Assignment 1: Demonstrating ROC Curve from Iris Data

Objective:

To demonstrate how to plot a ROC curve using logistic regression and the Iris dataset.

Problem Statement:

The objective is to classify the Iris species (Iris-setosa, Iris-versicolor, Iris-virginica) using logistic regression and plot a Receiver Operating Characteristic (ROC) curve for the binary classification case.

Dataset: Use the Iris dataset from the sklearn.datasets module.

Task: Use logistic regression to classify Iris species. You will treat it as a binary classification problem by considering only two species (Iris-setosa and Iris-versicolor).

Instructions:

Load the Iris dataset.

Select the features sepal length and sepal width.

Convert the problem into a binary classification problem by selecting only two classes (Iris-setosa and Iris-versicolor).

Split the data into training and testing sets.

Train a logistic regression model.

Use the trained model to make predictions on the test set.

Plot the ROC curve for the binary classification.

Compute and display the Area Under the Curve (AUC) score.

Expected Output:

ROC Curve Plot

AUC score

Assignment 2: Demonstrating Violin Plot from Iris Data

Objective:

To demonstrate the violin plot using the Iris dataset for visualizing the distribution of different features for the three species of Iris.

Problem Statement:

Visualize the distribution of the features sepal length, sepal width, petal length, and petal width for each species of Iris using violin plots.

Dataset: Use the Iris dataset from the sklearn.datasets module.

Task: Generate violin plots to visualize the distribution of the features for each species.

Instructions:

Load the Iris dataset.

Extract the species and features.

Create violin plots for each feature, separating the species (Iris-setosa, Iris-versicolor, Iris-virginica).

Ensure that each subplot clearly labels the feature and species.

Expected Output:

Violin plot for all four features (sepal length, sepal width, petal length, and petal width).