

Expt No-13

Date: 13-10-25

## Hypothetical using T-Test

Objective: To test whether the average IQ score of a sample of students differs significantly from a population mean IQ score of 100.

### Procedure:

1. Null Hypothesis ( $H_0$ ): The average IQ score of the sample is 100.
2. Alternative Hypothesis ( $H_1$ ): The average IQ score of the sample is not 100.
3. Sample: Measure the IQ scores of 25 randomly selected students.
4. T-Test: Conduct a one-sample T-Test to compare sample mean to 100.
5. Decision Rule: Use a significance level of  $\alpha = 0.05$ .

Program:

```
import numpy as np
import scipy.stats as stats
np.random.seed(42)

sample_size = 25
sample_data = np.random.normal(loc=102, scale=
    15, size=sample_size)

population_mean = 100

sample_mean = np.mean(sample_data)
sample_std = np.std(sample_data, ddof=1)
n = len(sample_data)

t_statistic, p_value = stats.ttest_1samp(sample_data,
    population_mean)

print(f"Sample Mean: {sample_mean:.2f}")
print(f"T-Statistic: {t_statistic:.4f}")
print(f"P-Value: {p_value:.4f}")

alpha = 0.05

if p_value < alpha:
    print("Reject the null hypothesis: The average
    Ia score is significantly different from 100.")
else:
    print("Fail to reject the null hypothesis:
    There is no significant difference in average Ia
    score from 100.")
```

Output:

Sample Mean : 99.55

T-Statistic : -0.1577

P-Value : 0.8766

Fail to ~~reject~~ reject the null hypothesis : There is no significant difference in average IQ score from

Test for A prior distribution

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### Result :

The calculated T-statistic is  $-0.1377$  with a p-value of  $0.8760$ . Since the p-value  $> 0.05$ , we fail to reject the null hypothesis. Thus there is no significant difference.