RIPHAH INTERNATIONAL UNIVERSITY, ISLAMABAD

Lab#10

Bachelors of Computer Science – 6th Semester

Course: Artificial Intelligence

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LAB TASKS

Question # 1

Implement KNN classifier with Iris dataset.

```python
import numpy as np
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report
from collections import Counter


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


X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)


class KNearestNeighbors:  1 usage
    def _init_(self, k=3):
        self.k = k

    def fit(self, X_train, y_train):  1 usage
        self.X_train = np.array(X_train)
        self.y_train = np.array(y_train)

    def _calculate_distance(self, point1, point2):  1 usage
        return np.sqrt(np.sum((point1 - point2) ** 2))

    def predict(self, X_test):  1 usage
        return [self._predict_single(sample) for sample in X_test]

    def _predict_single(self, sample):  1 usage
        distances = [self._calculate_distance(sample, train_sample) for train_sample in self.X_train]
        nearest_indices = np.argsort(distances)[:self.k]
        nearest_labels = [self.y_train[idx] for idx in nearest_indices]
        return Counter(nearest_labels).most_common(1)[0][0]
```

```python
knn_model = KNearestNeighbors(k=3)
knn_model.fit(X_train, y_train)


y_pred = knn_model.predict(X_test)


accuracy = np.mean(y_pred == y_test)
print(f"Model Accuracy: {round(accuracy * 100, 2)}%")


print("\nClassification Report:")
print(classification_report(y_test, y_pred))
```