Live 2025-10-15

October 15, 2025

1 More Plotting Live 2025-10-15

```
[2]: import numpy as np
     import pandas as pd
     import matplotlib.pyplot as plt

     from sklearn import datasets
     import seaborn as sns

     X = sns.load_dataset("iris")

     X.head()
```

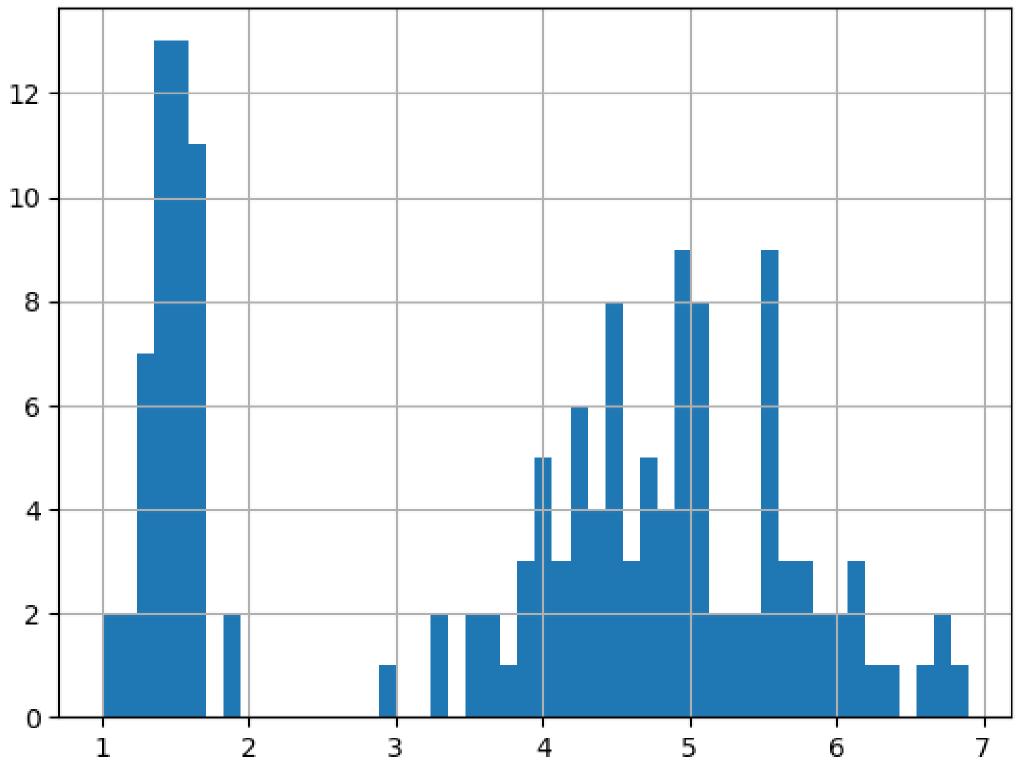
```
[2]:    sepal_length  sepal_width  petal_length  petal_width species
     0           5.1          3.5           1.4          0.2  setosa
     1           4.9          3.0           1.4          0.2  setosa
     2           4.7          3.2           1.3          0.2  setosa
     3           4.6          3.1           1.5          0.2  setosa
     4           5.0          3.6           1.4          0.2  setosa
```

We already did plots feature by feature and/or species by species. These were **line-graphs** (matplotlib) (a line from one instance to the next instance).

We could do * **histograms** (pandas) (number of instances in a range of feature values) * bargraphs (not so useful for this field) * pie charts (not so useful for this field) * **scatter-plot** (matplotlib) (one point in the graph for each instance of data (2D))

