```
import pandas as pd

from google.colab import drive
drive.mount('/content/drive')
iris=pd.read_csv('/content/drive/MyDrive/Colab Notebooks/iris.csv')
```

```
Mounted at /content/drive
```

```
iris
```

```
     sepal.length  sepal.width  petal.length  petal.width    variety
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
..            ...          ...           ...          ...        ...
145           6.7          3.0           5.2          2.3  Virginica
146           6.3          2.5           5.0          1.9  Virginica
147           6.5          3.0           5.2          2.0  Virginica
148           6.2          3.4           5.4          2.3  Virginica
149           5.9          3.0           5.1          1.8  Virginica

[150 rows x 5 columns]
```

```
pip install scikit-learn
```

```
Requirement already satisfied: scikit-learn in
/usr/local/lib/python3.10/dist-packages (1.2.2)
Requirement already satisfied: numpy>=1.17.3 in
/usr/local/lib/python3.10/dist-packages (from scikit-learn) (1.23.5)
Requirement already satisfied: scipy>=1.3.2 in
/usr/local/lib/python3.10/dist-packages (from scikit-learn) (1.11.3)
Requirement already satisfied: joblib>=1.1.1 in
/usr/local/lib/python3.10/dist-packages (from scikit-learn) (1.3.2)
Requirement already satisfied: threadpoolctl>=2.0.0 in
/usr/local/lib/python3.10/dist-packages (from scikit-learn) (3.2.0)
```

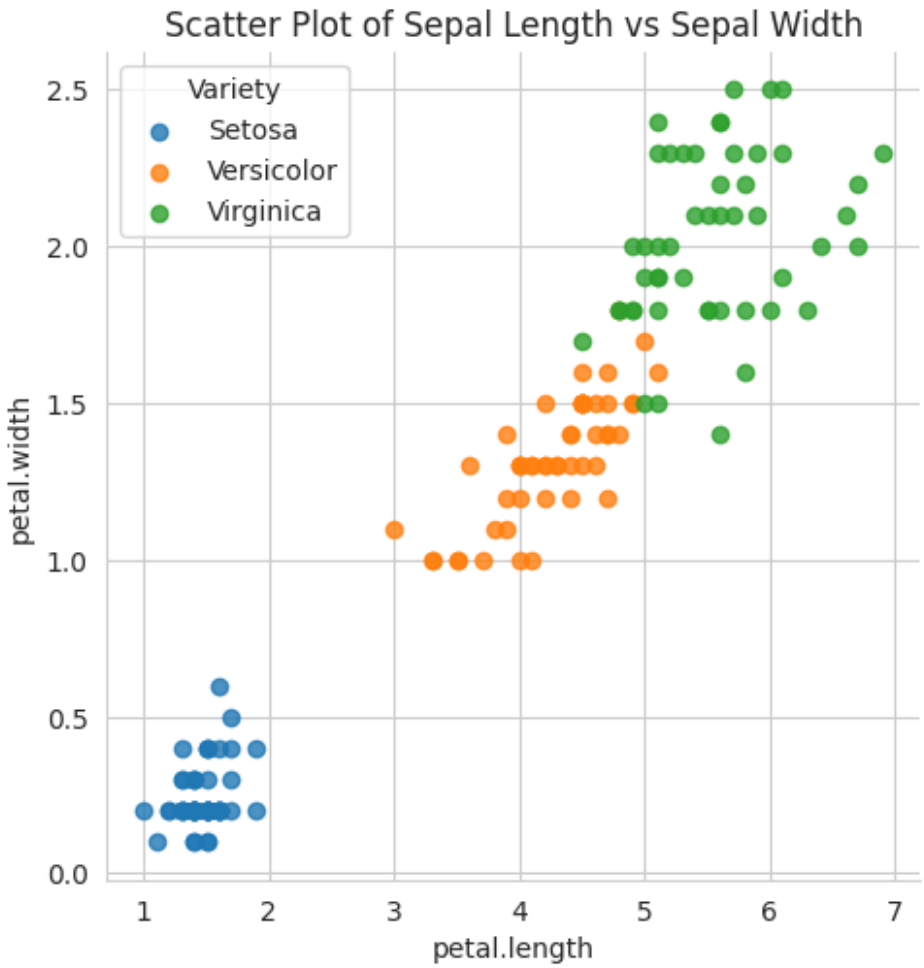
```
from sklearn.model_selection import train_test_split    # import
libraries
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score, classification_report

X=iris.drop(columns=['variety'])
y = iris['variety']
```

