54. K-Means Clustering (Practical)

In [1]:

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

In [2]:

```
dataset = pd.read_csv(r'Data/iris_raw.csv')
dataset.head(3)
```

Out[2]:

	sepal_length	sepal_width	petal_length	petal_width
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

54.1 Making Clusters of Data

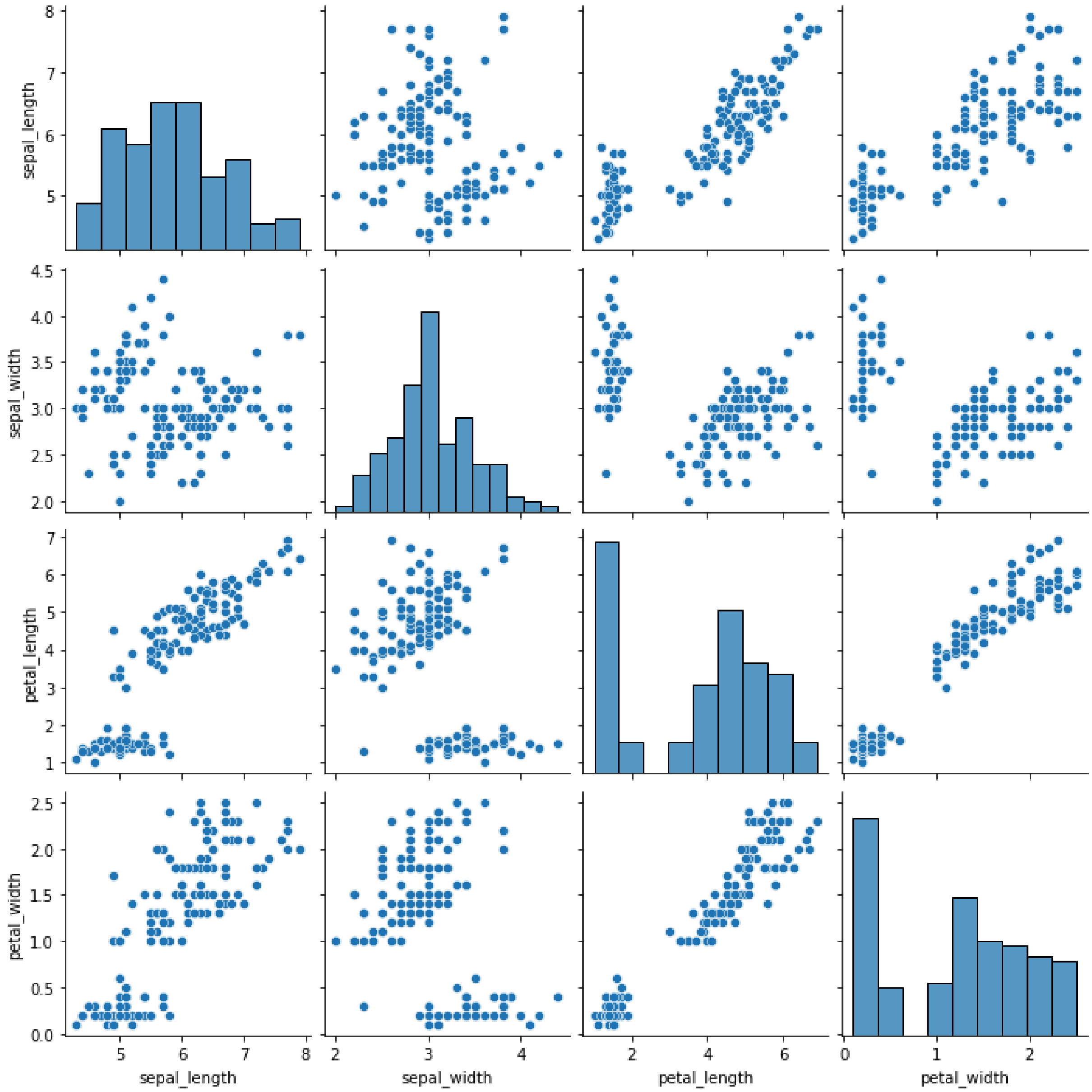
- Use K-mean clustering when **your data is linearly separable**

Check the data if it is linearly separable

In [3]:

```
sns.pairplot(data=dataset)
plt.show()
```

```
C:\Users\rashi\AppData\Local\Programs\Python\Python39\lib\site-packages\seaborn\axis
grid.py:123: UserWarning: The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
```



- In supervised learning, the data is split into training and testing data
- In unsupervised learning, data is not split into training and testing data b/c the data is unlabelled

54.1.1 Find Number of clusters

In [7]:

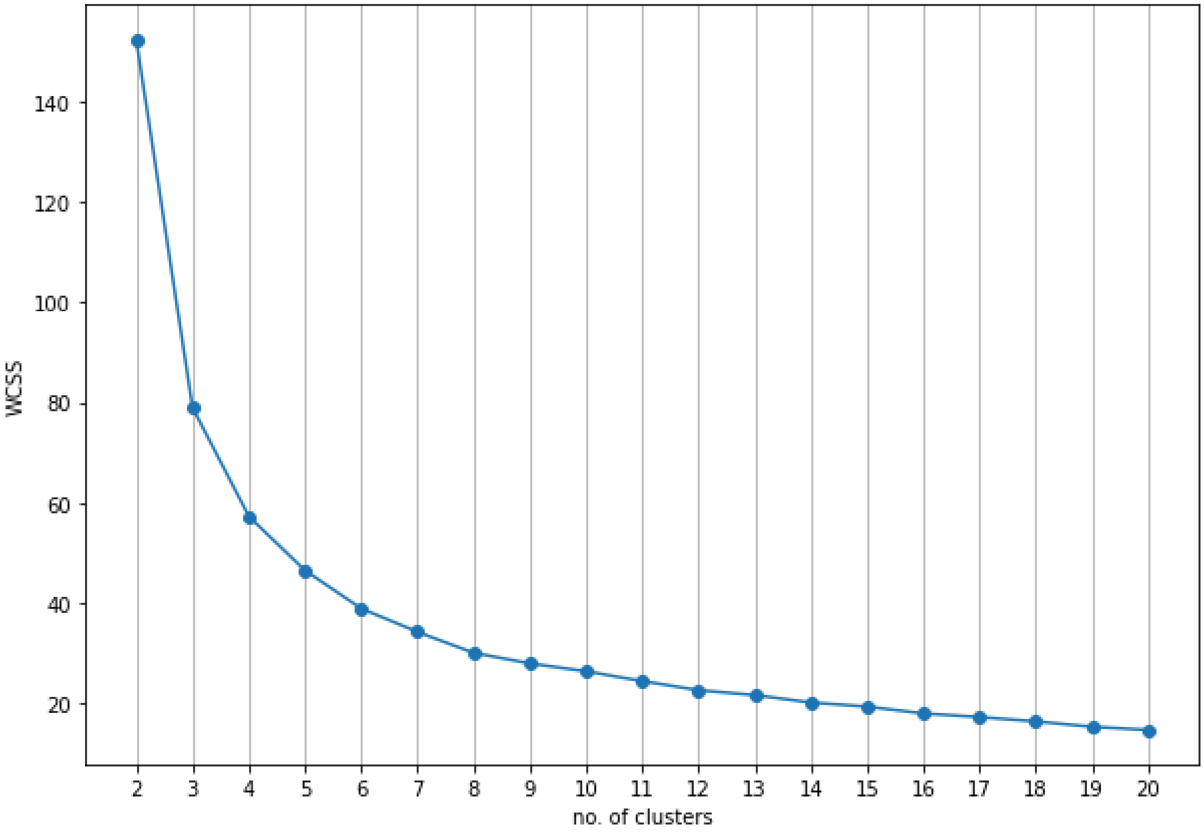
```
from sklearn.cluster import KMeans
```

In [14]:

```
# Use a loop to find best number of clusters from 2 to 20
wcss = []

for i in range(2,21):
    km = KMeans(n_clusters=i, init='k-means++')
    km.fit(dataset)
    wcss.append(km.inertia_) # it assings value of wcss {Elbow graph}
```

In [29]:
```
plt.figure(figsize=(10,7))
plt.plot([i for i in range(2,21)], wcss, marker='o')
plt.xlabel('no. of clusters')
plt.xticks([i for i in range(2,21)])
plt.ylabel('WCSS')
plt.grid(axis='x')
plt.show()
```



Elbow point = 3

It means that will have 3 number of clusters

In [ ]:

In [30]:
```
kmn = KMeans(n_clusters=3)
kmn.fit_predict(dataset)
```

Out[30]:
```
array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 1, 1, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 1, 2, 2, 2, 2, 1, 2, 2, 2,
       2, 2, 2, 1, 1, 2, 2, 2, 2, 1, 2, 1, 2, 1, 2, 2, 1, 1, 2, 2, 2, 2,
       2, 1, 2, 2, 2, 2, 1, 2, 2, 2, 1, 2, 2, 2, 1, 2, 2, 1])
```

In [32]:
```
dataset['Predict'] = kmn.fit_predict(dataset)
```

In [33]:
```
dataset
```

Out[33]:

