Energy Consumption Dataset - Linear Regression

```
import numpy as np
import pandas as pd
from sklearn.preprocessing import LabelEncoder
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
from sklearn.metrics import
r2_score,mean_absolute_error,mean_squared_error
from sklearn.model_selection import train_test_split

df = pd.read_csv(r"C:\my files\train_energy_data.csv")
df.head()
```

```
  Building Type  Square Footage  Number of Occupants  Appliances Used
\
0   Residential            7063                   76               10

1    Commercial           44372                   66               45

2    Industrial           19255                   37               17

3   Residential           13265                   14               41

4    Commercial           13375                   26               18


   Average Temperature Day of Week  Energy Consumption
0                29.84     Weekday             2713.95
1                16.72     Weekday             5744.99
2                14.30     Weekend             4101.24
3                32.82     Weekday             3009.14
4                11.92     Weekday             3279.17
```

```
df.isnull().sum()
```

```
Building Type          0
Square Footage         0
Number of Occupants    0
Appliances Used        0
Average Temperature    0
Day of Week            0
Energy Consumption     0
dtype: int64
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 7 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   Building Type         1000 non-null   object 
 1   Square Footage        1000 non-null   int64  
 2   Number of Occupants   1000 non-null   int64  
 3   Appliances Used       1000 non-null   int64  
 4   Average Temperature   1000 non-null   float64
 5   Day of Week           1000 non-null   object 
 6   Energy Consumption    1000 non-null   float64
dtypes: float64(2), int64(3), object(2)
memory usage: 54.8+ KB
```

```
day_en = LabelEncoder()
df["day_encoder"]=day_en.fit_transform(df["Day of Week"])
buil_en = LabelEncoder()
df["buil_encoder"]=buil_en.fit_transform(df["Building Type"])
df.head()
```

```
  Building Type  Square Footage  Number of Occupants  Appliances Used
\
0   Residential            7063                   76               10

1    Commercial           44372                   66               45

2    Industrial           19255                   37               17

3   Residential           13265                   14               41

4    Commercial           13375                   26               18


   Average Temperature Day of Week  Energy Consumption  day_encoder  \
0                29.84     Weekday             2713.95            0
1                16.72     Weekday             5744.99            0
2                14.30     Weekend             4101.24            1
3                32.82     Weekday             3009.14            0
4                11.92     Weekday             3279.17            0

   buil_encoder
0             2
1             0
2             1
3             2
4             0
```

```
x = df[["buil_encoder","Square Footage","Number of
Occupants","Appliances Used","day_encoder","Average Temperature"]]
y = df["Energy Consumption"]
```

```
x_train,x_test,y_train,y_test =
train_test_split(x,y,test_size=0.2,random_state =42)

eng_model = LinearRegression()
eng_model.fit(x_train,y_train)
```

```
LinearRegression()
```

```
bu = input("enter the building type: ")
sf = int(input("Enter the square footage: "))
occup = int(input("Enter the number of occupants: "))
app = int(input("Enter the number of appliances used: "))
day_enc = input("Enter the day of week: ")
avgt = float(input("enter the temp: "))
```

```
enter the building type:  Commercial
Enter the square footage:  1234
Enter the number of occupants:  10
Enter the number of appliances used:  5
Enter the day of week:  Weekday
enter the temp:  14.32
```

```
day_en1 = day_en.transform([day_enc])[0]
buil_en1 = buil_en.transform([bu])[0]
print(day_en1,buil_en1)
```

```
0 0
```

```
result = eng_model.predict([[buil_en1,sf,occup,app,day_en1,avgt]])
print("The predicated energy consumption is: ",result[0])
```

```
The predicated energy consumption is:  2427.853237953262

C:\ProgramData\anaconda3\Lib\site-packages\sklearn\base.py:439:
UserWarning: X does not have valid feature names, but LinearRegression
was fitted with feature names
  warnings.warn(
```

```
model_predictions =eng_model.predict(x_test)
```

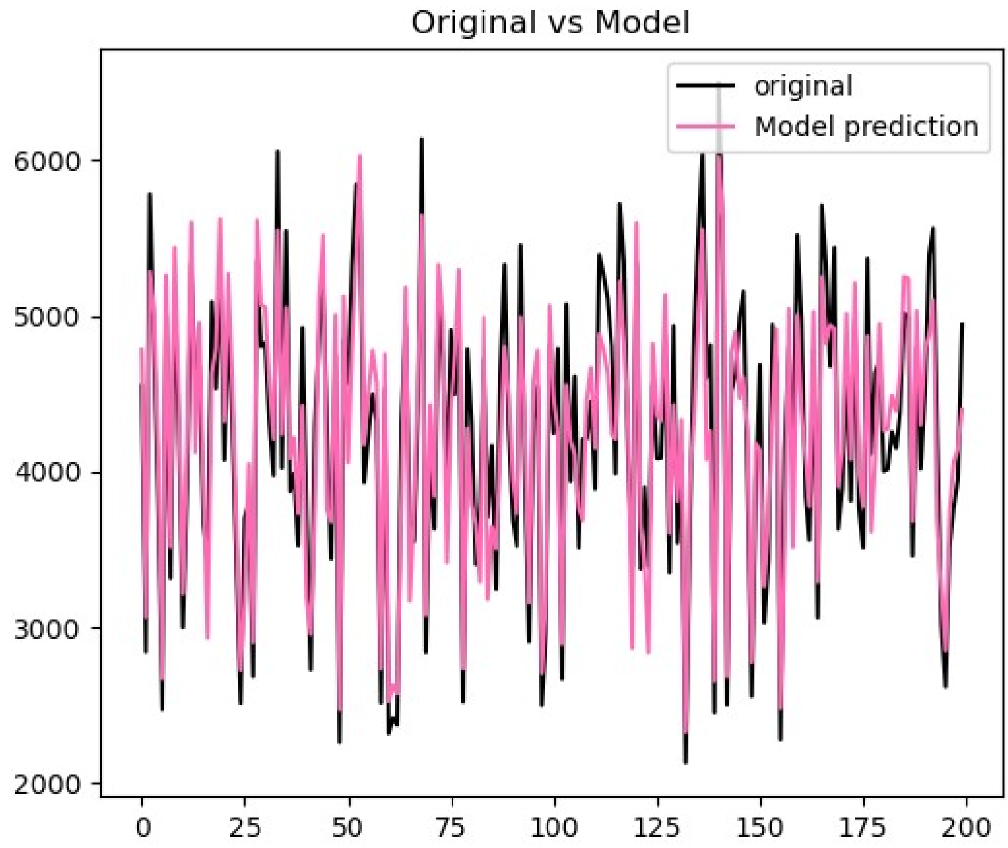
```
len(y_test)
```

```
200
```

```
len(model_predictions)
```

```
200
```

```
plt.figure(figsize=(6,5))
plt.plot(np.arange(0,200),y_test,color = "k",label = "original")
plt.plot(np.arange(0,200),model_predictions,color = "hotpink",label =
"Model prediction")
plt.title("Original vs Model")
plt.legend()
plt.show()
```



```
r2score = r2_score(y_test,model_predictions)
print(r2score)
```

```
0.8451931910305273
```

```
mse = mean_squared_error(y_test,model_predictions)
print(mse)
```

```
126059.23184237469
```

```
mae = mean_absolute_error(y_test,model_predictions)
print(mae)
```

```
330.37436517131096
```