Dec 2, 2024

Data Visualization

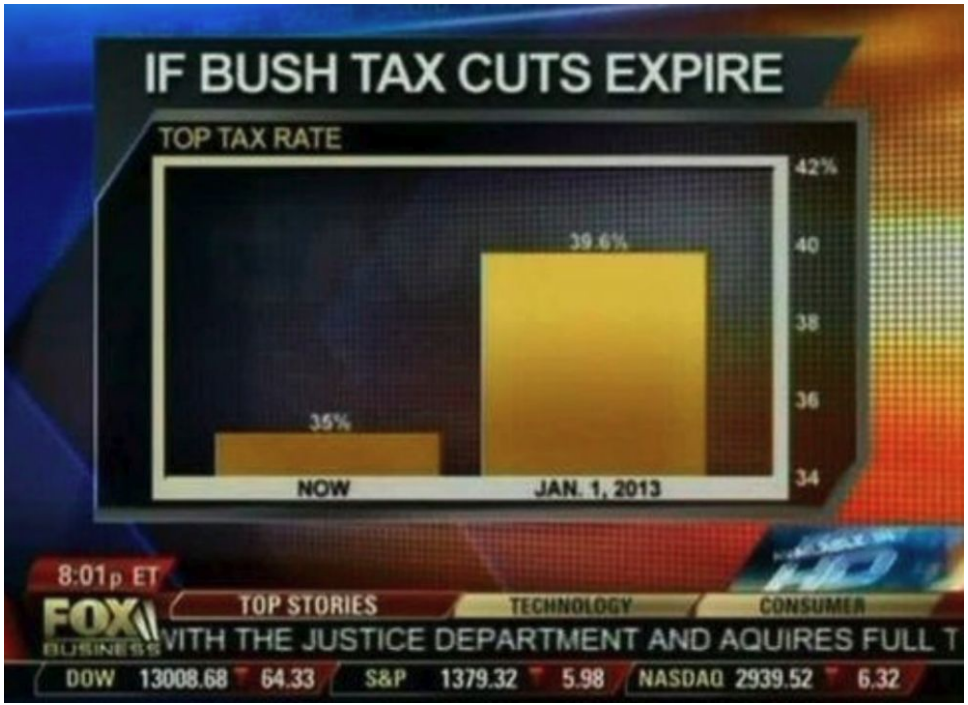
Week 9. The principles of plot design I

Reminder

There are two main options for visualizing geospatial data:

- choroplet
- cartogram

Introduction



Introduction

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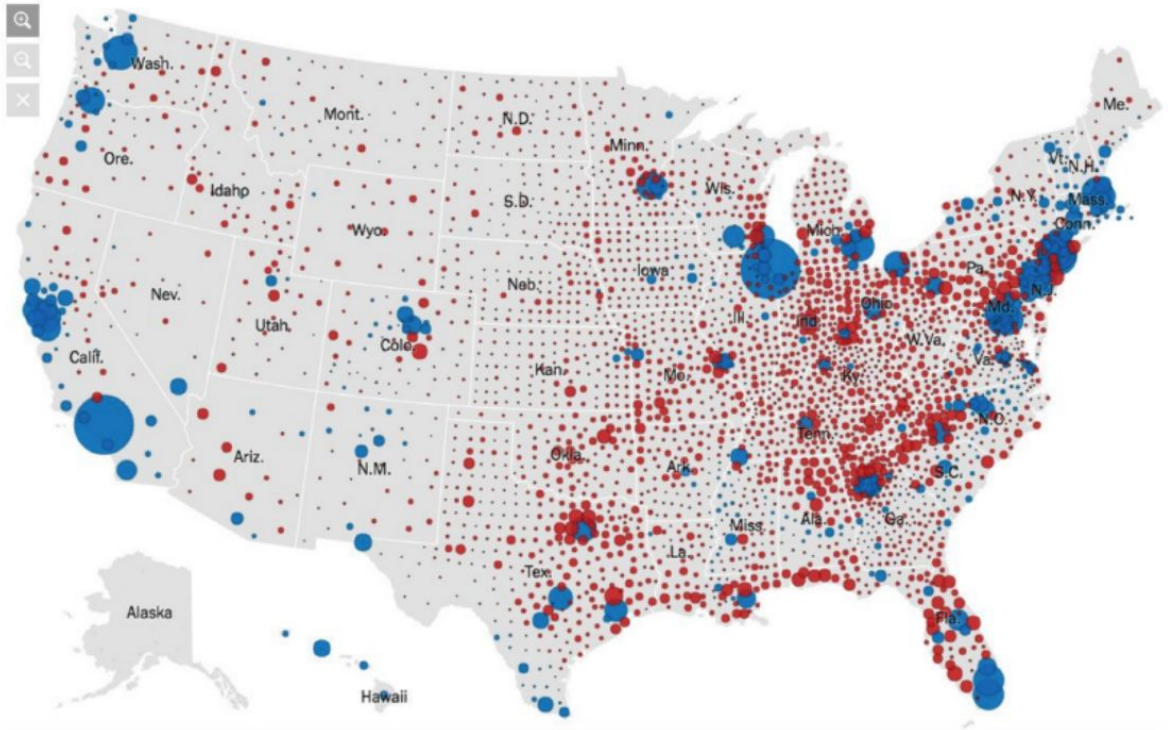

