```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

df = pd.read_csv('iris.csv')

print(f"Number of Rows: {df.shape[0]}")
print(f"Number of Columns: {df.shape[1]}")


print("\nDataset Info:")
print(df.info())


print("\nDescriptive Statistics:")
print(df.describe())


print("\nMissing Values in Each Column:")
print(df.isnull().sum())

print("\nSpecies Value Counts:")
print(df['species'].value_counts())


# Histograms
df.hist(figsize=(10, 8), bins=20, color='skyblue', edgecolor='black')
plt.suptitle("Histogram of Iris Features")
plt.show()

# Line Plot
plt.figure(figsize=(10, 6))
for col in df.columns[:-1]:
    plt.plot(df.index, df[col], label=col)
plt.title("Line Plot of Features")
plt.xlabel("Index")
plt.ylabel("Values")
plt.legend()
plt.show()

# Bar Plot
avg_features = df.groupby('species').mean()
avg_features.plot(kind='bar', figsize=(10, 6))
plt.title("Average Feature Values by Species")
plt.ylabel("Mean Value")
plt.xticks(rotation=0)
plt.show()

# Count Plot
plt.figure(figsize=(8,5))
sns.countplot(x='species', data=df)
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```
plt.title("Count of Samples by Species")
plt.show()


# Violin Plot
plt.figure(figsize=(10,6))
sns.violinplot(x='species', y='sepal_length', data=df)
plt.title("Violin Plot of Sepal Length by Species")
plt.show()

# Scatter Plot
plt.figure(figsize=(8,6))
