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import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeRegressor
from sklearn.metrics import mean_squared_error, r2_score
import matplotlib.pyplot as plt
from sklearn.tree import plot_tree

data = {
    'Room Size (sq ft)': [100, 200, 150, 300, 250, 120, 180, 220, 350,
270],
    'Number of Windows': [1, 2, 1, 3, 2, 1, 1, 2, 3, 2],
    'Temperature (°F)': [70, 72, 68, 75, 74, 69, 71, 73, 76, 74]
}

df = pd.DataFrame(data)

X = df[['Room Size (sq ft)', 'Number of Windows']]
y = df['Temperature (°F)']

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

dt_regressor = DecisionTreeRegressor(random_state=42)
dt_regressor.fit(X_train, y_train)

DecisionTreeRegressor(random_state=42)

y_pred = dt_regressor.predict(X_test)

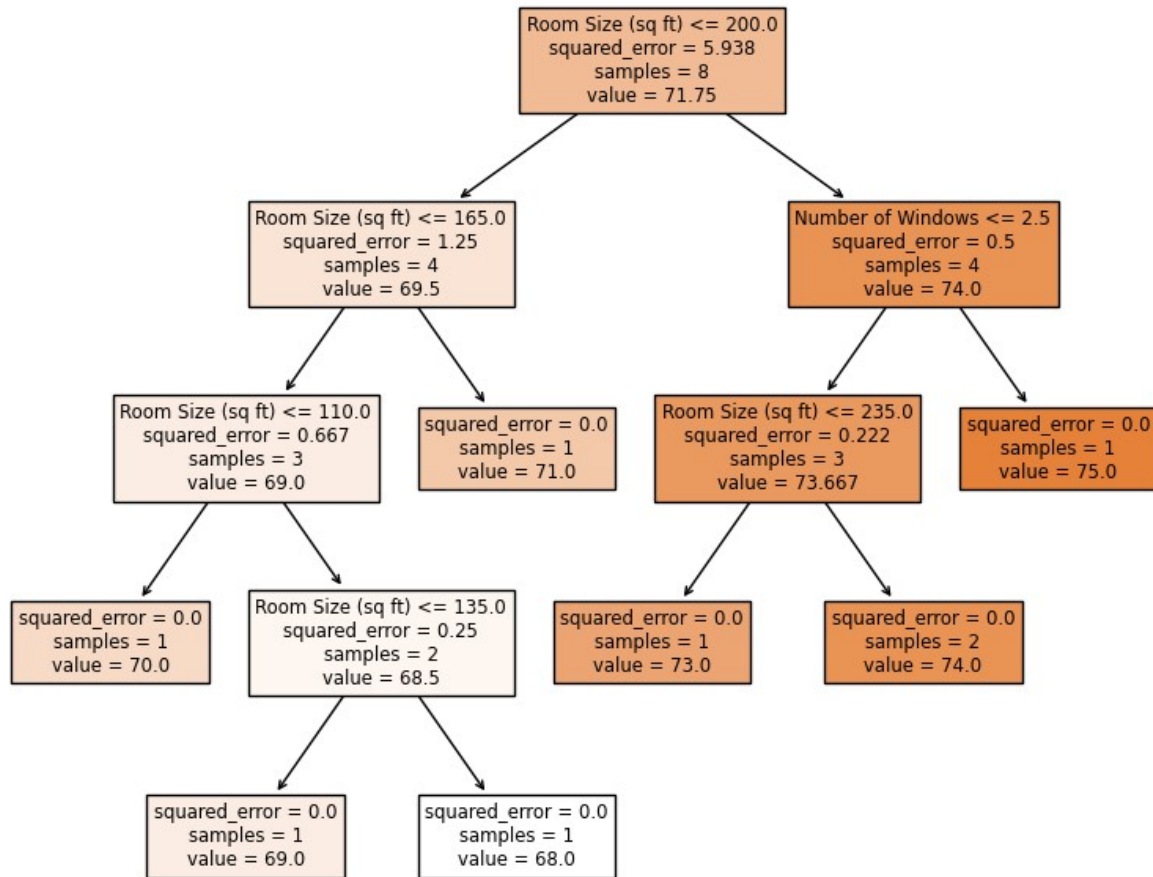
mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)
print(f'Mean Squared Error (MSE): {mse}')
print(f'R-squared (R2): {r2}')

Mean Squared Error (MSE): 1.0
R-squared (R2): 0.75

plt.figure(figsize=(10, 8))
plot_tree(dt_regressor, feature_names=X.columns, filled=True)
plt.title("Decision Tree Regression")
plt.show()

```

Decision Tree Regression



```
new_room = [[250, 2]] # Room Size = 250 sq ft, Number of Windows = 2
predicted_temp = dt_regressor.predict(new_room)
print(f'Predicted Temperature for new room: {predicted_temp[0]}')
```

Predicted Temperature for new room: 74.0

```
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439:
UserWarning: X does not have valid feature names, but
DecisionTreeRegressor was fitted with feature names
warnings.warn(
```