# **1. Figures**

## **1.1 Figure 1 - Circle Packing**

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**Figure 1:** Graph of Circle Packing. Note that circles are grouped by brand, circles’ sizes are based on cylinder numbers and color depth represents the power data.

## **1.2 Figure 2 - Beeswarm Plot**

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**Figure 2:** Beeswarm plot. Note that circles are grouped by number of cylinders on the y axis, the economy is mapped on the x axis, circles’ sizes are based on power(hp), and the darker the color, the heavier the car.

# **2. Summary**

## **2.1 How we perform the tasks**

Figure 1: Import sample dataset “Cars(Multivariate)” provided by RAWGraphs. Select Circle Packing (Hierarchy (weighted)) as our chart model. Drag the “brand” category to the “Hierarchy” section, it generates circles grouped by car brands. Then drag the “cylinders” category to the “Size” section, the circle sizes represent the numbers of cylinders. The next step is to drag the “power(hp)” category to the “Color” section, and choose the “Color Scale” as “Linear(numeric)”. So only one color shows on the plot and the color depth is based on the power(hp). The last step is to check the “Sort By Size” box, it sorts the circles in order to make the plot organized.

Figure 2: Import sample dataset “Cars(Multivariate)” provided by RAWGraphs. Select Beeswarm Plot (Distribution) as our chart model. Drag the “cylinders” category to the “Groups” section, it divides the circles based on values of “cylinders”. Then drag the “economy (mpg)” category to the “X-Axis” section, and it decides the horizontal position of the circles based on “economy (mpg)” values. Drag another category “power(hp)” to the “Radius” section, the area of the circles is generated by “power(hp)” data. The next step is to drag the “weight (lb)” category to the “Colors” section, and choose the “Color Scale” as “Linear(numeric)”. So only one color shows on the plot and the color depth is based on the weight (lb).

## **2.2 Our findings**

Figure 1, circle packing: The size of the circle is based on brand, each circle represents a brand. And the size is based on the cylinders when the cylinder’s number is larger and the circle size is bigger. Color means that the darker the color, the greater the power.

So, we can find findings in figure 1:

* Although ford has the largest number of 8-cylinder cars, its power is not very high. Same as Chevrolet.
* Renault's power and cylinder values are small.
* Some good brand cars, such as Benz and BMW, have a low value of cylinder and power. Consumers choosing them may be considering other aspects. Or they do better in other ways as luxury cars.
* The values of Oldsmobile and Chrysler’s cylinder and power are relatively high. If consumers consider these two factors, they may choose these two brands.
* Choosing a car is not just a matter of these two criteria, but of other considerations.

Figure 2, beeswarm plot. The size of the radius depends on power: the larger power is, the larger the circle is. The color represents weight. The darker the color, the heavier the weight. So, we can get these findings in figure 2:

* Most automobile cylinders between 4 and 6, the economy in between 15 to 20. This shows that the demands of customers in these two aspects lead the automobile manufacturers to produce these cars.
* There are very few cars with three cylinders. Maybe eliminated by the market in the future.
* The more cylinders a car has, the heavier it is. If the customer considers the weight of the car, it can not consider the car with eight cylinders. Carmakers might try to make cars with more cylinders and lighter weight.

## **2.3 What we have learned**

We learned a lot through this exercise. We tried a number of different visualizations, but many of them were too cluttered, or simply illegible. One thing that we learned was that you can’t always add in every detail in a visualization. For example, in Figure 2, if you change the value of color to be some more unique value, such as brand or name, there are too many colors, and it distracts from the main point. Although more detail can be helpful, if it does not add to what you want the audience to take away, it is detrimental. Along this same vein, if you add labels to visualization with too many data points, it takes away from the story because they overlap and you cannot read them.

Another thing that we learned was to use incremental colors when you are dealing with a scale, like 0-60 times. When you use unique colors, the charts look very confusing, and again, you don’t take anything away from it. When you use an incremental color scheme, you can very easily make out what you are looking at, and the finding is intuitive.

We also learned that when you are looking at a graph, axis labels are very important. Without them, it is very difficult to make out the point behind the graph.

In summary, the most important thing that we learned was to really focus on what we wanted the audience to take away, and if a feature does not add to that take-away, then it should not be included, because it only serves as a distraction from the main point.

# **3. References**

"How to make a treemap", by RAWGraphs Team. Licensed under CC BY-NC-SA 4.0. Accessed: April 15, 2020, from <https://rawgraphs.io/learning/how-to-make-a-treemap/>

"How to make a beeswarm plot", by RAWGraphs Team. Licensed under CC BY-NC-SA 4.0. Accessed: April 15, 2020, from <https://rawgraphs.io/learning/how-to-make-a-beeswarm-plot/>

“Multivariate.csv”, by RAWGraphs Team. Licensed under CC BY-NC-SA 4.0. Accessed: April 15, 2020, from, from <https://github.com/densitydesign/raw/blob/master/data/multivariate.csv>