sns.scatterplot(x='sepal_length', y='petal_length', hue='species',
data=df)
plt.title("Scatter Plot: Sepal Length vs Petal Length")
plt.show()

#  Heatmap
plt.figure(figsize=(8,6))
sns.heatmap(df.iloc[:, :-1].corr(), annot=True, cmap='coolwarm')
plt.title("Feature Correlation Heatmap")
plt.show()

#  Pie Chart
species_counts = df['species'].value_counts()
plt.figure(figsize=(6,6))
plt.pie(species_counts, labels=species_counts.index, autopct='%1.1f%
%', startangle=140)
plt.title("Species Distribution")
plt.show()

#  Boxplots
plt.figure(figsize=(12, 8))
for i, col in enumerate(df.columns[:-1], 1):
    plt.subplot(2, 2, i)
    sns.boxplot(x='species', y=col, data=df)
    plt.title(f"{col} by Species")
plt.tight_layout()
plt.show()


Number of Rows: 150
Number of Columns: 5

Dataset Info:
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column        Non-Null Count  Dtype
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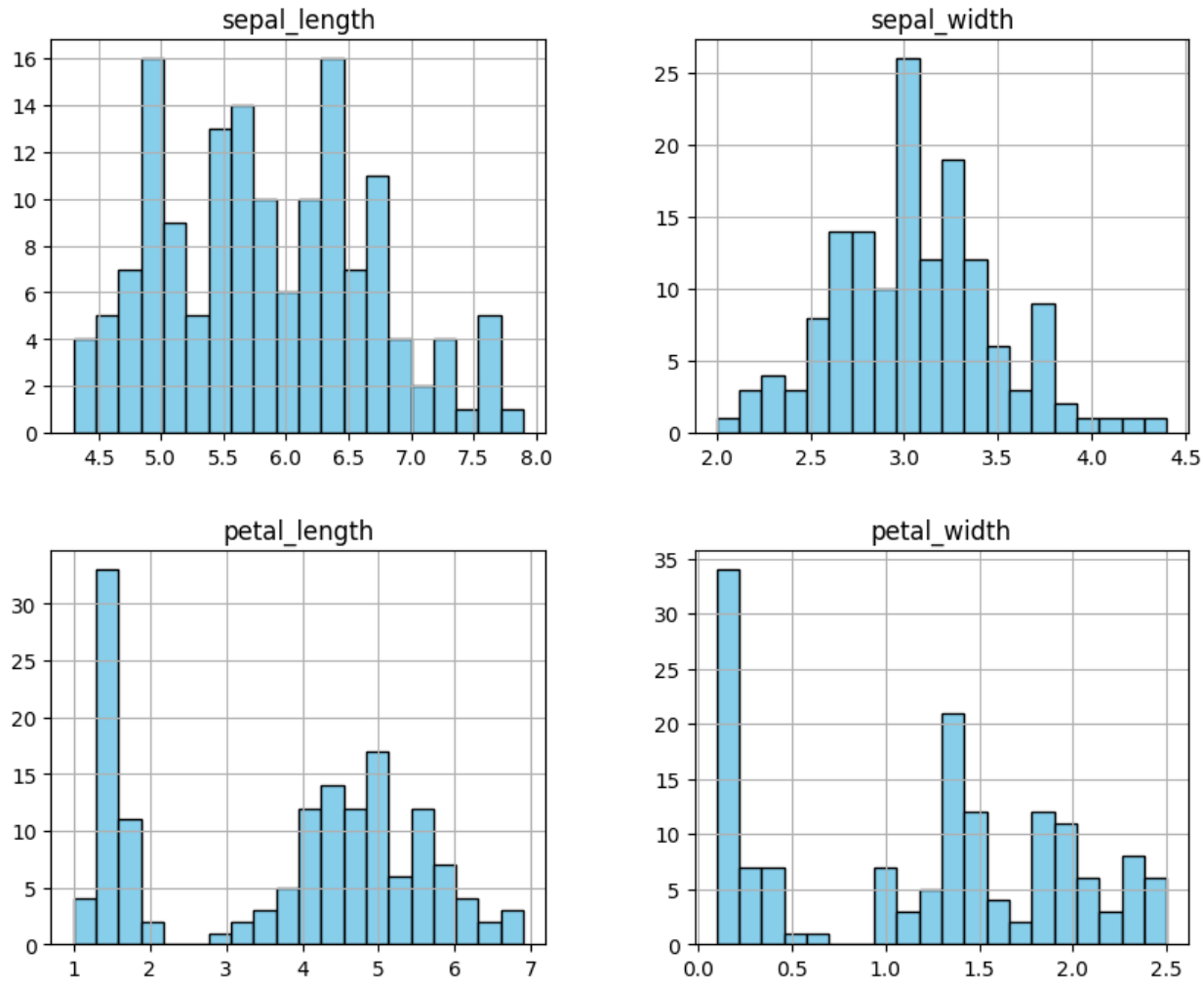
```

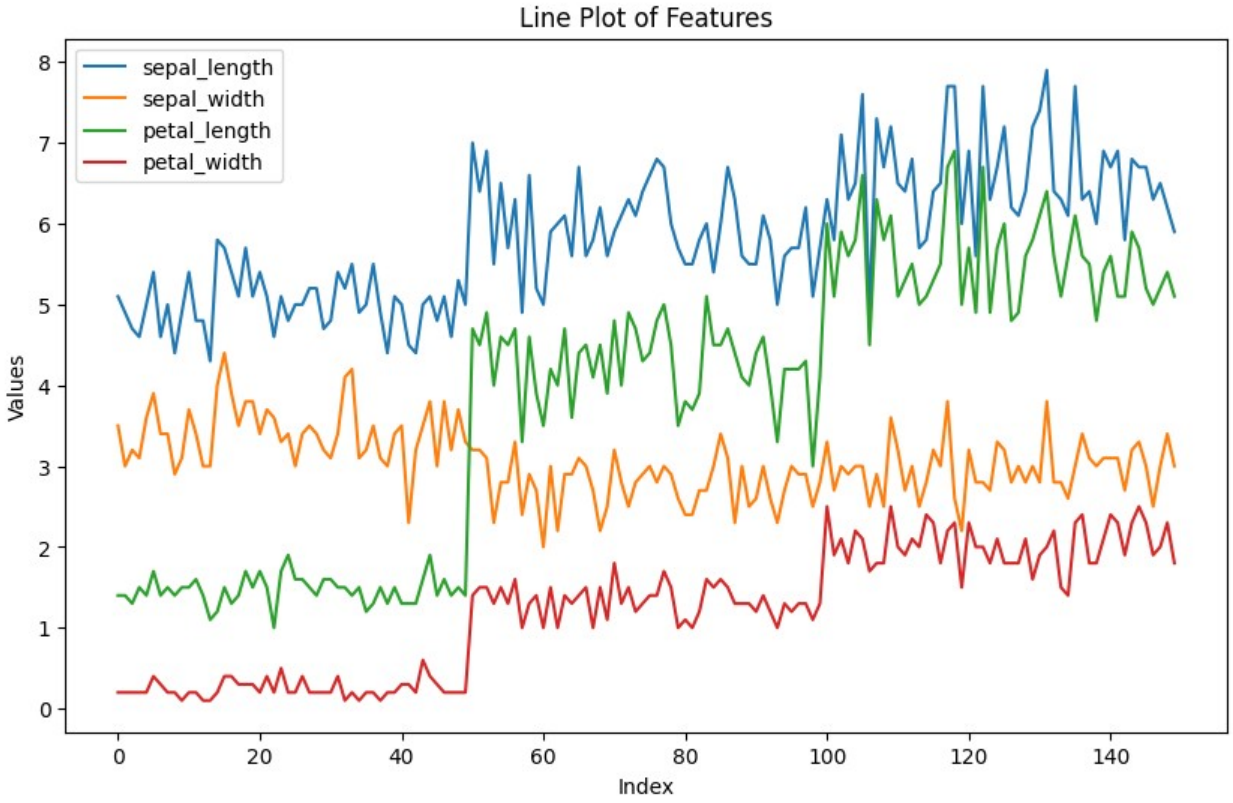
```
 0   sepal_length  150 non-null    float64
 1   sepal_width   150 non-null    float64
 2   petal_length  150 non-null    float64
 3   petal_width   150 non-null    float64
 4   species       150 non-null    object
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
None

