Honda CRV	Maintenance Cost	9	10	90	9.00
2019 Honda CRV	Price Point	9	7	63	9.00
2019 Honda CRV	Safety	9	5	45	9.00
2019 Hyundai Santa Fe	Maintenance Cost	8.5	10	85	7.91
2019 Hyundai Santa Fe	Price Point	7	7	49	7.91
2019 Hyundai Santa Fe	Safety	8	5	40	7.91
2019 Toyota Rav 4	Maintenance Cost	9	10	90	8.45
2019 Toyota Rav 4	Price Point	8	7	56	8.45
2019 Toyota Rav 4	Safety	8	5	40	8.45

D. For this section, I created a data sheet with added columns Weight, Weight Value and Weighted Rating for Criteria 2. The same calculation has been applied like the previous tables.

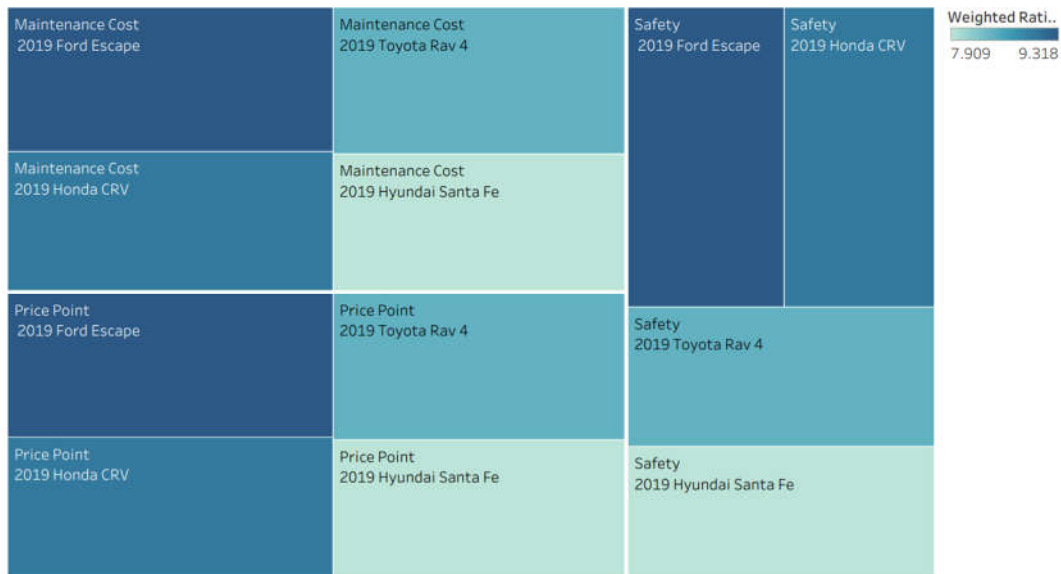
Brand	Features	Value	Weight	Weighted Value	Weighted Rating
2019 Ford Escape	Fuel Economy	8	10	80	7.64
2019 Ford Escape	Insurance	8	8	64	7.64
2019 Ford Escape	Resale Value	7	10	70	7.64
2019 Honda CRV	Fuel Economy	10	10	100	9.36
2019 Honda CRV	Insurance	9	8	72	9.36
2019 Honda CRV	Resale Value	9	10	90	9.36
2019 Hyundai Santa Fe	Fuel Economy	7	10	70	7.00
2019 Hyundai Santa Fe	Insurance	7	8	56	7.00
2019 Hyundai Santa Fe	Resale Value	7	10	70	7.00
2019 Toyota Rav 4	Fuel Economy	8	10	80	8.43
2019 Toyota Rav 4	Insurance	7	8	56	8.43
2019 Toyota Rav 4	Resale Value	10	10	100	8.43

E. In this section, I created a data sheet with added columns Weight, Weight Value and Weighted Rating for both Criteria 1 & Criteria 2.

