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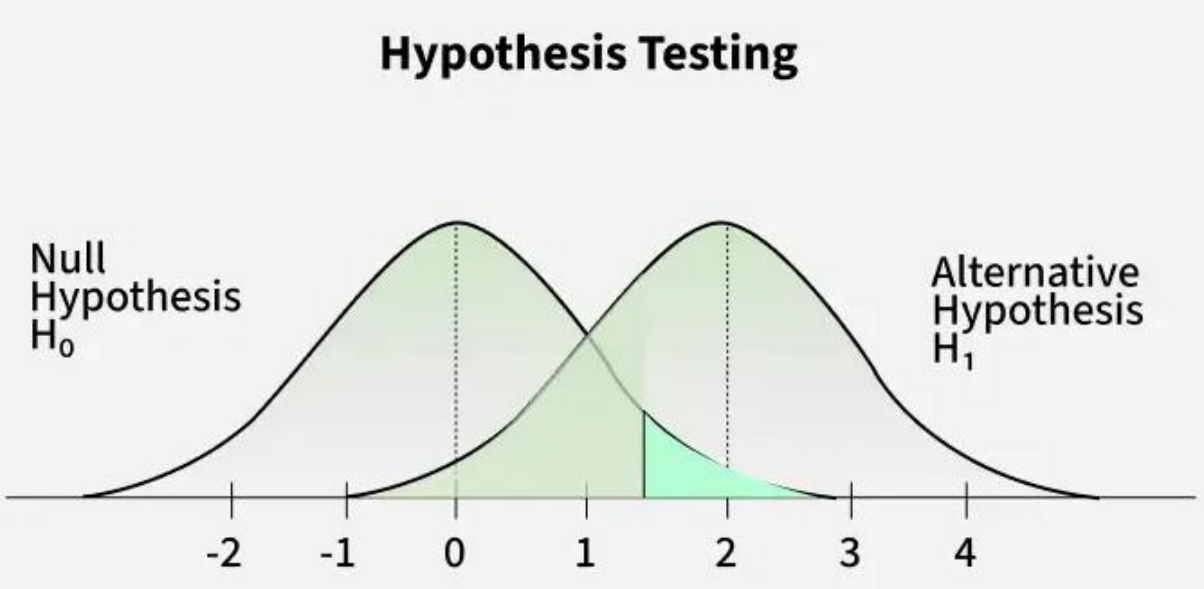
Hypothesis Testing

Hypothesis testing compares two opposite ideas about a group of people or things and uses data from a small part of that group (a sample) to decide which idea is more likely true. We collect and study the sample data to check if the claim is correct.



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For example, if a company says its website gets 50 visitors each day on average, we use hypothesis testing to look at past visitor data and see if this claim is true or if the actual number is different.

Defining Hypotheses

- **Null Hypothesis (H_0):** The starting assumption. For example, "The average visits are 50."
- **Alternative Hypothesis (H_1):** The opposite, saying there is a difference. For example, "The average visits are not 50."

Key Terms of Hypothesis Testing

To understand the Hypothesis testing firstly we need to understand the key terms which are given below:

- **Significance Level (α):** How sure we want to be before saying the claim is false. Usually, we choose 0.05 (5%).
- **p-value:** The chance of seeing the data if the null hypothesis is true. If this is less than α, we say the claim is probably false.
- **Test Statistic:** A number that helps us decide if the data supports or rejects the claim.
- **Critical Value:** The cutoff point to compare with the test statistic.
- **Degrees of freedom:** A number that depends on the data size and helps find the critical value.