

Task 6: Probability and Statistical Testing

Objective

Study probability distributions and hypothesis testing methods such as **t-test** and **chi-squared test**.

Understand statistical inference and confidence intervals using **SciPy** and **NumPy**.

Implementation

- Generate random samples from **normal** and **Poisson** distributions.
 - Perform **t-tests** to compare group means.
 - Conduct a **chi-squared test** for categorical variables.
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Python Code

```
import numpy as np
from scipy import stats
# Generate sample data
group1 = np.random.normal(50, 5, 30)
group2 = np.random.normal(52, 5, 30)
# Perform t-test
t_stat, p_value = stats.ttest_ind(group1, group2)
print("T-statistic:", t_stat)
print("P-value:", p_value)
# Chi-squared test
observed = np.array([[10, 20], [20, 15]])
chi2, p, dof, exp = stats.chi2_contingency(observed)
print("Chi-square:", chi2)
```

Client Project

Perform hypothesis testing to compare two business strategies and report which one performs better