Calories Burned Prediction

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Introduction:

Obesity is becoming a major and common problem in today's lifestyle. This leads people to choose their diet and do an equal amount of exercise to stay fit and healthy. The main part here is people should have adequate knowledge about their calorie intake and burn, keeping a track of their calorie intake is easy as it's available on the product label or on the internet. Keeping track of calories burnt is a difficult part as there are very few devices for that. Calories burned by an individual are based on MET charts and formulas.

The main agenda of this report is a prediction of the burnt calories with the help of an XG boost regression model as the ML (machine learning) algorithm to show accurate results. The model is fed with more than 15,000 data and its mean absolute error is 2.7 which will become better over time by feeding the XG boost regression model with more data.

About Dataset:

The model is fed with more than 15,000 data and its mean absolute error is 2.7 which will become better over time by feeding the XG boost regression model with more data.

```
<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  int64
 4   Weight      15000 non-null  int64
 5   Duration    15000 non-null  int64
 6   Heart_Rate  15000 non-null  int64
 7   Body_Temp   15000 non-null  float64
 8   Calories    15000 non-null  int64
dtypes: float64(1), int64(7), object(1)
memory usage: 1.0+ MB
```

Front-end and Backend:

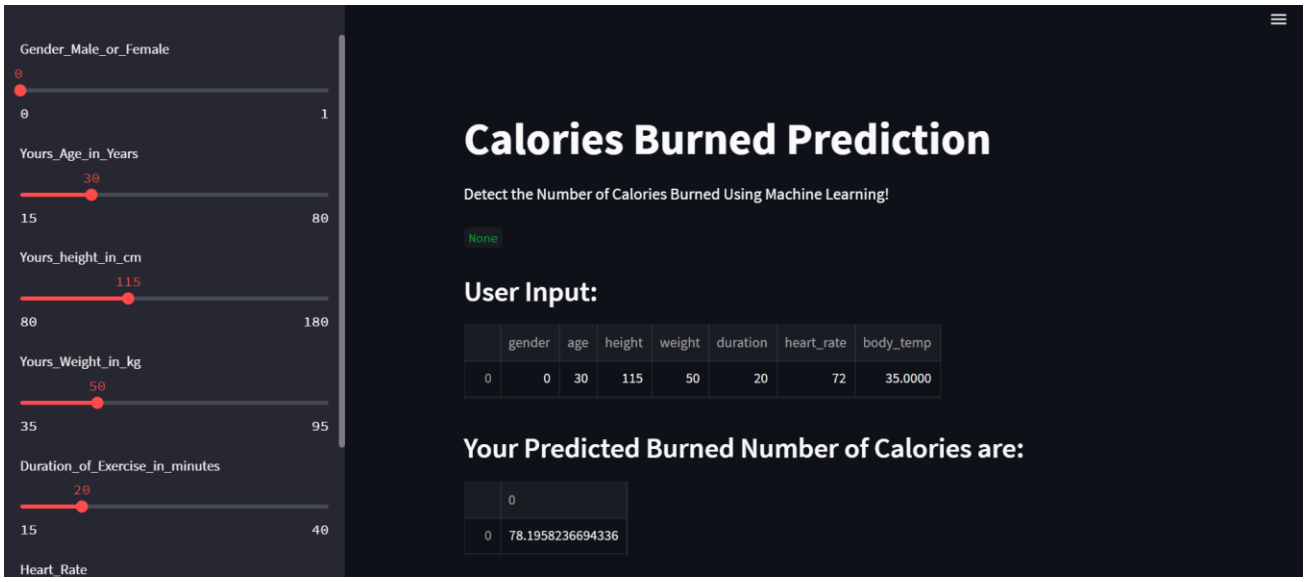
Front-end:

The front-end interface, built using Pyngrok, allows users to slidebar the input features like weight, height, temperature, duration of exercise and heartbeat, and the regressor model will then predict the corresponding calories burnt. The Pyngrok library was used to create a

localhost tunnel, which allows the interface to be accessed remotely. This allows users to access the interface from any device with a web browser, making it more convenient for users to test the model.

The results showed that the model was able to achieve high accuracy in recognizing the input images with a low error rate.

Overall, the project demonstrates the ability of XGBoost Regressor to predict calories burnt with high accuracy, and the use of Pyngrok that enables streamlit to work with the Google Collab and back-end processing to create a user-friendly and efficient system.



Backend:

A XGReggressor model was trained using this data and the architecture of the model was optimized using techniques such as learning rate.

The model was then validated using a separate test dataset. The first preprocessing of the dataset is done by rescaling and resizing. Then we split it into the train, validate and test split which is 70%, 20%, and 10% respectively and made them shuffle randomly.

Our XG Boost model performs the regression using ensemble of different models like (decision tree) as these are the continuous values and the boosting technique is applied to let the model learnt from the mistakes.

Mean Square Error:

```
print("Mean Absoulte Error of our Model is: ", mae)
```

```
Mean Absoulte Error of our Model is:  2.7159012502233186
```

Conclusion:

In conclusion, this project successfully used XGboost to perform prediction on the calories burnt, back-end processing to efficiently handle the model, and Pyngrok to create a user-friendly front-end interface and provides the interface to the streamlit to get run through

tunnels. The model achieved high accuracy and the Pyngrok tunnel allowed users to test the model remotely. Potential future improvements could include expanding the dataset and adding additional features to the interface.

Importing Libraries

```
import numpy as np #make array
import pandas as pd #import dataset and make dataframe
import matplotlib.pyplot as plt #to create the plots and graph
import seaborn as sns #same as matplotlib
from sklearn.model_selection import train_test_split  #training and testing split
from xgboost import XGBRegressor
from sklearn import metrics #to evaluate the model
```

Data Collection and Processing

```
#loading the data from csv file to pandas
calories = pd.read_csv('calories.csv')
calories.head()
```

	User_ID	Calories
0	14733363	231
1	14861698	66
2	11179863	26
3	16180408	71
4	17771927	35

```
exercise = pd.read_csv('exercise.csv')
exercise.head()
```

	User_ID	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
0	14733363	male	68	190	94	29	105	40.8	231
1	14861698	female	20	166	60	14	94	40.3	66
2	11179863	male	69	179	79	5	88	38.7	26
3	16180408	female	34	179	71	13	100	40.5	71
4	17771927	female	27	154	58	10	81	39.8	35

Calories burnt during different exercises so if we see the data the heart rate tells the type of exercise done by the person

```
exercise.head()
```

	User_ID	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
0	14733363	male	68	190	94	29	105	40.8	231
1	14861698	female	20	166	60	14	94	40.3	66
2	11179863	male	69	179	79	5	88	38.7	26
3	16180408	female	34	179	71	13	100	40.5	71
4	17771927	female	27	154	58	10	81	39.8	35

```
exercise.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  int64  
 4   Weight      15000 non-null  int64  
 5   Duration    15000 non-null  int64  
 6   Heart_Rate  15000 non-null  int64  
 7   Body_Temp   15000 non-null  float64
 8   Calories    15000 non-null  int64
```

```
dtypes: float64(1), int64(7), object(1)
memory usage: 1.0+ MB
```

```
#checking for some missing values
#isnull represents missing values
exercise.isnull().sum()
# the result represents that we donot have any missing values in our data set if we have any misssing value we have to preprocess it and then
```

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

Statistical Analysis on Dataset

```
# get statistical data about the data such as range, mean, max, min
exercise.describe()
```

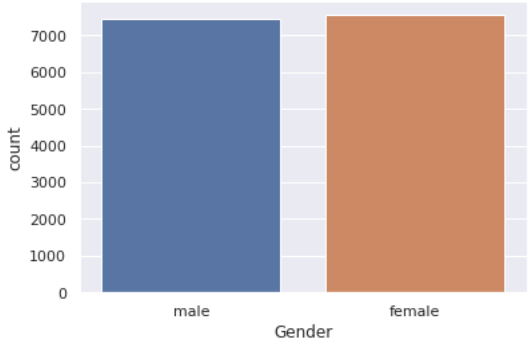
	User_ID	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories
count	1.500000e+04	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000	15000.000000
mean	1.497736e+07	42.789800	174.465133	74.966867	15.530600	95.518533	40.025453	89.539533
std	2.872851e+06	16.980264	14.258114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

Visualize the Data

```
#it creates some midlines in ploting the data, some background
sns.set()
```

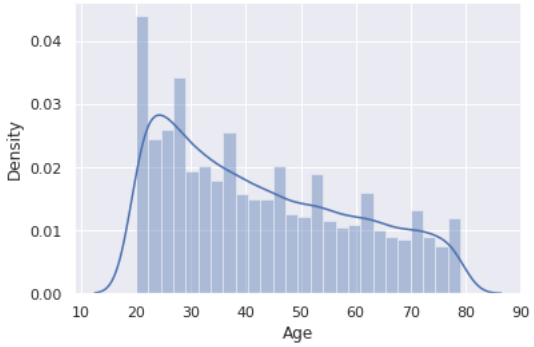
```
#draw some columns from our data except user id
#plotting gender column in count plot
#count plot is the categorical plot which contains two values such as in gender(Male or Female)
sns.countplot(exercise['Gender'])
#as the points are nearly equally distributed so a very good dataset
```

```
/usr/local/lib/python3.8/dist-packages/seaborn/_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From
  warnings.warn(
<matplotlib.axes._subplots.AxesSubplot at 0x7f6b5ed08df0>
```



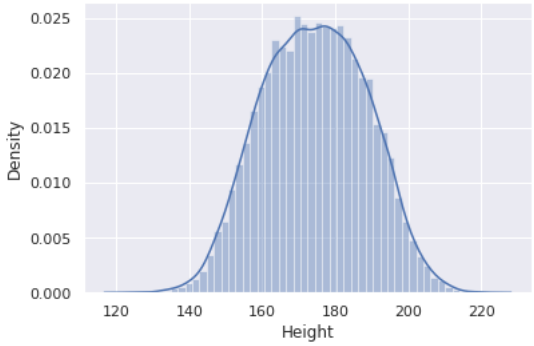
```
# Now for other columns we cannot use count plot but instead we use distribution plot
# finding the distribution of age column
sns.distplot(exercise['Age'])
#density represents peak which means how much more data is under which figure such as more values under 20
```

```
/usr/local/lib/python3.8/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be re
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f6b5ec7c9d0>
```



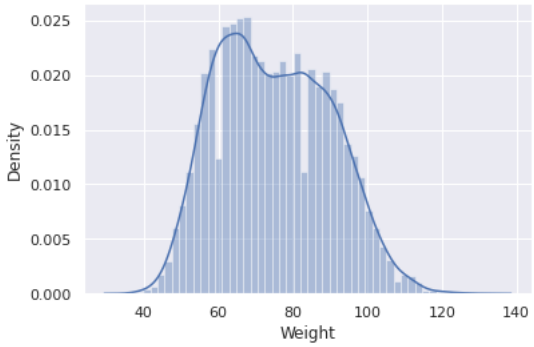

```
#distribution of height column
sns.distplot(exercise['Height'])
```

```
/usr/local/lib/python3.8/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be re
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f6b5ebf42b0>
```



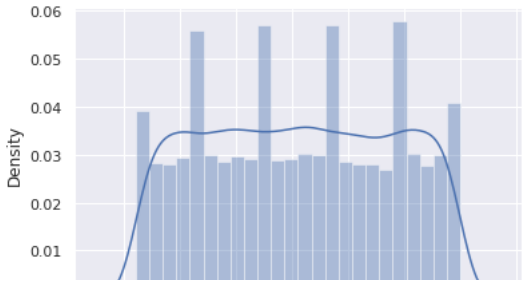

```
#distribution of weight column
sns.distplot(exercise['Weight'])
```

```
/usr/local/lib/python3.8/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be re
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f6b5eb0bd90>
```



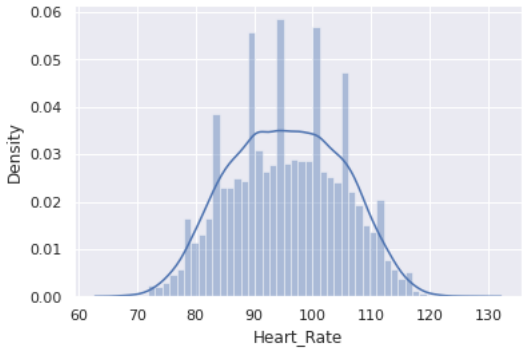

```
#distribution of duration column
sns.distplot(exercise['Duration'])
```

```
/usr/local/lib/python3.8/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be re
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f6b5ea35220>
```



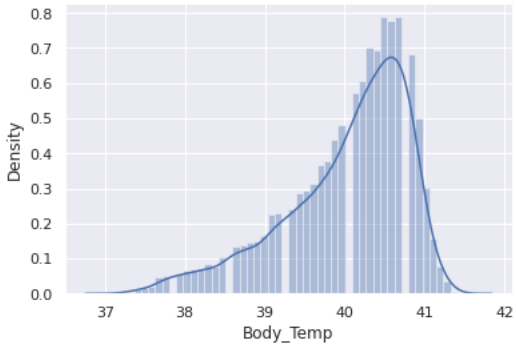

```
#distribution of heart_rate column
sns.distplot(exercise['Heart_Rate'])
```

```
/usr/local/lib/python3.8/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be re
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f6b5e958400>
```




```
#distribution of body_temp column
sns.distplot(exercise['Body_Temp'])
```

```
/usr/local/lib/python3.8/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be re
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f6b5e8b6b20>
```




```
#distribution of calories column
sns.distplot(exercise['Calories'])
```

```
/usr/local/lib/python3.8/dist-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be re
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f6b5e7e33d0>
```

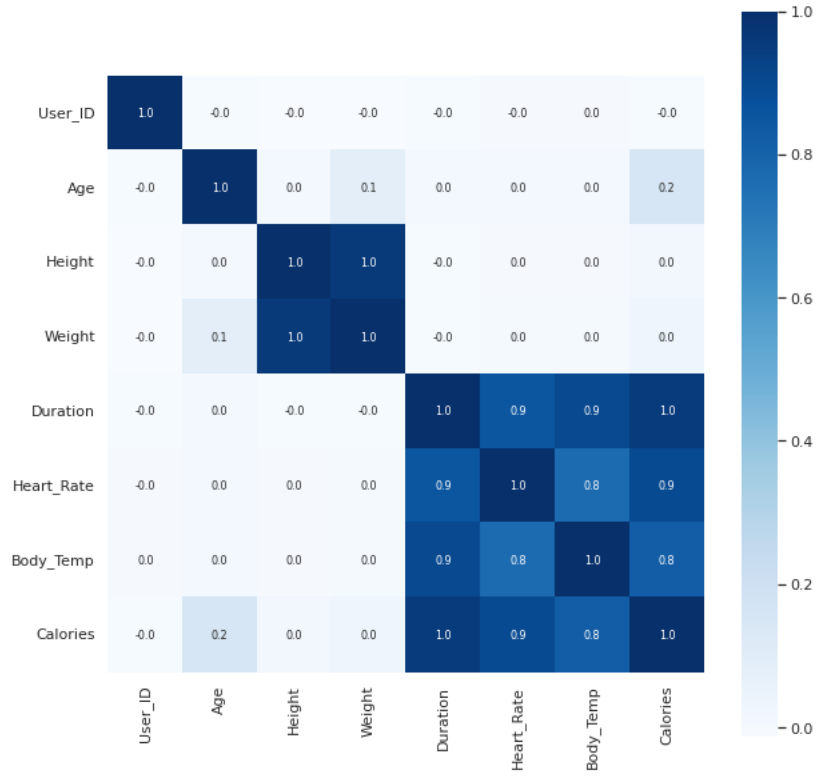

Finding the Correlations in the DataSet

1. Positive Correlation (Direct relation such as more duration more calories burnt)
2. Negative Correlations (Inverse relations)


```
#corr will use to find corelation values
corelations = exercise.corr()
```

```
# constructing a heatmap to understand the correlations
# 10,10 is size of figure
plt.figure(figsize=(10,10))
sns.heatmap(corelations, cbar=True, square=True, fmt='.1f', annot=True, annot_kws={'size':8}, cmap='Blues')
#heatmap give colours based on values
#We have each columns on y-axis as well as on x-axis so the computation will be based on comparison of each column with itself and with other
#0 represents no correlation as the correlation increase the colour becomes intense
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f6b5e6d7b50>
```




```
#in our dataframe all the values are numerical instead of Gender column so we have to compute it first numerically
# thatswhy the gender column is not included during statistical analysis of data
```

Convert all the values in Dataset to Numerical ones

```
#inplace parameter represents permananat change
exercise.replace({"Gender":{'male':0,'female':1}}, inplace=True)
```

```
exercise.head()
```

User_ID	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp	Calories

Sepearte the Features and Targets

```
x=exercise[["Gender","Age","Height","Weight","Duration","Heart_Rate","Body_Temp"]]
x
```

	Gender	Age	Height	Weight	Duration	Heart_Rate	Body_Temp
0	0	68	190	94	29	105	40.8
1	1	20	166	60	14	94	40.3
2	0	69	179	79	5	88	38.7
3	1	34	179	71	13	100	40.5
4	1	27	154	58	10	81	39.8
...	...	...	...	...	...	...	...
14995	1	20	193	86	11	92	40.4
14996	1	27	165	65	6	85	39.2
14997	1	43	159	58	16	90	40.1
14998	0	78	193	97	2	84	38.3
14999	0	63	173	79	18	92	40.5

15000 rows × 7 columns

```
y=exercise[["Calories"]]
y
```

	Calories
0	231
1	66
2	26
3	71
4	35
...	...
14995	45
14996	23
14997	75
14998	11
14999	98

15000 rows × 1 columns

Splitting the data into training and test sets

```
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)
```

```
[05:32:53] WARNING: /workspace/src/objective/regression_obj.cu:152: reg:linear is now deprecated in favor of reg:squarederror.
XGBRegressor()
```

Evaluation of Model

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 ]
```

Compare Predicted Values with the Original Values

Mean Absolute Error

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

```
print("Mean Absoulte Error of our Model is: ", mae)
```

```
Mean Absoulte Error of our Model is:  2.7159012502233186
```

```
pip install streamlit -q
```

```
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 9.3/9.3 MB 45.4 MB/s eta 0:00:00
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 79.0/79.0 KB 8.6 MB/s eta 0:00:00
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 238.9/238.9 KB 25.9 MB/s eta 0:00:00
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 164.8/164.8 KB 18.5 MB/s eta 0:00:00
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 4.7/4.7 MB 80.6 MB/s eta 0:00:00
  Preparing metadata (setup.py) ... done
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 184.0/184.0 KB 19.4 MB/s eta 0:00:00
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 62.7/62.7 KB 7.6 MB/s eta 0:00:00
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 84.5/84.5 KB 7.9 MB/s eta 0:00:00
  Building wheel for validators (setup.py) ... done
```

```
pip install streamlit
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: streamlit in /usr/local/lib/python3.8/dist-packages (1.17.0)
Requirement already satisfied: blinker>=1.0.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (1.5)
Requirement already satisfied: tornado>=5.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (6.0.4)
Requirement already satisfied: pyarrow>=4.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (9.0.0)
Requirement already satisfied: pydeck>=0.1.dev5 in /usr/local/lib/python3.8/dist-packages (from streamlit) (0.8.0)
Requirement already satisfied: pympler>=0.9 in /usr/local/lib/python3.8/dist-packages (from streamlit) (1.0.1)
Requirement already satisfied: cachetools>=4.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (5.2.1)
Requirement already satisfied: gitpython!=3.1.19 in /usr/local/lib/python3.8/dist-packages (from streamlit) (3.1.30)
Requirement already satisfied: protobuf<4,>=3.12 in /usr/local/lib/python3.8/dist-packages (from streamlit) (3.19.6)
Requirement already satisfied: toml in /usr/local/lib/python3.8/dist-packages (from streamlit) (0.10.2)
Requirement already satisfied: altair>=3.2.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (4.2.0)
Requirement already satisfied: click>=7.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (7.1.2)
Requirement already satisfied: importlib-metadata>=1.4 in /usr/local/lib/python3.8/dist-packages (from streamlit) (6.0.0)
Requirement already satisfied: validators>=0.2 in /usr/local/lib/python3.8/dist-packages (from streamlit) (0.20.0)
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.8/dist-packages (from streamlit) (2.8.2)
Requirement already satisfied: typing-extensions>=3.10.0.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (4.4.0)
Requirement already satisfied: numpy in /usr/local/lib/python3.8/dist-packages (from streamlit) (1.21.6)
Requirement already satisfied: pandas>=0.21.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (1.3.5)
Requirement already satisfied: rich>=10.11.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (13.2.0)
Requirement already satisfied: requests>=2.4 in /usr/local/lib/python3.8/dist-packages (from streamlit) (2.25.1)
Requirement already satisfied: tzlocal>=1.1 in /usr/local/lib/python3.8/dist-packages (from streamlit) (1.5.1)
Requirement already satisfied: packaging>=14.1 in /usr/local/lib/python3.8/dist-packages (from streamlit) (21.3)
Requirement already satisfied: pillow>=6.2.0 in /usr/local/lib/python3.8/dist-packages (from streamlit) (7.1.2)
Requirement already satisfied: watchdog in /usr/local/lib/python3.8/dist-packages (from streamlit) (2.2.1)
Requirement already satisfied: semver in /usr/local/lib/python3.8/dist-packages (from streamlit) (2.13.0)
Requirement already satisfied: jinja2 in /usr/local/lib/python3.8/dist-packages (from altair>=3.2.0->streamlit) (2.11.3)
Requirement already satisfied: toolz in /usr/local/lib/python3.8/dist-packages (from altair>=3.2.0->streamlit) (0.12.0)
Requirement already satisfied: jsonschema>=3.0 in /usr/local/lib/python3.8/dist-packages (from altair>=3.2.0->streamlit) (4.3.3)
Requirement already satisfied: entrypoints in /usr/local/lib/python3.8/dist-packages (from altair>=3.2.0->streamlit) (0.4)
Requirement already satisfied: gitdb<5,>=4.0.1 in /usr/local/lib/python3.8/dist-packages (from gitpython!=3.1.19->streamlit) (4.0.10)
Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.8/dist-packages (from importlib-metadata>=1.4->streamlit) (3.11.0)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /usr/local/lib/python3.8/dist-packages (from packaging>=14.1->streamlit) (3.
Requirement already satisfied: pytz>=2017.3 in /usr/local/lib/python3.8/dist-packages (from pandas>=0.21.0->streamlit) (2022.7)
```

```
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.8/dist-packages (from python-dateutil->streamlit) (1.15.0)
Requirement already satisfied: chardet<5,>=3.0.2 in /usr/local/lib/python3.8/dist-packages (from requests>=2.4->streamlit) (4.0.0)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.8/dist-packages (from requests>=2.4->streamlit) (2022.12.7)
Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.8/dist-packages (from requests>=2.4->streamlit) (2.10)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.8/dist-packages (from requests>=2.4->streamlit) (1.24.3)
Requirement already satisfied: pygments<3.0.0,>=2.6.0 in /usr/local/lib/python3.8/dist-packages (from rich>=10.11.0->streamlit) (2.6.1)
Requirement already satisfied: markdown-it-py<3.0.0,>=2.1.0 in /usr/local/lib/python3.8/dist-packages (from rich>=10.11.0->streamlit) (
Requirement already satisfied: decorator>=3.4.0 in /usr/local/lib/python3.8/dist-packages (from validators>=0.2->streamlit) (4.4.2)
Requirement already satisfied: smmap<6,>=3.0.1 in /usr/local/lib/python3.8/dist-packages (from gitdb<5,>=4.0.1->gitpython!=3.1.19->stre
Requirement already satisfied: MarkupSafe>=0.23 in /usr/local/lib/python3.8/dist-packages (from jinja2->altair>=3.2.0->streamlit) (2.0.
Requirement already satisfied: attrs>=17.4.0 in /usr/local/lib/python3.8/dist-packages (from jsonschema>=3.0->altair>=3.2.0->streamlit)
Requirement already satisfied: pyrsistent!=0.17.0,!=0.17.1,!=0.17.2,>=0.14.0 in /usr/local/lib/python3.8/dist-packages (from jsonschema
Requirement already satisfied: importlib-resources>=1.4.0 in /usr/local/lib/python3.8/dist-packages (from jsonschema>=3.0->altair>=3.2.
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.8/dist-packages (from markdown-it-py<3.0.0,>=2.1.0->rich>=10.11.0->
```

```
pip install streamlit-drawable-canvas
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting streamlit-drawable-canvas
  Downloading streamlit_drawable_canvas-0.9.2-py3-none-any.whl (1.2 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 1.2/1.2 MB 18.5 MB/s eta 0:00:00
Requirement already satisfied: Pillow in /usr/local/lib/python3.8/dist-packages (from streamlit-drawable-canvas) (7.1.2)
Requirement already satisfied: numpy in /usr/local/lib/python3.8/dist-packages (from streamlit-drawable-canvas) (1.21.6)
Requirement already satisfied: streamlit>=0.63 in /usr/local/lib/python3.8/dist-packages (from streamlit-drawable-canvas) (1.17.0)
Requirement already satisfied: protobuf<4,>=3.12 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-ca
Requirement already satisfied: rich>=10.11.0 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas
Requirement already satisfied: pandas>=0.21.0 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canva
Requirement already satisfied: pympler>=0.9 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas)
Requirement already satisfied: tornado>=5.0 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas)
Requirement already satisfied: gitpython!=3.1.19 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-ca
Requirement already satisfied: watchdog in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas) (2.
Requirement already satisfied: pyarrow>=4.0 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas)
Requirement already satisfied: validators>=0.2 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canv
Requirement already satisfied: semver in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas) (2.13
Requirement already satisfied: cachetools>=4.0 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canv
Requirement already satisfied: toml in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas) (0.10.2
Requirement already satisfied: typing-extensions>=3.10.0.0 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-d
Requirement already satisfied: click>=7.0 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas) (
Requirement already satisfied: blinker>=1.0.0 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canva
Requirement already satisfied: requests>=2.4 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas
Requirement already satisfied: tzlocal>=1.1 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas)
Requirement already satisfied: pydeck>=0.1.dev5 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-can
Requirement already satisfied: altair>=3.2.0 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canvas
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canv
Requirement already satisfied: importlib-metadata>=1.4 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawa
Requirement already satisfied: packaging>=14.1 in /usr/local/lib/python3.8/dist-packages (from streamlit>=0.63->streamlit-drawable-canv
Requirement already satisfied: entrypoints in /usr/local/lib/python3.8/dist-packages (from altair>=3.2.0->streamlit>=0.63->streamlit-dr
Requirement already satisfied: toolz in /usr/local/lib/python3.8/dist-packages (from altair>=3.2.0->streamlit>=0.63->streamlit-drawable
Requirement already satisfied: jinja2 in /usr/local/lib/python3.8/dist-packages (from altair>=3.2.0->streamlit>=0.63->streamlit-drawabl
Requirement already satisfied: jsonschema>=3.0 in /usr/local/lib/python3.8/dist-packages (from altair>=3.2.0->streamlit>=0.63->streamli
Requirement already satisfied: gitdb<5,>=4.0.1 in /usr/local/lib/python3.8/dist-packages (from gitpython!=3.1.19->streamlit>=0.63->stre
Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.8/dist-packages (from importlib-metadata>=1.4->streamlit>=0.63->stre
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /usr/local/lib/python3.8/dist-packages (from packaging>=14.1->streamlit>=0.6
Requirement already satisfied: pytz>=2017.3 in /usr/local/lib/python3.8/dist-packages (from pandas>=0.21.0->streamlit>=0.63->streamlit-
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.8/dist-packages (from python-dateutil->streamlit>=0.63->streamlit-dra
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.8/dist-packages (from requests>=2.4->streamlit>=0.63->strea
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.8/dist-packages (from requests>=2.4->streamlit>=0.63->st
Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.8/dist-packages (from requests>=2.4->streamlit>=0.63->streamlit-d
Requirement already satisfied: chardet<5,>=3.0.2 in /usr/local/lib/python3.8/dist-packages (from requests>=2.4->streamlit>=0.63->stream
Requirement already satisfied: markdown-it-py<3.0.0,>=2.1.0 in /usr/local/lib/python3.8/dist-packages (from rich>=10.11.0->streamlit>=0
Requirement already satisfied: pygments<3.0.0,>=2.6.0 in /usr/local/lib/python3.8/dist-packages (from rich>=10.11.0->streamlit>=0.63->s
Requirement already satisfied: decorator>=3.4.0 in /usr/local/lib/python3.8/dist-packages (from validators>=0.2->streamlit>=0.63->strea
Requirement already satisfied: smmap<6,>=3.0.1 in /usr/local/lib/python3.8/dist-packages (from gitdb<5,>=4.0.1->gitpython!=3.1.19->stre
Requirement already satisfied: MarkupSafe>=0.23 in /usr/local/lib/python3.8/dist-packages (from jinja2->altair>=3.2.0->streamlit>=0.63-
Requirement already satisfied: pyrsistent!=0.17.0,!=0.17.1,!=0.17.2,>=0.14.0 in /usr/local/lib/python3.8/dist-packages (from jsonschema
Requirement already satisfied: importlib-resources>=1.4.0 in /usr/local/lib/python3.8/dist-packages (from jsonschema>=3.0->altair>=3.2.
Requirement already satisfied: attrs>=17.4.0 in /usr/local/lib/python3.8/dist-packages (from jsonschema>=3.0->altair>=3.2.0->streamlit>
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.8/dist-packages (from markdown-it-py<3.0.0,>=2.1.0->rich>=10.11.0->
Installing collected packages: streamlit-drawable-canvas
Successfully installed streamlit-drawable-canvas-0.9.2
```

```
pip install pyngrok
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting pyngrok
  Downloading pyngrok-5.2.1.tar.gz (761 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 761.3/761.3 KB 13.6 MB/s eta 0:00:00
  Preparing metadata (setup.py) ... done
Requirement already satisfied: PyYAML in /usr/local/lib/python3.8/dist-packages (from pyngrok) (6.0)
```

```
  Building wheels for collected packages: pyngrok
    Building wheel for pyngrok (setup.py) ... done
    Created wheel for pyngrok: filename=pyngrok-5.2.1-py3-none-any.whl size=19792 sha256=a306a81a6164d4aea2666aa908fecdd2ce49606a132b3e40
    Stored in directory: /root/.cache/pip/wheels/5d/f2/70/526da675d32f17577ec47ac4c663084efe39d47c826b6c3bb1
  Successfully built pyngrok
  Installing collected packages: pyngrok
  Successfully installed pyngrok-5.2.1
```

```
from pyngrok import ngrok


ngrok.set_auth_token("2Kj73GrvHDrI5bVhk3Px9BsBWYu_7chYWEVJykAFTstLsc2NG")
```

```
!nohup streamlit run app.py --server.port 80 &
url = ngrok.connect(port = '80')
print(url)
```

```
  nohup: appending output to 'nohup.out'
  NgrokTunnel: "http://49b9-34-139-2-222.ngrok.io" -> "http://localhost:80"
```

