20250414_01

April 14, 2025

[65]:

```
from sklearn.datasets import load_iris
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

iris = load_iris(as_frame = True)
df = iris.frame
df['target'] = df['target'].map(dict(enumerate(iris.target_names)))
df.head()
```

[65]:

```
   sepal length (cm)  sepal width (cm)  petal length (cm)  petal width (cm)  \
0                5.1               3.5                1.4               0.2
1                4.9               3.0                1.4               0.2
2                4.7               3.2                1.3               0.2
3                4.6               3.1                1.5               0.2
4                5.0               3.6                1.4               0.2

   target
0  setosa
1  setosa
2  setosa
3  setosa
4  setosa
```

[67]:

```
df.groupby('target')['sepal length (cm)'].mean()
```

[67]:

```
target
setosa        5.006
versicolor    5.936
virginica     6.588
Name: sepal length (cm), dtype: float64
```

[69]:

```
df.groupby('target').agg({'sepal length (cm)':['mean', 'std', 'max'], 'petal␣
 ↪length (cm)':['median', 'min']}).T
```

[69]:

```
target                      setosa  versicolor  virginica
sepal length (cm) mean     5.00600    5.936000    6.58800
                  std      0.35249    0.516171    0.63588
```

```
                   max      5.80000    7.000000    7.90000
petal length (cm) median   1.50000    4.350000    5.55000
                   min      1.00000    3.000000    4.50000
```

```
[71]: df.groupby('target').describe().T
```

```
[71]: target                        setosa  versicolor  virginica
      sepal length (cm) count  50.000000   50.000000  50.000000
                        mean    5.006000    5.936000   6.588000
                        std     0.352490    0.516171   0.635880
                        min     4.300000    4.900000   4.900000
                        25%     4.800000    5.600000   6.225000
                        50%     5.000000    5.900000   6.500000
                        75%     5.200000    6.300000   6.900000
                        max     5.800000    7.000000   7.900000
      sepal width (cm)  count  50.000000   50.000000  50.000000
                        mean    3.428000    2.770000   2.974000
                        std     0.379064    0.313798   0.322497
                        min     2.300000    2.000000   2.200000
                        25%     3.200000    2.525000   2.800000
                        50%     3.400000    2.800000   3.000000
                        75%     3.675000    3.000000   3.175000
                        max     4.400000    3.400000   3.800000
      petal length (cm) count  50.000000   50.000000  50.000000
                        mean    1.462000    4.260000   5.552000
                        std     0.173664    0.469911   0.551895
                        min     1.000000    3.000000   4.500000
                        25%     1.400000    4.000000   5.100000
                        50%     1.500000    4.350000   5.550000
                        75%     1.575000    4.600000   5.875000
                        max     1.900000    5.100000   6.900000
      petal width (cm)  count  50.000000   50.000000  50.000000
                        mean    0.246000    1.326000   2.026000
                        std     0.105386    0.197753   0.274650
                        min     0.100000    1.000000   1.400000
                        25%     0.200000    1.200000   1.800000
                        50%     0.200000    1.300000   2.000000
                        75%     0.300000    1.500000   2.300000
                        max     0.600000    1.800000   2.500000
```

```
[73]: df['z_sepal_length'] = df.groupby('target')['sepal length (cm)'].
       ↪transform(lambda x:(x - x.mean())/x.std())
      df[['target', 'sepal length (cm)', 'z_sepal_length']].head(10)
```

```
[73]:    target  sepal length (cm)  z_sepal_length
      0  setosa                5.1        0.266674
      1  setosa                4.9       -0.300718
```

