```
# import required libraries

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

#from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from xgboost import XGBRegressor
from sklearn.linear_model import LinearRegression
#from sklearn.linear_model import Ridge,Lasso
from sklearn.tree import DecisionTreeRegressor
from sklearn.ensemble import RandomForestRegressor
from sklearn import metrics
from statsmodels.stats.outliers_influence import variance_inflation_factor
import pickle

import warnings
from warnings import filterwarnings
filterwarnings("ignore")

sns.set()
```

```
#Load the Calories dataset
df1 = pd.read_csv("/content/calories.csv")
df1.head()
```

	User_ID	Calories
0	14733363	231.0
1	14861698	66.0
2	11179863	26.0
3	16180408	71.0
4	17771927	35.0

Next steps: Generate code with df1 View recommended plots New interactive sheet

```
df1.shape
```

```
(15000, 2)
```

```
#Load the Exercise Dataset
df2 = pd.read_csv("/content/exercise.csv")
df2.head()
```

	User_ID	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp
0	14733363	male	68	190.0	94.0	29.0	105.0	40.8
1	14861698	female	20	166.0	60.0	14.0	94.0	40.3
2	11179863	male	69	179.0	79.0	5.0	88.0	38.7
3	16180408	female	34	179.0	71.0	13.0	100.0	40.5
4	17771927	female	27	154.0	58.0	10.0	81.0	39.8

Next steps: Generate code with df2 View recommended plots New interactive sheet

```
df2.shape
```

```
(15000, 8)
```

```
df = pd.concat([df2,df1["Calories"]],axis=1)
```

```
df.head()
```

	User_ID	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
0	14733363	male	68	190.0	94.0	29.0	105.0	40.8	231.0
1	14861698	female	20	166.0	60.0	14.0	94.0	40.3	66.0
2	11179863	male	69	179.0	79.0	5.0	88.0	38.7	26.0
3	16180408	female	34	179.0	71.0	13.0	100.0	40.5	71.0
4	17771927	female	27	154.0	58.0	10.0	81.0	39.8	35.0

Next steps: Generate code with df View recommended plots New interactive sheet

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 15000 entries, 0 to 14999
Data columns (total 9 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   User_ID     15000 non-null  int64  
 1   Gender      15000 non-null  object 
 2   Age         15000 non-null  int64  
 3   Height      15000 non-null  float64
 4   Weight      15000 non-null  float64
 5   Duration    15000 non-null  float64
 6   Heart_Rate  15000 non-null  float64
 7   Body_Temp   15000 non-null  float64
 8   Calories    15000 non-null  float64
dtypes: float64(6), int64(2), object(1)
memory usage: 1.0+ MB
```

```
df.describe()
```

	User_ID	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
count	1.500000e+04	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000
mean	1.497736e+07	42.789800	174.465133	74.966867	15.530600	95.518533	40.025453	89.539533
std	2.872851e+06	16.980264	14.258114	15.035657	8.319203	9.583328	0.779230	62.456978
min	1.000116e+07	20.000000	123.000000	36.000000	1.000000	67.000000	37.100000	1.000000
25%	1.247419e+07	28.000000	164.000000	63.000000	8.000000	88.000000	39.600000	35.000000
50%	1.499728e+07	39.000000	175.000000	74.000000	16.000000	96.000000	40.200000	79.000000
75%	1.744928e+07	56.000000	185.000000	87.000000	23.000000	103.000000	40.600000	138.000000
max	1.999965e+07	79.000000	222.000000	132.000000	30.000000	128.000000	41.500000	314.000000

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

	0
User_ID	0
Gender	0
Age	0
Height	0
Weight	0
Duration	0
Heart_Rate	0
Body_Temp	0
Calories	0

