Statistics

Hypothesis Testing

What is Hypothesis?

An idea or explanation of something that is based on a few known facts but that has not yet been proved to be true or correct.

-- Oxford Dictionary

What is Hypothesis?

Testing a known assumption that is generally accepted as the truth.

Testing a claim that is supposed to change the current facts.

Null Vs Alternate Hypothesis

H_0

- There is no change from the stated facts.
- Chocolate bars weigh 100 gms or more

$=$

$\leq$

$\geq$

H_a

- The stated facts are incorrect
- Chocolate bars weigh less than 100 gms

$\neq$

$<$

$>$

Statistical Significance

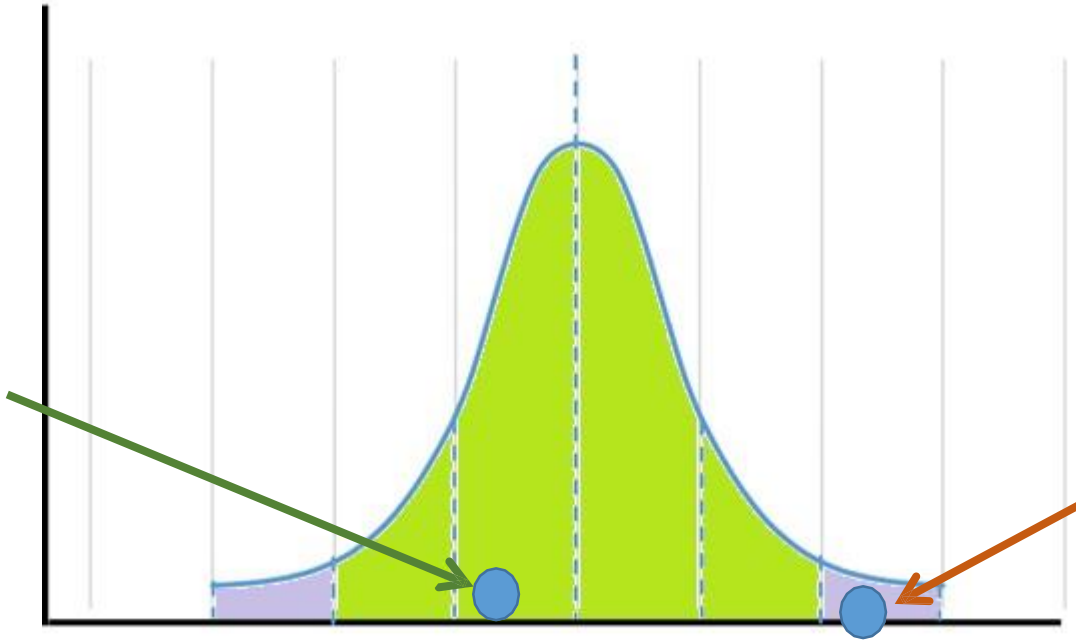
Statistical Significance

H_0

We expect this to happen.

It happened.

Nothing changes.
Null Hypothesis is true.
Status quo remains.



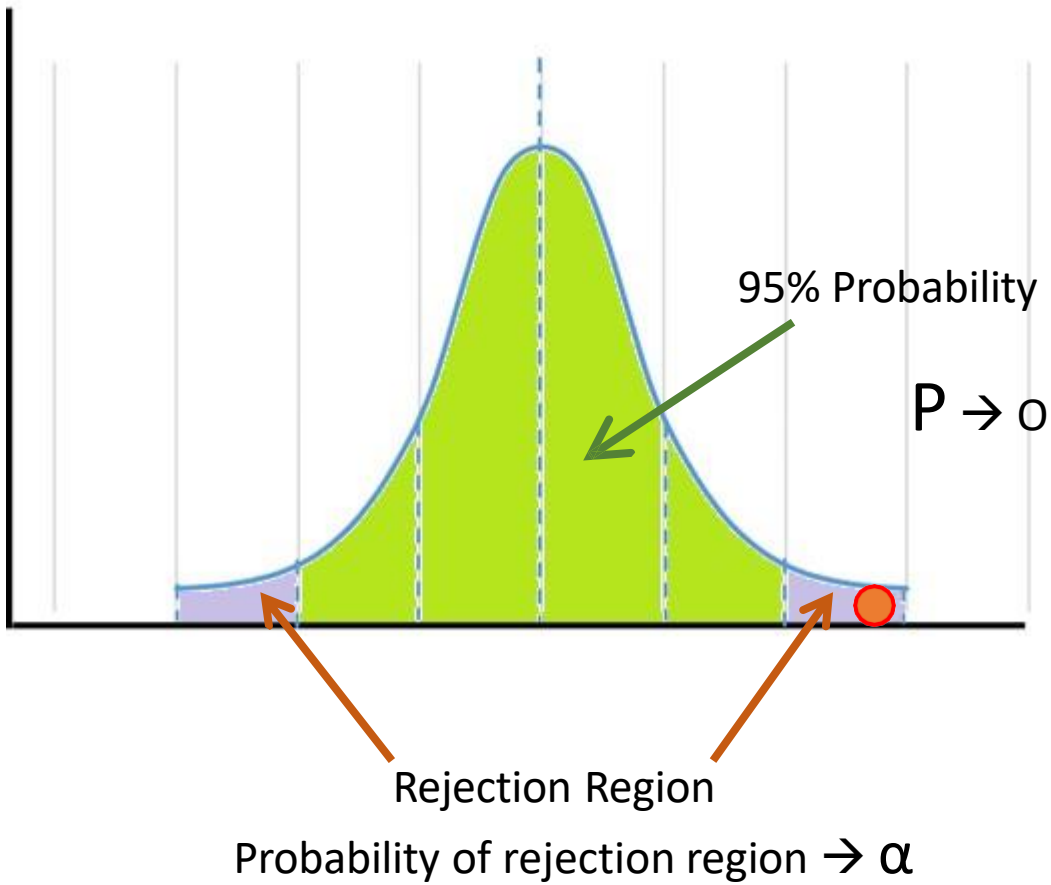
H_a

We don't expect this.

Still it happened.

Null Hypothesis rejected.
Status quo or claim is rejected

Important terms – Statistical Significance



P → Observed or seen Probability of the sample

$P < \alpha$

Reject Null Hypothesis

Hypothesis Testing

Current average waiting period for the customers who call the customer service helpline is 100 seconds with a standard deviation of 20 seconds. Certain changes were recently done to the IVR menu options as well as the overall customer service processes. After a week, the management picked-up a sample of 100 calls and found that the average waiting period was 95 seconds. Have the process implementations resulted in the waiting period reduction?

H_0 : null hypothesis : There is no change in the waiting period.

H_a : alternate hypothesis : The waiting period has reduced.

Significance Level; **α = 0.05 or 5%**

1. State Population parameters and Sample statistics

μ = 100; σ = 20; N = 100; $\bar{X}$ = 95;

2. Compute Sample Standard Deviation and Z-Value

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} \qquad Z = \frac{\bar{x} - \mu}{\sigma_{\bar{x}}}$$

3. Compute ρ using Z-Score for the Z-value

ρ = 0.62%

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