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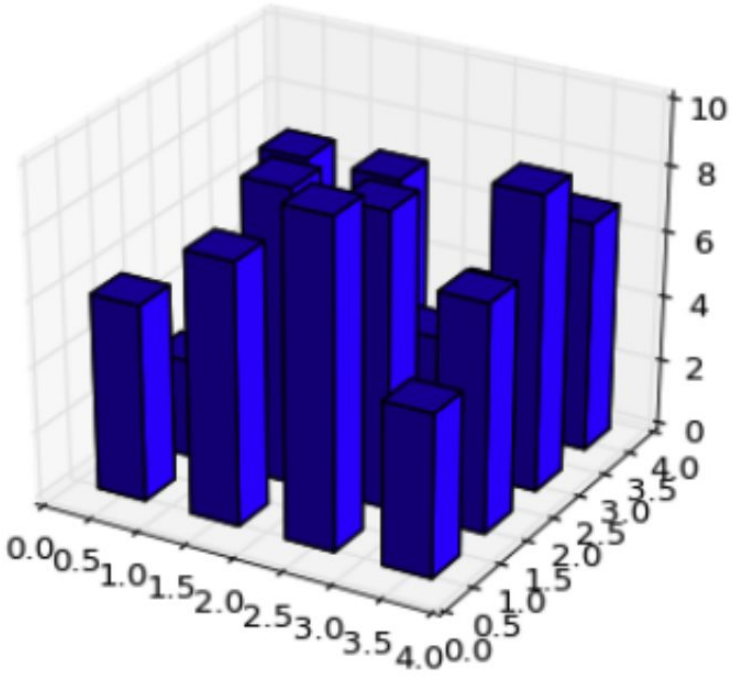
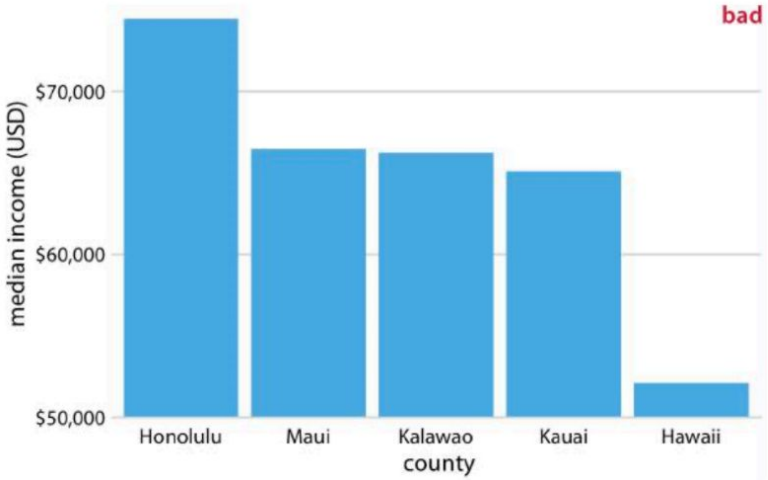
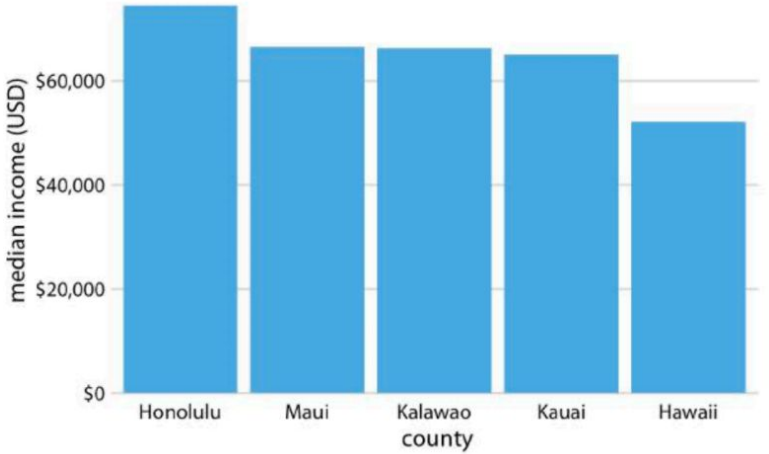