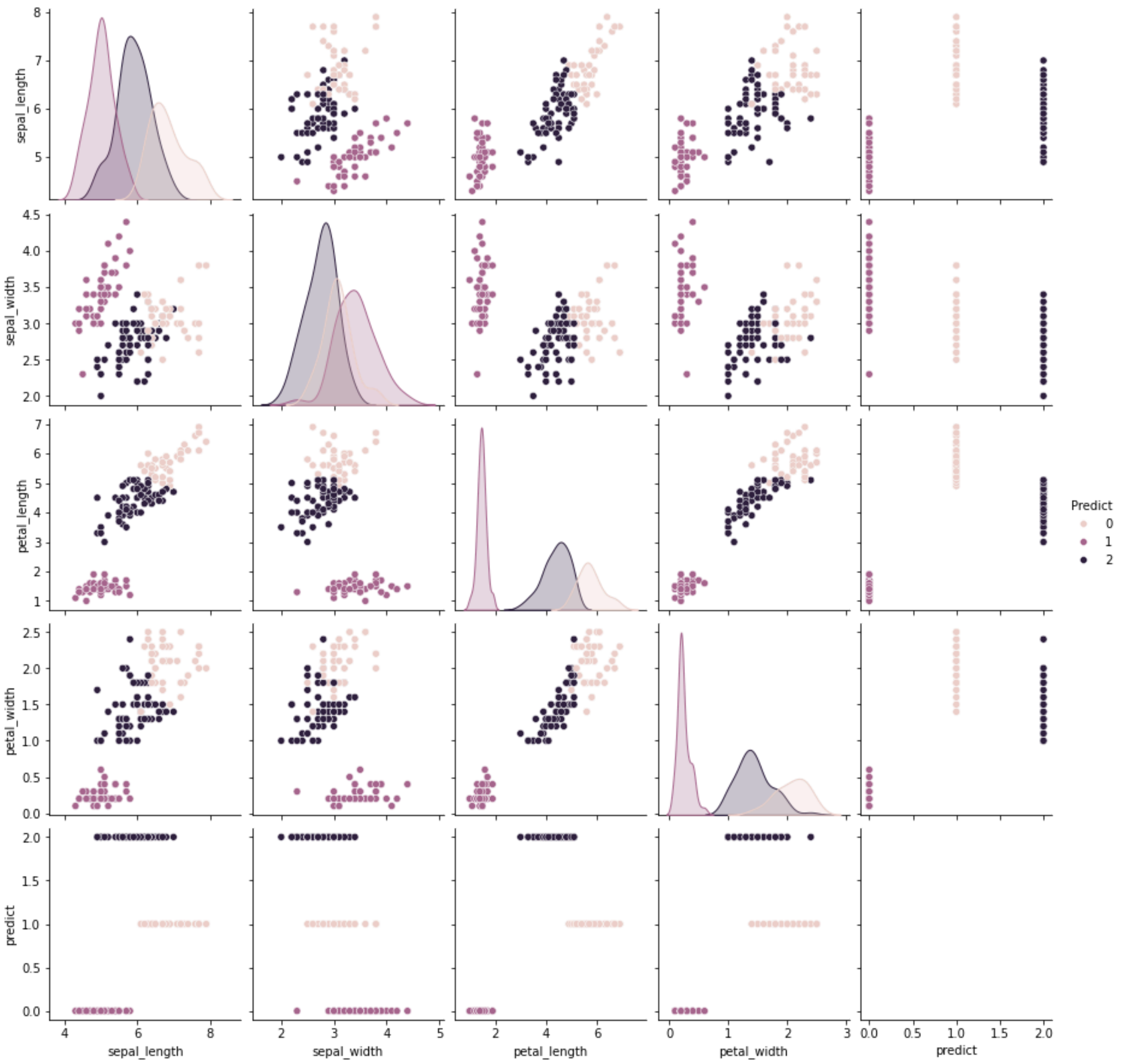
	sepal_length	sepal_width	petal_length	petal_width	predict	Predict
0	5.1	3.5	1.4	0.2	0	1
1	4.9	3.0	1.4	0.2	0	1
2	4.7	3.2	1.3	0.2	0	1
3	4.6	3.1	1.5	0.2	0	1
4	5.0	3.6	1.4	0.2	0	1
...	...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	1	0
146	6.3	2.5	5.0	1.9	2	2
147	6.5	3.0	5.2	2.0	1	0
148	6.2	3.4	5.4	2.3	1	0
149	5.9	3.0	5.1	1.8	2	2

150 rows × 6 columns

In [39]:

```
sns.pairplot(data=dataset, hue='Predict')
plt.savefig(r"Generated_images/raw-iris-clustering-predict.jpg")
plt.show()
```

```
C:\Users\rashi\AppData\Local\Programs\Python\Python39\lib\site-packages\seaborn\axis
grid.py:123: UserWarning: The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
```