```
# drop User_ID column because this is not required from Main Dataframe itself

df.drop(columns = ["User_ID"],axis=1,inplace =True)
```

```
df.head()
```

	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
0	male	68	190.0	94.0	29.0	105.0	40.8	231.0
1	female	20	166.0	60.0	14.0	94.0	40.3	66.0
2	male	69	179.0	79.0	5.0	88.0	38.7	26.0
3	female	34	179.0	71.0	13.0	100.0	40.5	71.0
4	female	27	154.0	58.0	10.0	81.0	39.8	35.0

Next steps: Generate code with df View recommended plots New interactive sheet

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 15000 entries, 0 to 14999
Data columns (total 8 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   Gender      15000 non-null  object 
 1   Age         15000 non-null  int64  
 2   Height      15000 non-null  float64
 3   Weight      15000 non-null  float64
 4   Duration    15000 non-null  float64
 5   Heart_Rate  15000 non-null  float64
 6   Body_Temp   15000 non-null  float64
 7   Calories    15000 non-null  float64
dtypes: float64(6), int64(1), object(1)
memory usage: 937.6+ KB
```

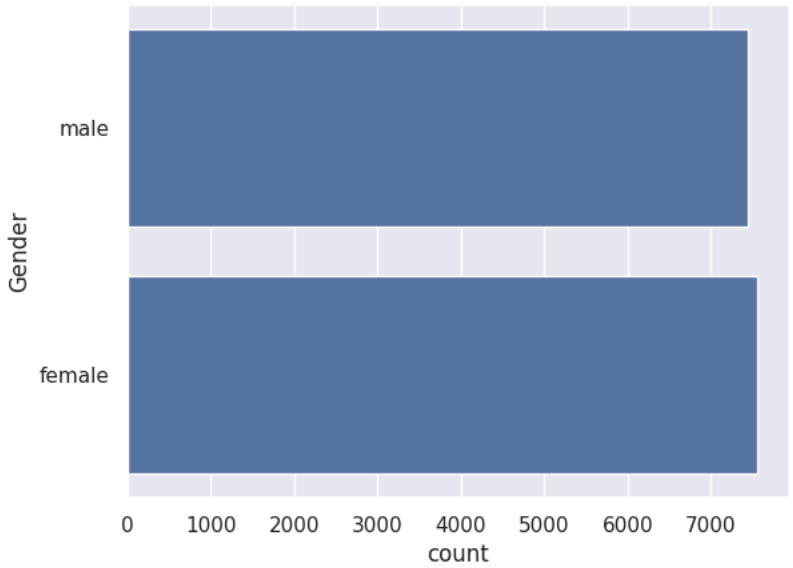
```
#Fatching Categorical Data
cat_col=[col for col in df.columns if df[col].dtype=='O'] #-->Object-"o"
cat_col
```

```
['Gender']
```

```
df["Gender"].value_counts()
```

	count
Gender	
female	7553
male	7447

```
# plotting the gender column in count plot
sns.countplot(df['Gender'])
plt.show()
```



```
#pd.get_dummies(df["Gender"],drop_first=True)
```

```
categorical = df[cat_col]
categorical.head()
```

	Gender
0	male
1	female
2	male
3	female
4	female

Next steps: Generate code with categorical View recommended plots New interactive sheet

```
categorical = pd.get_dummies(categorical["Gender"],drop_first=True)
```

```
categorical
```

	male
0	True
1	False
2	True
3	False
4	False
...	...
14995	False
14996	False
14997	False
14998	True
14999	True

15000 rows × 1 columns

Next steps: Generate code with categorical View recommended plots New interactive sheet

```
Num_col = [col for col in df.columns if df[col].dtype != "O"]
Num_col
```

```
['Age', 'Height', 'Weight', 'Duration', 'Heart_Rate', 'Body_Temp', 'Calories']
```

```
df[Num_col].shape
```

```
(15000, 7)
```

```
Numerical = df[Num_col]
Numerical.head()
```

	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
0	68	190.0	94.0	29.0	105.0	40.8	231.0
1	20	166.0	60.0	14.0	94.0	40.3	66.0
2	69	179.0	79.0	5.0	88.0	38.7	26.0
3	34	179.0	71.0	13.0	100.0	40.5	71.0
4	27	154.0	58.0	10.0	81.0	39.8	35.0

Next steps: Generate code with Numerical View recommended plots New interactive sheet

```
Numerical.shape
```

