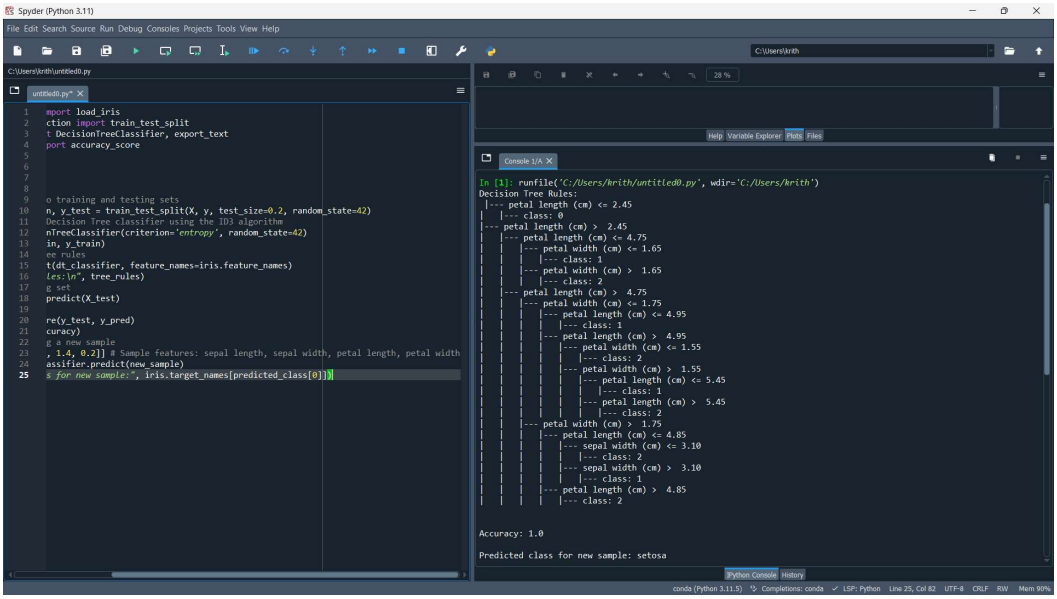
TASK 1: IRIS FLOWER CLASSIFICATION

- **Program:**

```
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier, export_text
from sklearn.metrics import accuracy_score
# Load the Iris dataset
iris = load_iris()
X = iris.data
y = iris.target
# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)
# Create and train the Decision Tree classifier using the ID3 algorithm
dt_classifier = DecisionTreeClassifier(criterion='entropy', random_state=42)
dt_classifier.fit(X_train, y_train)
# Print the decision tree rules
tree_rules = export_text(dt_classifier, feature_names=iris.feature_names)
print("Decision Tree Rules:\n", tree_rules)
# Predict on the testing set
y_pred = dt_classifier.predict(X_test)
# Calculate accuracy
accuracy = accuracy_score(y_test, y_pred)
print("\nAccuracy:", accuracy)
# Example of classifying a new sample
new_sample = [[5.1, 3.5, 1.4, 0.2]] # Sample features: sepal length, sepal width,
petal length, petal width
predicted_class = dt_classifier.predict(new_sample)
print("\nPredicted class for new sample:",
iris.target_names[predicted_class[0]])
```

- **Output:**


Spyder (Python 3.11)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\krith\untitled0.py
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ction import train_test_split
t DecisionTreeClassifier, export_text
port accuracy_score
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n, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
Decision Tree classifier using the ID3 algorithm
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les:\n", tree_rules)
g set
predict(X_test)
re(y_test, y_pred)
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g a new sample
, 1.4, 0.2]] # Sample features: sepal length, sepal width, petal length, petal width
assifier.predict(new_sample)
s for new sample:", iris.target_names[predicted_class[0]])
Help Variable Explorer Plots Files
Console 1/A
In [1]: runfile('C:/Users/krith/untitled0.py', wdir='C:/Users/krith')
Decision Tree Rules:
|--- petal length (cm) <= 2.45
| |--- class: 0
|--- petal length (cm) > 2.45
| |--- petal length (cm) <= 4.75
| | |--- petal width (cm) <= 1.65
| | | |--- class: 1
| | |--- petal width (cm) > 1.65
| | | |--- class: 2
| |--- petal length (cm) > 4.75
| | |--- petal width (cm) <= 1.75
| | | |--- petal length (cm) <= 4.95
| | | | |--- class: 1
| | | |--- petal length (cm) > 4.95
| | | | |--- petal width (cm) <= 1.55
| | | | | |--- class: 2
| | | | |--- petal width (cm) > 1.55
| | | | | |--- petal length (cm) <= 5.45
| | | | | | |--- class: 1
| | | | | |--- petal length (cm) > 5.45
| | | | | | |--- class: 2
| | |--- petal width (cm) > 1.75
| | | |--- petal length (cm) <= 4.85
| | | | |--- sepal width (cm) <= 3.10
| | | | | |--- class: 2
| | | | |--- sepal width (cm) > 3.10
| | | | | |--- class: 1
| | | |--- petal length (cm) > 4.85
| | | | |--- class: 2
Accuracy: 1.0
Predicted class for new sample: setosa
IPython Console History
conda (Python 3.11.5) Completions: conda LSP: Python Line 25, Col 82 UTF-8 CRLF RW Mem 90%