# DA_C1

September 7, 2020

[1]:
```
import pandas as pd
import numpy as np
```

[4]:
```
import io

df = pd.read_csv('~/Downloads/iris.csv')
```

[5]:
```
df.head()
```

[5]:
```
   sepal length  sepal width  petal length  petal width        class
0           5.1          3.5           1.4          0.2  Iris-setosa
1           4.9          3.0           1.4          0.2  Iris-setosa
2           4.7          3.2           1.3          0.2  Iris-setosa
3           4.6          3.1           1.5          0.2  Iris-setosa
4           5.0          3.6           1.4          0.2  Iris-setosa
```

[9]:
```
print(f"Number of features in the dataframe : {len(df.columns)}")
```

```
Number of features in the dataframe : 5
```

[13]:
```
print("Feature\t\tType\n", df.dtypes)
```

```
Feature         Type
 sepal length    float64
sepal width     float64
petal length    float64
petal width     float64
class            object
dtype: object
```

[12]:
```
df.describe()
```

[12]:
```
       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
```

[15]:

```
statistics  = pd.DataFrame(np.zeros((7, 4)), index=["Min", "Max", "Mean",␣
 ↪"Range", "SD", "Variance", "90th Percentile"], columns=df.columns[0:4:1])
statistics.loc["Min"] = df.min()
statistics.loc["Max"] = df.max()
statistics.loc["Mean"] = df.mean()
statistics.loc["Range"] = statistics.loc["Max"]-statistics.loc["Min"]
statistics.loc["SD"] = df.std(ddof=0)
statistics.loc["Variance"] = df.var(ddof=0)
statistics.loc["90th Percentile"] = df.quantile(0.9)
print(statistics)
```

```
                 sepal length  sepal width  petal length  petal width
Min                  4.300000     2.000000      1.000000     0.100000
Max                  7.900000     4.400000      6.900000     2.500000
Mean                 5.843333     3.054000      3.758667     1.198667
Range                3.600000     2.400000      5.900000     2.400000
SD                   0.825301     0.432147      1.758529     0.760613
Variance             0.681122     0.186751      3.092425     0.578532
90th Percentile      6.900000     3.610000      5.800000     2.200000
```

[16]:

```
def manualStats(df):
    statistics  = pd.DataFrame(np.zeros((7, 4)), index=["Min", "Max", "Mean",␣
 ↪"Range", "SD", "Variance", "90th Percentile"], columns=df.columns[0:4:1])

    statistics.loc["Max"] = df.max()
    statistics.loc["Min"] = df.min()

    mean = pd.Series(np.zeros(4), index = df.columns[:4:])
    percentile = pd.Series(np.zeros(4), index = df.columns[:4:])

    for i in df.columns[:4:]:
        currCol = df[i].to_numpy()
        currCol = np.sort(currCol)
        for j in range(len(df.index)):
            mean[i] += df.iloc[j][i]
        percentile[i] = currCol[(int)((len(currCol)+1)*0.9)-1]

    mean /= len(df.index)

    statistics.loc["Mean"] = mean
    statistics.loc["90th Percentile"] = percentile
    statistics.loc["Range"] = statistics.loc["Max"]-statistics.loc["Min"]
    variance = pd.Series(np.zeros(4), index = df.columns[:4:])

    for i in df.columns[:4:]:
        currMean = mean[i]
        for j in range(len(df.index)):
            variance[i] += ((df.iloc[j][i] - currMean)**2)

    variance /= len(df.index)

    statistics.loc["Variance"] = variance
    statistics.loc["SD"] = variance**0.5

    return statistics
```