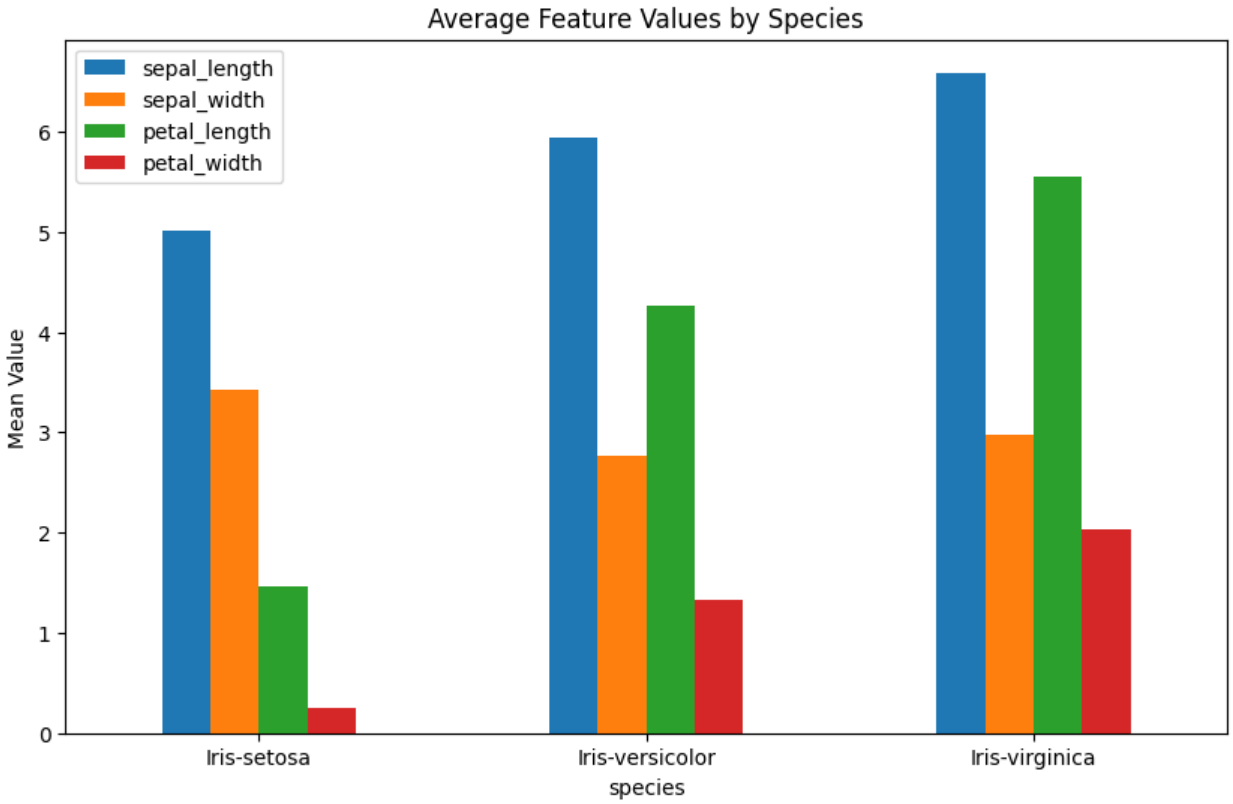
Descriptive Statistics:
       sepal_length  sepal_width  petal_length  petal_width
count    150.000000   150.000000    150.000000   150.000000
mean       5.843333     3.054000      3.758667     1.198667
std        0.828066     0.433594      1.764420     0.763161
min        4.300000     2.000000      1.000000     0.100000
25%        5.100000     2.800000      1.600000     0.300000
50%        5.800000     3.000000      4.350000     1.300000
75%        6.400000     3.300000      5.100000     1.800000
max        7.900000     4.400000      6.900000     2.500000

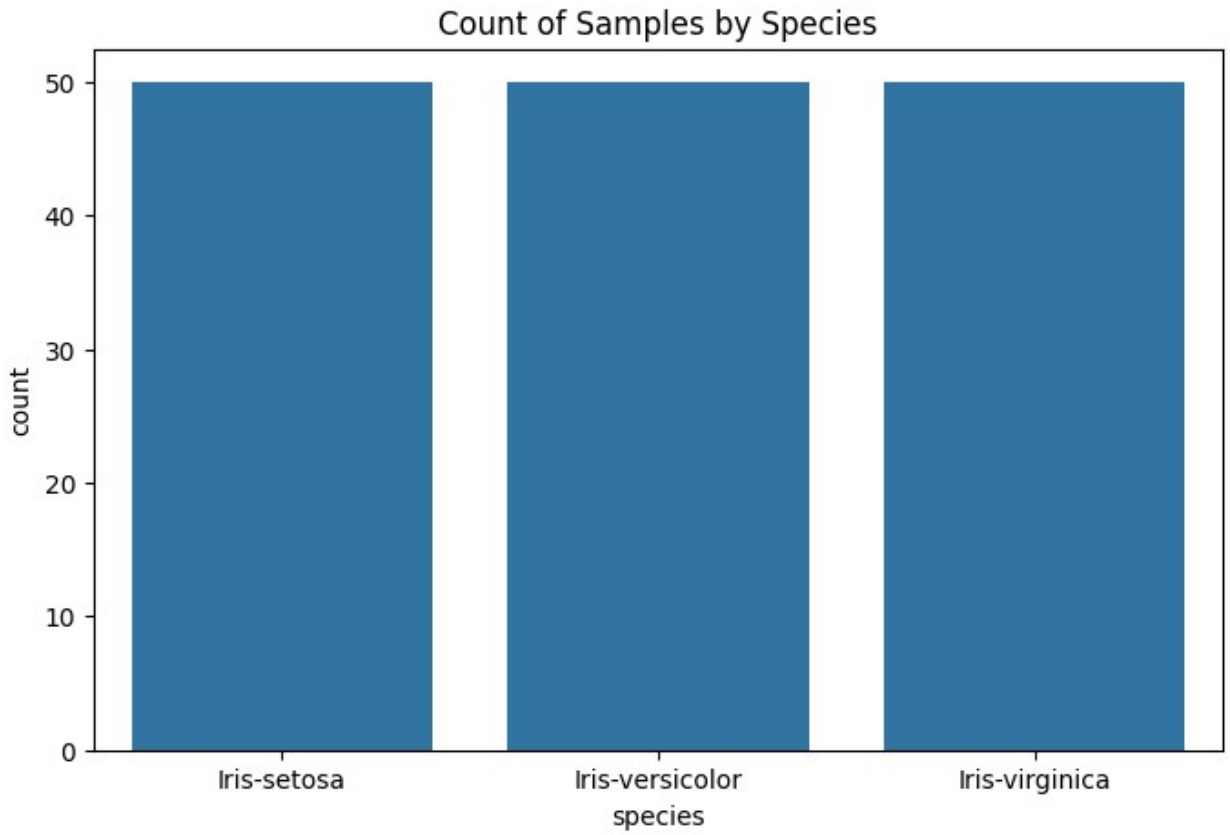
Missing Values in Each Column:
sepal_length    0