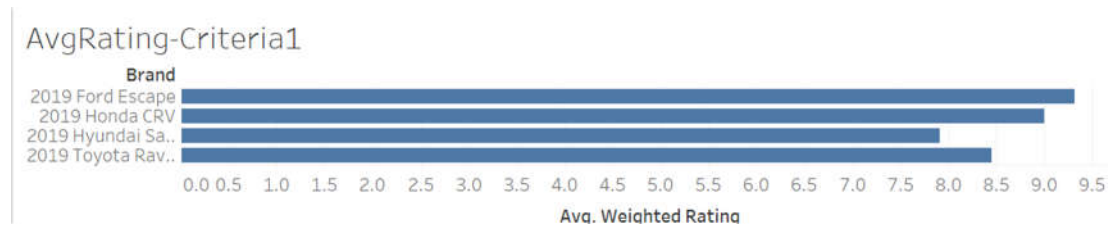
Brand	Features	Value	Weight	Weighted Value	Weighted Rating
2019 Ford Escape	Fuel Economy	8	10	80	7.64
2019 Ford Escape	Insurance	8	8	64	7.64
2019 Ford Escape	Maintenance Cost	9	10	90	9.32
2019 Ford Escape	Price Point	10	7	70	9.32
2019 Ford Escape	Resale Value	7	10	70	7.64
2019 Ford Escape	Safety	9	5	45	9.32
2019 Honda CRV	Fuel Economy	10	10	100	9.36
2019 Honda CRV	Insurance	9	8	72	9.36
2019 Honda CRV	Maintenance Cost	9	10	90	9.00
2019 Honda CRV	Price Point	9	7	63	9.00
2019 Honda CRV	Resale Value	9	10	90	9.36
2019 Honda CRV	Safety	9	5	45	9.00
2019 Hyundai Santa Fe	Fuel Economy	7	10	70	7.00
2019 Hyundai Santa Fe	Insurance	7	8	56	7.00
2019 Hyundai Santa Fe	Maintenance Cost	8.5	10	85	7.91
2019 Hyundai Santa Fe	Price Point	7	7	49	7.91
2019 Hyundai Santa Fe	Resale Value	7	10	70	7.00
2019 Hyundai Santa Fe	Safety	8	5	40	7.91
2019 Toyota Rav 4	Fuel Economy	8	10	80	8.43
2019 Toyota Rav 4	Insurance	7	8	56	8.43
2019 Toyota Rav 4	Maintenance Cost	9	10	90	8.45
2019 Toyota Rav 4	Price Point	8	7	56	8.45
2019 Toyota Rav 4	Resale Value	10	10	100	8.43
2019 Toyota Rav 4	Safety	8	5	40	8.45

