

Artificial Intelligence and Machine Learning

LAB 7

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7. Implement KNN Classification algorithm on a dataset. Analyse the model using different K values and display the performance of the model.

Program:

```
import matplotlib.pyplot as plt
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score

iris = load_iris()
X = iris.data
y = iris.target

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=0)

scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

k_values = list(range(1, 11))
accuracies = []

for k in k_values:
    knn = KNeighborsClassifier(n_neighbors=k)
    knn.fit(X_train, y_train)
    y_pred = knn.predict(X_test)
    acc = accuracy_score(y_test, y_pred)
    accuracies.append(acc)
    print(f'K = {k} --> Accuracy = {acc:.2f}')

plt.plot(k_values, accuracies, marker='o')
plt.title('KNN Accuracy vs K Value')
plt.xlabel('K Value')
plt.ylabel('Accuracy')
plt.xticks(k_values)
plt.grid(True)
plt.show()
```

Output:

K = 1 --> Accuracy = 0.93
K = 2 --> Accuracy = 0.96
K = 3 --> Accuracy = 0.98
K = 4 --> Accuracy = 0.98
K = 5 --> Accuracy = 0.98
K = 6 --> Accuracy = 0.98
K = 7 --> Accuracy = 0.98
K = 8 --> Accuracy = 0.98
K = 9 --> Accuracy = 0.98
K = 10 --> Accuracy = 0.98