1. The principle of proportional ink

- The shaded area used to represent a numerical value should be directly proportional to the corresponding value.
- When shaded areas such as bars, rectangles, or any geometric shapes are used, perceptual issues may arise if they are inconsistent with the data value being represented. In such cases, it is crucial to ensure that there is no inconsistency.
- Examples where this principle is violated are commonly found, especially in the popular media and the financial world.

1. The principle of proportional ink





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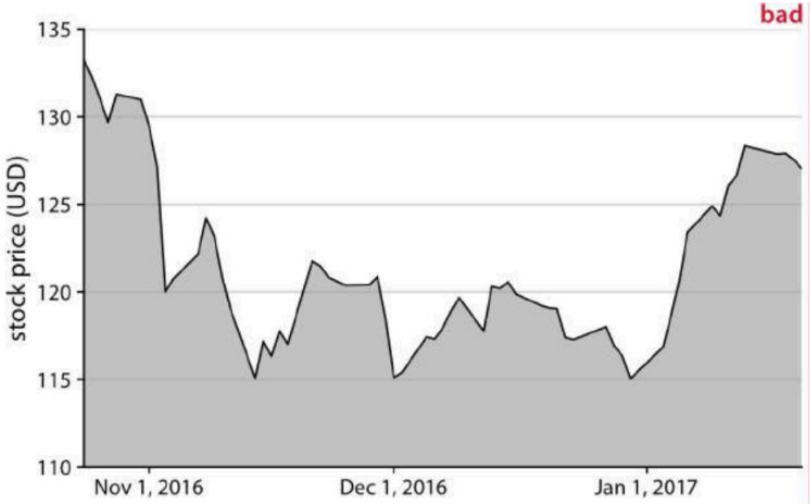