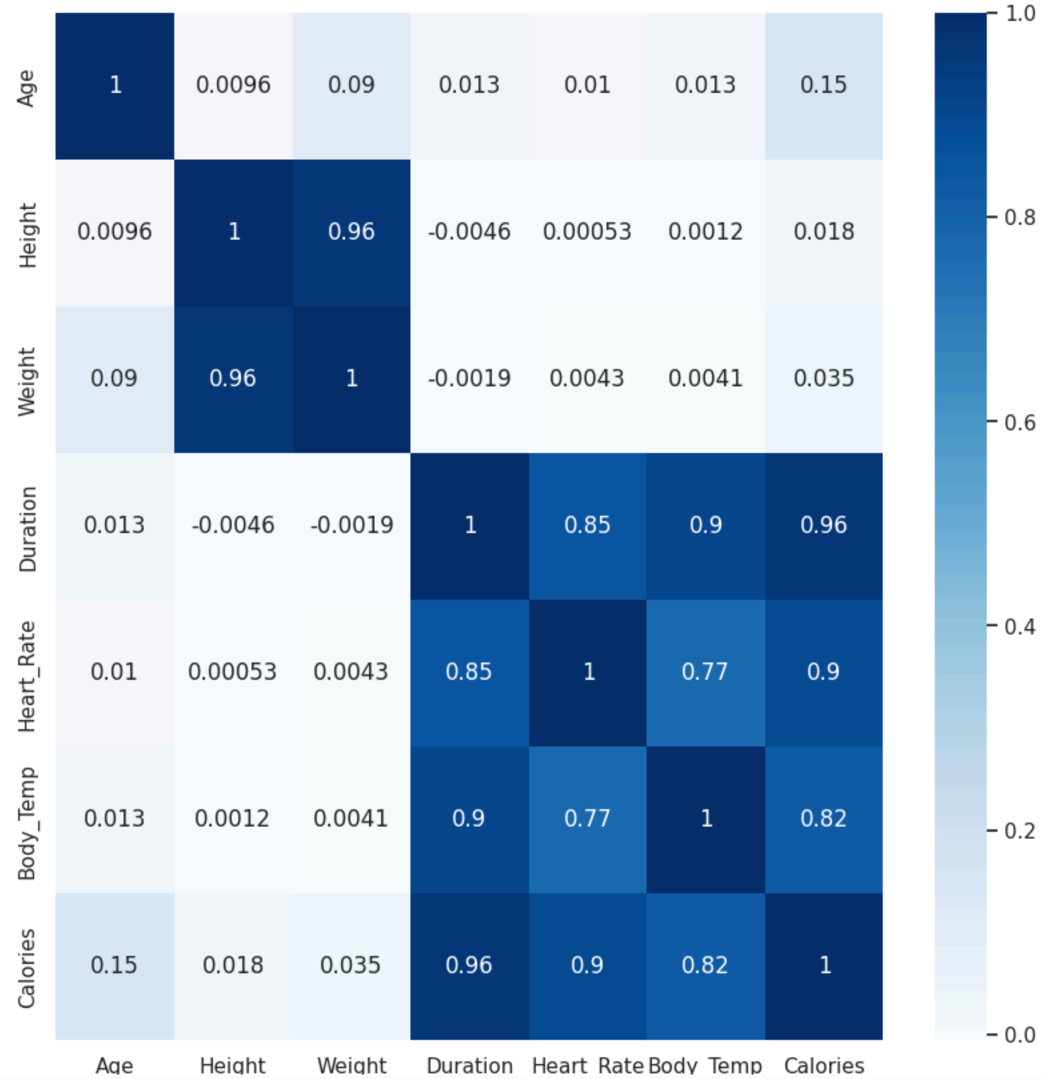
```
(15000, 7)
```

```
plt.figure(figsize=(20,15))
plotnumber = 1
```

```
for column in Numerical:
  if plotnumber <= 8:
    ax = plt.subplot(3,3,plotnumber)
    sns.distplot(Numerical[column])
    plt.xlabel(column,fontsize=15)
  plotnumber+=1
plt.show()
```

```
# constructing a heatmap to understand the correlation

plt.figure(figsize=(10,10))
sns.heatmap(Numerical.corr(), cmap='Blues',annot = True)
```

```
<Axes: >
```



```
data = pd.concat([categorical,Numerical],axis=1)
```

