CH 1 What is Stats

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0.1 Statistics Terminology

0.1.1 Stats Def

"The objective of statistics is to make an inference about a population based on information contained in a simple form that population and to provide an associated measure of goodness for the inference."

0.1.2 Stats Goal

1. Identify population of interest (who studying).
2. inferential objective (what want to know).
3. How to collect data

0.2 Graphical Methods

For Graphs: points of subdivision should be chosen so that measurements cannot be on the point of division. 5-20 intervals is good.

we should learn py while reading these next few textbooks. true.

We use Numerical Descriptive Measures to describe data. There are measures of central tendency and measures of variation.

0.3 Numerical Methods

0.3.1 Mean

$$\bar{y} = \frac{1}{n} \sum_{i=1}^{n} y_i \tag{1}$$

where $\bar{y}$ is a mean of a sample n. The populatio mean is μ

0.3.2 Variance

Variance: sum of square of differences between measurements and mean over (n-1)

$$s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(y_i - \bar{y})^2 \tag{2}$$

0.3.3 Standard Deviation

SD is the positive 2root of variance:

$$s = \sqrt{s^2} \tag{3}$$

the corresponding population SD is denoted by: $\sigma = \sqrt{\sigma^2}$
used for a single set of measurements

0.3.4 Empirical Rule

For a dist of measurements that is approx normal, it follows that the interval with end points: $\mu \pm \sigma$ contains 68% of measurements
$\mu \pm 2\sigma$ contains 95% of measurements
$\mu = 3\sigma$ contains almost all of the measurements

0.4 Inferences

Assumptions cannot be definite from small fractions of a population
Probabilists assume they know the structure of the PoI and use theory to compute.
Staticians use sample then probability.