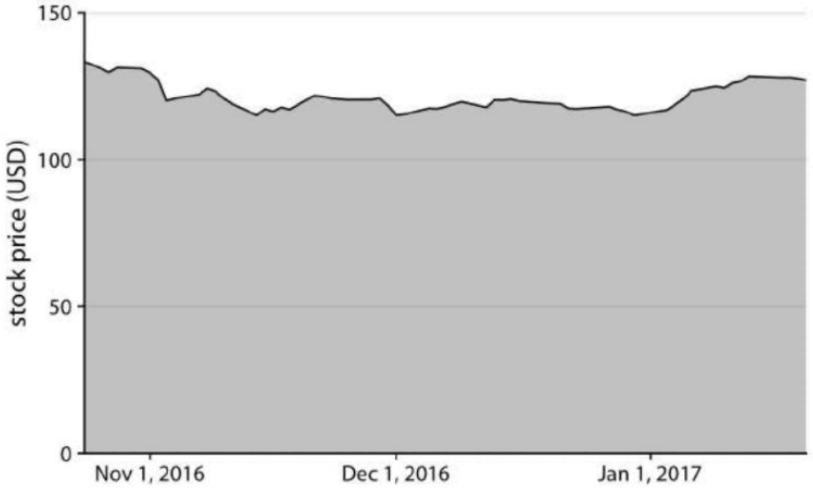

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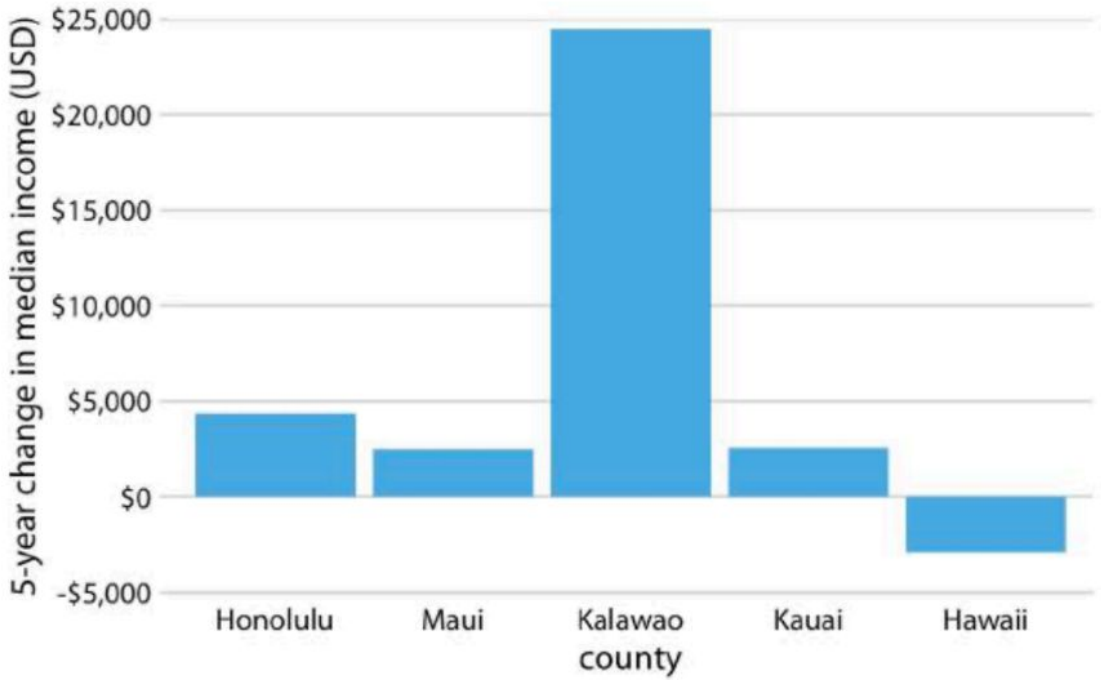

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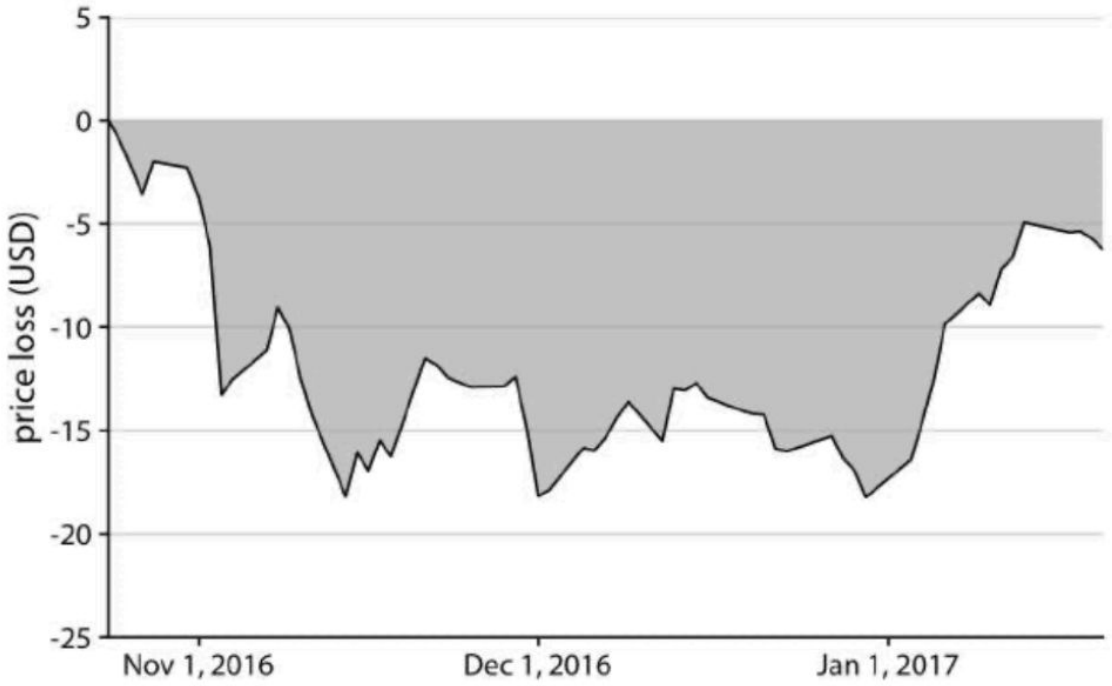
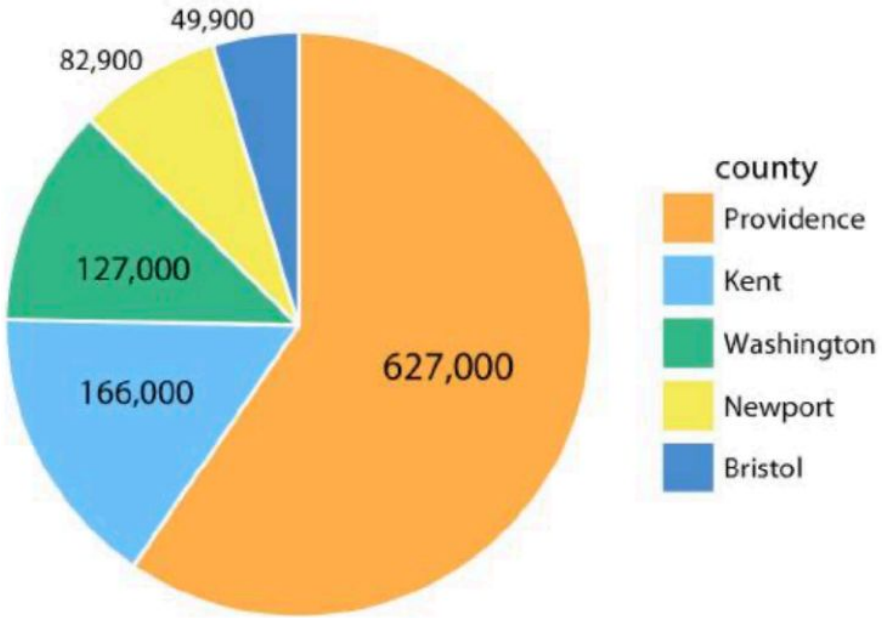