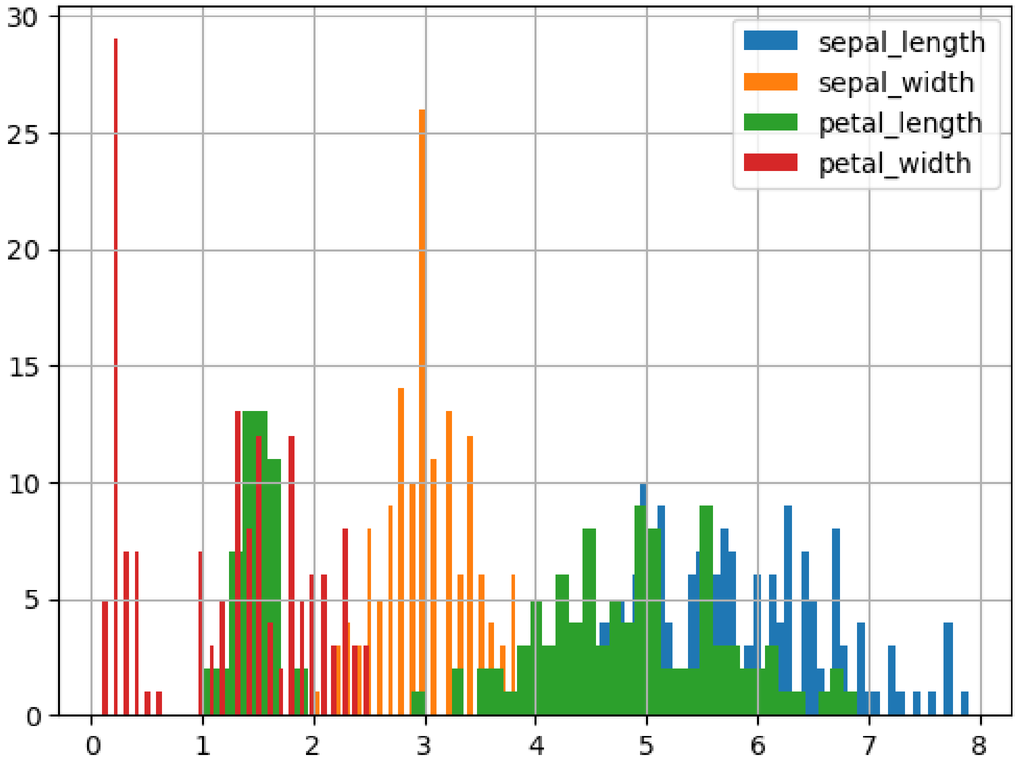
```
[5]: X.petal_length.hist(bins = 50)
```

```
[5]: <Axes: >
```



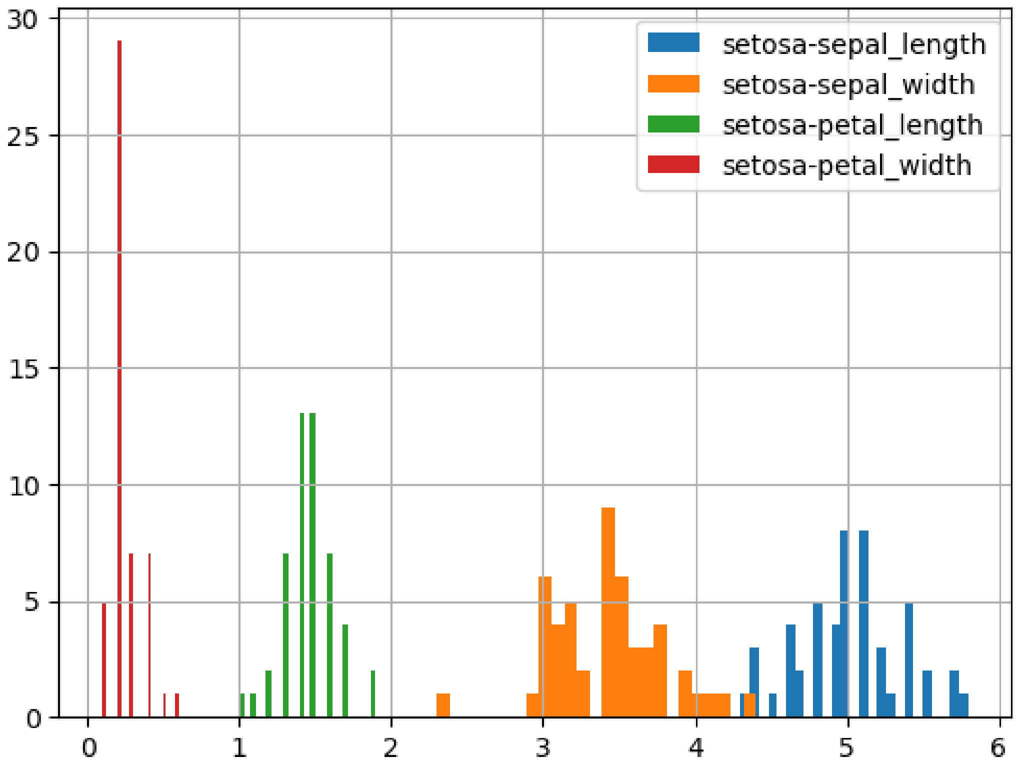
X-Axis == value of the feature shown Y-Axis == count of data instances where value is in bin (value range)

