Task-1 : Iris Flowers Classification ML Project(Beginner Level Task)

This particular ML project is usually referred to as the “Hello World” of Machine Learning. The iris flowers dataset contains numeric attributes, and it is perfect for beginners to learn about supervised ML algorithms, mainly how to load and handle data. Also, since this is a small dataset, it can easily fit in memory without requiring special transformations or scaling capabilities.

Dataset used link : http://archive.ics.uci.edu/ml/datasets/Iris

A look into dataset

```
#Introduction
#We will be using the iris data set.
#This is a well-known data set containing iris species and sepal and petal measurements.
#The data we will use are in a file called `iris.csv` found in the /content/iris.csv directory.
import os
```

```
import numpy as np
import pandas as pd



#load the data
df_iris = pd.read_csv('/content/iris.csv',names=["Sepal_Length_in_cm","Sepal_Width_in_cm","Petal_Length_in_cm","Petal_Width_in_cm","S
df_iris
```

	Sepal_Length_in_cm	Sepal_Width_in_cm	Petal_Length_in_cm	Petal_Width_in_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
...	...	...	...	...
145	6.7	3.0	5.2	2.3
146	6.3	2.5	5.0	1.9
147	6.5	3.0	5.2	2.0
148	6.2	3.4	5.4	2.3
149	5.9	3.0	5.1	1.8

150 rows × 5 columns

```
##shape(numbers of rows)
print(df_iris.shape[0])
##column names
print(df_iris.columns.tolist())
```

```
##data types
print(df_iris.dtypes)
```

```
     150
     ['Sepal_Length_in_cm', 'Sepal_Width_in_cm', 'Petal_Length_in_cm', 'Petal_Width_in_cm', 'Species_Flower']
     Sepal_Length_in_cm    float64
     Sepal_Width_in_cm     float64
     Petal_Length_in_cm    float64
     Petal_Width_in_cm     float64
     Species_Flower         object
     dtype: object
```

```
## to get more info of the dataset
df_iris.info()
```

```
     <class 'pandas.core.frame.DataFrame'>
     RangeIndex: 150 entries, 0 to 149
     Data columns (total 5 columns):
      #   Column              Non-Null Count  Dtype
     ---  ------              --------------  -----
      0   Sepal_Length_in_cm  150 non-null    float64
      1   Sepal_Width_in_cm   150 non-null    float64
      2   Petal_Length_in_cm  150 non-null    float64
      3   Petal_Width_in_cm   150 non-null    float64
      4   Species_Flower      150 non-null    object
     dtypes: float64(4), object(1)
     memory usage: 6.0+ KB
```

```
#let's check if we got some null values or not
df_iris.isnull().sum()
```

```
     Sepal_Length_in_cm    0
     Sepal_Width_in_cm     0
     Petal_Length_in_cm    0
     Petal_Width_in_cm     0
     Species_Flower        0
     dtype: int64
```

```
#let's Generate descriptive statistics.
```

```
#Descriptive statistics include those that summarize the central tendency, dispersion and shape of a dataset’s distribution, excludi
#Analyzes both numeric and object series, as well as DataFrame column sets of mixed data types
df_iris.describe()
```

	Sepal_Length_in_cm	Sepal_Width_in_cm	Petal_Length_in_cm	Petal_Width_in_
count	150.000000	150.000000	150.000000	150.0000
mean	5.843333	3.054000	3.758667	1.1986
std	0.828066	0.433594	1.764420	0.7631
min	4.300000	2.000000	1.000000	0.1000
25%	5.100000	2.800000	1.600000	0.3000
50%	5.800000	3.000000	4.350000	1.3000
75%	6.400000	3.300000	5.100000	1.8000
max	7.900000	4.400000	6.900000	2.5000

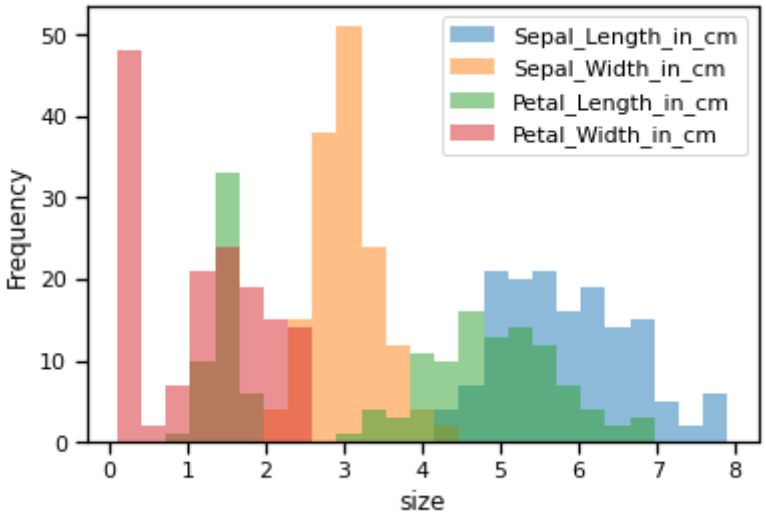
```
df_iris.groupby('Species_Flower').agg([np.mean,np.median])
```