1. The principle of proportional ink

- In the previous examples, the data have been visualized on a linear axis, meaning that each observation value is coded based on both area and position along the x or y axis.
- In some visualization approaches, however, methods are used where observation values are represented primarily or directly by area, without a corresponding position mapping.

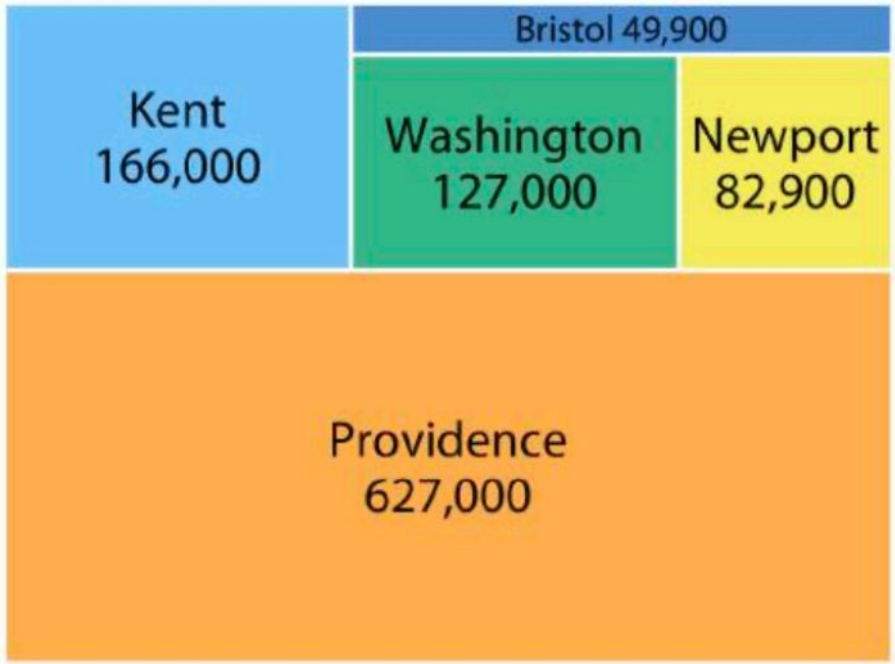
1. The principle of proportional ink

- In pie charts, the dominant visual feature noticed is the area of each slice.
- Since the area of each slice is proportional to the data values it represents, pie charts adhere to the principle of proportionality.
- However, the area in a pie chart can be perceived differently than the area in a bar chart. The main reason for this is that human perception primarily focuses on distances, not areas.