F. This section presents three different data visualizations based on Criteria 1.

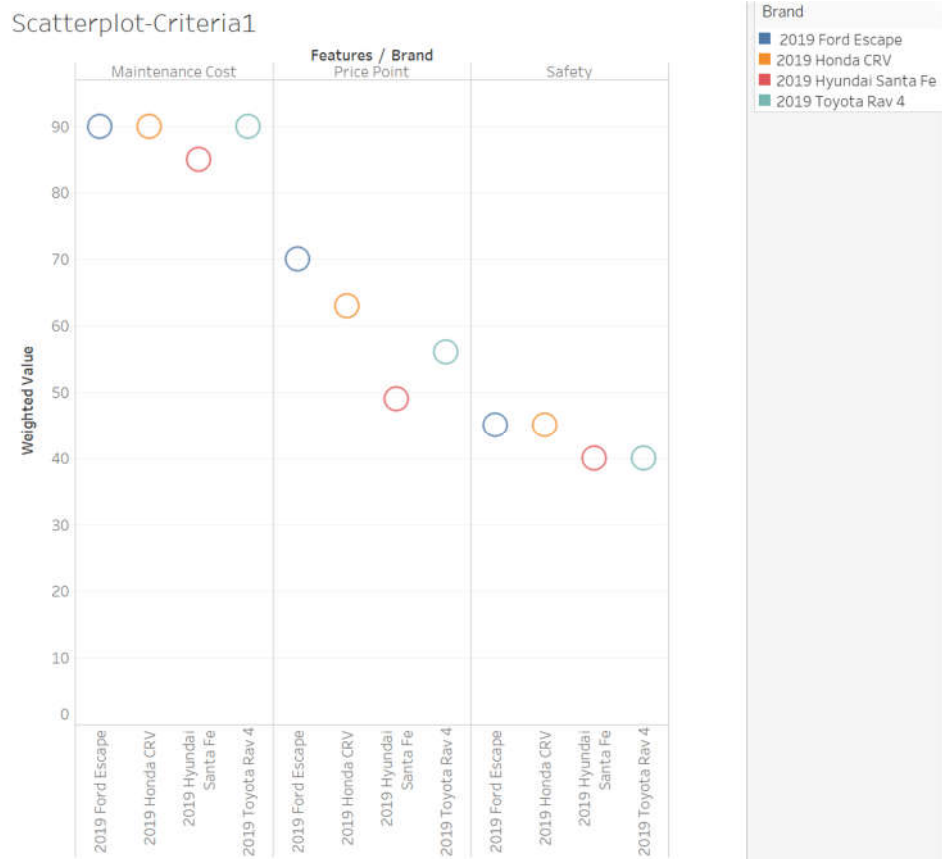
Treemap-Criteria 1



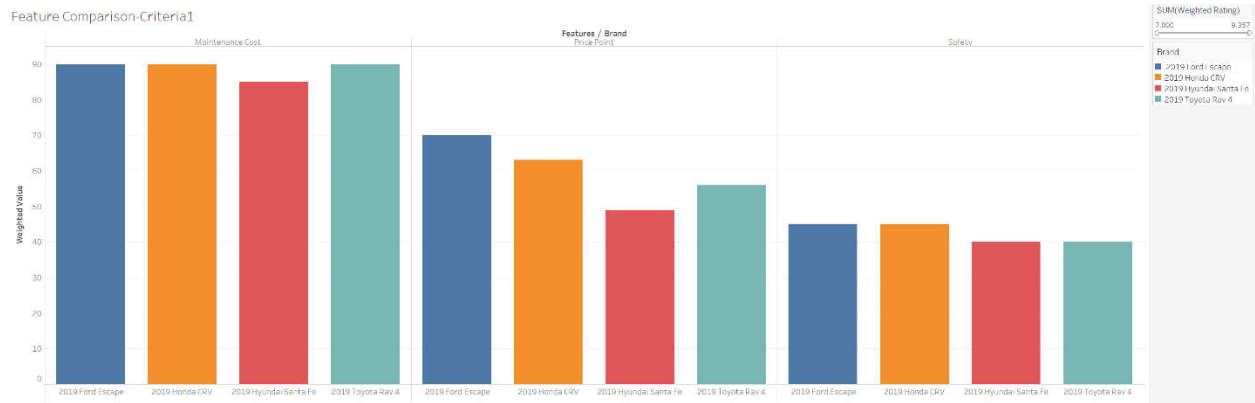
Bar graph for the Average Weighted Rating – Criteria 1