[17]:

```
m_statistics = manualStats(df)
print(m_statistics)
```

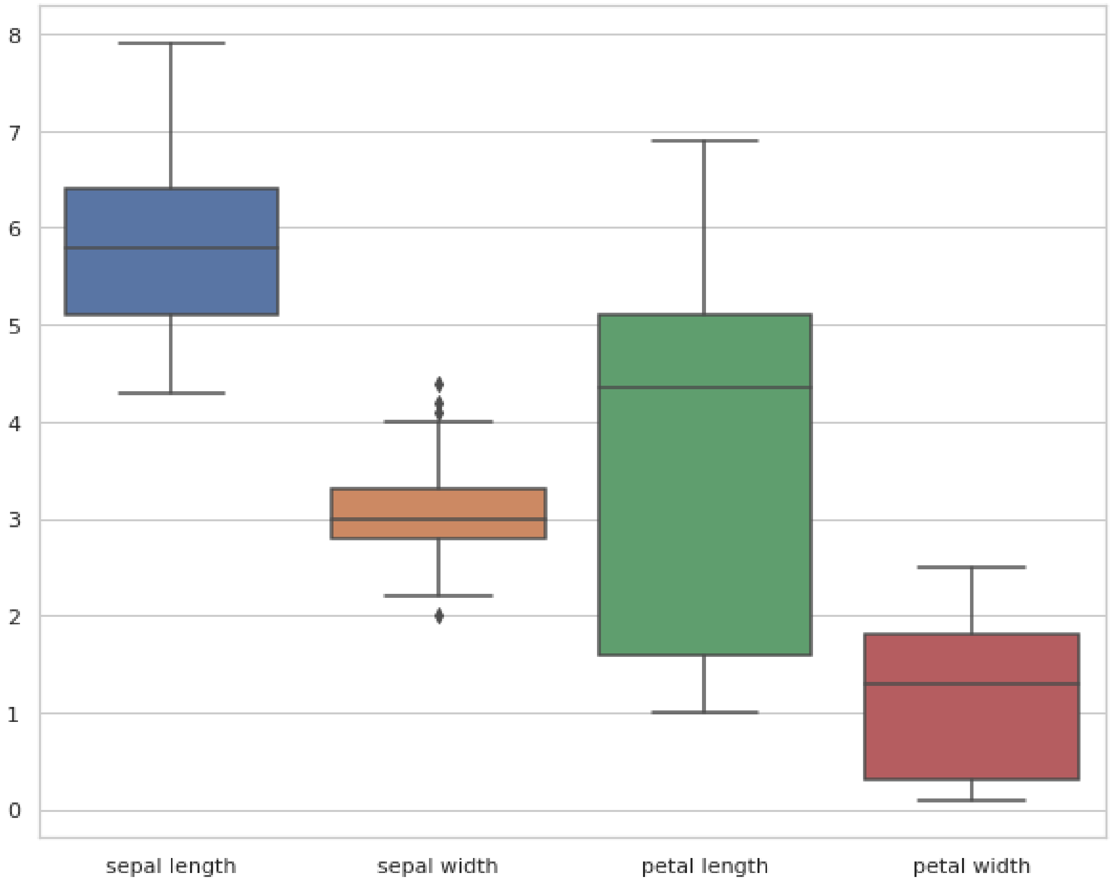
```
                 sepal length  sepal width  petal length  petal width
Min                  4.300000     2.000000      1.000000     0.100000
Max                  7.900000     4.400000      6.900000     2.500000
Mean                 5.843333     3.054000      3.758667     1.198667
Range                3.600000     2.400000      5.900000     2.400000
SD                   0.825301     0.432147      1.758529     0.760613
Variance             0.681122     0.186751      3.092425     0.578532
90th Percentile      6.900000     3.600000      5.800000     2.200000
```

