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import pandas as pd

from sklearn.model_selection import train_test_split

from sklearn.linear_model import LinearRegression

from sklearn.preprocessing import StandardScaler, OneHotEncoder

from sklearn.compose import ColumnTransformer

from sklearn.metrics import mean_squared_error, r2_score

import matplotlib.pyplot as plt


# Load and preprocess data

data = pd.read_csv('EX4A.csv')

data['days_per_week'] = data['days_per_week'].apply(lambda x: len(x.split(',')))


# Features and target

attributes = data.drop('avg_time_in_gym', axis=1)

target = data['avg_time_in_gym']


# Column types

cat_features = ['gender', 'abonoment_type', 'attend_group_lesson', 'fav_group_lesson',
                'fav_drink', 'personal_training', 'name_personal_trainer', 'uses_sauna']

num_features = ['Age', 'visit_per_week', 'days_per_week']


# Preprocessing

preprocess = ColumnTransformer([
    ('num', StandardScaler(), num_features),
    ('cat', OneHotEncoder(), cat_features)
])

attributes = preprocess.fit_transform(attributes)


# Train-test split

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```
attributes_train, attributes_test, target_train, target_test = train_test_split(
    attributes, target, test_size=0.2, random_state=42)
```

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# Model training and prediction
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```
model = LinearRegression()
```

```
model.fit(attributes_train, target_train)
```

```
target_pred = model.predict(attributes_test)
```

```
# Evaluation
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```
print("Mean Squared Error:", mean_squared_error(target_test, target_pred))
```

```
print("R2 Score:", r2_score(target_test, target_pred))
```

```
# Visualization
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```
plt.scatter(target_test, target_pred, color='blue', alpha=0.6)
```

```
plt.plot([target_test.min(), target_test.max()], [target_test.min(), target_test.max()], 'r--')
```

```
plt.xlabel('Actual')
```

```
plt.ylabel('Predicted')
```

```
plt.title('Actual vs Predicted')
```

```
plt.show()
```