Scatter Plot for Criteria 1

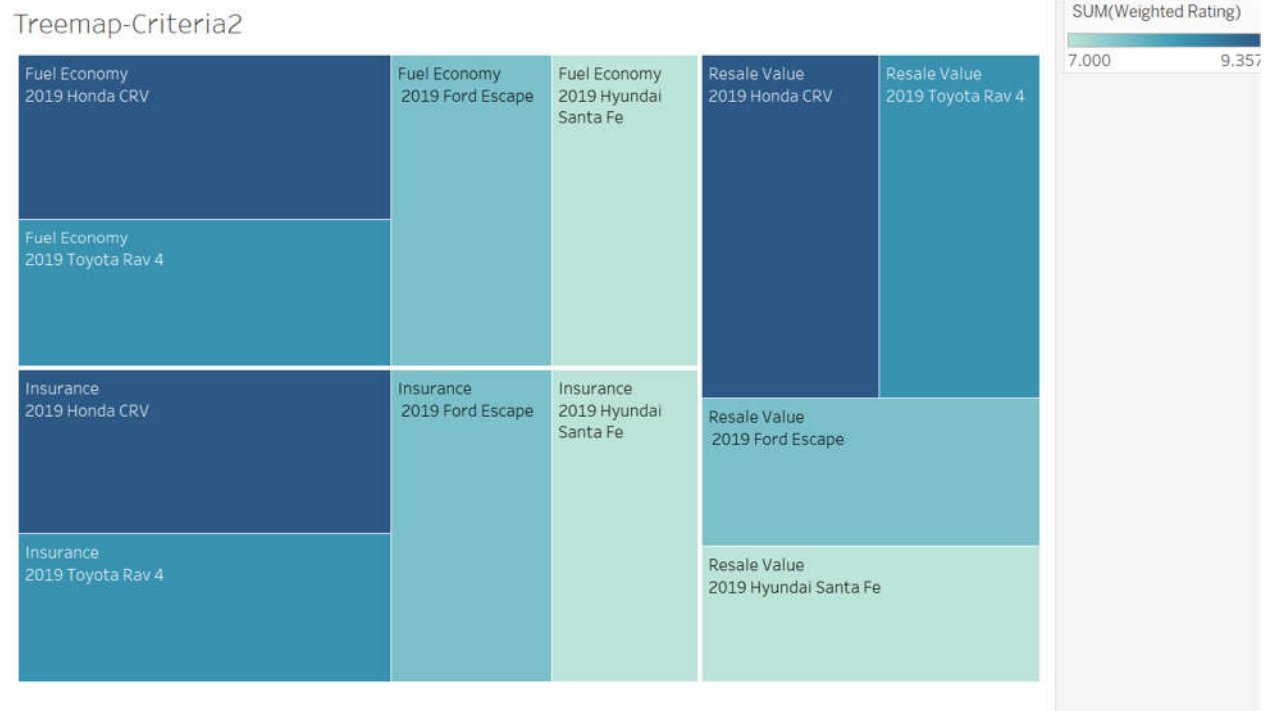


Bar graph feature comparison – Criteria 1

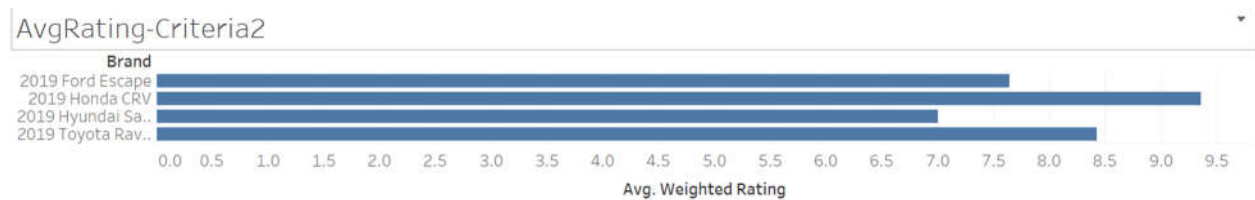


G. This section presents three different data visualizations based on Criteria2.

TreeMap – Criteria 2