```
from pyngrok import ngrok
tunnels = ngrok.get_tunnels()
tunnels
```

```
  [<NgrokTunnel: "https://49b9-34-139-2-222.ngrok.io" -> "http://localhost:80">,
   <NgrokTunnel: "http://49b9-34-139-2-222.ngrok.io" -> "http://localhost:80">]
```

✓ 0s completed at 10:48 AM

Sweetviz
2.1.4

Get updates, docs & report issues here

Created & maintained by Francois Bertrand
Graphic design by Jean-Francois Hains

ASSOCIATIONS

Train

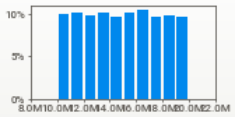
15000	ROWS
0	DUPLICATES
1.9 MB	RAM
9	FEATURES
1	CATEGORICAL
8	NUMERICAL
0	TEXT

NO COMPARISON TARGET

Train

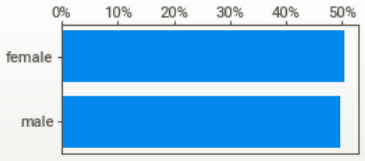
1 User_ID

VALUES:	15,000 (100%)	MAX	20.0M	RANGE	10.0M
MISSING:	---	95%	19.5M	IQR	5.0M
		Q3	17.4M	STD	2.9M
DISTINCT:	15,000 (100%)	MEDIAN	15.0M	VAR	8.3T
		AVG	15.0M		
ZEROES:	---	Q1	12.5M	KURT.	-1.19
		5%	10.5M	SKEW	0.005
		MIN	10.0M	SUM	224.7B



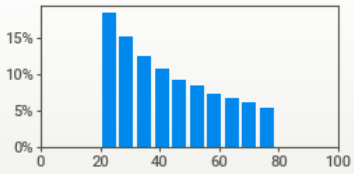
2 Gender

VALUES:	15,000 (100%)
MISSING:	---
DISTINCT:	2 (<1%)



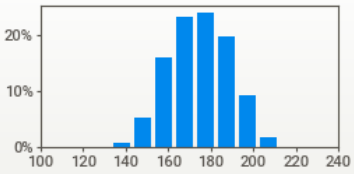
3 Age

VALUES:	15,000 (100%)	MAX	79.0	RANGE	59.0
MISSING:	---	95%	74.0	IQR	28.0
		Q3	56.0	STD	17.0
DISTINCT:	60 (<1%)	AVG	42.8	VAR	288
		MEDIAN	39.0		
ZEROES:	---	Q1	28.0	KURT.	-0.949
		5%	21.0	SKEW	0.473
		MIN	20.0	SUM	642k



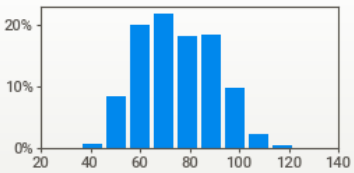
4 Height

VALUES:	15,000 (100%)	MAX	222.0	RANGE	99.0
MISSING:	---	95%	197.0	IQR	21.0
		Q3	185.0	STD	14.3
DISTINCT:	90 (<1%)	MEDIAN	175.0	VAR	203
		AVG	174.5		
ZEROES:	---	Q1	164.0	KURT.	-0.513
		5%	151.0	SKEW	-0.006
		MIN	123.0	SUM	2.6M



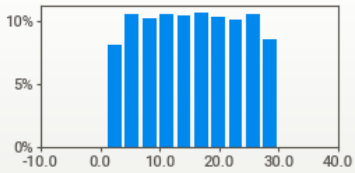
5 Weight

VALUES:	15,000 (100%)	MAX	132.0	RANGE	96.0
MISSING:	---	95%	100.0	IQR	24.0
		Q3	87.0	STD	15.0
DISTINCT:	91 (<1%)	AVG	75.0	VAR	226
		MEDIAN	74.0		
ZEROES:	---	Q1	63.0	KURT.	-0.682
		5%	53.0	SKEW	0.227
		MIN	36.0	SUM	1.1M



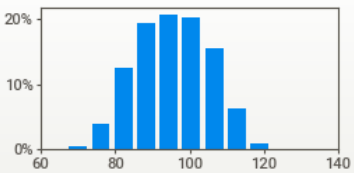
6 Duration

VALUES:	15,000 (100%)	MAX	30.0	RANGE	29.0
MISSING:	---	95%	28.0	IQR	15.0
		Q3	23.0	STD	8.32
DISTINCT:	30 (<1%)	MEDIAN	16.0	VAR	69.2
		AVG	15.5		
ZEROES:	---	Q1	8.0	KURT.	-1.18
		5%	3.0	SKEW	0.005
		MIN	1.0	SUM	233k



7 Heart_Rate

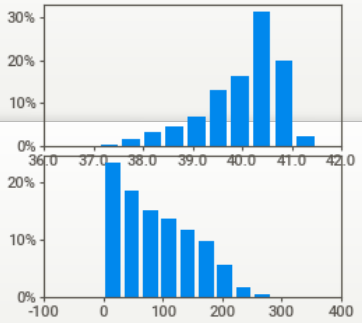
VALUES:	15,000 (100%)	MAX	128.0	RANGE	61.0
MISSING:	---	95%	111.0	IQR	15.0
		Q3	103.0	STD	9.58
DISTINCT:	59 (<1%)	MEDIAN	96.0	VAR	91.8
		AVG	95.5		
ZEROES:	---	Q1	88.0	KURT.	-0.644
		5%	80.0	SKEW	-0.011
		MIN	67.0	SUM	1.4M



8 Body_Temp

VALUES:	15,000 (100%)	MAX	41.50	RANGE	4.40
MISSING:	---	95%	41.00	IQR	1.00
		Q3	40.60	STD	0.779

DISTINCT:	45 (<1%)	MEDIAN	40.20	VAR	0.607		
ZEROES:	---	AVG	40.03	KURT.	0.517		
		Q1	39.60	SKEW	-0.994		
		5%	38.40	SUM	600k		
		MIN	37.10				



9 Calories

VALUES:	15,000 (100%)	MAX	314	RANGE	313		
MISSING:	---	95%	200	IQR	103		
		Q3	138	STD	62.5		
DISTINCT:	277 (2%)	AVG	90	VAR	3,901		
		MEDIAN	79				
ZEROES:	---	Q1	35	KURT.	-0.718		
		5%	9	SKEW	0.505		
		MIN	1	SUM	1.3M		