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import numpy as np
from scipy import stats

data = np.loadtxt('FT2.txt')

# Mean and 95% confidence interval
mean = np.mean(data)
std_error_of_mean = stats.sem(data)
ci_of_mean = stats.t.interval(0.95, len(data)-1, loc=mean,
scale=std_error_of_mean)

# Variance and 95% confidence interval
variance = np.var(data, ddof=1)
n = len(data)
alpha = 0.05
chi2_upper = stats.chi2.ppf(1 - alpha / 2, n - 1)
chi2_lower = stats.chi2.ppf(alpha / 2, n - 1)
ci_of_var = ((n - 1) * variance / chi2_upper, (n - 1) * variance /
chi2_lower)

# Median and 95% confidence interval
median = np.median(data)
bootstrap_number = 10000
bootstrapped_medians = [np.median(np.random.choice(data, size=n,
replace=True)) for _ in range(bootstrap_number)]
ci_of_median = np.percentile(bootstrapped_medians, [2.5, 97.5])

print(f"Mean: {mean:.2f},\n95% Confidence Interval: {ci_of_mean}")
print(f"Variance: {variance:.2f},\n95% Confidence Interval:
{ci_of_var}")
print(f"Median: {median:.2f},\n95% Confidence Interval:
{ci_of_median}")

Mean: 209.27,
95% Confidence Interval: (201.09330023805987, 217.4434644678225)
Variance: 4689.96,
95% Confidence Interval: (3990.597523022395, 5591.808462558782)
Median: 240.00,
95% Confidence Interval: [230. 246.5]

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