[18]:

```
import matplotlib.pyplot as plt
import seaborn as sns
```

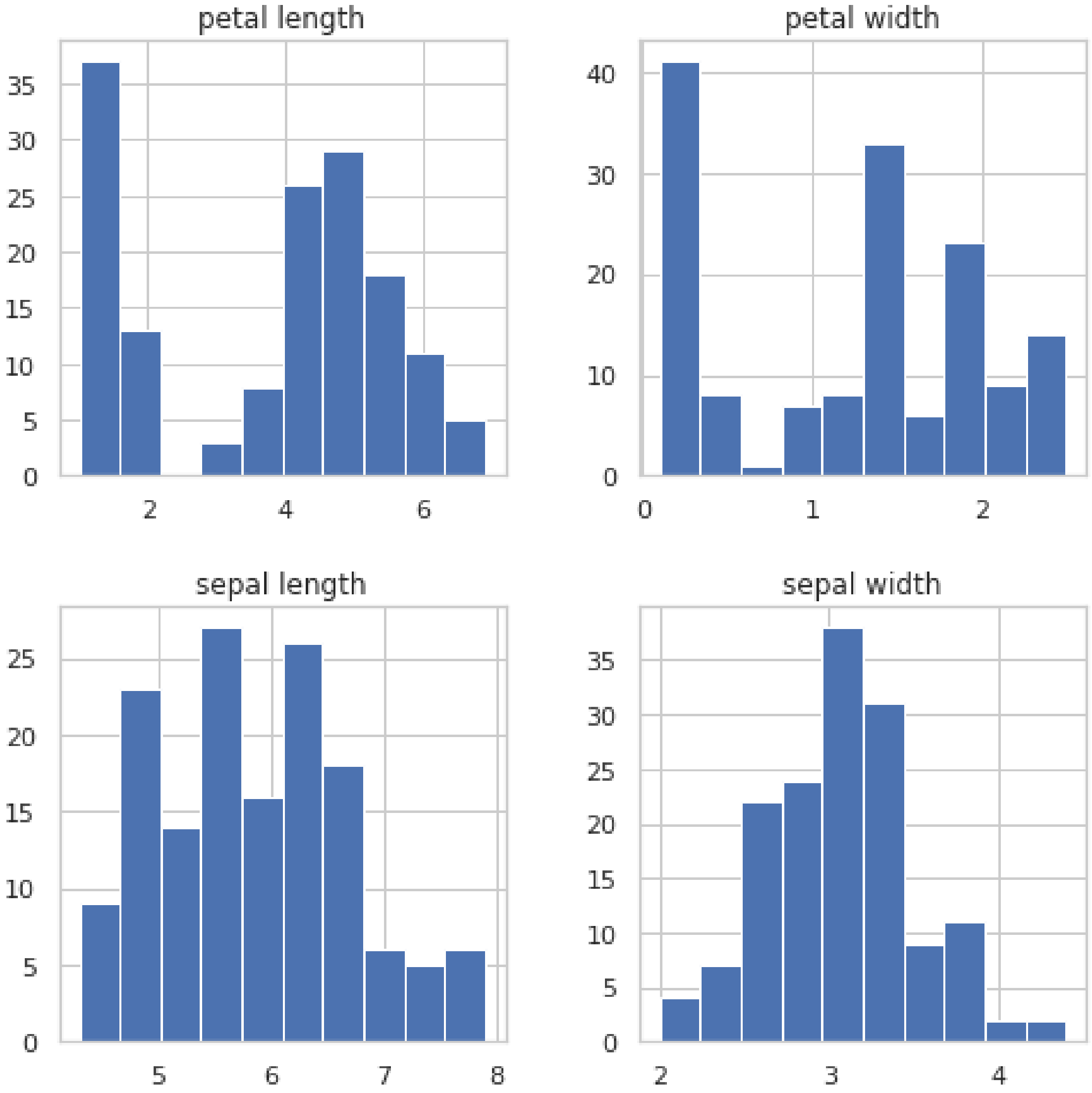
[19]:

```
sns.set(style="whitegrid")
plt.figure(figsize=(10,8))
ax = sns.boxplot(data=df, orient="v")
```



```
[20]: fig = plt.figure(figsize = (8,8))
      ax = fig.gca()
      df.hist(ax=ax)
      plt.show()
```

```
<ipython-input-20-501320c614cd>:3: UserWarning: To output multiple subplots, the
figure containing the passed axes is being cleared
  df.hist(ax=ax)
```


petal length
35
30
25
20
15
10
5
0
2
4
6
petal width
40
30
20
10
0
0
1
2
sepal length
25
20
15
10
5
0
5
6
7
8
sepal width
35
30
25
20
15
10
5
0
2
3
4

[ ]: