Importing the Dependencies

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from xgboost import XGBRegressor
from sklearn import metrics
```

Data Collection & Processing

```
# loading the data from csv file to a Pandas DataFrame
calories = pd.read_csv('/content/calories.csv')
```

```
# print the first 5 rows of the dataframe
calories.head()
```

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

```
exercise_data = pd.read_csv('/content/exercise.csv')
```

```
exercise_data.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

Combining the two Dataframes

```
calories_data = pd.concat([exercise_data, calories['Calories']], axis=1)
```

```
calories_data.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

```
# checking the number of rows and columns
calories_data.shape
```

```
(15000, 9)
```

```
# getting some informations about the data
calories_data.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
```

```
# checking for missing values
calories_data.isnull().sum()
```

```
User_ID       0
Gender        0
Age           0
Height        0
Weight        0
Duration      0
Heart_Rate    0
Body_Temp     0
Calories      0
dtype: int64
```

Data Analysis

```
# get some statistical measures about the data
calories_data.describe()
```

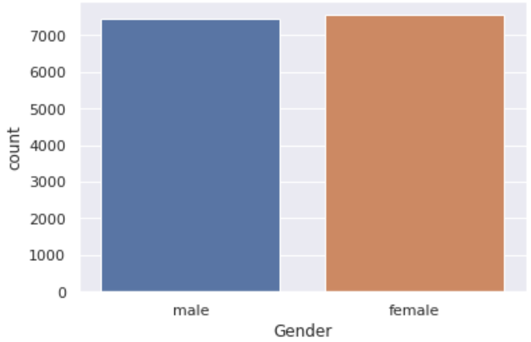
	User_ID	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
count	1.500000e+04	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000
mean	1.497736e+07	42.789800	174.465133	74.966867	15.530600	95.518533	40.025453	89.539533
std	2.872851e+06	16.980264	14.258114	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

Data Visualization

```
sns.set()
```

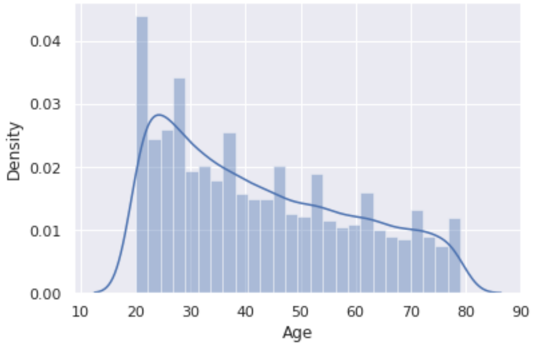
```
# plotting the gender column in count plot
sns.countplot(calories_data['Gender'])
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg: x. Fr
  FutureWarning
<matplotlib.axes._subplots.AxesSubplot at 0x7fcbbd756110>
```



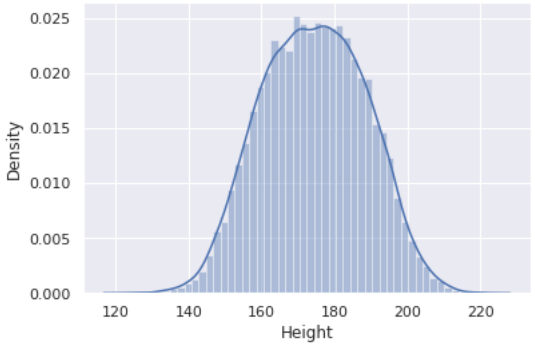
```
# finding the distribution of "Age" column
sns.distplot(calories_data['Age'])
```

```
    /usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2557: FutureWarning: `distplot` is a deprecated function and will be
      warnings.warn(msg, FutureWarning)
    <matplotlib.axes._subplots.AxesSubplot at 0x7fcbbd200550>
```



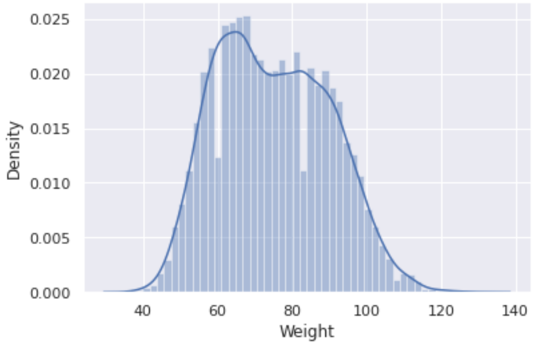
```
# finding the distribution of "Height" column
sns.distplot(calories_data['Height'])
```

```
    /usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2557: FutureWarning: `distplot` is a deprecated function and will be
      warnings.warn(msg, FutureWarning)
    <matplotlib.axes._subplots.AxesSubplot at 0x7fcbb1ed3d10>
```



```
# finding the distribution of "Weight" column
sns.distplot(calories_data['Weight'])
```

```
    /usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2557: FutureWarning: `distplot` is a deprecated function and will be
      warnings.warn(msg, FutureWarning)
    <matplotlib.axes._subplots.AxesSubplot at 0x7fcbb1e2c190>
```



Finding the Correlation in the dataset

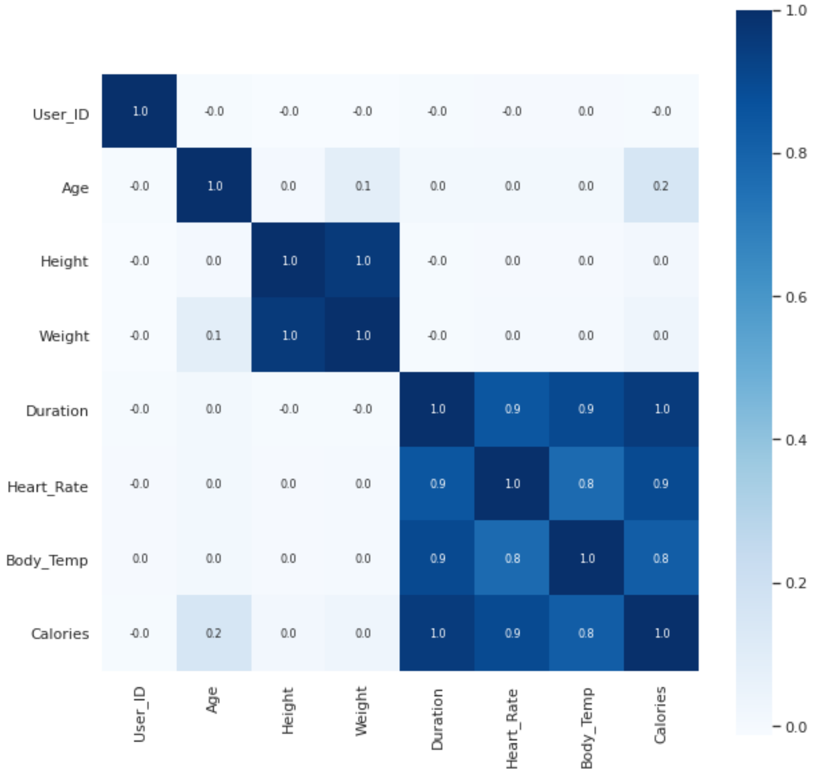
1. Positive Correlation
2. Negative Correlation

```
correlation = calories_data.corr()
```

```
# constructing a heatmap to understand the correlation

plt.figure(figsize=(10,10))
sns.heatmap(correlation, cbar=True, square=True, fmt='.1f', annot=True, annot_kws={'size':8}, cmap='Blues')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fcbd5c75650>
```



Converting the text data to numerical values

```
calories_data.replace({"Gender":{'male':0,'female':1}}, inplace=True)
```

```
calories_data.head()
```

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

Separating features and Target

```
X = calories_data.drop(columns=['User_ID','Calories'], axis=1)
Y = calories_data['Calories']
```

```
print(X)
```

```
       Gender  Age  Height  Weight  Duration  Heart_Rate  Body_Temp
0           0   68   190.0    94.0      29.0       105.0       40.8
1           1   20   166.0    60.0      14.0        94.0       40.3
2           0   69   179.0    79.0       5.0        88.0       38.7
3           1   34   179.0    71.0      13.0       100.0       40.5
4           1   27   154.0    58.0      10.0        81.0       39.8
...       ...  ...     ...     ...       ...         ...        ...
14995       1   20   193.0    86.0      11.0        92.0       40.4
14996       1   27   165.0    65.0       6.0        85.0       39.2
14997       1   43   159.0    58.0      16.0        90.0       40.1
14998       0   78   193.0    97.0       2.0        84.0       38.3
14999       0   63   173.0    79.0      18.0        92.0       40.5

[15000 rows x 7 columns]
```

```
print(Y)
```

```
0        231.0
1         66.0
2         26.0
3         71.0
4         35.0
```

```
                ...
     14995     45.0
     14996     23.0
     14997     75.0
     14998     11.0
     14999     98.0
     Name: Calories, Length: 15000, dtype: float64
```

Splitting the data into training data and Test data

```
X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size=0.2, random_state=2)
```

```
print(X.shape, X_train.shape, X_test.shape)
```

```
     (15000, 7) (12000, 7) (3000, 7)
```

Model Training

XGBoost Regressor

```
# loading the model
model = XGBRegressor()
```

```
# training the model with X_train
model.fit(X_train, Y_train)
```

```
     [10:06:32] WARNING: /workspace/src/objective/regression_obj.cu:152: reg:linear is now deprecated in favor of reg:squarederror.
     XGBRegressor(base_score=0.5, booster='gbtree', colsample_bylevel=1,
                  colsample_bynode=1, colsample_bytree=1, gamma=0,
                  importance_type='gain', learning_rate=0.1, max_delta_step=0,
                  max_depth=3, min_child_weight=1, missing=None, n_estimators=100,
                  n_jobs=1, nthread=None, objective='reg:linear', random_state=0,
                  reg_alpha=0, reg_lambda=1, scale_pos_weight=1, seed=None,
                  silent=None, subsample=1, verbosity=1)
```

Evaluation

Prediction on Test Data

```
test_data_prediction = model.predict(X_test)
```

```
print(test_data_prediction)
```

```
     [129.06204  223.79721   39.181965 ... 145.59767   22.53474   92.29064 ]
```

Mean Absolute Error

```
mae = metrics.mean_absolute_error(Y_test, test_data_prediction)
```

```
print("Mean Absolute Error = ", mae)
```

```
     Mean Absolute Error =  2.7159012502233186
```