Iris Flower Classification

Import the required packages

In [1]:
```
import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

import seaborn as sns # data visualization library
import matplotlib.pyplot as plt # for creating static, animated, and interactive vi
```

Load the Dataset

In [2]:
```
df = pd.read_csv("D:\CognoRise InfoTech\IRIS.csv")
```

In [3]:
```
iris = df.copy()
iris.head()
```

Out[3]:

	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
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [4]:
```
iris.info()
iris.species.value_counts()
```

Out[4]:
```
<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
Iris-setosa        50
Iris-versicolor    50
Iris-virginica     50
Name: species, dtype: int64
```

In [5]:
```
iris.describe().T
```

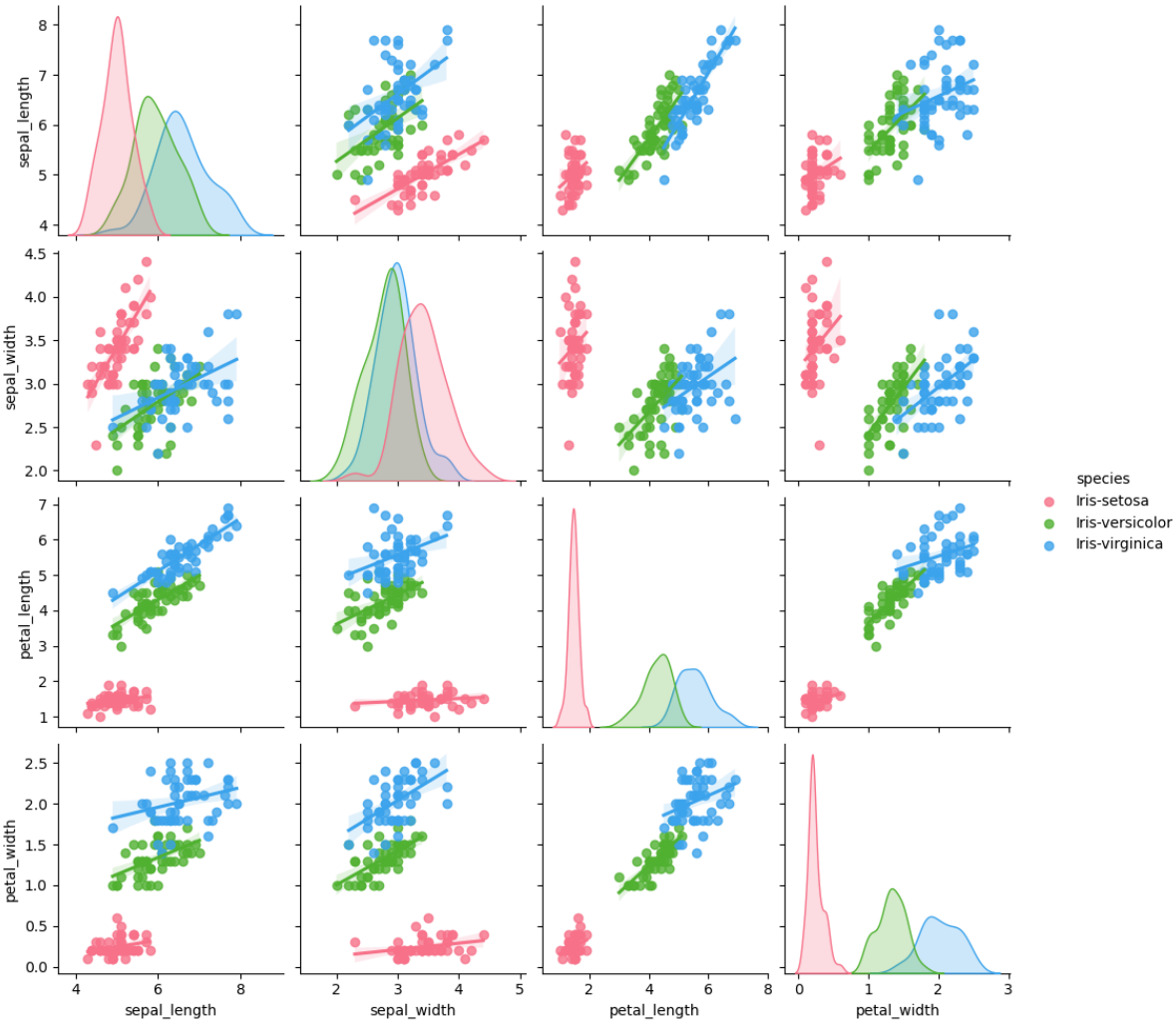
Out[5]:

	count	mean	std	min	25%	50%	75%	max
sepal_length	150.0	5.843333	0.828066	4.3	5.1	5.80	6.4	7.9
sepal_width	150.0	3.054000	0.433594	2.0	2.8	3.00	3.3	4.4
petal_length	150.0	3.758667	1.764420	1.0	1.6	4.35	5.1	6.9
petal_width	150.0	1.198667	0.763161	0.1	0.3	1.30	1.8	2.5

