Smartwatch_Data_Analysis_using_Python

In [16]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import plotly.express as px
import plotly.graph_objects as go

data = pd.read_csv("dailyActivity_merged.csv")
print(data.head())
```

```
           Id ActivityDate  TotalSteps  TotalDistance  TrackerDistance  \
0  1503960366    4/12/2016       13162           8.50             8.50   
1  1503960366    4/13/2016       10735           6.97             6.97   
2  1503960366    4/14/2016       10460           6.74             6.74   
3  1503960366    4/15/2016        9762           6.28             6.28   
4  1503960366    4/16/2016       12669           8.16             8.16   

   LoggedActivitiesDistance  VeryActiveDistance  ModeratelyActiveDistance  
\
0                       0.0                1.88                      0.55   
1                       0.0                1.57                      0.69   
2                       0.0                2.44                      0.40   
3                       0.0                2.14                      1.26   
4                       0.0                2.71                      0.41   

   LightActiveDistance  SedentaryActiveDistance  VeryActiveMinutes  \
0                 6.06                      0.0                 25   
1                 4.71                      0.0                 21   
2                 3.91                      0.0                 30   
3                 2.83                      0.0                 29   
4                 5.04                      0.0                 36   

   FairlyActiveMinutes  LightlyActiveMinutes  SedentaryMinutes  Calories  
0                   13                   328               728      1985  
1                   19                   217               776      1797  
2                   11                   181              1218      1776  
3                   34                   209               726      1745  
4                   10                   221               773      1863  
```

In [17]:

```
print(data.isnull().sum())
```

```
Id                          0
ActivityDate                0
TotalSteps                  0
TotalDistance               0
TrackerDistance             0
LoggedActivitiesDistance    0
VeryActiveDistance          0
ModeratelyActiveDistance    0
LightActiveDistance         0
SedentaryActiveDistance     0
VeryActiveMinutes           0
FairlyActiveMinutes         0
LightlyActiveMinutes        0
SedentaryMinutes            0
Calories                    0
dtype: int64
```

In [18]:

```
print(data.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 940 entries, 0 to 939
Data columns (total 15 columns):
 #   Column                    Non-Null Count  Dtype  
---  ------                    --------------  -----  
 0   Id                        940 non-null    int64  
 1   ActivityDate              940 non-null    object 
 2   TotalSteps                940 non-null    int64  
 3   TotalDistance             940 non-null    float64
 4   TrackerDistance           940 non-null    float64
 5   LoggedActivitiesDistance  940 non-null    float64
 6   VeryActiveDistance        940 non-null    float64
 7   ModeratelyActiveDistance  940 non-null    float64
 8   LightActiveDistance       940 non-null    float64
 9   SedentaryActiveDistance   940 non-null    float64
 10  VeryActiveMinutes         940 non-null    int64  
 11  FairlyActiveMinutes       940 non-null    int64  
 12  LightlyActiveMinutes      940 non-null    int64  
 13  SedentaryMinutes          940 non-null    int64  
 14  Calories                  940 non-null    int64  
dtypes: float64(7), int64(7), object(1)
memory usage: 110.3+ KB
None
```

In [20]:

```
# Changing datatype of ActivityDate
data["ActivityDate"] = pd.to_datetime(data["ActivityDate"], 
                                      format="%m/%d/%Y")
print(data.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 940 entries, 0 to 939
Data columns (total 15 columns):
 #   Column                    Non-Null Count  Dtype         
---  ------                    --------------  -----         
 0   Id                        940 non-null    int64         
 1   ActivityDate              940 non-null    datetime64[ns]
 2   TotalSteps                940 non-null    int64         
 3   TotalDistance             940 non-null    float64       
 4   TrackerDistance           940 non-null    float64       
 5   LoggedActivitiesDistance  940 non-null    float64       
 6   VeryActiveDistance        940 non-null    float64       
 7   ModeratelyActiveDistance  940 non-null    float64       
 8   LightActiveDistance       940 non-null    float64       
 9   SedentaryActiveDistance   940 non-null    float64       
 10  VeryActiveMinutes         940 non-null    int64         
 11  FairlyActiveMinutes       940 non-null    int64         
 12  LightlyActiveMinutes      940 non-null    int64         
 13  SedentaryMinutes          940 non-null    int64         
 14  Calories                  940 non-null    int64         
dtypes: datetime64[ns](1), float64(7), int64(7)
memory usage: 110.3 KB
None
```

In [8]:

```
data["TotalMinutes"] = data["VeryActiveMinutes"] + data["FairlyActiveMinu
print(data["TotalMinutes"].sample(5))
```

