

## Lecture Outline

### Statistical Methods

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- Statistics
- Appropriateness of statistical operations
- Statistical methods

### Statistics

- Deals with samples
- Samples represent a population
- Based on probability
- Statistical parameters summarise samples
- Statistics are estimates

### Appropriate Operations

- Measurement theory
  - Lecture 9
- Measurements are made on different scales
- Permitted operations depend on scale
- Just because you can represent something as a number, doesn't mean you can perform statistical operations on those numbers!

### Mode / Median

- Mode is the most frequent value in the sample
- Applies to nominal scale and above
- Median measures central tendency
  - What the centre of the values is
- The middle of a set of ordered values
  - The mid-point of the range
- Applies to ordinal scale and above

### Mean

- Another measure of central tendency
- Average
  - Many meanings to this word
- Most common is arithmetic mean
- A value that represents the population
- Applies to interval scale and above

## Variance

- Dispersion about the mean
- How widely spread the sample is
- Deviation from expectations
- Applies to interval scale and above

## Standard Deviation

- Derived from variance
- Also describes spread of a sample
- Applies to interval scales and above
- Coefficient of variation
  - Derived from standard deviation
  - Applicable to ratio scales and above

## Histogram

- Displays distribution of values
  - frequencies
- Divides range into regular 'bins'
- Count examples that fall into each bin
- Plotted as a bar chart
- Can be done with ordinal or above

## Normal Distributions

- AKA Gaussian
- Many statistical tests assume a normal distribution
- Normal distributions are
  - Continuous
  - Symmetrical
  - Bell-shaped
- Standard deviation

## Summary

- Statistics summarise populations
- Statistics deal with samples
- Statistics should be appropriate for the scale of measurements
- Different statistical measures tell us different things about the sample