Semester 4 Subject Statistics for AIDS Academic Year 2023 2024

MODULE 3: STATISTICAL EXPERIMENTS AND SIGNIFICANCE TESTING

A/B TESTING:

An A/B Test is an experiment with two groups to establish which of two treatments, products, procedures, or like is superior.

Treatment:
Something (drug, price, web headline) to which a subject is exposed.

Treatment group:
A group of subjects exposed to a specific treatment

Subject: Subject in the experiment is the web visitor

Outcome: The measuring are clicks, purchases, visit duration, number of pages visited, whether a particular page is visited etc.

Examples:
A/B tests are common in web design and marketing, since results are so readily measured. Some examples of A/B include:

* Testing two soil treatments to determine which produces better seed germination.
* Testing two prices to determine which yields more net profit.
* Testing two web headlines to determine which produces more clicks.

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Consider the example of the below website:

statistics.com Analytics for DataScience Online certificate program

→ Type 1.

statistics.com Analytics for DataScience. Certificate Online

→ Type 2.

The owner of the website creates both the web pages and parallely releases both websites. They are under test for 10 days. Based on number of clicks, views per page, revenue generated the design of the website will be selected.

The most common metric to compare group A to group B in data science is a binary variable : click or no-click, buy or dont buy and so on. Those results would be summed up in a 2x2 table.

Example:

Table for ecommerce experiment results

Outcome	Price A	Price B
Conversion	200	182
No Conversion	23,539	22,406.

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If one were ~~not~~ interested not in conversion, but in revenue per pageview, the results of the above table might look like this in typical default software output.

Revenue/page-view with price A = 3.87, SD = 51.10
Revenue/page-view with price B = 4.11, SD = 62.98

SD refers to the standard deviation of the values within each group.

HYPOTHESIS TESTING:

Hypothesis testing is a statistical method used to determine if there is enough evidence in a sample data to draw conclusions about a population. It involves formulating two competing hypothesis,

* The null hypothesis (Ho)
* The Alternative hypothesis (H1)

NULL HYPOTHESIS (Ho):

A null hypothesis is a statement in which there is no relation between two variables.

* Researchers try to reject or disprove it.
* The testing process is always Indirect and Implicit.
* Null hypothesis is rejected if the p-value is less than the alpha-value; otherwise it is rejected.