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ROLL NO: 08

PRACTICAL: 5

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import pandas as pd
from sklearn.datasets import load_wine
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score

# Load the Wine dataset
wine = load_wine()
X = pd.DataFrame(wine.data, columns=wine.feature_names)
y = wine.target

# Split the data into training and testing sets (80% training, 20% testing)
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

# Instantiate the Linear Regression model
model = LinearRegression()

# Train the model on the training set
model.fit(X_train, y_train)

# Make predictions on the testing set
y_pred = model.predict(X_test)

# Evaluate the model
mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)

# Display the evaluation metrics
print("Wine Dataset:")
print(f"Mean Squared Error (MSE): {mse:.4f}")
print(f"R-squared (R2): {r2:.4f}")

# Display the coefficients for each feature
coefficients = pd.DataFrame({'Feature': X.columns, 'Coefficient':
model.coef_})
print("\nCoefficients:")
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print(coefficients)
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Wine Dataset:

Mean Squared Error (MSE): 0.0685

R-squared (R2): 0.8825

Coefficients:

	Feature	Coefficient
0	alcohol	-0.109280
1	malic_acid	0.043350
2	ash	-0.204973
3	alcalinity_of_ash	0.044028
4	magnesium	0.000038
5	total_phenols	0.152212
6	flavanoids	-0.353372
7	nonflavanoid_phenols	-0.320201
8	proanthocyanins	0.017596
9	color_intensity	0.076823
10	hue	-0.091345
11	od280/od315_of_diluted_wines	-0.281543
12	proline	-0.000697