[14]:
```
cols = X.columns
cols = cols.drop("species")
for c in cols:
    X[c].hist(bins = 50,label=c)
plt.legend()
plt.show()
```

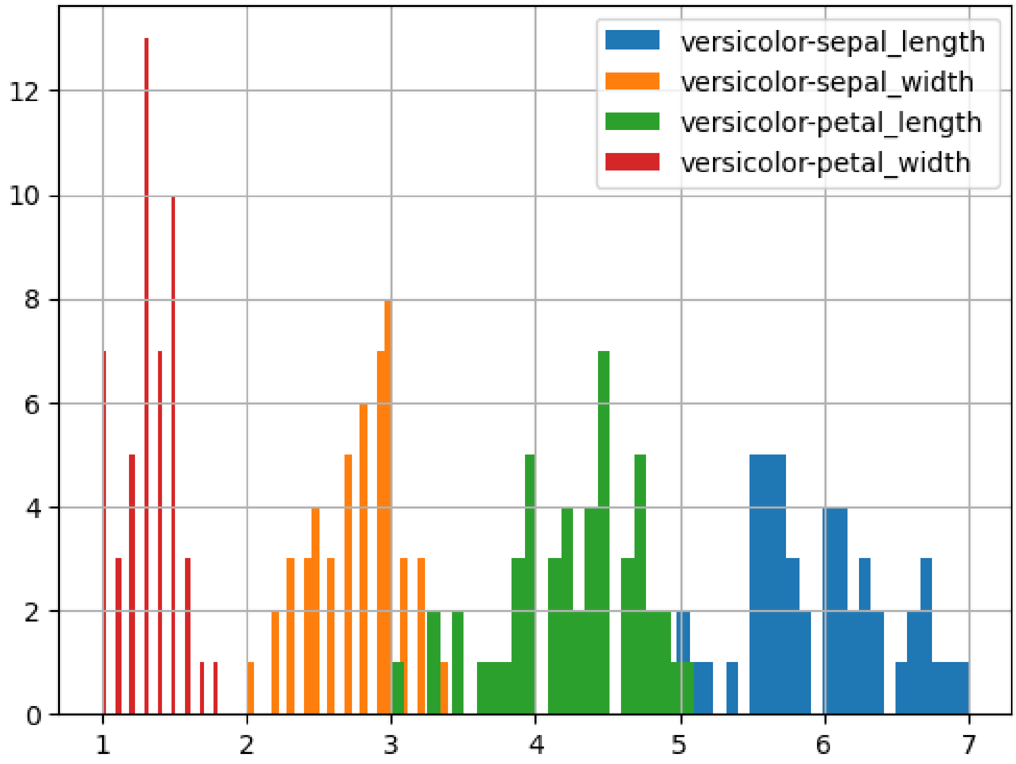


[20]:

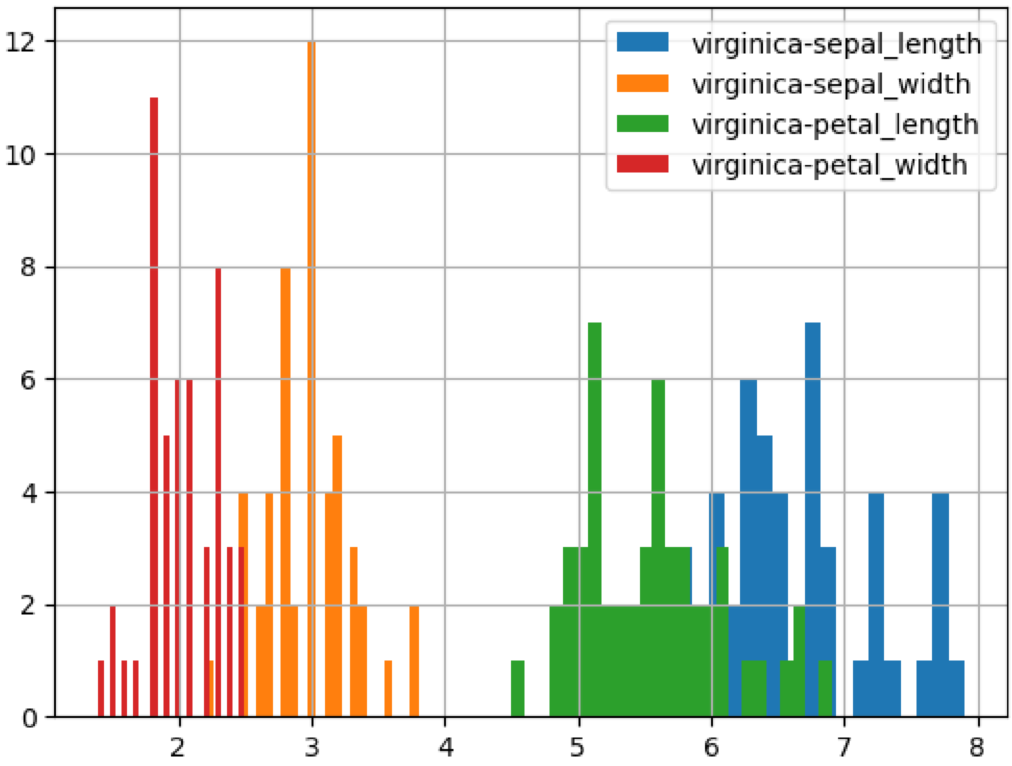
```
species = X.species.unique()
for s in species:
    xx = X[X.species == s]
    for c in cols:
        xx[c].hist(bins = 25,label=f"{s}-{c}")
    plt.legend()
    plt.show()
```



30
25
20
15
10
5
0
0
1
2
3
4
5
6
🟦 setosa-sepal_length
🟧 setosa-sepal_width
🟩 setosa-petal_length
🟥 setosa-petal_width



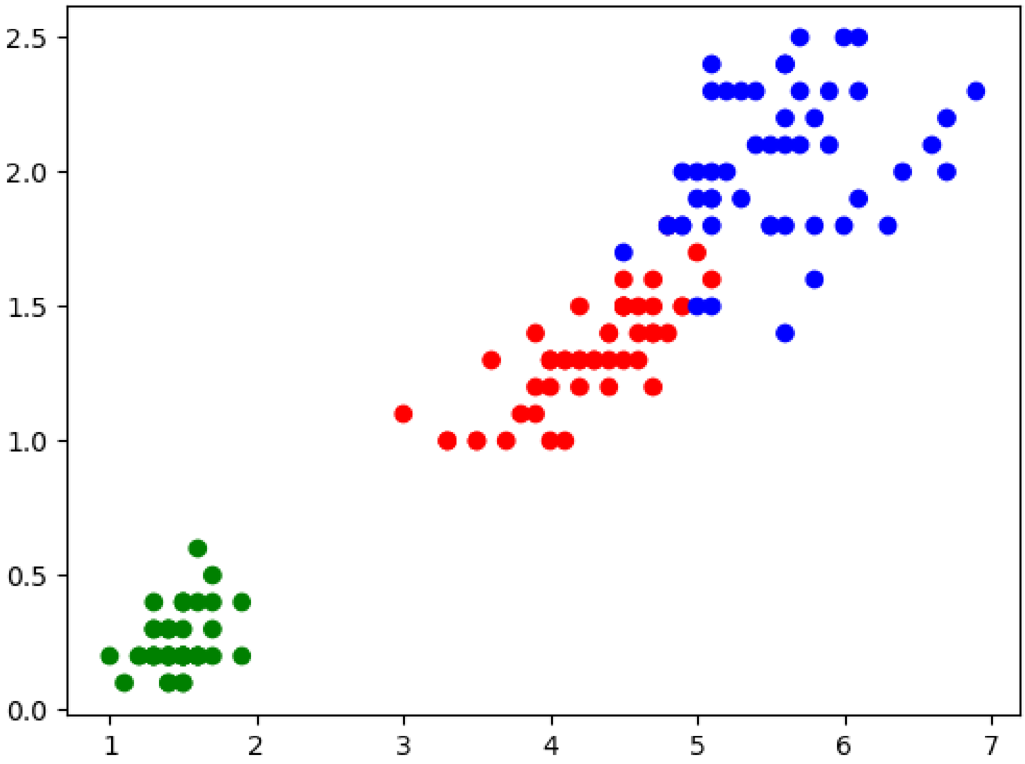
12
10
8
6
4
2
0
1
2
3
4
5
6
7
🟦 versicolor-sepal_length
🟧 versicolor-sepal_width
🟩 versicolor-petal_length
🟥 versicolor-petal_width



```
[24]: colors = {'setosa' : 'green', 'versicolor' : 'red',  'virginica' : 'blue'}

      plt.scatter(X.petal_length,X.petal_width,c=X.species.map(colors))
```

```
[24]: <matplotlib.collections.PathCollection at 0x7fdcea5b2e90>
```