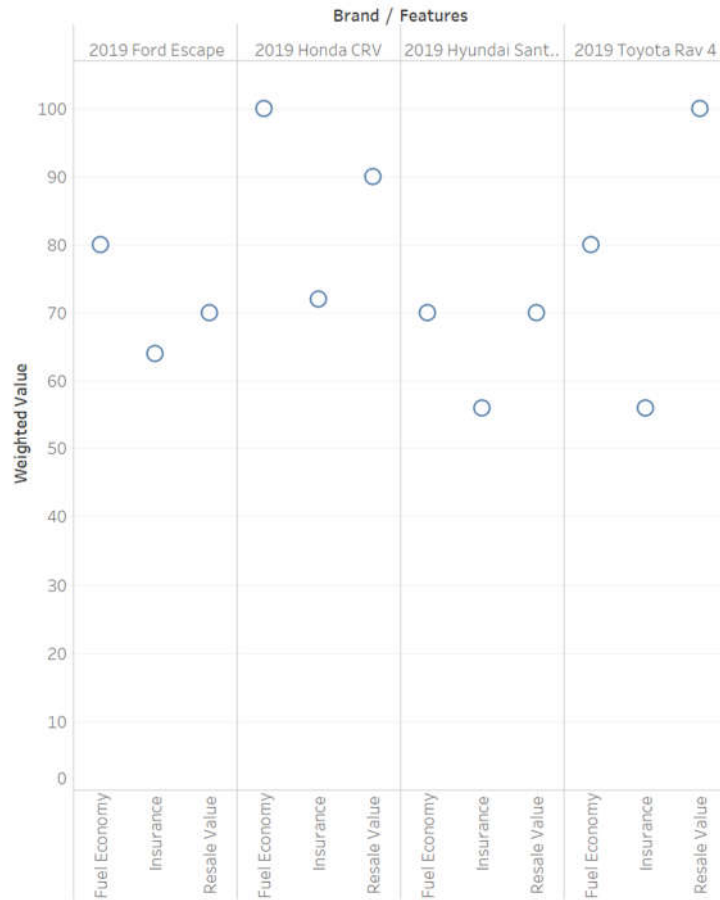


Bar graph for the Average Weighted Rating – Criteria 2

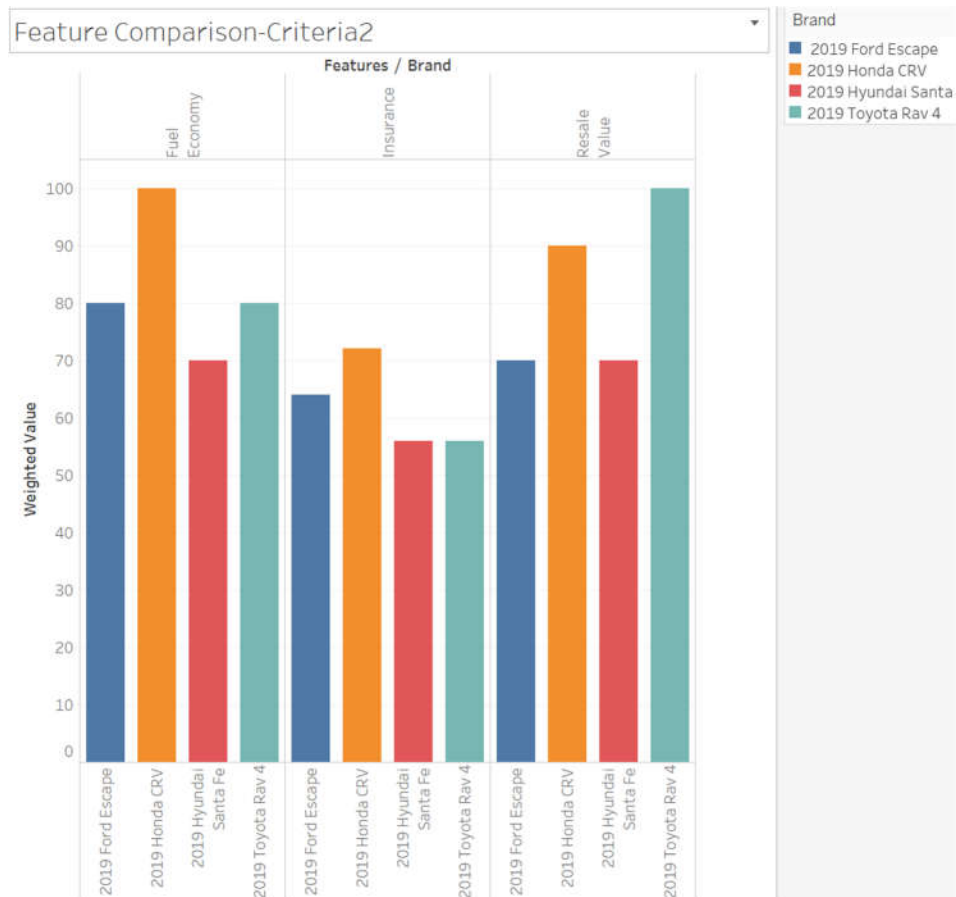


Scattered Plot for Weighted Value – Criteria 2

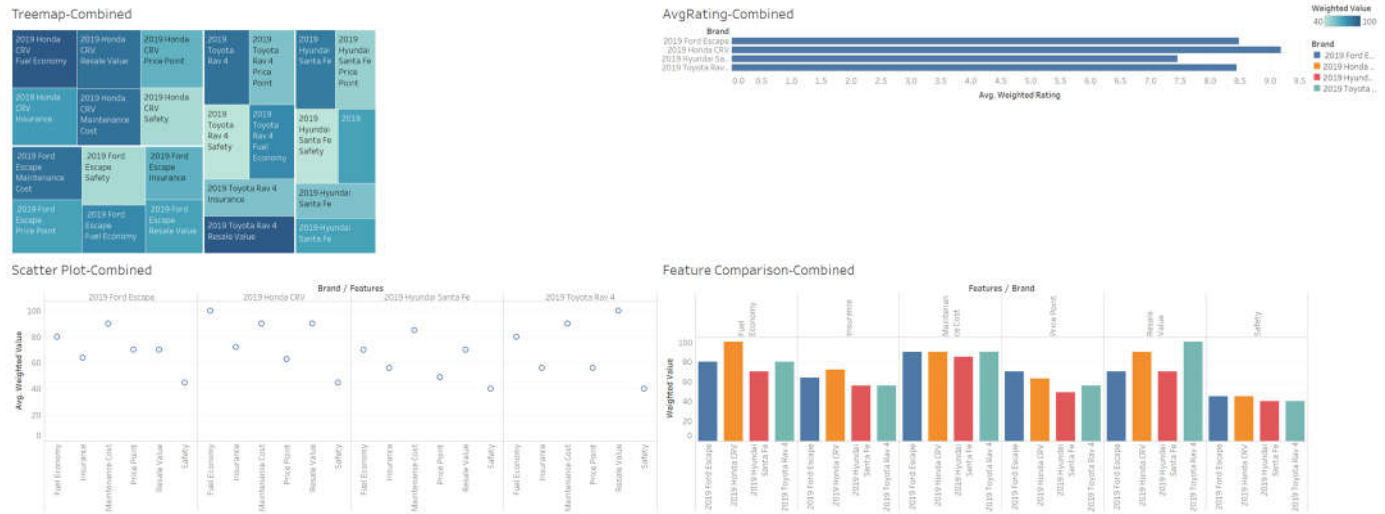
Scatter Plot-Criteria2



