CREATE A CHATBOT IN PYTHON

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INTRODUCTION :

K-Nearest Neighbours (KNN) is a popular machine learning algorithm used for classification and regression tasks. It is a **lazy learning**, non-parametric algorithm that uses data with several classes to predict the classification of the new sample point. KNN is non-parametric since it doesn't make any assumptions on the data being studied.

During the training phase, the KNN algorithm stores the entire training dataset as a reference. When implementing an algorithm, you will always need a data set. So, you start by loading the training and the test data. Then, you choose the nearest data points (the value of K). K can be any integer.

The working of KNN Algorithm in Machine Learning can be summarized in three steps:

1. Load the data
2. Choose the nearest data points (the value of K)
3. Do the following, for each test data –
    - Calculate the distance between test data and each row of training data
    - Sort the calculated distances in ascending order based on distance values
    - Get top K rows from sorted array
    - Get the most frequent class of these rows
    - Return this class as output.

PROCESS:

 # Import necessary modules

from sklearn.neighbors import KNeighborsClassifier

```
from sklearn.model_selection import train_test_split
from sklearn.datasets import load_iris

# Loading data
irisData = load_iris()

# Create feature and target arrays
X = irisData.data
y = irisData.target

# Split into training and test set
X_train, X_test, y_train, y_test = train_test_split(
                    X, y, test_size = 0.2, random_state=42)

knn = KNeighborsClassifier(n_neighbors=7)

knn.fit(X_train, y_train)

# Predict on dataset which model has not seen before
print(knn.predict(X_test))
```

OUTPUT:

```
[1 0 2 1 1 0 1 2 2 1 2 0 0 0 0 1 2 1 1 2 0 2 0 2 2 2 2 2 0 0]
```

```
# Import necessary modules
from sklearn.neighbors import KNeighborsClassifier
from sklearn.model_selection import train_test_split
from sklearn.datasets import load_iris
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# Loading data
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                            X, y, test_size = 0.2, random_state=42)

knn =  KNeighborsClassifier(n_neighbors=7)

knn.fit(X_train, y_train)

# Calculate the accuracy of the model
print(knn.score(X_test, y_test))
```

OUTPUT:

```
0.9666666666666667
```

```
# Import necessary modules
from sklearn.neighbors import KNeighborsClassifier
from sklearn.model_selection import train_test_split
from sklearn.datasets import load_iris
import numpy as np
import matplotlib.pyplot as plt

irisData = load_iris()

# Create feature and target arrays
X = irisData.data
y = irisData.target

# Split into training and test set
X_train, X_test, y_train, y_test = train_test_split(
                            X, y, test_size = 0.2, random_state=42)

neighbors = np.arange(1, 9)
train_accuracy = np.empty(len(neighbors))
test_accuracy = np.empty(len(neighbors))
```

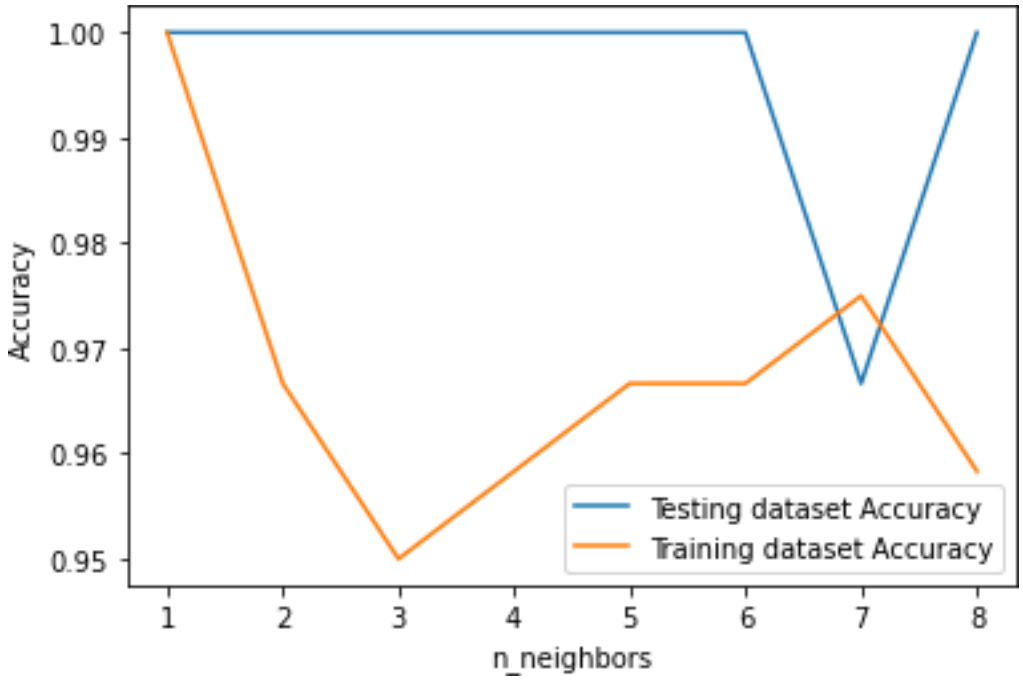
```
# Loop over K values
for i, k in enumerate(neighbors):
        knn = KNeighborsClassifier(n_neighbors=k)
        knn.fit(X_train, y_train)

        # Compute training and test data accuracy
        train_accuracy[i] = knn.score(X_train, y_train)
        test_accuracy[i] = knn.score(X_test, y_test)

# Generate plot
plt.plot(neighbors, test_accuracy, label = 'Testing dataset
Accuracy')
plt.plot(neighbors, train_accuracy, label = 'Training dataset
Accuracy')

plt.legend()
plt.xlabel('n_neighbors')
plt.ylabel('Accuracy')
plt.show()
```

OUTPUT:



CONCLUSION:

In this article, we covered the workings of the KNN algorithm and its implementation in Python. It's one of the most basic yet effective machine-learning models. For KNN implementation in R, you can go through this tutorial: kNN Algorithm using R. You can also go for our free course – K-Nearest Neighbors (KNN) Algorithm in Python and R, to further your foundations of KNN.

In this article, we used the KNN model directly from the *scikit-learn* library. You can also implement KNN from scratch (I recommend this!), which is covered in this article: KNN simplified.