# practical-10-piyusha-supe

April 12, 2025

## 1 PIYUSHA SUPE 23CO315

### Data Visualization III

Download the Iris flower dataset or any other dataset into a DataFrame. (e.g., https://archive.ics.uci.edu/ml/datasets/Iris ). Scan the dataset and give the inference as: 1. List down the features and their types (e.g., numeric, nominal) available in the dataset. 2. Create a histogram for each feature in the dataset to illustrate the feature distributions. 3. Create a boxplot for each feature in the dataset. 4. Compare distributions and identify outliers

[1]:
```
# Required Libraries
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

# Load the Iris Dataset (from seaborn)
iris = sns.load_dataset("iris")

# Preview the dataset
print("Dataset:")
print(iris.head())
print(iris.tail())
print(iris.info())
print(iris.describe(include = "all"))
print(iris.shape)
print(iris.size)
print(iris.ndim)
print(iris.columns)
print(iris.dtypes)
```

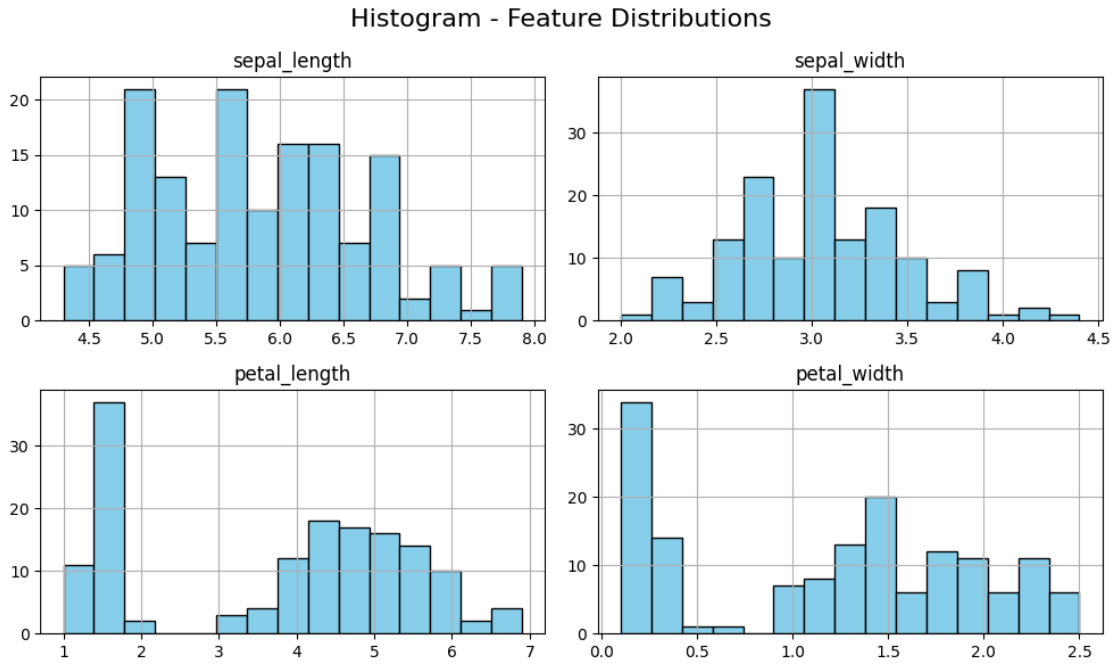
```
Dataset:
   sepal_length  sepal_width  petal_length  petal_width species
0           5.1          3.5           1.4          0.2  setosa
1           4.9          3.0           1.4          0.2  setosa
2           4.7          3.2           1.3          0.2  setosa
3           4.6          3.1           1.5          0.2  setosa
4           5.0          3.6           1.4          0.2  setosa
     sepal_length  sepal_width  petal_length  petal_width    species
145           6.7          3.0           5.2          2.3  virginica
```

```
146           6.3          2.5           5.0          1.9  virginica
147           6.5          3.0           5.2          2.0  virginica
148           6.2          3.4           5.4          2.3  virginica
149           5.9          3.0           5.1          1.8  virginica
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 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
        sepal_length  sepal_width  petal_length  petal_width species
count     150.000000   150.000000    150.000000   150.000000     150
unique           NaN          NaN           NaN          NaN       3
top              NaN          NaN           NaN          NaN  setosa
freq             NaN          NaN           NaN          NaN      50
mean        5.843333     3.057333      3.758000     1.199333     NaN
std         0.828066     0.435866      1.765298     0.762238     NaN
min         4.300000     2.000000      1.000000     0.100000     NaN
25%         5.100000     2.800000      1.600000     0.300000     NaN
50%         5.800000     3.000000      4.350000     1.300000     NaN
75%         6.400000     3.300000      5.100000     1.800000     NaN
max         7.900000     4.400000      6.900000     2.500000     NaN
(150, 5)
750
2
Index(['sepal_length', 'sepal_width', 'petal_length', 'petal_width',
       'species'],
      dtype='object')
sepal_length    float64
sepal_width     float64
petal_length    float64
petal_width     float64
species          object
dtype: object
```