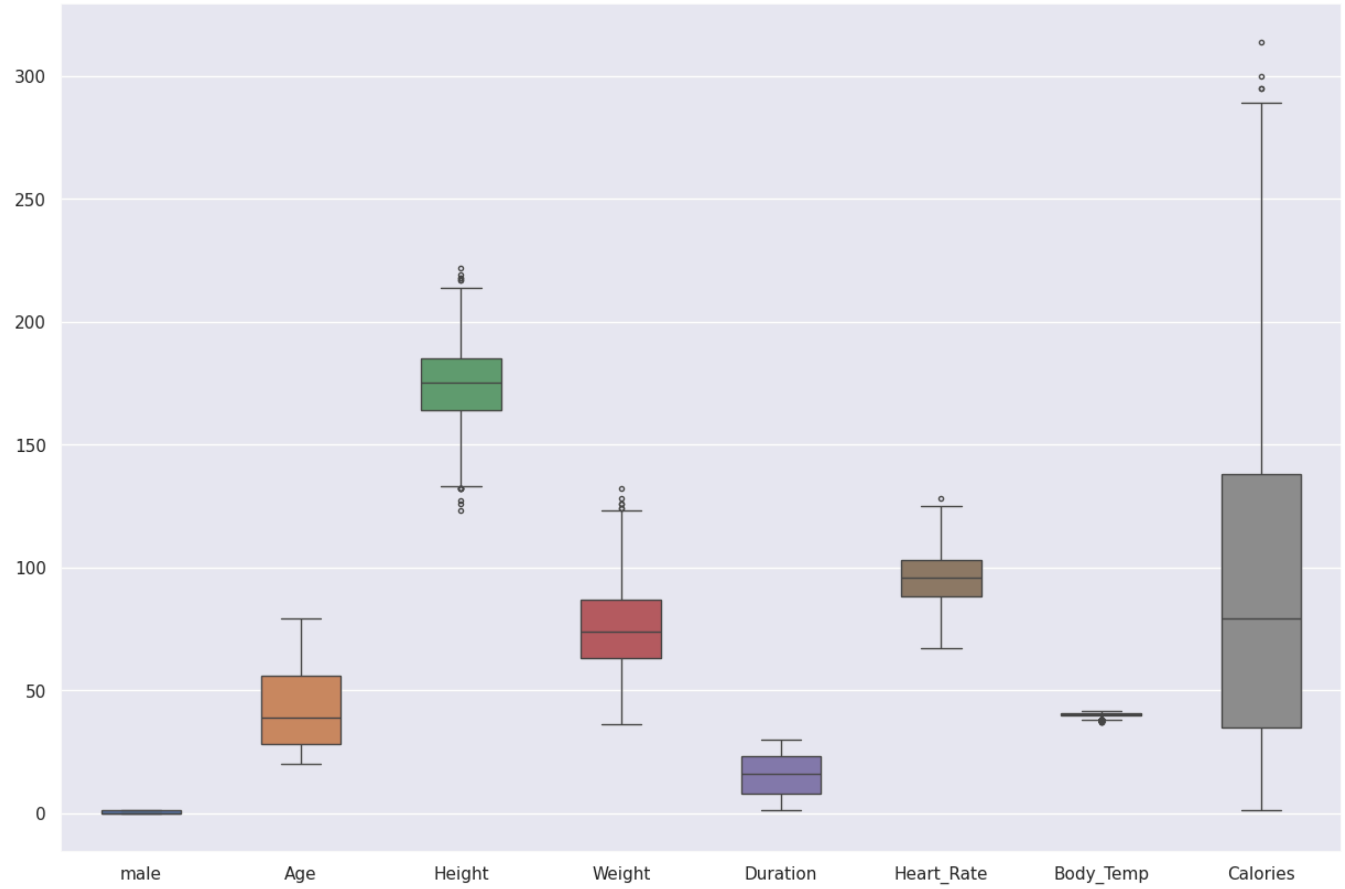
```
data.head()
```

	male	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
0	True	68	190.0	94.0	29.0	105.0	40.8	231.0
1	False	20	166.0	60.0	14.0	94.0	40.3	66.0
2	True	69	179.0	79.0	5.0	88.0	38.7	26.0
3	False	34	179.0	71.0	13.0	100.0	40.5	71.0
4	False	27	154.0	58.0	10.0	81.0	39.8	35.0

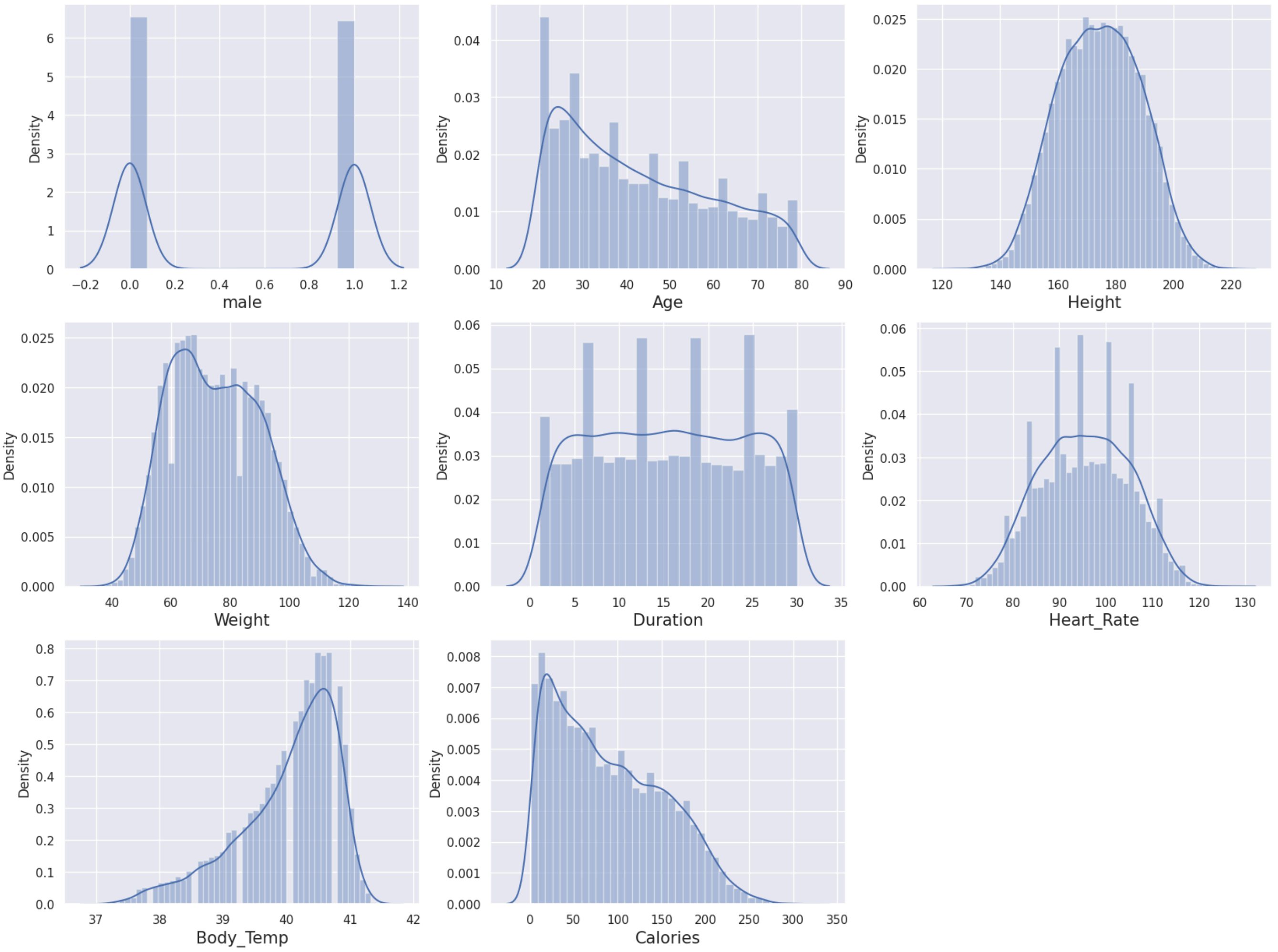
Next steps: Generate code with data View recommended plots New interactive sheet

```
fig,ax = plt.subplots(figsize = (15,10))
sns.boxplot(data=data,width = 0.5,fliersize = 3,ax=ax)
```

```
<Axes: >
```



```
plt.figure(figsize=(20,15))
plotnumber = 1

for column in data:
  if plotnumber <= 8:
    ax = plt.subplot(3,3,plotnumber)
    sns.distplot(data[column])
    plt.xlabel(column,fontsize=15)
  plotnumber+=1
plt.show()
```



```
data.columns
```

```
Index(['male', 'Age', 'Height', 'Weight', 'Duration', 'Heart_Rate',
       'Body_Temp', 'Calories'],
      dtype='object')
```

```
X = data.drop(columns = ["Calories"],axis = 1)
y = data["Calories"]
```

```
X.head()
```