Bar Graph of feature comparison for the sum of the weighted value – Criteria 2



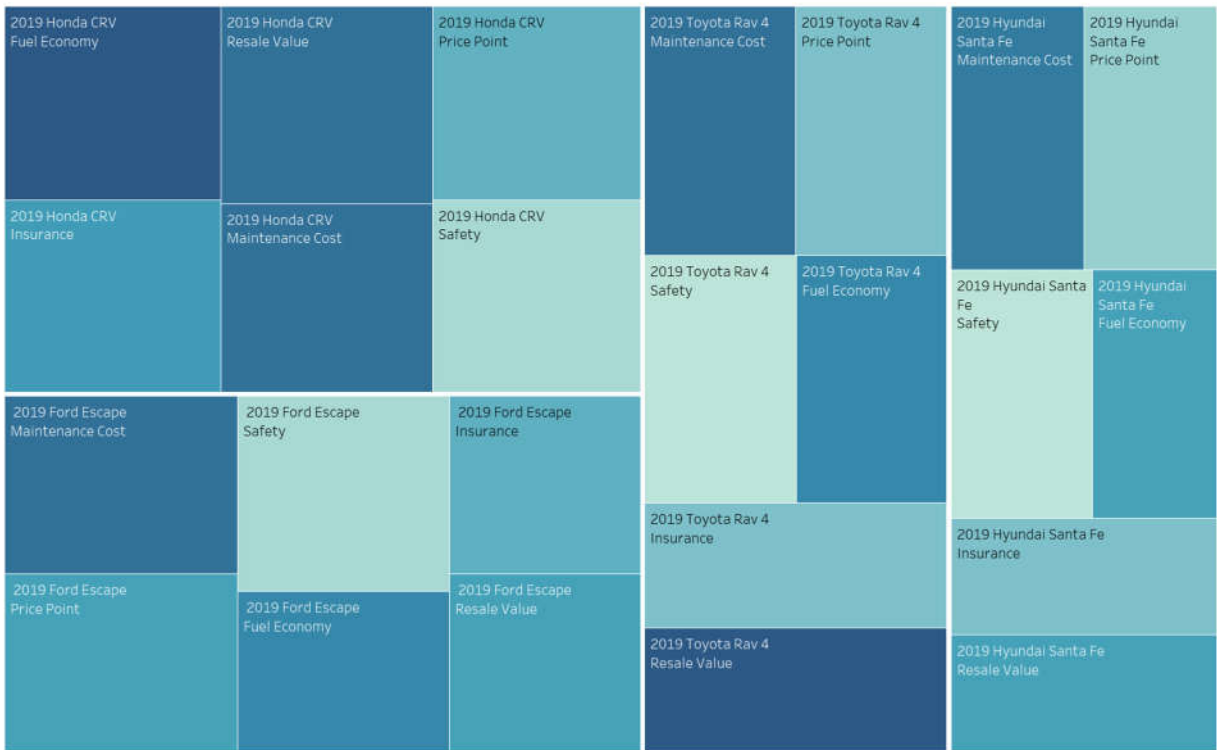
H. I created a dashboard shows four types of visuals including TreeMap, Horizontal and Vertical Bar Graph, Scatter Plot for combined criteria.