54.2 Making raw data with original data

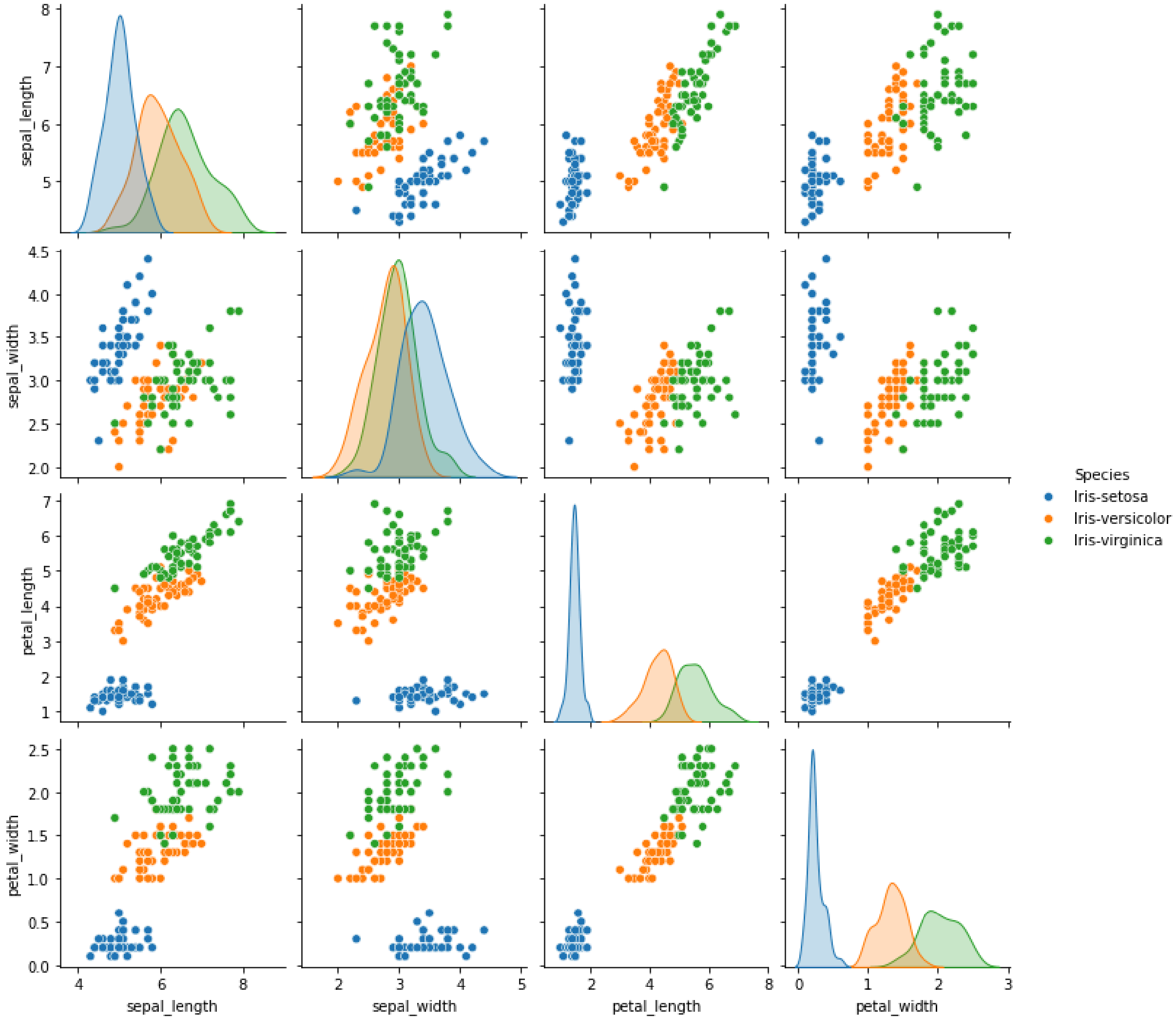
In [35]:
```
org_dataset = pd.read_csv(r'Data/iris.csv')
org_dataset.head(3)
```

Out[35]:

	sepal_length	sepal_width	petal_length	petal_width	Species
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

In [40]:
```
sns.pairplot(data=org_dataset, hue='Species')
plt.savefig(r"Generated_images/raw-iris-clustering-original-data.jpg")
plt.show()
```

```
C:\Users\rashi\AppData\Local\Programs\Python\Python39\lib\site-packages\seaborn\axis
grid.py:123: UserWarning: The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
```



In [ ]: