

## Assignment 1: Iris Flower Classification using Decision Tree

### Task:

1. Load the Iris dataset.
2. Split the data into training and testing sets (80% training, 20% testing).
3. Train a Decision Tree Classifier on the training set.
4. Visualize the decision tree formed.
5. Evaluate the model using a confusion matrix and classification report.
6. Predict the species for a new input:  $[[5.1, 3.5, 1.4, 0.2]]$  (sepal length, sepal width, petal length, petal width).

## Assignment 2: Heart Disease Prediction using Decision Tree

**Objective:** Use the **Heart Disease dataset** to predict whether a person has heart disease based on various medical attributes.

### Task:

1. Load the Heart Disease dataset.
2. Perform basic data preprocessing (e.g., handling missing values).
3. Split the data into training and testing sets (80% training, 20% testing).
4. Train a Decision Tree Classifier.
5. Plot the decision tree.
6. Evaluate the model using accuracy, confusion matrix, and classification report.
7. Test the classifier with the following input:  $[[63, 1, 3, 145, 233, 1, 0, 150, 0, 2.3, 0, 0, 1]]$  (attributes represent age, sex, chest pain type, etc.).

### Expected Output:

- Accuracy of the model
- Confusion Matrix and Classification Report
- Visualization of the Decision Tree
- Prediction for the given input

## Assignment 3: Titanic Survival Prediction using Decision Tree

### Task:

1. Load the Titanic dataset.
2. Perform basic data preprocessing:
  - a. Handle missing values (e.g., in the "Age" and "Embarked" columns).
  - b. Convert categorical features to numeric using label encoding or one-hot encoding.
3. Split the data into training and testing sets (80% training, 20% testing).
4. Train a Decision Tree Classifier on the training data.
5. Visualize the decision tree.
6. Evaluate the model using accuracy, confusion matrix, and classification report.
7. Test the classifier with this input: ['3', 'male', '22', '0', '0', '7.25', 'S'].

### Expected Output:

- Confusion Matrix and Classification Report
- Visualization of the Decision Tree
- Prediction of survival for the provided input