

ASSIGNMENT

Title: K-Nearest Neighbors (KNN) Algorithm in Machine Learning

Objective: In this assignment, you will learn how to implement and use the K-Nearest Neighbors algorithm for classification tasks using Python. You will practice data preprocessing, model training, and evaluation using the Wine dataset.

Tasks:

1. Import the necessary libraries: Start by importing the required libraries, including pandas, numpy, matplotlib, and scikit-learn.
2. Load the dataset: Load the Wine dataset into a pandas DataFrame using the `load_wine()` function from scikit-learn.
3. Preprocess the data: Split the data into features and target variables. Scale the features using the `StandardScaler()` function from scikit-learn.
4. Split the data: Split the data into training and testing sets using the `train_test_split()` function from scikit-learn. Set the `test_size` parameter to 0.3 and the `random_state` parameter to 42.
5. Train the model: Create an instance of the `KNeighborsClassifier()` class from scikit-learn. Set the `n_neighbors` parameter to 5 and fit the model on the training data.
6. Evaluate the model: Predict the target variable for the testing set using the `predict()` function from scikit-learn. Calculate the accuracy score using the `accuracy_score()` function from scikit-learn.
7. Important point : Tune the hyperparameters: Test different values for the `n_neighbors` parameter to see how it affects the accuracy score. Plot a graph to visualize the relationship between `n_neighbors` and the accuracy score.
8. Conclusion: Write a conclusion on the performance of the KNN algorithm on the Wine dataset and the optimal value for the `n_neighbors` parameter.