	Sepal_Length_in_cm		Sepal_Width_in_cm		Petal_Length_in_cm		Petal_
	mean	median	mean	median	mean	median	mean
Species_Flower							
Iris-setosa	5.006	5.0	3.418	3.4	1.464	1.50	0.244
Iris-versicolor	5.936	5.9	2.770	2.8	4.260	4.35	1.326
Iris-virginica	6.588	6.5	2.974	3.0	5.552	5.55	2.026

Exploratory Data Analysis

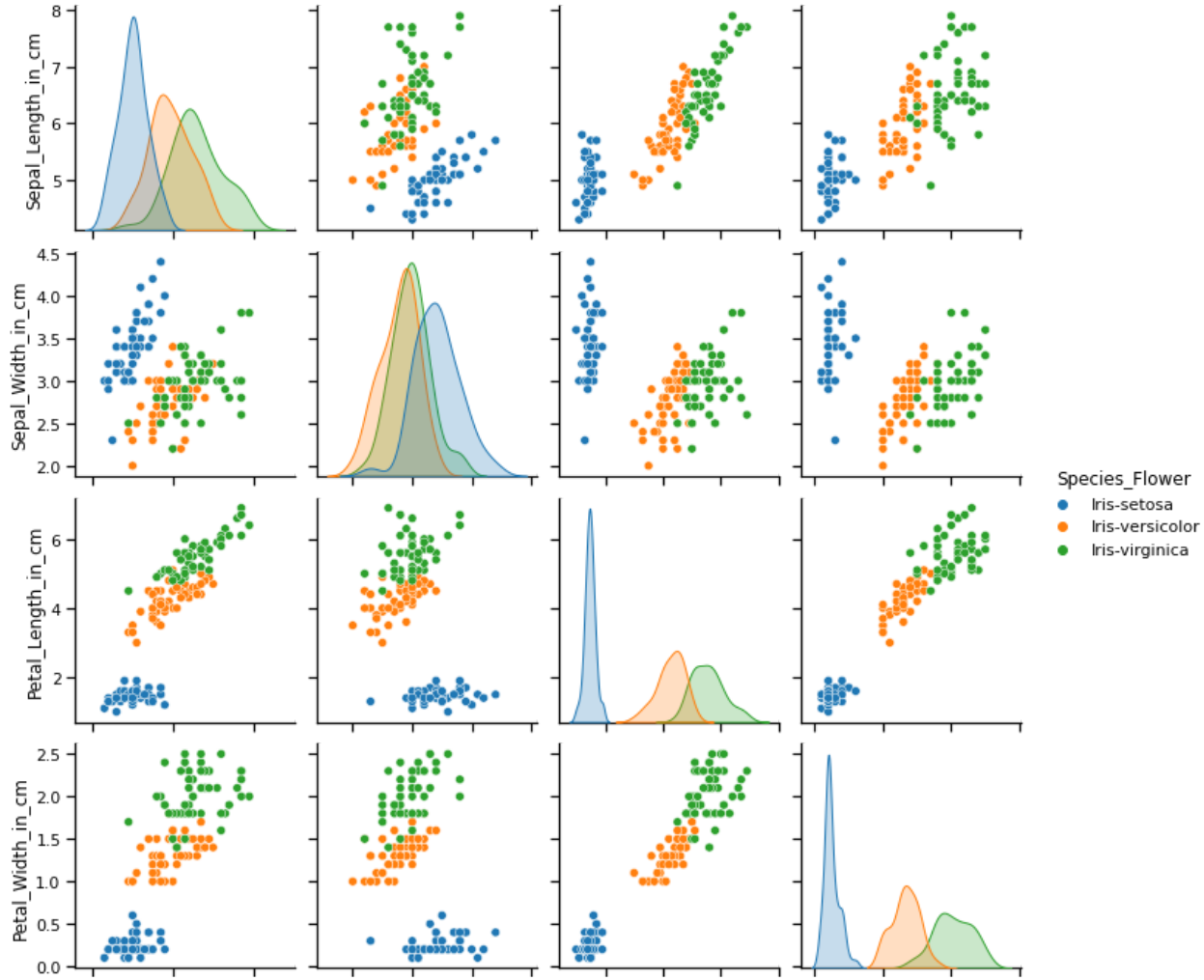
```
#A single plot with histograms for each feature ("Sepal_Length_in_cm","Sepal_Width_in_cm","Petal_Length_in_cm","Petal_Width_in_cm") c
import seaborn as sns
sns.set_context('notebook')
ax=df_iris.plot.hist(bins=25,alpha=0.5)
ax.set_xlabel('size')
```

```
Text(0.5, 0, 'size')
```

