Significance Testing: Takeaways ⤴

Syntax

- Visualizing a sampling distribution:

```python
mean_differences = []

for i in range(1000):

    group_a = []

    group_b = []

    for value in all_values:

        assignment_chance = np.random.rand()

        if assignment_chance >= 0.5:

            group_a.append(value)

        else:

            group_b.append(value)

        iteration_mean_difference = np.mean(group_b) - np.mean(group_a)

        mean_differences.append(iteration_mean_difference)

    plt.hist(mean_differences)

    plt.show()
```

Concepts

- A hypothesis is a pattern or rule that can be tested. We use hypothesis testing to determine if a change we made had a meaningful impact.

  - A null hypothesis describes what is happening currently.

  - While we use an alternative hypothesis to compare with the null hypothesis to decide which describes the data better.

- In a blind experiment, none of the participants knows which group they're in. Blind experiments help reduce potential bias.

- If there is a meaningful difference in the results, we say the result is statistically significant.
- A test statistic is a numerical value that summarizes the data; we can use it in statistical formulas.
- The permutation test is a statistical test that involves simulating rerunning the study many times and recalculating the test statistic for each iteration.
- A sampling distribution approximates the full range of possible test statistics under the null hypothesis.
- A p-value can be considered to be a measurement of how unusual an observed event is. The lower the p-value, the more unusual the event is.
- Whether we reject or fail to reject the null hypothesis or alternative hypothesis depends on the p-value threshold, which should be set before conducting the experiment.
- The most common p-value threshold is `0.05` or `5%`. The p-value threshold can affect the conclusion you reach.

Resources

- [What P-Value Tells You](#)
- [Difference Between A/B Testing and Hypothesis Testing](#)
- [Type I and Type II Errors](#)