Checking Missing Values

```
iris.isnull().sum()
```

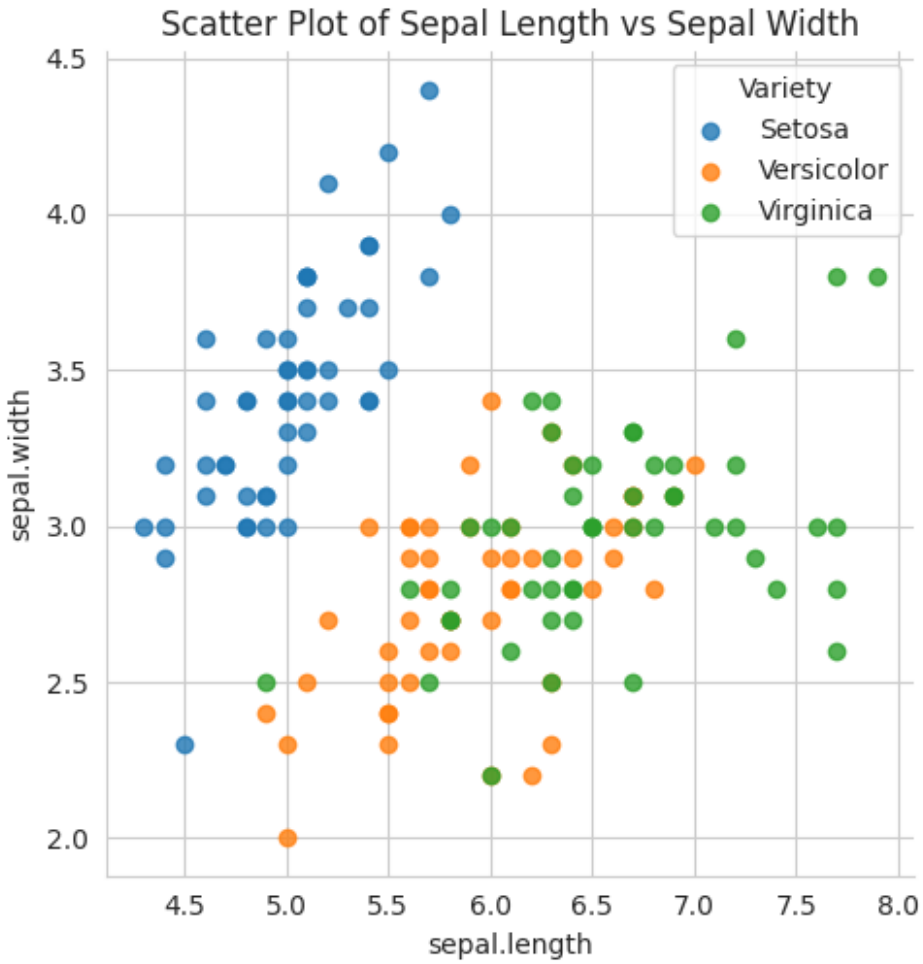
```
sepal.length    0
sepal.width     0
petal.length    0
petal.width     0
variety         0
dtype: int64
```

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


sns.set_style("whitegrid")

sns.lmplot(x='petal.length', y='petal.width', data=iris,
hue='variety', fit_reg=False, legend=False)
plt.title("Scatter Plot of Sepal Length vs Sepal Width")
plt.legend(title="Variety")
plt.show()
```



Scatter Plot:Setosa have smaller petal width and length and virginica have higher petal length and width

```
sns.set_style("whitegrid")

sns.lmplot(x='sepal.length', y='sepal.width', data=iris,
hue='variety', fit_reg=False, legend=False)
plt.title("Scatter Plot of Sepal Length vs Sepal Width")
plt.legend(title="Variety")
plt.show()
```



Splitting the dataset

```
X_train, X_test, Y_train, Y_test = train_test_split(X,y,
test_size=0.2, random_state=42) # Splitting the dataset into 80 - 20
```

Implemendation of KNN

```
k=3
knn = KNeighborsClassifier(n_neighbors=k)

knn.fit(X_train, Y_train)
```

```
KNeighborsClassifier(n_neighbors=3)
```

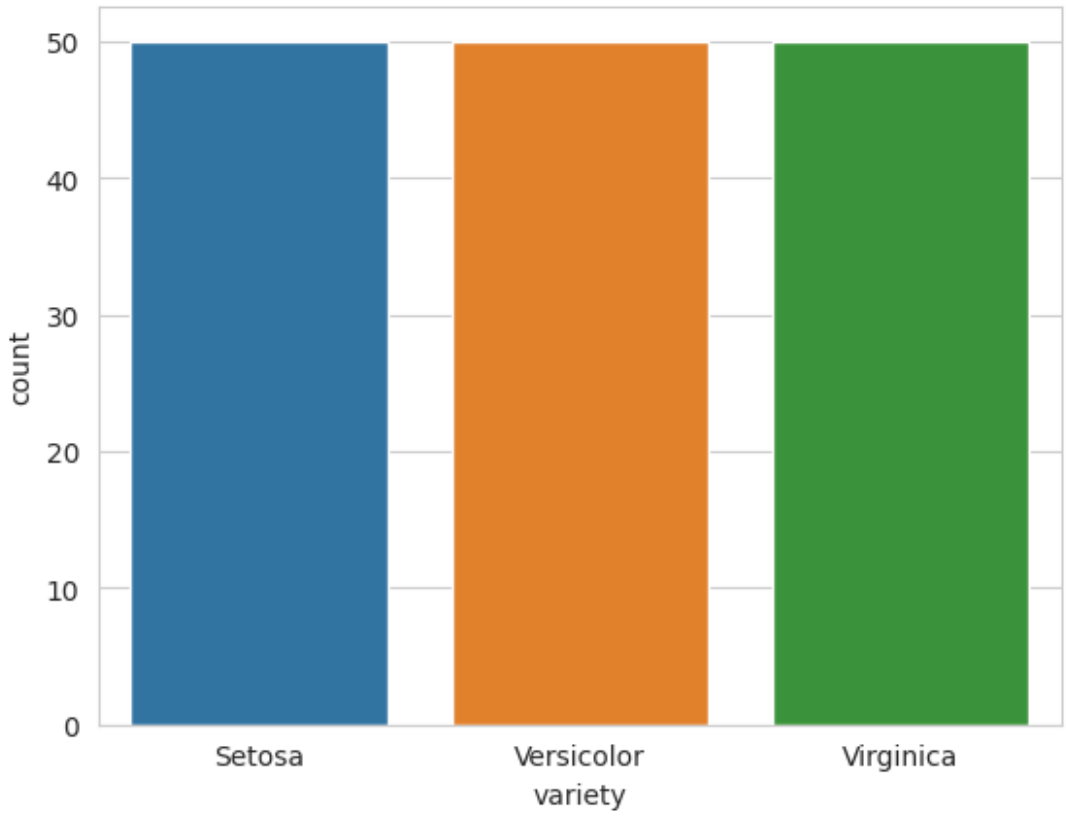
```
y_pred = knn.predict(X_test)