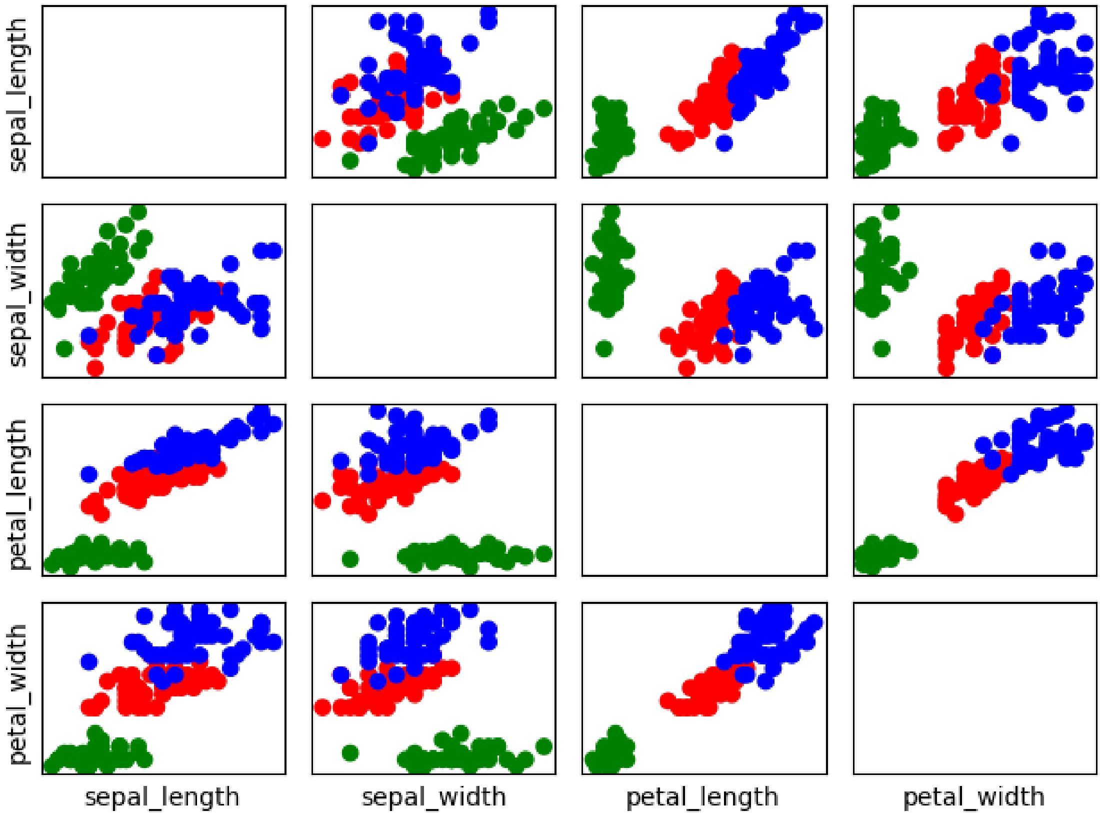
[27]:

```
# from cheat sheet :-)

columns = cols

# create subplots
fig, axes = plt.subplots(nrows=len(columns), ncols=len(columns))

# two nested loops to plot each feature against each feature
for ix, xf in enumerate(columns):
    for iy, yf in enumerate(columns):
        x = X[xf]
        y = X[yf]
        if ix != iy:
            axes[iy, ix].scatter(x,y,c=X['species'].map(colors))
        if iy == len(columns)-1:
            axes[iy, ix].set_xlabel(xf)
        if ix == 0:
            axes[iy, ix].set_ylabel(yf)
        axes[iy, ix].set_xticks([])
        axes[iy, ix].set_yticks([])
plt.tight_layout()
plt.show()
```


sepal_length
sepal_width
petal_length
petal_width
sepal_length
sepal_width
petal_length
petal_width

```
[ ]:
```