In [ ]:
```
#Importing Libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sb
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder, StandardScaler
from sklearn import metrics
from sklearn.svm import SVC
from xgboost import XGBRegressor
from sklearn.linear_model import LinearRegression, Lasso, Ridge
from sklearn.ensemble import RandomForestRegressor

import warnings
warnings.filterwarnings('ignore')
```

In [ ]:
```
#Dataset
df = pd.read_csv('calories.csv')
df.head()
```

Out[ ]:

	User_ID	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	C
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	

In [ ]:
```
#size of the dataset
df.shape
```

Out[ ]:
```
(15000, 9)
```

In [ ]:
```
#dataset contains which type of data
df.info()
```

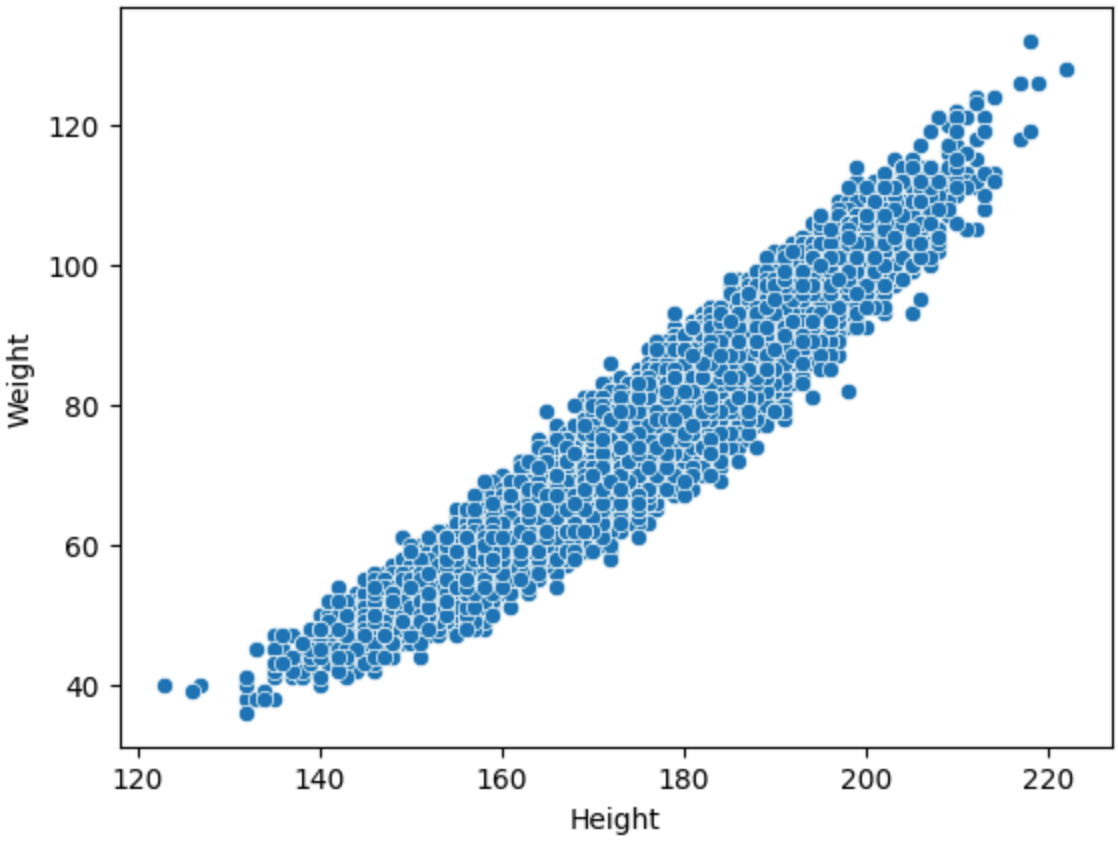
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 15000 entries, 0 to 14999
Data columns (total 9 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   User_ID     15000 non-null  int64  
 1   Gender      15000 non-null  object 
 2   Age         15000 non-null  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
```

In [ ]:
```
df.describe()
```

Out[ ]:

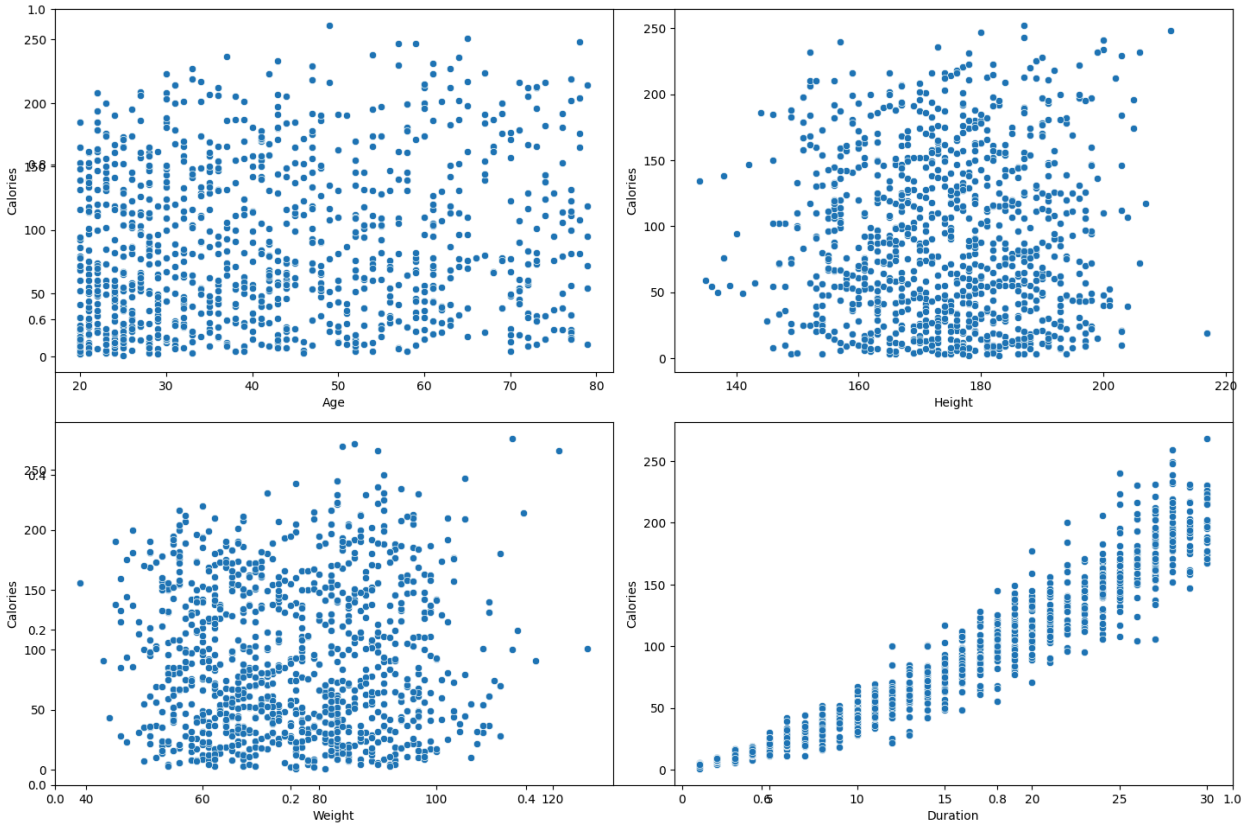
	User_ID	Age	Height	Weight	Duration	
count	1.500000e+04	15000.000000	15000.000000	15000.000000	15000.000000	1
mean	1.497736e+07	42.789800	174.465133	74.966867	15.530600	
std	2.872851e+06	16.980264	14.258114	15.035657	8.319203	
min	1.000116e+07	20.000000	123.000000	36.000000	1.000000	
25%	1.247419e+07	28.000000	164.000000	63.000000	8.000000	
50%	1.499728e+07	39.000000	175.000000	74.000000	16.000000	
75%	1.744928e+07	56.000000	185.000000	87.000000	23.000000	
max	1.999965e+07	79.000000	222.000000	132.000000	30.000000	

In [ ]:
```
#Exploratory Data Analysis,analyzing the data using visual techniques
sb.scatterplot(x='Height', y='Weight', data=df)
plt.show()
```



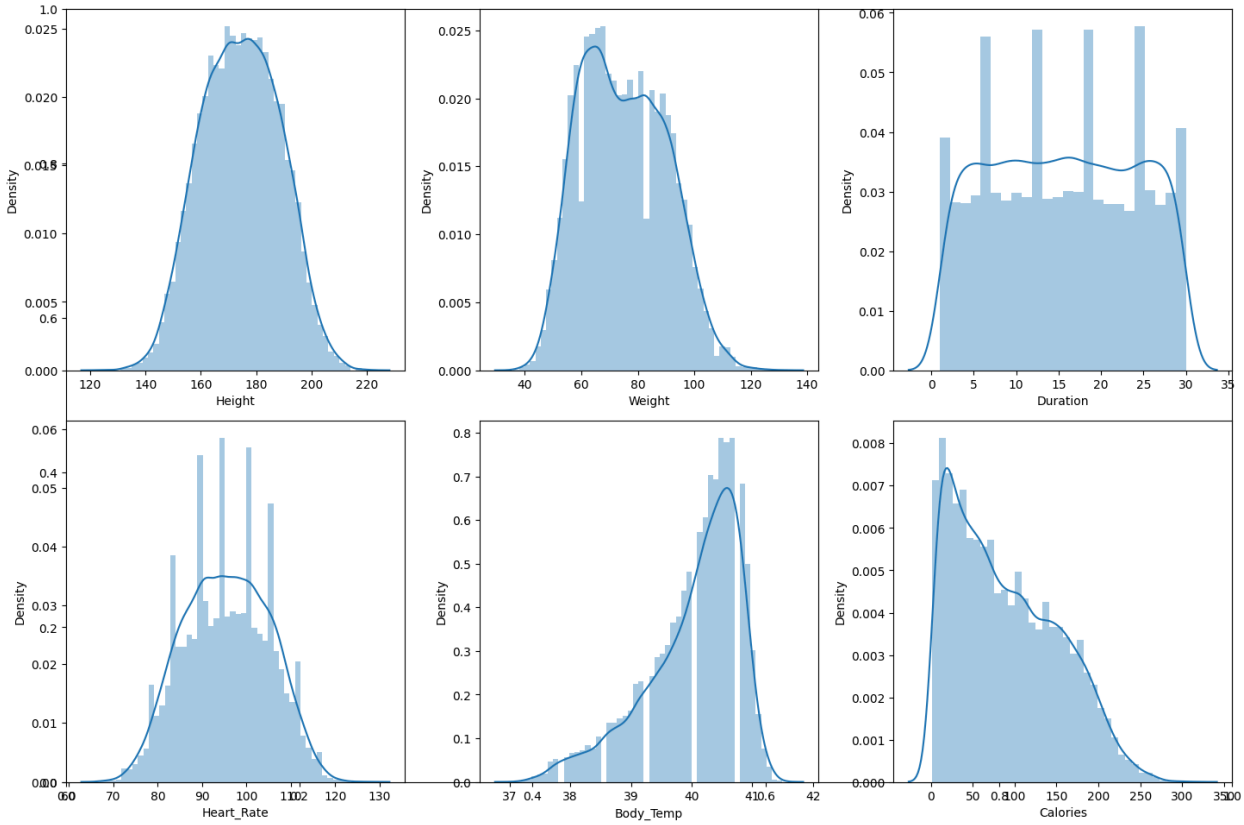
In [ ]:
```
features = ['Age', 'Height', 'Weight', 'Duration']

plt.subplots(figsize=(15, 10))
for i, col in enumerate(features):
    plt.subplot(2, 2, i + 1)
    x = df.sample(1000)
    sb.scatterplot(x=col, y='Calories', data=x)
plt.tight_layout()
plt.show()
```



In [ ]:
```
features = df.select_dtypes(include='float').columns

plt.subplots(figsize=(15, 10))
for i, col in enumerate(features):
    plt.subplot(2, 3, i + 1)
    sb.distplot(df[col])
plt.tight_layout()
plt.show()
```

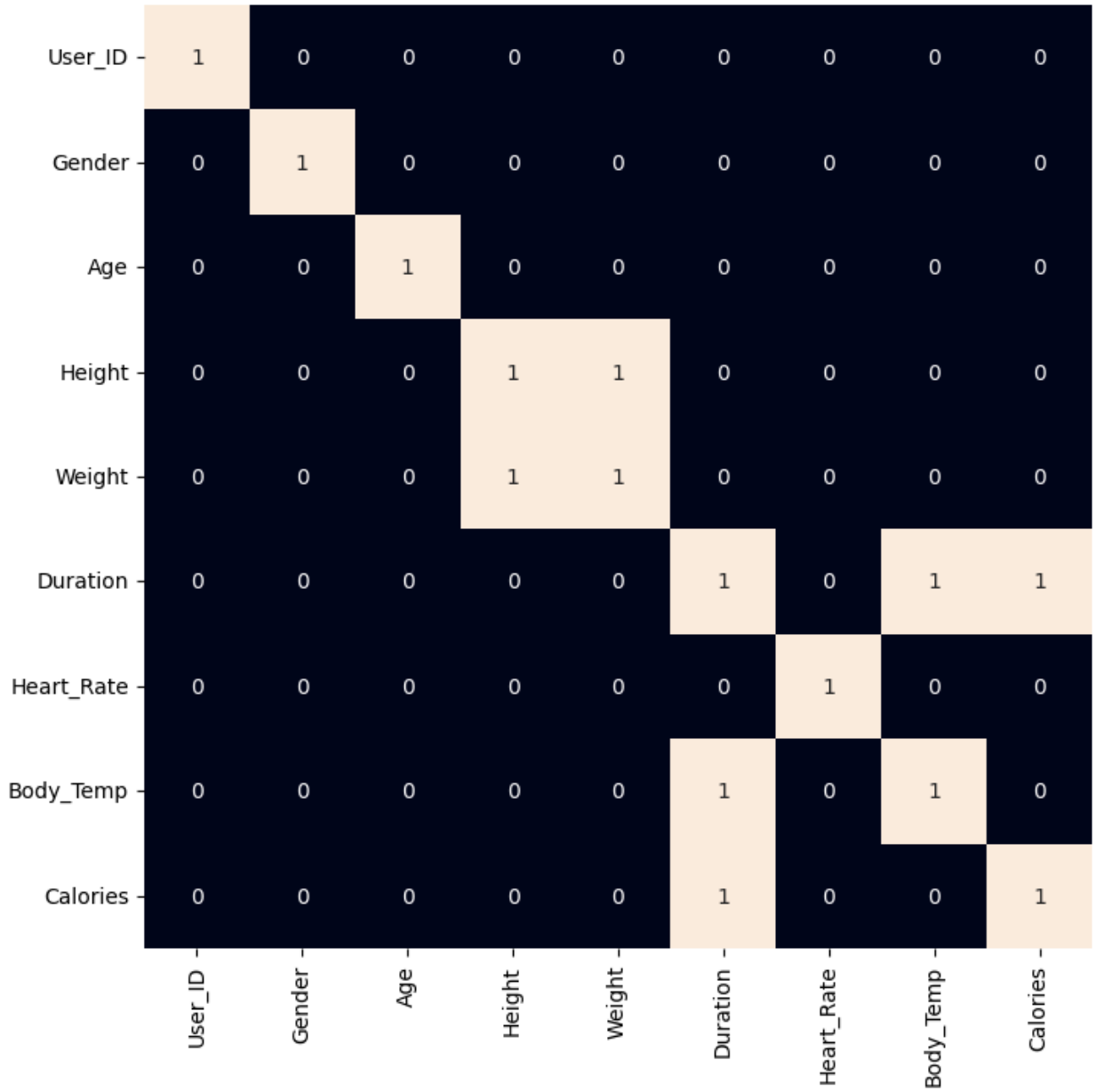


In [ ]:
```
df.replace({'male': 0, 'female': 1},
           inplace=True)
df.head()
```

Out[ ]:

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

In [ ]:
```
plt.figure(figsize=(8, 8))
sb.heatmap(df.corr() > 0.9,
           annot=True,
           cbar=False)
plt.show()
```



In [ ]:
```
to_remove = ['Weight', 'Duration']
df.drop(to_remove, axis=1, inplace=True)
```

In [ ]:
```
#Model Training
features = df.drop(['User_ID', 'Calories'], axis=1)
target = df['Calories'].values

X_train, X_val,\
    Y_train, Y_val = train_test_split(features, target,
                                      test_size=0.1,
                                      random_state=22)
X_train.shape, X_val.shape
```

Out[ ]:
```
((13500, 5), (1500, 5))
```

In [ ]:
```
# Normalizing the features for stable and fast training.
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_val = scaler.transform(X_val)
```

In [ ]:
```
# train some state-of-the-art machine learning models and compare them which f
from sklearn.metrics import mean_absolute_error as mae
models = [LinearRegression(), XGBRegressor(),
          Lasso(), RandomForestRegressor(), Ridge()]

for i in range(5):
    models[i].fit(X_train, Y_train)

    print(f'{models[i]} : ')

    train_preds = models[i].predict(X_train)
    print('Training Error : ', mae(Y_train, train_preds))

    val_preds = models[i].predict(X_val)
    print('Validation Error : ', mae(Y_val, val_preds))
    print()
```

```
LinearRegression() :
Training Error :  17.893463692619434
Validation Error :  18.007896272831253

XGBRegressor(base_score=None, booster=None, callbacks=None,
             colsample_bylevel=None, colsample_bynode=None,
             colsample_bytree=None, device=None, early_stopping_rounds=None,
             enable_categorical=False, eval_metric=None, feature_types=None,
             gamma=None, grow_policy=None, importance_type=None,
             interaction_constraints=None, learning_rate=None, max_bin=None,
             max_cat_threshold=None, max_cat_to_onehot=None,
             max_delta_step=None, max_depth=None, max_leaves=None,
             min_child_weight=None, missing=nan, monotone_constraints=None,
             multi_strategy=None, n_estimators=None, n_jobs=None,
             num_parallel_tree=None, random_state=None, ...) :
Training Error :  7.89463304294701
Validation Error :  10.12050432946533

Lasso() :
Training Error :  17.915089584958036
Validation Error :  17.995033362288662

RandomForestRegressor() :
Training Error :  3.976404419753086
Validation Error :  10.499940291005291

Ridge() :
Training Error :  17.893530494767777
Validation Error :  18.00781790803129
```