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1  import numpy as np
2
3  def knn_regression(X_train, y_train, X_test, k=3):
4      """
5      Implements a KNN algorithm for regression tasks, predicting the average of the k nearest
neighbors.
6
7      Args:
8          X_train (numpy.ndarray): Training feature data.
9          y_train (numpy.ndarray): Training target values.
10         X_test (numpy.ndarray): Test feature data.
11         k (int): Number of nearest neighbors to consider.
12
13     Returns:
14         numpy.ndarray: Predicted target values for the test data.
15     """
16
17     y_pred = []
18     for x_test in X_test:
19         distances = np.linalg.norm(X_train - x_test, axis=1) # Calculate Euclidean distances
20         nearest_indices = np.argsort(distances)[:k] # Get indices of k nearest neighbors
21         predicted_value = np.mean(y_train[nearest_indices]) # Calculate average of target values
22         y_pred.append(predicted_value)
23
24     return np.array(y_pred)
25
26 # Example usage with a small dataset
27 X_train = np.array([[1, 2], [3, 4], [5, 6], [7, 8]])
28 y_train = np.array([1.5, 3.5, 5.5, 7.5])
29 X_test = np.array([[2, 3]])
30
31 predictions = knn_regression(X_train, y_train, X_test, k=2)
32 print("Predicted value:", predictions)

```