- I. As demonstrated on the Average Rating Bar Graph in dashboard Criteria 1, the 2019 Honda CRV ranked the second and based on Criteria 2 Average Rating Bar Graph, the CRV ranked the first. So, after combining both Criteria 1 and Criteria 2, the CRV appears to be the best car of our choice.
- J. The diagrams in the dashboard demonstrate the relationship between different features, their weight in terms of personal/company point of view and their ratings. These features and weighted value relationships provide suggestions in decision making (for example, Maintenance, Price Point, and Safety have a weight of 10, 7, and 5 respectively from the company point of view). On the other hand, the criteria Fuel Economy, Resale Value, and Insurance have the importance of 10, 10, and 8, respectively from a personal view. The company and individual preference have a different set of standards that offers unique value in the decision-making process.
This presentation has 4 different types of visualization for every feature and weight relationship.

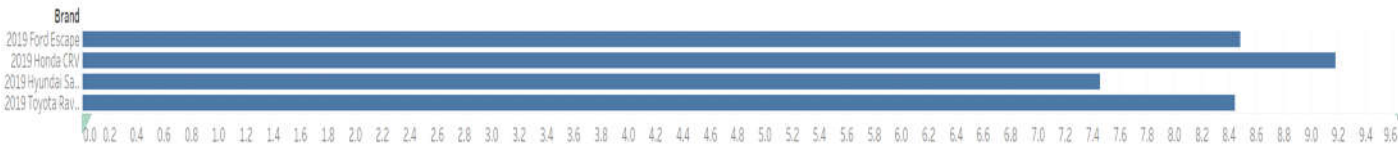
The first diagram shows a TreeMap for all features in boxes with a different shade of blue to identify which car has better value.

Treemap-Combined



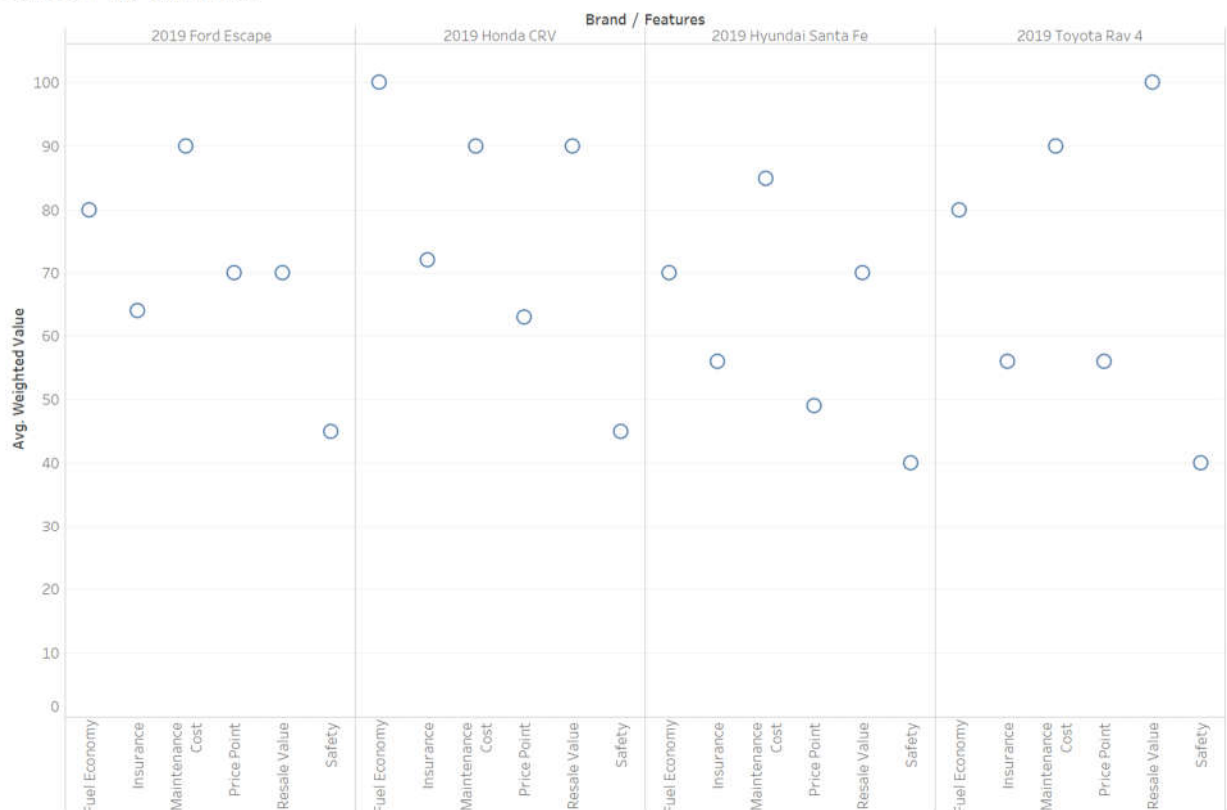
The second diagram shows a horizontal bar graph demonstrating which car has a better average rating.