sepal_width     0
petal_length    0
petal_width     0
species         0
dtype: int64

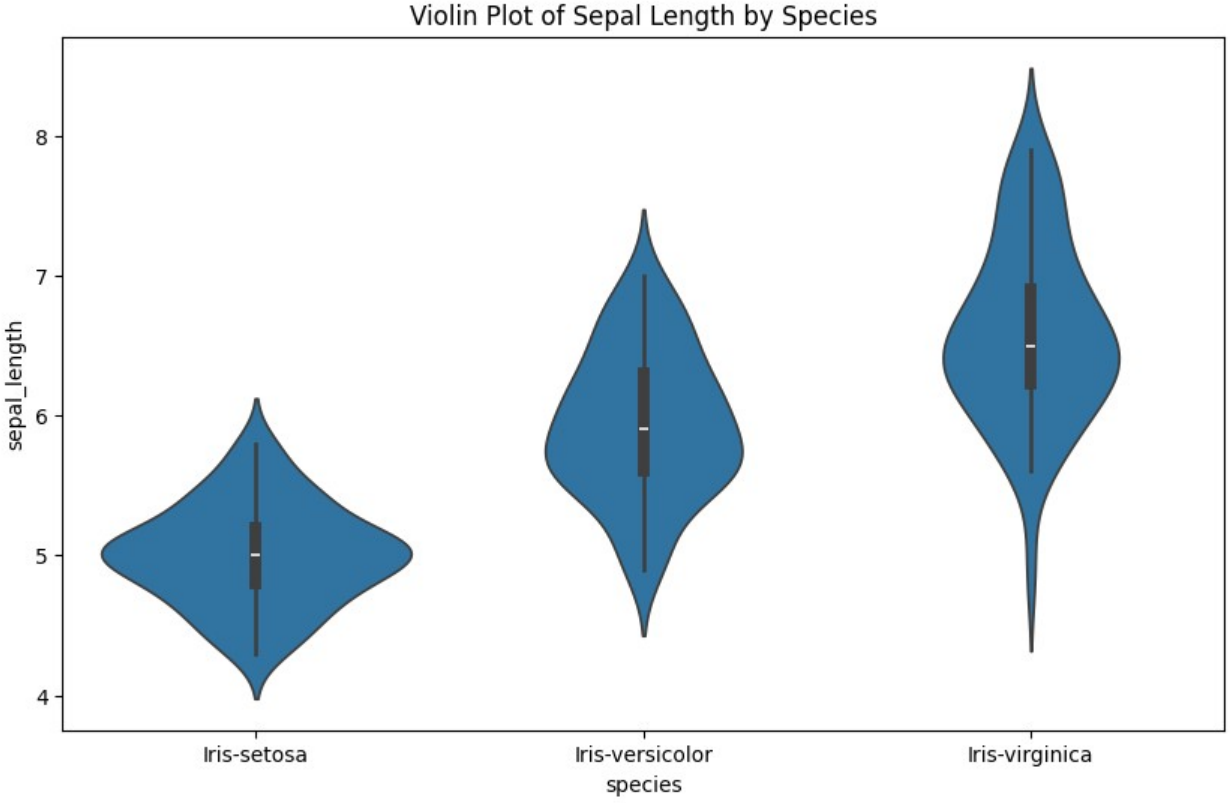
Species Value Counts:
species
Iris-setosa        50
Iris-versicolor    50
Iris-virginica     50
Name: count, dtype: int64
```

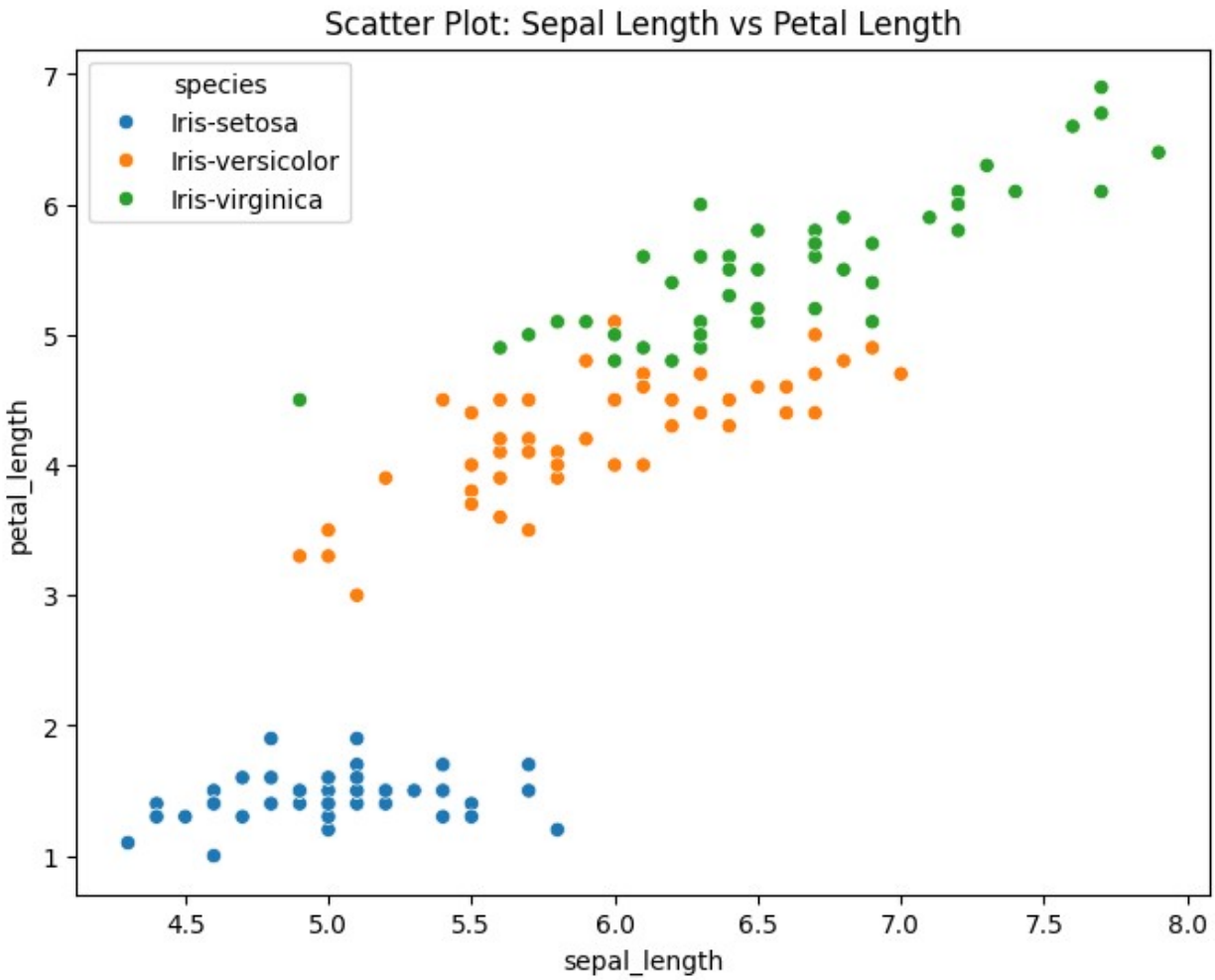

Histogram of Iris Features
sepal_length
sepal_width
petal_length
petal_width

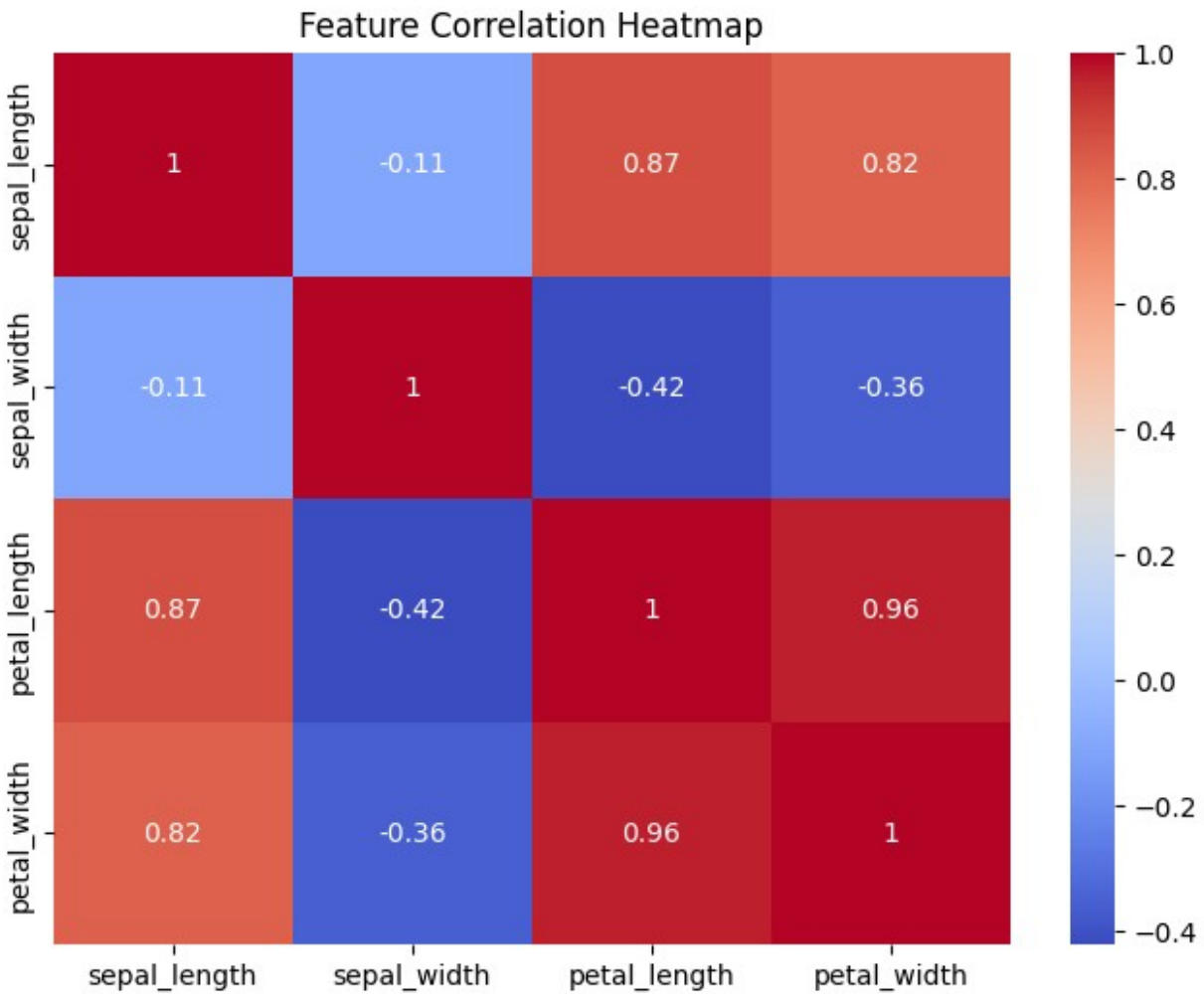

Line Plot of Features
sepal_length
sepal_width
petal_length
petal_width
Values
Index
0
20
40
60
80
100
120
140
0
1
2
3
4
5
6
7
8

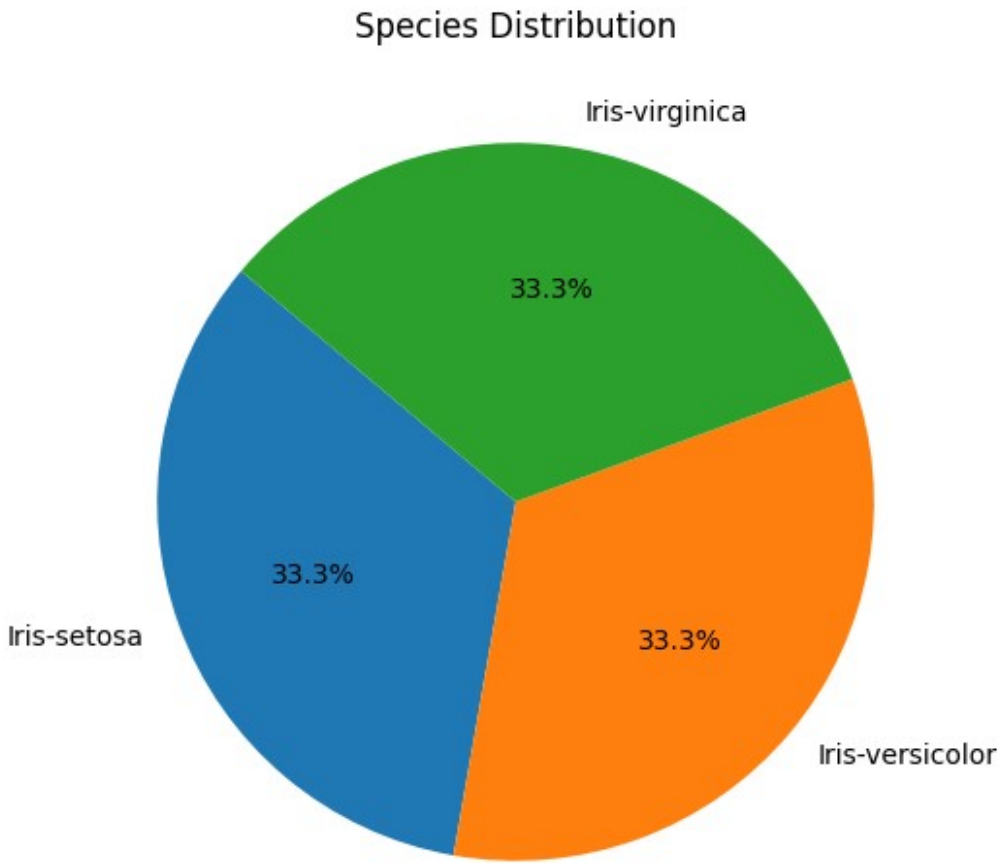

Average Feature Values by Species
sepal_length
sepal_width
petal_length
