

# Fundamentals of Data Science

Data Visualisation



# Ranking visual encodings

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- In 1985, Cleveland and McGill published in the Journal of the American Statistical Association
- 'Graphical Perception and Graphical Methods for Analyzing Scientific Data'
- They proposed basic guidelines for choosing an appropriate graphic form
- The paper lists and ranks 10 'elementary perceptual tasks'

# Cleveland & McGill (1984)

Rank of graphic properties based on human ability to understand information

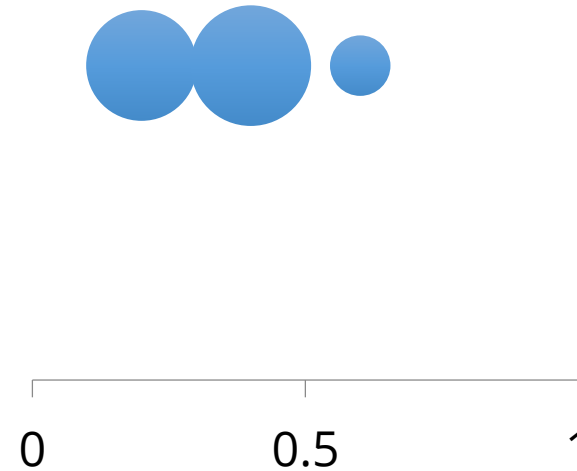
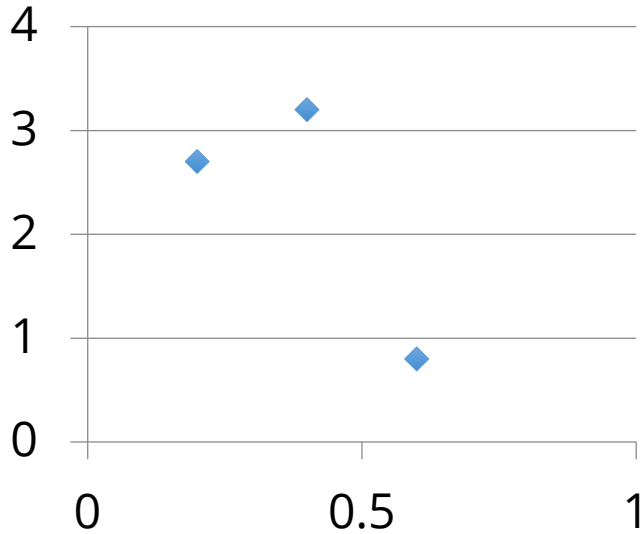
These are particularly relevant for detecting differences and making comparisons

- Position along a common scale
- Position on identical but nonaligned scales
- Length
- Angle, slope
- Area
- Volume, density, colour saturation
- Colour hue

For accurate comparisons, graphical forms from the top of this list should be used.

Cleveland, W. S., & McGill, R. (1984). Graphical perception: Theory, experimentation, and application to the development of graphical methods. *Journal of the American statistical association*, 79(387), 531-554.

# Using common scale vs area



It is easier for humans to perceive the differences the values for  $X=0.2$  and  $X=0.4$  using position along a common scale (on the scatter plot), than by using area (in the bubble chart).