AvgRating-Combined



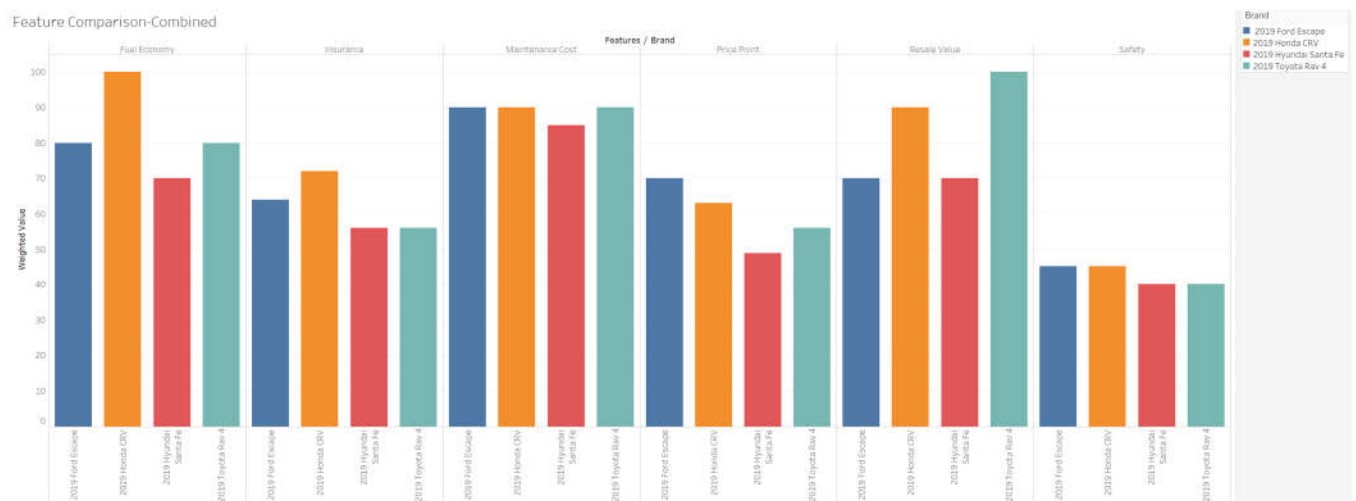
The third diagram shows a scatter plot comparison of different features for all cars that can suggest which car has a better value.

Scatter Plot-Combined



The fourth diagram shows a histogram with different colors comparing several features of the cars which seem to be easier to understand for a non-technical audience.

Feature Comparison-Combined



K. References:

- 1) 2019 Compact SUV ratings: <https://www.jdpower.com/Cars/Ratings/Quality/2019/Compact-SUV>
- 2) Car Insurance Comparison <http://www.finder.com/car-insurance>