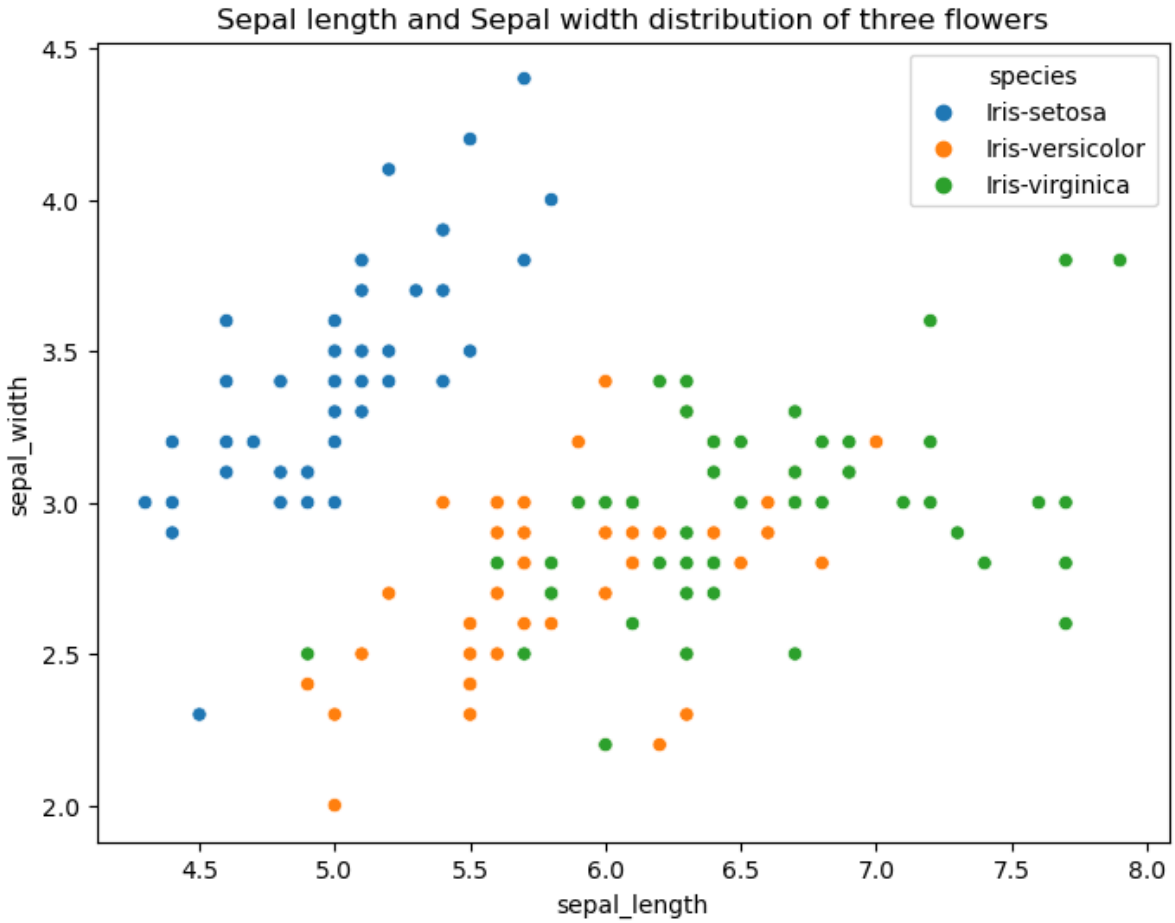
Visualization

In [6]:
```
plt.figure(figsize=(8,6));
sns.pairplot(iris,kind='reg',hue ='species',palette="husl" );
```

