STAT1012 Statistics for Life Sciences

Quick Revision Notes

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(Reference: lecture and tutorial notes)

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# I) Descriptive Statistics

Data type: Qualitative (Special: Categorical), Quantitative (Discrete, Continuous)

## Central tendency

Sample mean:

Sequential update property:

Mode: The value which has the greatest number of occurrence (may not be unique)

Median: The “middle” value, or the average of the two values closest to “middle” after sorting

Percentile: The p-th percentile () is a value such that p% of the data are less than or equal to . In particular, upper quantile = , median = , lower quantile = .

Denote the sorted data by where . This is equivalent to saying that is the smallest, is the second smallest etc.

Median: if n is odd or if n is even

Percentile: where if is not an integer.

Otherwise,

## Dispersion

Symmetric: the left hand side of the distribution mirrors the right hand side

Unimodal: the mode is unique

Skewness: measure of asymmetry

Left-skewed (negatively skewed): mean < median, have a few extreme small values

Right-skewed (positively skewed): mean > median, have a few extreme large values

Symmetric mean = median (converse not true)

Symmetric + unimodal mean = median = mode (converse not true)



Range: maximum – minimum ()

Interquartile range:

Sample variance: or

Sample standard deviation:

## Graphical methods

Bar graph: use for categorical data, show the number of observations in each category

Histogram: use for quantitative data, showing the number of observations in each range

Stem-and-leaf plot: ordered the data into a tree-like structure

Boxplot: show 5 numbers (min, Q1, median, Q3, max), help locate outliers (As a rule of thumb, some people define outliers as values > Q3 + 1.5\*IQR or < Q1 – 1.5\*IQR)