

EXPERIMENT-11

Random Sampling and Sampling Distribution

Aim:

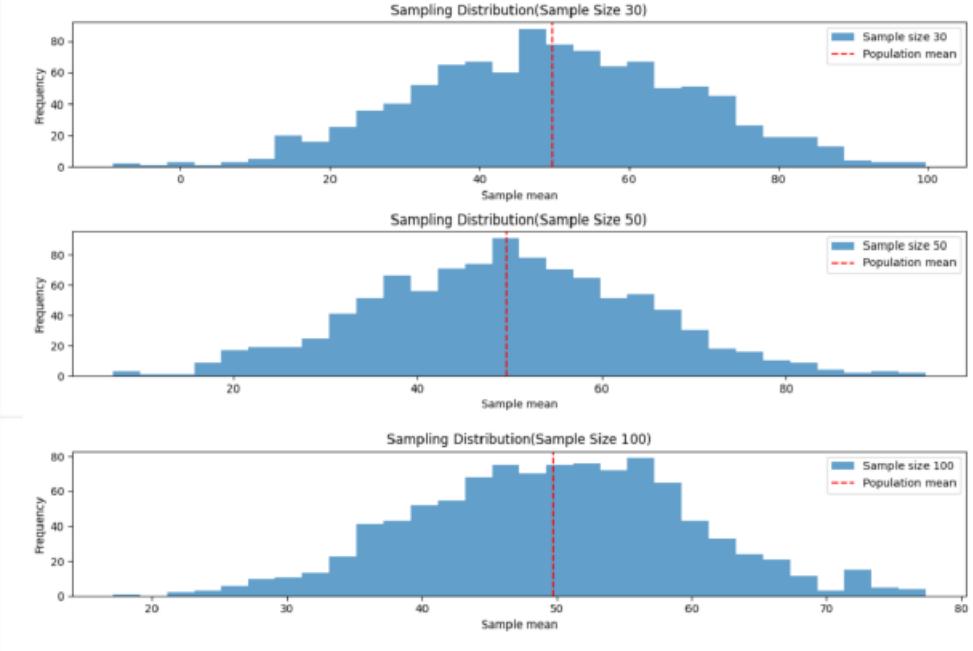
To explore random sampling from population and understand the concept of sampling distribution

Procedure:

- Create a population of data with specified distribution
- Perform random sampling from population to create multiple sample of different sizes
- Compute sample statistics
- Plot histograms or density plots of each statistics
- Compare the sampling distribution of the sample statistic of the sample statistic with mean distribution

Program:

```
| 1 ❶ import numpy as np
| 1 import matplotlib.pyplot as plt
| 1 mean=50
| 1 std=100
| 1 size=100000
| 1 population=np.random.normal(mean,std,size)
| 1 sample=[30,50,100]
| 1 num=1000
| 1 sample_means={}
| 1 for i in sample:
| 1     sample_means[i]=[]
| 1     for j in range(num):
| 1         samp=np.random.choice(population,size=i,replace=False)
| 1         sample_means[i].append(np.mean(samp))
| 1 plt.figure(figsize=(12,8))
| 1 for i,j in enumerate(sample):
| 1     plt.subplot(len(sample),1,i+1)
| 1     plt.hist(sample_means[j],bins=30,alpha=0.7,label=f'Sample size {j}')
| 1     plt.axvline(np.mean(population),color='red',linestyle='dashed',linewidth=1.5,label='Population mean')
| 1     plt.title(f'Sampling Distribution(Sample Size {j})')
| 1     plt.xlabel('Sample mean')
| 1     plt.ylabel('Frequency')
| 1     plt.legend()
| 1
| 1 plt.tight_layout()
| 1 plt.show()
```



Result:

Thus the python program for random sampling and sampling distribution is executed and output is verified successfully