	male	Age	Height	Weight	Duration	Heart_Rate	Body_Temp
0	True	68	190.0	94.0	29.0	105.0	40.8
1	False	20	166.0	60.0	14.0	94.0	40.3
2	True	69	179.0	79.0	5.0	88.0	38.7
3	False	34	179.0	71.0	13.0	100.0	40.5
4	False	27	154.0	58.0	10.0	81.0	39.8

Next steps: Generate code with X View recommended plots New interactive sheet

```
y.head()
```

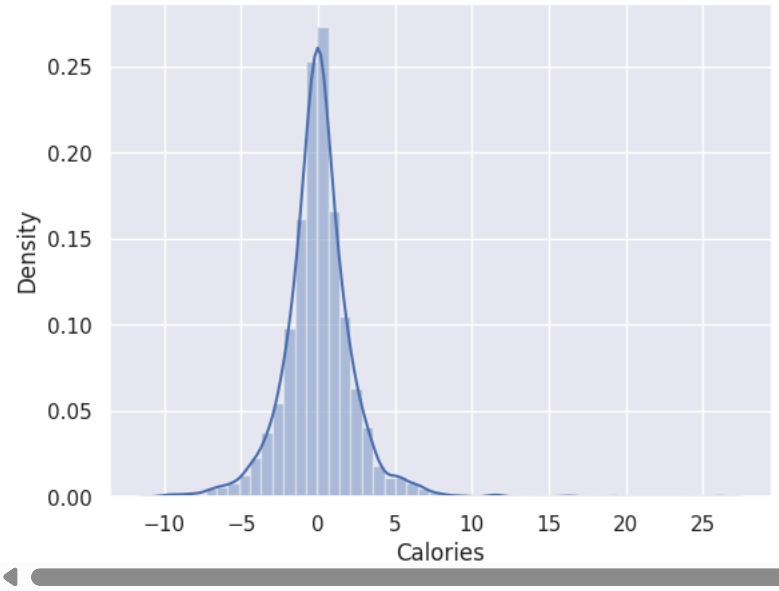
	Calories
0	231.0
1	66.0
2	26.0
3	71.0
4	35.0

```
# Split the Data

X_train,X_test,y_train,y_test = train_test_split(X,y,test_size = 0.2,random_state=1)


print("Shape of X Train: ",X_train.shape)
print("Shape of X Test: ",X_test.shape)
print("Shape of y Train: ",y_train.shape)
print("Shape of y Test: ",y_test.shape)
```

```
Shape of X Train:  (12000, 7)
Shape of X Test:  (3000, 7)
Shape of y Train:  (12000,)
Shape of y Test:  (3000,)
```

```
#from sklearn import metrics
def predict(ml_model):
    model=ml_model.fit(X_train,y_train)
    print('Score : {}'.format(model.score(X_train,y_train)))
    y_prediction=model.predict(X_test)
    print('predictions are: \n {}'.format(y_prediction))
    print('\n')

    r2_score=metrics.r2_score(y_test,y_prediction)
    print('r2 score: {}'.format(r2_score))

    print('MAE:',metrics.mean_absolute_error(y_test,y_prediction))
    print('MSE:',metrics.mean_squared_error(y_test,y_prediction))
    print('RMSE:',np.sqrt(metrics.mean_squared_error(y_test,y_prediction)))

    sns.distplot(y_test-y_prediction)


regression = predict(XGBRegressor())
regression
```