accuracy=accuracy_score(Y_test, y_pred)
report= classification_report(Y_test, y_pred)
print(f'Accuracy: {accuracy}')
```

```
Accuracy: 1.0
```

```
class_counts = iris['variety'].value_counts()
class_counts
```

```
Setosa        50
Versicolor    50
Virginica     50
Name: variety, dtype: int64
```

```
import matplotlib.pyplot as plt
import seaborn as sns
sns.countplot(x='variety', data=iris)
plt.show()
```



Every Class Label(Setosa,Versicolor,Virginica) has equal count of 50

```
import csv
import math
import pandas as pd
from google.colab import drive

# Mount Google Drive
drive.mount('/content/drive')

def load_data(filename):
    dataset = []
    class_encoding = {'Setosa': 0, 'Versicolor': 1, 'Virginica': 2}
    with open(filename, 'r') as file:
        lines = csv.reader(file)
        next(lines)
        for row in lines:
            row[-1] = class_encoding[row[-1]]
            dataset.append([float(x) for x in row])
    return dataset

# calculate distance using Euclidean distance
def euclidean_distance(point1, point2):
    distance = 0
    for i in range(len(point1)):
```

```
        distance += (point1[i] - point2[i]) ** 2
    return math.sqrt(distance)

#find neighrous neighbor
def get_neighbors(train_data, test_data, k):
    distances = []
    for row in train_data:
        dist = euclidean_distance(test_data, row)
        distances.append((row, dist))
    distances.sort(key=lambda x: x[1])
    neighbors = [x[0] for x in distances[:k]]
    return neighbors

#predicting based on vote
def predict_classification(neighbors):
    class_votes = {}
    for neighbor in neighbors:
        target = neighbor[-1]
        if target in class_votes:
            class_votes[target] += 1
        else:
            class_votes[target] = 1
    sorted_votes = sorted(class_votes.items(), key=lambda x: x[1],
reverse=True)
    return sorted_votes[0][0]

#evaluate the model to get accuracy
def evaluate_model(train_data, test_data, k):
    correct = 0
    for row in test_data:
        neighbors = get_neighbors(train_data, row, k)
        predicted_class = predict_classification(neighbors)
        if predicted_class == row[-1]:
            correct += 1
    accuracy = (correct / float(len(test_data))) * 100.0
    return accuracy

# Define the file path in your Google Drive
file_path = '/content/drive/MyDrive/Colab Notebooks/iris.csv'

data = load_data(file_path)

# Split the data into training and test sets
split_ratio = 0.8
split = int(len(data) * split_ratio)
train_data = data[:split]
test_data = data[split:]

#Assign value of K
k = 3
```

```
correct = 0
for row in test_data:
    neighbors = get_neighbors(train_data, row, k)
    predicted_class = predict_classification(neighbors)
    if predicted_class == row[-1]:
        correct += 1

accuracy = (correct / float(len(test_data))) * 100.0
print(f'Accuracy: {accuracy:.2f}%')

new_data_point = [6.6, 2.9, 4.6, 1.3]
k = 3
neighbors = get_neighbors(train_data, new_data_point, k)
predicted_class = predict_classification(neighbors)
variety_mapping = {0: 'Setosa', 1: 'Versicolor', 2: 'Virginica'}
predicted_variety = variety_mapping[predicted_class]

print(f'Predicted Variety: {predicted_variety}')
```

```
Drive already mounted at /content/drive; to attempt to forcibly
remount, call drive.mount("/content/drive", force_remount=True).
Accuracy: 100.00%
Predicted Variety: Versicolor
```