

Statistics

Lecture 2



Feb 19-8:47 AM

What is statistics?

It is about collecting information (data), organize them, graph them, do certain calculations and draw conclusion with some degree of confidence.

Two Branches:

1) Descriptive

Collect data, graph, organize, do calculations.

2) Inferential

Draw conclusion from our collected data with some level of confidence.

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Data must be collected randomly
 ↳ Sample (Randomly selected)

Entire field of interest → Population
 (All, Every)

Anything that describes Sample → Statistic
 " " " Population → Parameter

The average age of 10 randomly selected nurses was 35 Yrs. Statistic

The median income for all teachers in LAUSD is \$65,000/Yr. ↑
 ↳ Parameter

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Data {

- 1) Qualitative
(Non-Numerical)
- 2) Quantitative
(Numerical) {
 - 1) Discrete
(Countable)
 - 2) Continuous
(Measurable)

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Level of Measurements:

- 1) Nominal
 - Mike, Mary, Moe
 - Red, white, Blue
 - Poor, Rich
 - Small, Med., Large
- 2) Ordinal
 - Small, Med., Large
 - Zip codes, shirt size
 - 4, 6, 8, 10, ...
- 3) Ratio
 - Small drink 10oz
 - Large drink 20oz
- 4) Interval (Range of values)
 - 90% - 100% → A
 - Commute drive 30 min to 45 mins

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Methods of collecting data:

Sampling

- 1) Systematic: Every kth item selected.
Select every 5th item for inspection.
- 2) Stratified: Divide into groups.
Select few from each group

CSULA, Randomly selected

- 75 Fresh.,
- 100 Soph.,
- 80 Jr.,
- 40 Sr., and
- 50 Graduate students

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3) cluster : Divide into groups
Select few groups
Ask every member of
Selected groups to participate
in a survey.

College offers 2000 sections of classes
this semester. Random select 200 classes
and ask all students in these sections
to complete a survey.

4) Random / Convenience Least reliable
method

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Experiment vs observation

There are changes
or not due to
Some action.

You notice changes
without any action
taken

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Consider the Sample below

1, 2, 2, 5, 8

1) Sample Size $n=5$

2) Range = Max - Min = $8 - 1 = 7$

3) Midrange = $\frac{\text{Max} + \text{Min}}{2} = \frac{8+1}{2} = 4.5$

4) Mode = 2

5) $\sum x = 1 + 2 + 2 + 5 + 8 = 18$
Summation of x

6) $\sum x^2 = 1^2 + 2^2 + 2^2 + 5^2 + 8^2 = 98$
 $= 1 + 4 + 4 + 25 + 64$

7) Compute $\frac{n \sum x^2 - (\sum x)^2}{n(n-1)} = \frac{5 \cdot 98 - 18^2}{5(5-1)}$
 $= \frac{490 - 324}{5 \cdot 4} = \frac{166}{20} = 8.3$

Round up $\rightarrow 9$

Round to a whole # $\rightarrow 8$

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Sample has a minimum of 15 and maximum of 85.

1) Range = Max - Min = $85 - 15 = 70$

2) Midrange = $\frac{\text{Max} + \text{Min}}{2} = \frac{85 + 15}{2} = 50$

3) Divide range by 3 if decimal \rightarrow Round up

$\frac{\text{Range}}{3} = \frac{70}{3} = 23.\bar{3}$ if whole \rightarrow Add 1
24

4) Divide range by 5 if decimal \rightarrow Round up
if whole \rightarrow Add 1

$\frac{\text{Range}}{5} = \frac{70}{5} = 14$

15

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