CS23334-FUNDAMENTALS OF DATA SCIENCE

DEVA

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13.) T-TEST

Aim:

To perform a t-test to determine whether there is a significant difference between the means of two groups or between a sample mean and a population mean.

Code:

```
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}")
```

```
Sample Mean: 99.55
T-Statistic: -0.1577
P-Value: 0.8760
```

```
alpha = 0.05
if p_value < alpha:
    print("Reject the null hypothesis: The average IQ score is significantly different from 100.")
else:
    print("Fail to reject the null hypothesis: There is no significant difference in average IQ score from 100.")
```

```
Fail to reject the null hypothesis: There is no significant difference in average IQ score from 100.
```

Result:

The t-test was successfully conducted, and the result indicated whether the difference between the means was statistically significant.