petal_width
Mean Value
Iris-setosa
Iris-versicolor
Iris-virginica
species
0
1
2
3
4
5
6

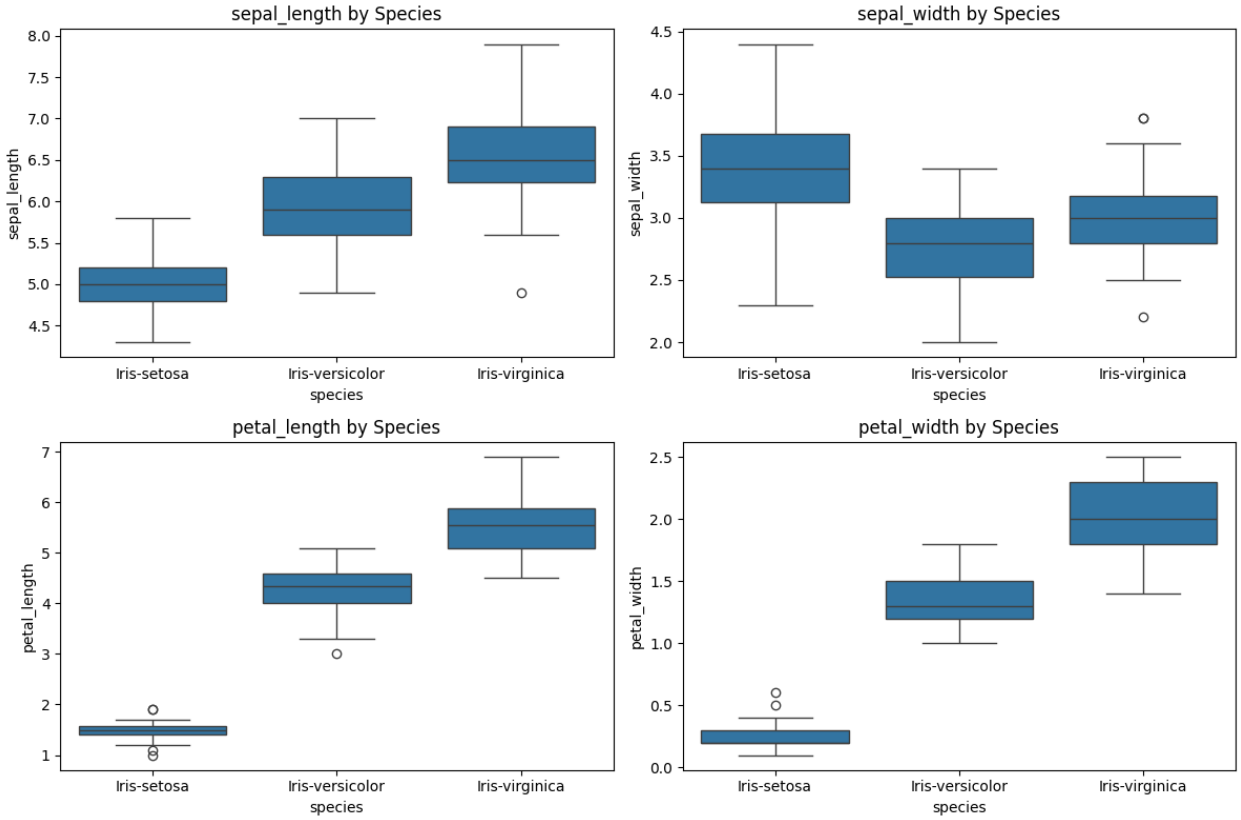

Count of Samples by Species
count
50
40
30
20
10
0
Iris-setosa
Iris-versicolor
Iris-virginica
species


Violin Plot of Sepal Length by Species
sepal_length
8
7
6
5
4
Iris-setosa
Iris-versicolor
Iris-virginica
species


Scatter Plot: Sepal Length vs Petal Length
species
Iris-setosa
Iris-versicolor
Iris-virginica
petal_length
sepal_length
1
2
3
4
5
6
7
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0


Feature Correlation Heatmap
sepal_length
sepal_width
petal_length
petal_width
1
-0.11
0.87
0.82
-0.11
1
-0.42
-0.36
0.87
-0.42
1
0.96
0.82
-0.36
0.96
1
sepal_length
sepal_width
petal_length
petal_width
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4


Species Distribution
Iris-virginica
33.3%
33.3%
Iris-setosa
33.3%
Iris-versicolor


sepal_length by Species
sepal_length
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
Iris-setosa
Iris-versicolor
Iris-virginica
species
sepal_width by Species
sepal_width
4.5
4.0
3.5
3.0
2.5
2.0
Iris-setosa
Iris-versicolor
Iris-virginica
species
petal_length by Species
petal_length
7
6
5
4
3
2
1
Iris-setosa
Iris-versicolor
Iris-virginica
species
petal_width by Species
petal_width
2.5
2.0
1.5
1.0
0.5
0.0
Iris-setosa
Iris-versicolor
Iris-virginica
species