

TASK 1: IRIS FLOWER

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import numpy as np

import pandas as pd

from sklearn.datasets import load_iris

from sklearn.model_selection import train_test_split

from sklearn.preprocessing import StandardScaler

from sklearn.ensemble import RandomForestClassifier

from sklearn.metrics import accuracy_score, classification_report, confusion_matrix

iris = load_iris()

X = iris.data      # Feature measurements

y = iris.target     # Species labels (0: setosa, 1: versicolor, 2: virginica)

target_names = iris.target_names

df = pd.DataFrame(X, columns=iris.feature_names)

df['species'] = y

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)

scaler = StandardScaler()

X_train_scaled = scaler.fit_transform(X_train)

X_test_scaled = scaler.transform(X_test)

clf = RandomForestClassifier(n_estimators=100, random_state=42)

clf.fit(X_train_scaled, y_train)

y_pred = clf.predict(X_test_scaled)

print("Accuracy:", accuracy_score(y_test, y_pred))

print("Confusion Matrix:\n", confusion_matrix(y_test, y_pred))

print("Classification Report:\n", classification_report(y_test, y_pred, target_names=target_names))
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mse = mean_squared_error(y_test, y_pred)
rmse = np.sqrt(mse)
r2 = r2_score(y_test, y_pred)
print("\nEvaluation Metrics:")
print(f"Mean Squared Error: {mse:.2f}")
print(f"Root Mean Squared Error: {rmse:.2f}")
print(f"R-squared: {r2:.2f}")
```