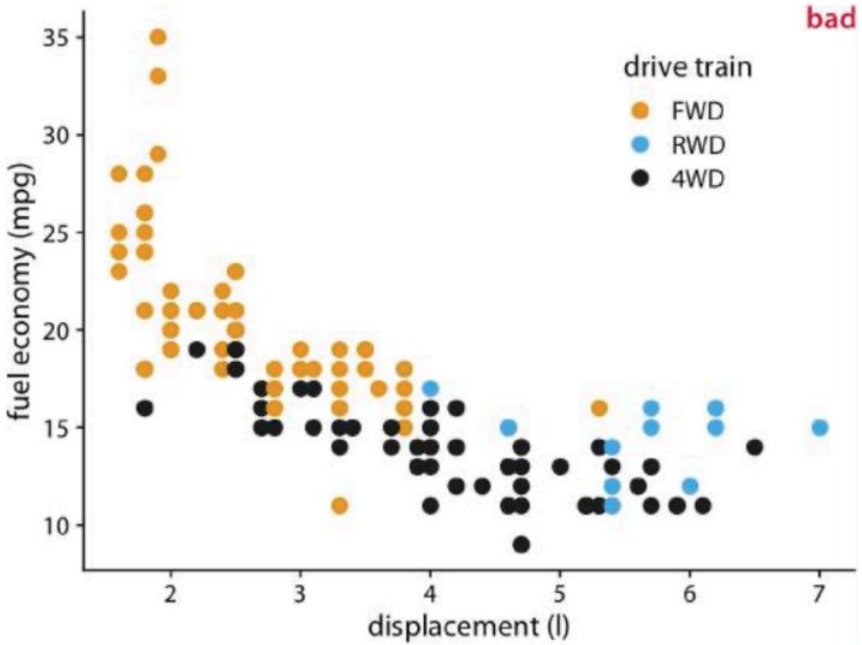
1. The principle of proportional ink

- The situation, where human perception is better at perceiving distances than areas, also arises in treemaps, which can be considered as a square version of pie charts.
- Compared to bar charts, population differences between districts are less pronounced in treemaps.



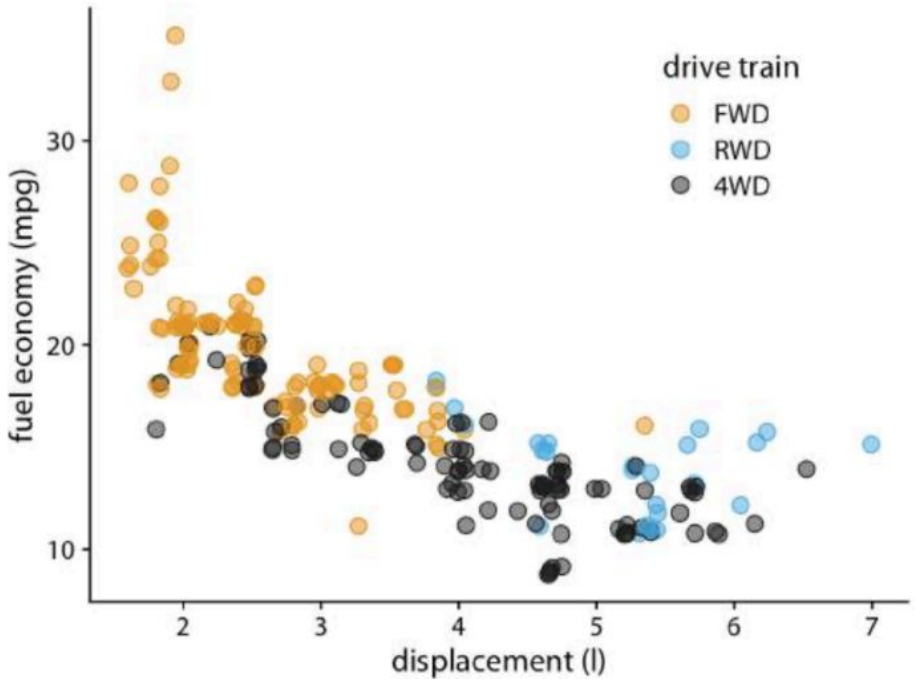
2. Overlapping points

- When visualizing the relationship between two variables in large or very large datasets, a scatter plot can be used.
- However, when many points overlap, interpreting the scatter plot becomes difficult.
- If observation values are recorded with low precision or rounded, similar issues can arise even in small datasets. In fact, observations may have exactly the same values.



2. Overlapping points

If overlapping points are made transparent, areas where points overlap will appear darker, allowing the regions with concentrated observation values to be detected more easily.



Reference

The notes and plots in the presentation are compiled from Claus O. Wilke's book, *Fundamentals of Data Visualization*.