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import pandas as pd

from sklearn.model_selection import train_test_split

from sklearn.linear_model import LogisticRegression

from sklearn.metrics import accuracy_score, classification_report


# Step 1: Load the Iris dataset from the current directory

df = pd.read_csv('iris.csv')


# Display the first few rows of the dataset

print("Sample of the dataset:")

print(df.head())


# Step 2: View basic statistical details for each species

print("\nBasic Statistical Details:")

print(df.groupby('Species').describe())


# Step 3: Prepare the data for logistic regression

# Independent variables (features): SepalLengthCm, SepalWidthCm, PetalLengthCm, PetalWidthCm

X = df[['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']]

# Target variable: Species

y = df['Species']


# Step 4: Split the data into training and testing sets (80:20 ratio)

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)


# Step 5: Build a logistic regression model

model = LogisticRegression(max_iter=200) # Increase max_iter for convergence
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model.fit(X_train, y_train)
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# Step 6: Predict on the testing set
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y_pred = model.predict(X_test)
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# Step 7: Evaluate the model
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accuracy = accuracy_score(y_test, y_pred)
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print("\nModel Accuracy:", accuracy)
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# Step 8: Print classification report
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print("\nClassification Report:")
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print(classification_report(y_test, y_pred))
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