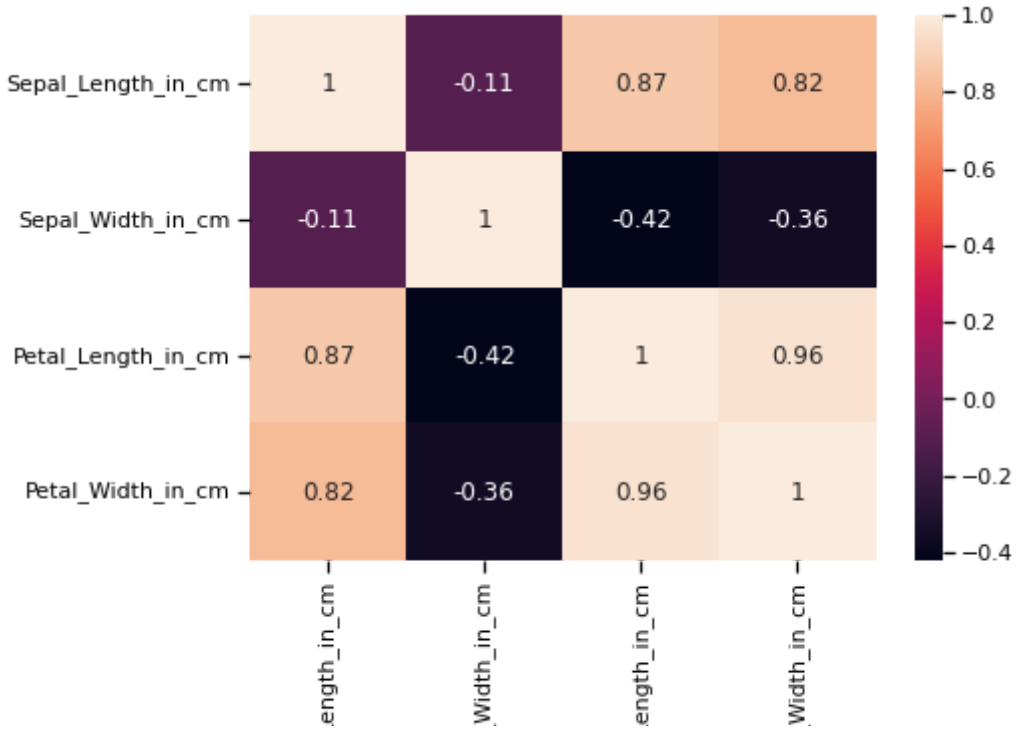



```
# pairwise relationships in a dataset.
sns.pairplot(df_iris,hue="Species_Flower")
```

```
<seaborn.axisgrid.PairGrid at 0x7f44317c9fd0>
```




```
#rectangular data as a color-encoded matrix
import matplotlib.pyplot as plt
plt.figure(figsize=(7,5))
sns.heatmap(df_iris.corr(), annot=True)
plt.show()
```



Splitting data into train and test sets accordingly

```
#To encode target labels with value between 0 and n_classes-1
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
df_iris['Species_Flower'] = le.fit_transform(df_iris['Species_Flower'])
df_iris
```

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```
from sklearn.model_selection import train_test_split
X = df_iris.drop(columns=['Species_Flower'])
Y = df_iris['Species_Flower']
x_train , x_test , y_train , y_test = train_test_split(X , Y , test_size = 0.3)
```

150 rows × 5 columns

Training the model using Linear Support Vector Classification

```
#Similar to SVC with parameter kernel='linear', but implemented in terms of liblinear rather than libsvm
#so it has more flexibility in the choice of penalties and loss functions and should scale better to large numbers of samples.
from sklearn.svm import LinearSVC
Li_svc=LinearSVC()
Li_svc.fit(x_train,y_train)
```

```
/usr/local/lib/python3.8/dist-packages/sklearn/svm/_base.py:1206: ConvergenceWarning: Liblinear failed to converge, increase th
  warnings.warn(
LinearSVC()
```

Predicting on the trained model

```
y_pred=Li_svc.predict(x_test)
```

Report on how well the model works

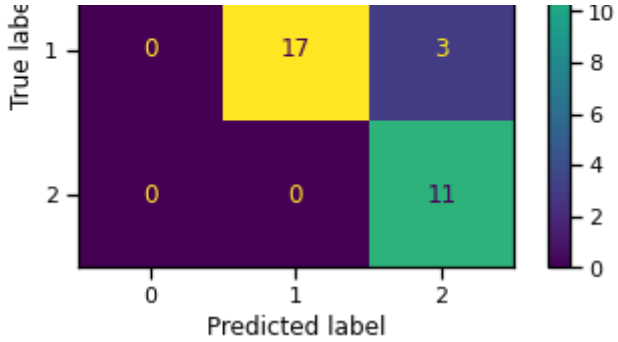
```
from sklearn.metrics import accuracy_score, plot_confusion_matrix, classification_report
score=accuracy_score(y_test,y_pred)
print('Linear Support Vector Classification')
classification_report(y_test,y_pred)
print(f'Accuracy: {round(score*100,6)}%')
```

```
     Linear Support Vector Classification
     Accuracy: 93.333333%
```

```
plot_confusion_matrix(Li_svc,x_test,y_test)
```

```
/usr/local/lib/python3.8/dist-packages/sklearn/utils/deprecation.py:87: FutureWarn
  warnings.warn(msg, category=FutureWarning)
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7f442410fcd0>
```

By: Komal Reddy K



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