25.Question 2: Decision Tree for Iris Flower Classification

You are analyzing the famous Iris flower dataset to classify iris flowers into three species based on

their sepal and petal dimensions. You want to use a Decision Tree classifier to accomplish this task.

Write a Python program that loads the Iris dataset from scikit-learn, and allows the user to input the

sepal length, sepal width, petal length, and petal width of a new flower. The program should then

use the Decision Tree classifier to predict the species of the new flower.

Code :

#25

import pandas as pd

from sklearn.tree import DecisionTreeClassifier

from sklearn.model\_selection import train\_test\_split

from sklearn.preprocessing import LabelEncoder

from sklearn.metrics import accuracy\_score

df = pd.read\_excel(r"C:\Users\hares\Downloads\q25\_05.xlsx")

# Step 2: Encode species labels

le = LabelEncoder()

df['species'] = le.fit\_transform(df['species'])

# Step 3: Split data

X = df.drop('species', axis=1)

y = df['species']

X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=42)

# Step 4: Train Decision Tree model

model = DecisionTreeClassifier(random\_state=42)

model.fit(X\_train, y\_train)

# Step 5: Evaluate

y\_pred = model.predict(X\_test)

acc = accuracy\_score(y\_test, y\_pred)

print(f"Model accuracy on test data: {acc \* 100:.2f}%")

# Step 6: Predict new flower

def predict\_new\_flower():

print("\nEnter measurements of a new flower:")

inputs = []

for col in X.columns:

value = float(input(f"{col}: "))

inputs.append(value)

prediction = model.predict([inputs])

species\_name = le.inverse\_transform(prediction)[0]

print(f"\nPrediction: The flower species is likely '{species\_name}'.")

predict\_new\_flower()

Output :

Model accuracy on test data: 50.00%

Enter measurements of a new flower:

sepal\_length: 6.0

sepal\_width: 5.2

petal\_length: 3.85

petal\_width: 8.2

Prediction: The flower species is likely 'virginica'.

Dataset :

| **sepal\_length** | **sepal\_width** | **petal\_length** | **petal\_width** | **species** |
| --- | --- | --- | --- | --- |
| 5.1 | 3.5 | 1.4 | 0.2 | setosa |
| 7.0 | 3.2 | 4.7 | 1.4 | versicolor |
| 6.3 | 3.3 | 6.0 | 2.5 | virginica |
| 4.9 | 3.0 | 1.4 | 0.2 | setosa |
| 6.7 | 3.1 | 4.4 | 1.4 | versicolor |
| 5.8 | 2.7 | 5.1 | 1.9 | virginica |
| 5.0 | 3.4 | 1.5 | 0.2 | setosa |
| 6.5 | 2.8 | 4.6 | 1.5 | versicolor |
| 7.6 | 3.0 | 6.6 | 2.1 | virginica |
| 5.4 | 3.9 | 1.7 | 0.4 | setosa |