[2]:
```python
# 1. Feature List and Types
print("\nFeature Types:")
for column in iris.columns:
    dtype = iris[column].dtype
    ftype = "Nominal" if dtype == "object" else "Numeric"
```

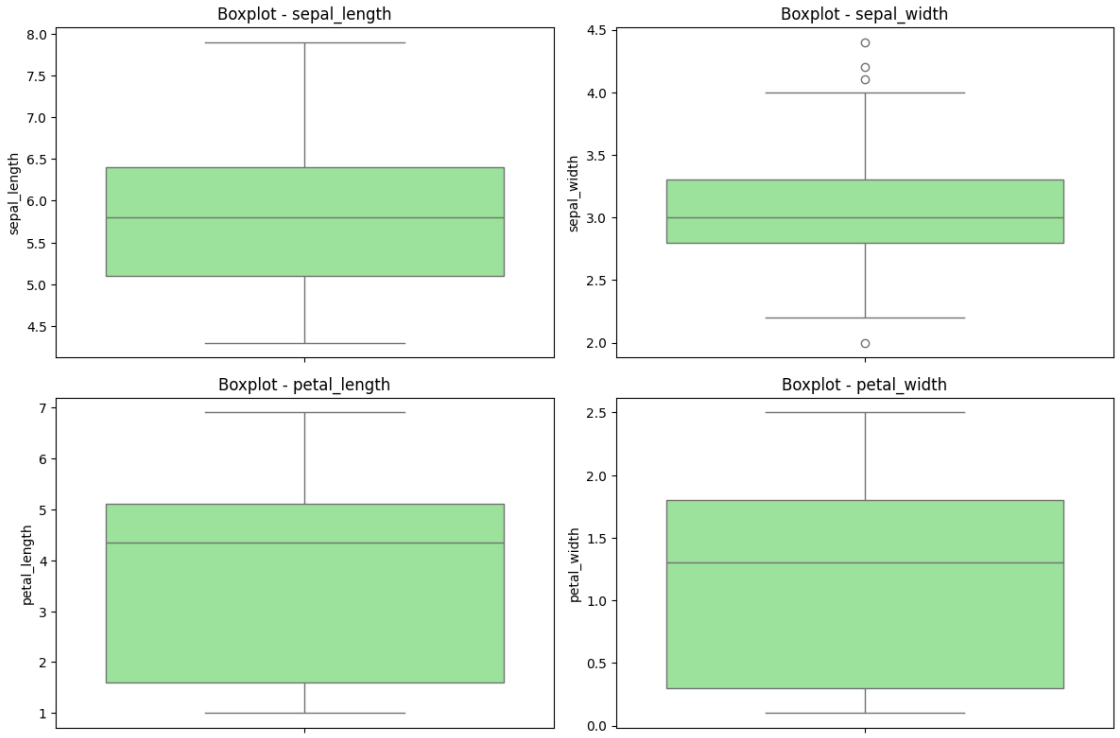
```
    print(f"{column}: {ftype} ({dtype})")

# 2. Histograms for Each Numeric Feature
iris_numeric = iris.drop(columns='species')  # Only numeric features

iris_numeric.hist(bins=15, figsize=(10, 6), color='skyblue', edgecolor='black')
plt.suptitle("Histogram - Feature Distributions", fontsize=16)
plt.tight_layout()
plt.show()
```

```
 Feature Types:
sepal_length: Numeric (float64)
sepal_width: Numeric (float64)
petal_length: Numeric (float64)
petal_width: Numeric (float64)
species: Nominal (object)
```




[3]:
```
# 3. Boxplots for Each Feature
plt.figure(figsize=(12, 8))
for i, col in enumerate(iris_numeric.columns, 1):
    plt.subplot(2, 2, i)
    sns.boxplot(y=iris[col], color='lightgreen')
    plt.title(f"Boxplot - {col}")
plt.tight_layout()
```

```
plt.show()
```




[5]:
```
# 4. Observations
print("\nObservations & Inference:")

# Describe statistics
print("\nDescriptive Statistics:")
print(iris_numeric.describe())

# Check for outliers using IQR method
print("\nOutliers (using IQR):")
for column in iris_numeric.columns:
    Q1 = iris[column].quantile(0.25)
    Q3 = iris[column].quantile(0.75)
    IQR = Q3 - Q1
    lower = Q1 - 1.5 * IQR
    upper = Q3 + 1.5 * IQR
    outliers = iris[(iris[column] < lower) | (iris[column] > upper)]
    print(f"{column}: {len(outliers)} outlier(s)")
```

```
Observations & Inference:

Descriptive Statistics:
```

```
       sepal_length  sepal_width  petal_length  petal_width
count    150.000000   150.000000    150.000000   150.000000
mean       5.843333     3.057333      3.758000     1.199333
std        0.828066     0.435866      1.765298     0.762238
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

Outliers (using IQR):
sepal_length: 0 outlier(s)
sepal_width: 4 outlier(s)
petal_length: 0 outlier(s)
petal_width: 0 outlier(s)
```

PIYUSHA SUPE 23CO315