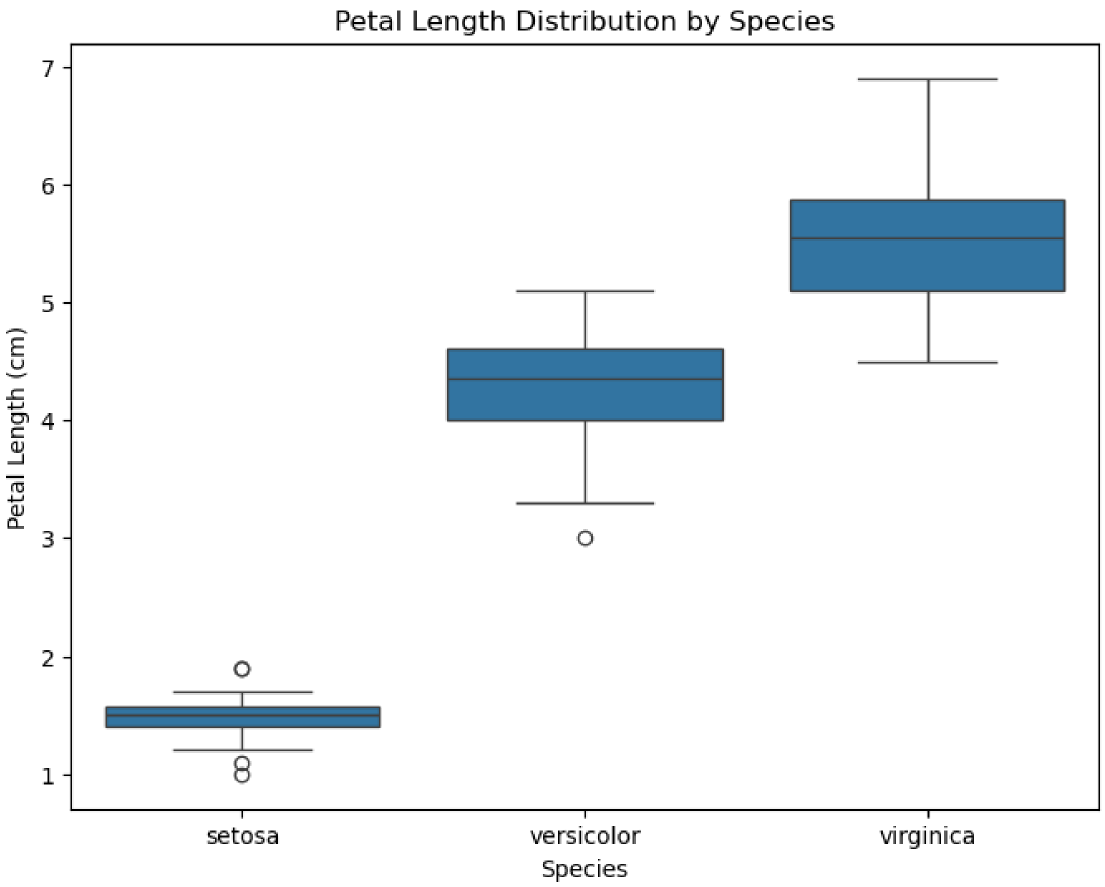
```
2  setosa                 4.7       -0.868111
3  setosa                 4.6       -1.151807
4  setosa                 5.0       -0.017022
5  setosa                 5.4        1.117763
6  setosa                 4.6       -1.151807
7  setosa                 5.0       -0.017022
8  setosa                 4.4       -1.719199
9  setosa                 4.9       -0.300718
```

[75]:
```
def custom_summary(group):
    return pd.Series({'sepal_max':group['sepal length (cm)'].max(), 'sepal_min':
  ↪group['sepal length (cm)'].min(), 'sepal_median':group['sepal length (cm)'].
  ↪median(), 'sepal_iqr':group['sepal length (cm)'].quantile(0.75) -␣
  ↪group['sepal length (cm)'].quantile(0.25)})
```