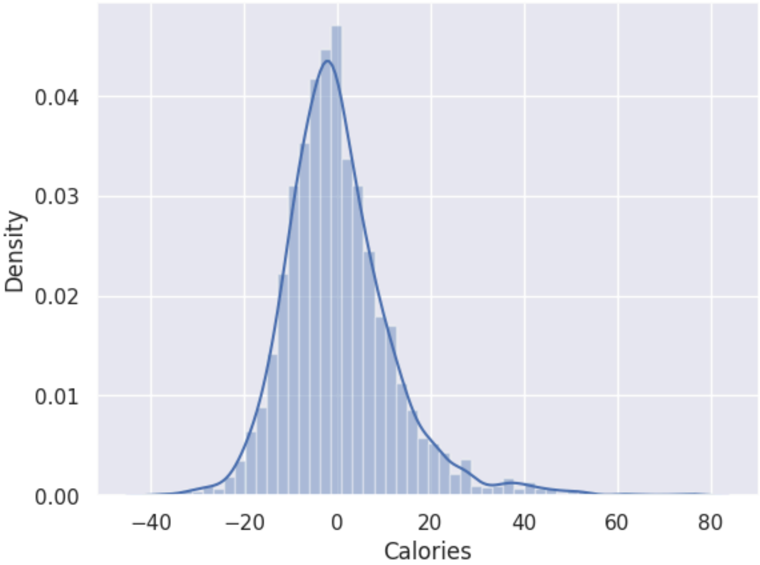
```
Score : 0.9995380557081355
predictions are:
 [197.06581   70.867226 196.99498  ...  29.043041 104.09284   14.61472 ]


r2 score: 0.9986863132331905
MAE: 1.5521575984954834
MSE: 5.2744122853837005
RMSE: 2.2966088664340956
```



```
# saving the model to the local file system
filename = 'finalized_model.pickle'
pickle.dump(regression, open(filename, 'wb'))
```

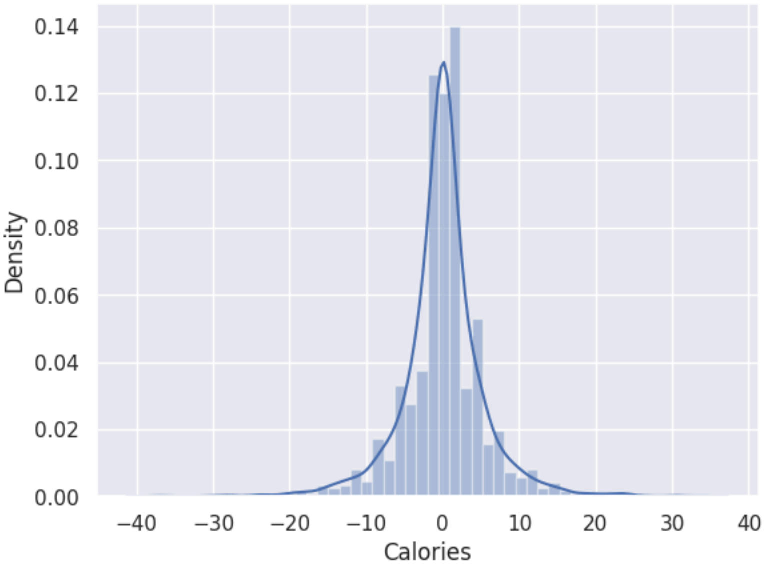
```
predict(LinearRegression())
```

```
Score : 0.967592555473578
predictions are:
 [198.81182363  80.43555305 194.40940033 ...  22.14745631 118.63504926
 -11.98134672]


r2 score: 0.9655977245826504
MAE: 8.479071745987955
MSE: 138.12408611460899
RMSE: 11.752620393538157
```



```
predict(DecisionTreeRegressor())
```

```
Score : 1.0
predictions are:
 [194.  75. 204. ...  30. 109.  13.]


r2 score: 0.9925279631413153
MAE: 3.508
MSE: 30.0
RMSE: 5.477225575051661
```



```
predict(RandomForestRegressor())
```

```
Score : 0.9996689754858116
predictions are:
 [197.33  66.2  196.24 ...  27.61 110.36  14.04]


r2 score: 0.9976380134821432
MAE: 1.8292333333333333
MSE: 9.4833038
RMSE: 3.0794973291107106
```