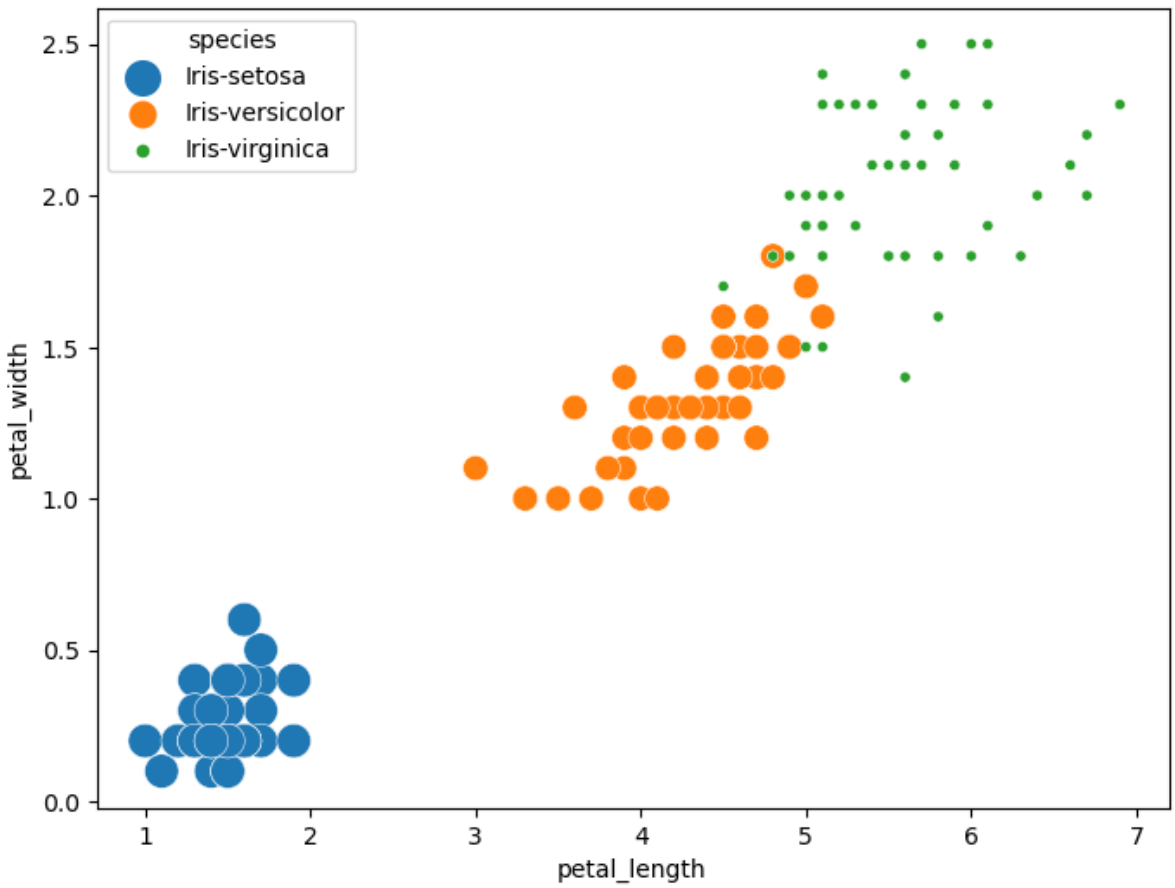
```
<Figure size 800x600 with 0 Axes>
```



In [7]:
```
plt.figure(figsize=(8,6));
sns.scatterplot(x=iris.sepal_length,y=iris.sepal_width,hue=iris.species).set_title(
```



In [8]:
```
plt.figure(figsize=(8,6));
cmap = sns.cubehelix_palette(dark=.5, light=.9, as_cmap=True)
ax = sns.scatterplot(x="petal_length", y="petal_width",hue="species",size="species"
```



Creating ML classify Models

In [9]:
```
#Encoding Categorical Data
from sklearn.preprocessing import LabelEncoder
lb_make = LabelEncoder()
iris['species'] = lb_make.fit_transform(iris['species'])
iris.sample(3)
```

Out[9]:

	sepal_length	sepal_width	petal_length	petal_width	species
109	7.2	3.6	6.1	2.5	2
22	4.6	3.6	1.0	0.2	0
127	6.1	3.0	4.9	1.8	2

In [10]:
```
# # PCA ===> if data consist of too many parameters/variables(columns) then we need
# from sklearn.decomposition import PCA
# pca = PCA(n_components = 2,whiten = True) #whitten = normalize
# pca.fit(iris)
# x_pca = pca.transform(iris)
```

In [11]:
```
# Importing metrics for evaluation
from sklearn.metrics import confusion_matrix
from sklearn.metrics import classification_report
```

In [12]:
```
y = iris.species
X = iris.drop('species',axis = 1)
```

In [13]:
```
#Train and Test split,cross_val,k-fold
from sklearn.model_selection import KFold,train_test_split,cross_val_score
X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.3,random_state=0)
```

KNN Model

In [14]:
```
from sklearn.neighbors import KNeighborsClassifier
```

In [15]:
```
knn = KNeighborsClassifier(n_neighbors = 3)
knn.fit(X_train,y_train)
```

Out[15]:
```
KNeighborsClassifier
KNeighborsClassifier(n_neighbors=3)
```

In [16]:
```
y_pred = knn.predict(X_test)
```

Summary of the predictions

In [17]:
```
# Summary of the predictions made by the KNN
print(classification_report(y_test, y_pred))
print(confusion_matrix(y_test, y_pred))
```

```
                precision    recall  f1-score   support

           0       1.00      1.00      1.00        16
           1       1.00      0.94      0.97        18
           2       0.92      1.00      0.96        11

    accuracy                           0.98        45
   macro avg       0.97      0.98      0.98        45
weighted avg       0.98      0.98      0.98        45

[[16  0  0]
 [ 0 17  1]
 [ 0  0 11]]
```

Accuracy score

In [18]:
```
from sklearn.metrics import accuracy_score
print('accuracy is',accuracy_score(y_pred,y_test))
```

```
accuracy is 0.9777777777777777
```

In [ ]:
```

```