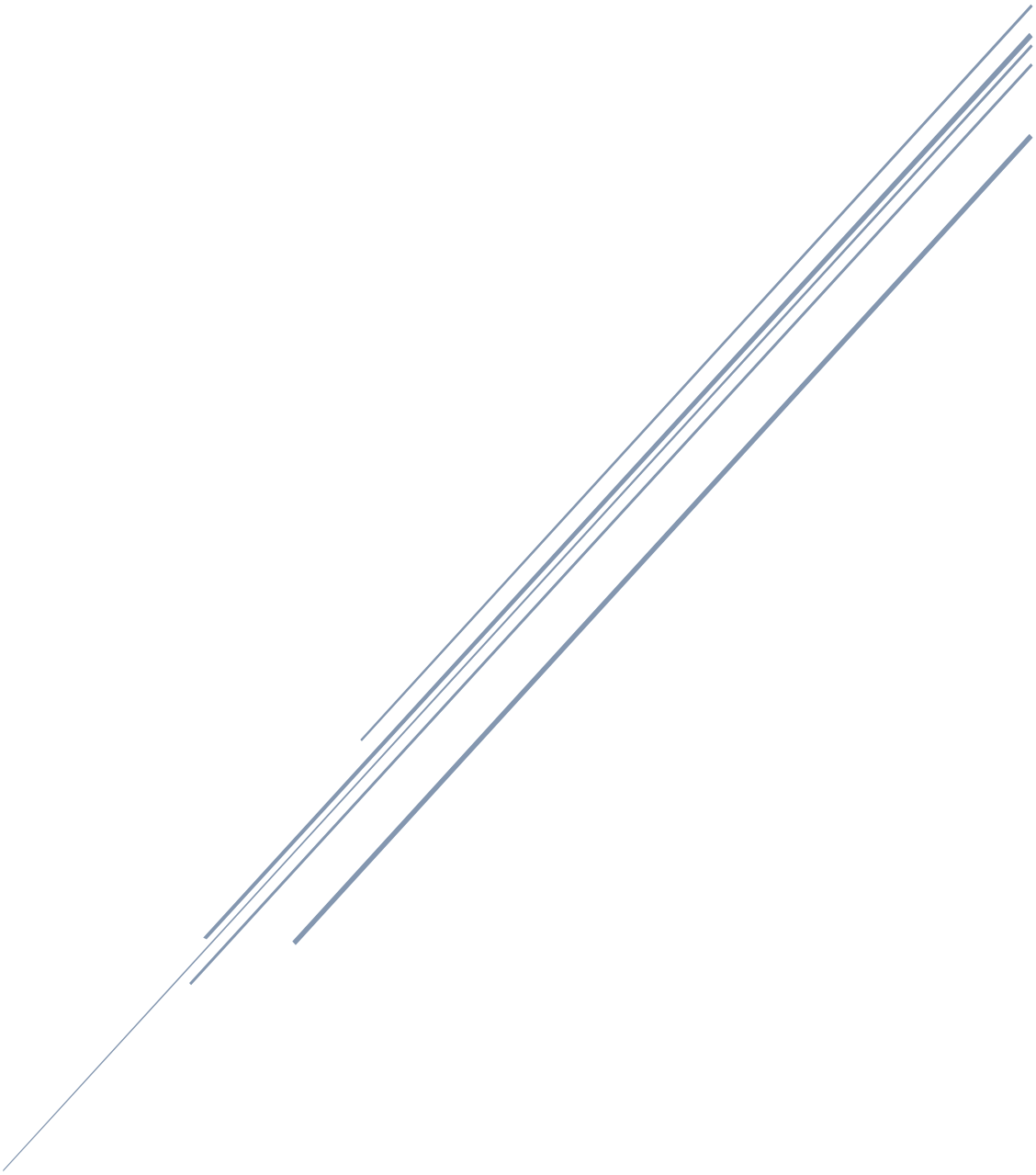
MACHINE LEARNING LAB

Department of Mechatronics Engineering



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Lab#3: KNN-Algorithm

Objective:

- Familiarize students with K Nearest Algorithm
- Use the dataset to train the model and predict the output on the new input.

Introduction:

The k-nearest neighbors' algorithm, also known as KNN or k-NN, is a non-parametric, supervised learning classifier, which uses proximity to make classifications or predictions about the grouping of an individual data point. While it can be used for either regression or classification problems, it is typically used as a classification algorithm, working off the assumption that similar points can be found near one another.

Lab Tasks:

Question #1:

Using Sklearn library and KNN algorithm, find the nearest neighbor for the input given by user.

Code Snippet:

Uni_Labs > KNN-lab3.py > ...

```
# ----1. importing Dataset----
from sklearn.datasets import load_iris
iris = load_iris() #dictionary that contains the design & target
    #dataset is cleaned already so putting it in matrices
    #no preprocessing required as all the data is numerical
X = iris.data #features
Y = iris.target #output


# ----2. Splitting the data for train and testing
from sklearn.model_selection import train_test_split
X_train, X_test, Y_train, Y_test = train_test_split(X,Y, train_size=0.80)

# ----3. Choose the KNN model
from sklearn.neighbors import KNeighborsClassifier
knn = KNeighborsClassifier(n_neighbors= 5)

# ----4. fitting the data to the model
knn.fit(X_train,Y_train)

# ----5. Evaluating the model
print("Model Score: ",knn.score(X_test, Y_test)) #acuracy nearly 0.966666666667
```

Figure 1 Code Snippet-I

```python

# ----6. Predicting the output on the basis of user' input.
inp1 = float(input("Enter Sepal length: "))
inp2 = float(input("Enter Sepal width: "))
inp3 = float(input("Enter Sepal length: "))
inp4 = float(input("Enter Sepal width: "))

# create an array to feed into the predition function
import numpy as np
inp = np.array([[inp1, inp2, inp3, inp4]])
prob = knn.predict_proba(inp)
print("Probabilty matrix: ",prob)
out = knn.predict(inp)[0]
# ----7. Interpreting the result in human readable form
flowerdict = {
  0: "Setosa",
  1: "Versicolor",
  2: "Virginia"
}
print("Depending upon features model predict output as : ",flowerdict[out])
```

Figure 2 Code Snippet-II

Output:

```
PS C:\Users\19097\Desktop\vs_pyto> & C:/Users/19097/anaconda3/python.exe c:/Users/19097/Desktop/vs_pyto/Uni_Lab
s/KNN-lab3.py
Model Score:  0.9666666666666667
Enter Sepal length: 4.5
Enter Sepal width: 3.2
Enter Sepal length: 2.3
Enter Sepal width: 1.2
Probabilty matrix:  [[1. 0. 0.]]
Depending upon features model predict output as :  Setosa
```

Figure 3 Terminal Output

Conclusion:

After performing this lab, we were able to find import the dataset available in sklearn library and after splitting the data into test and train set we fitted the model and check the score using the new test input. Average score was 0.90+ which is quite good. Afterwards, we took the input from the user and predict the most likely outcome.