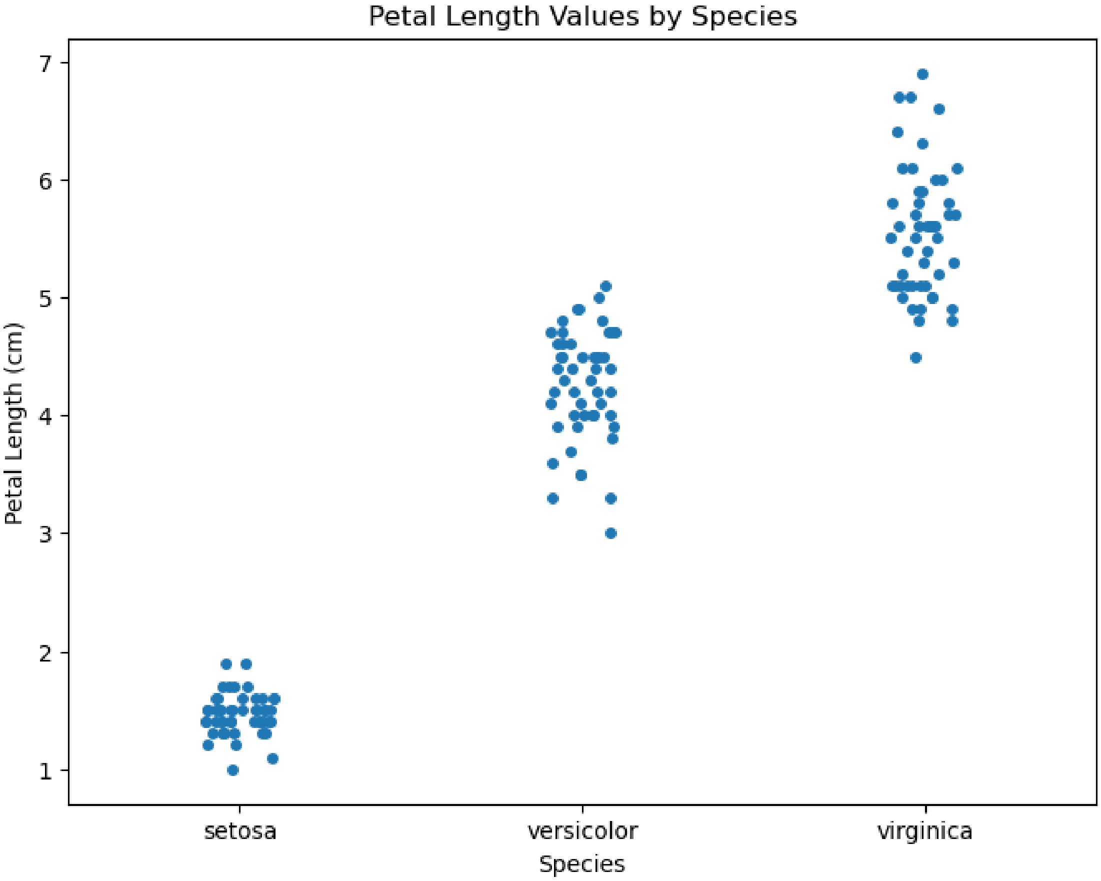
[77]:
```
df.groupby('target')[['sepal length (cm)', 'petal width (cm)']].
  ↪apply(custom_summary)
```

[77]:
```
            sepal_max  sepal_min  sepal_median  sepal_iqr
target
setosa            5.8        4.3           5.0      0.400
versicolor        7.0        4.9           5.9      0.700
virginica         7.9        4.9           6.5      0.675
```

[79]:
```
plt.figure(figsize = (8,6))
sns.boxplot(data = df, x = 'target', y = 'petal length (cm)')
plt.title('Petal Length Distribution by Species')
plt.xlabel('Species')
plt.ylabel('Petal Length (cm)')
plt.show()
```



[81]:
```
plt.figure(figsize = (8,6))
sns.stripplot(data = df, x = 'target', y = 'petal length (cm)', jitter = True)
plt.title('Petal Length Values by Species')
plt.xlabel('Species')
plt.ylabel('Petal Length (cm)')
plt.show()
```


Petal Length Values by Species
Petal Length (cm)
1
2
3
4
5
6
7
setosa
versicolor
virginica
Species