```
306    1440
143    1440
78     1440
907    1440
467    1038
Name: TotalMinutes, dtype: int64
```

In [9]:

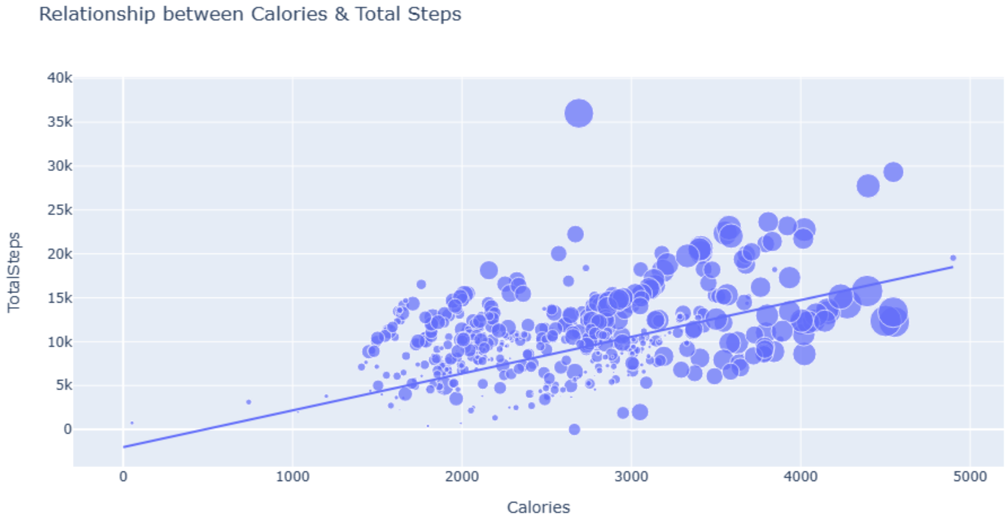
```
print(data.describe())
```

```
                 Id    TotalSteps  TotalDistance  TrackerDistance  \
count  9.400000e+02    940.000000     940.000000       940.000000
mean   4.855407e+09   7637.910638       5.489702         5.475351
std    2.424805e+09   5087.150742       3.924606         3.907276
min    1.503960e+09      0.000000       0.000000         0.000000
25%    2.320127e+09   3789.750000       2.620000         2.620000
50%    4.445115e+09   7405.500000       5.245000         5.245000
75%    6.962181e+09  10727.000000       7.712500         7.710000
max    8.877689e+09  36019.000000      28.030001        28.030001

       LoggedActivitiesDistance  VeryActiveDistance  ModeratelyActiveDist
ance  \
count                940.000000          940.000000                940.00
0000
mean                   0.108171            1.502681                  0.56
7543
std                    0.619897            2.658941                  0.88
3580
min                    0.000000            0.000000                  0.00
0000
25%                    0.000000            0.000000                  0.00
0000
50%                    0.000000            0.210000                  0.24
0000
75%                    0.000000            2.052500                  0.80
0000
max                    4.942142           21.920000                  6.48
0000

       LightActiveDistance  SedentaryActiveDistance  VeryActiveMinutes  \
count           940.000000               940.000000         940.000000
mean              3.340819                 0.001606          21.164894
std               2.040655                 0.007346          32.844803
min               0.000000                 0.000000           0.000000
25%               1.945000                 0.000000           0.000000
50%               3.365000                 0.000000           4.000000
75%               4.782500                 0.000000          32.000000
max              10.710000                 0.110000         210.000000

       FairlyActiveMinutes  LightlyActiveMinutes  SedentaryMinutes  \
count           940.000000            940.000000        940.000000
mean             13.564894            192.812766        991.210638
std              19.987404            109.174700        301.267437
min               0.000000              0.000000          0.000000
25%               0.000000            127.000000        729.750000
50%               6.000000            199.000000       1057.500000
75%              19.000000            264.000000       1229.500000
max             143.000000            518.000000       1440.000000

          Calories  TotalMinutes
count   940.000000    940.000000
mean   2303.609574   1218.753191
std     718.166862    265.931767
min       0.000000      2.000000
25%    1828.500000    989.750000
50%    2134.000000   1440.000000
75%    2793.250000   1440.000000
max    4900.000000   1440.000000
```

Let’s Analyze the Smartwatch Data⌚

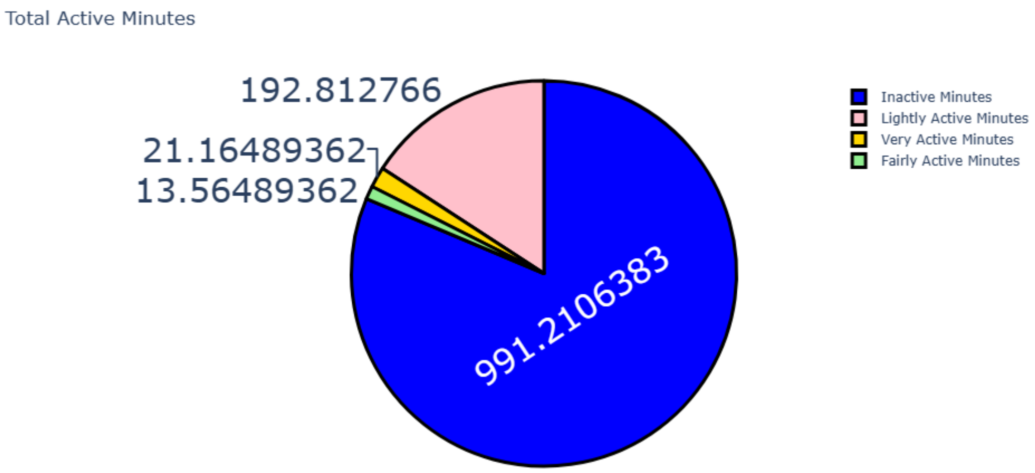
In [21]:

```
figure = px.scatter(data_frame = data, x = "Calories",
                   y = "TotalSteps", size = "VeryActiveMinutes",
                   trendline = "ols",
                   title = "Relationship between Calories & Total Steps")
figure.show()
```



In [11]:

```
label = ["Very Active Minutes", "Fairly Active Minutes",
         "Lightly Active Minutes", "Inactive Minutes"]
counts = data[["VeryActiveMinutes", "FairlyActiveMinutes",
               "LightlyActiveMinutes", "SedentaryMinutes"]].mean()
colors = ['gold','lightgreen', "pink", "blue"]

fig = go.Figure(data=[go.Pie(labels=label, values=counts)])
fig.update_layout(title_text='Total Active Minutes')
fig.update_traces(hoverinfo='label+percent', textinfo='value', textfont_s
                  marker=dict(colors=colors, line=dict(color='black', wid
fig.show()
```



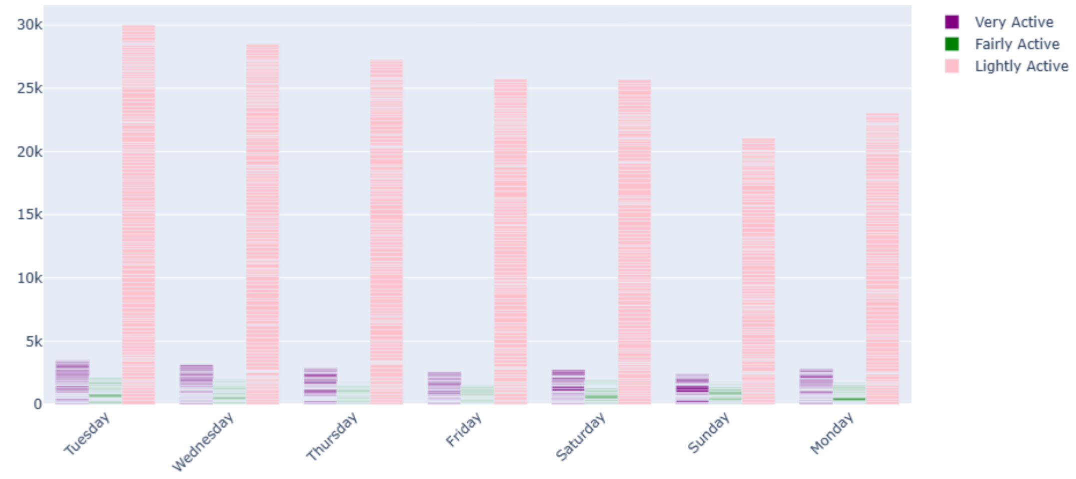
In [12]:

```
data["Day"] = data["ActivityDate"].dt.day_name()
print(data["Day"].head())
```

```
0      Tuesday
1    Wednesday
2     Thursday
3       Friday
4     Saturday
Name: Day, dtype: object
```

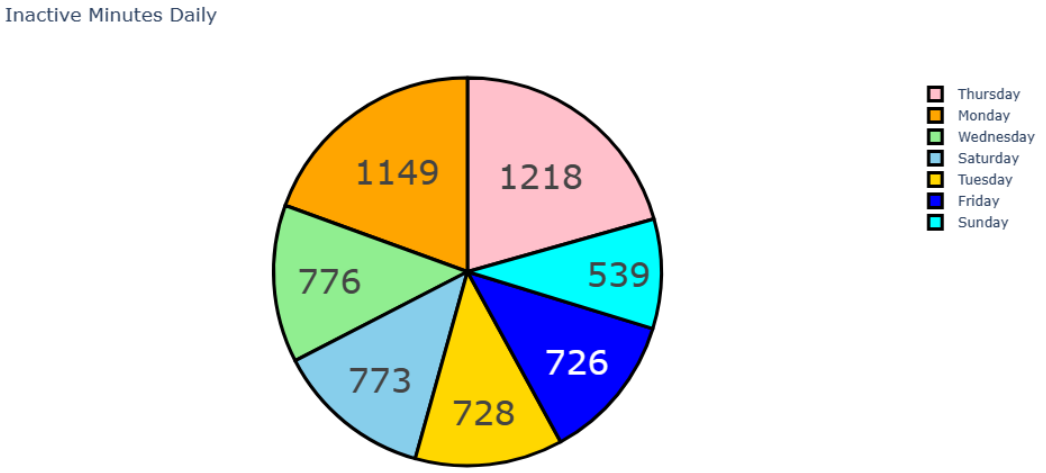
In [13]:

```
fig = go.Figure()
fig.add_trace(go.Bar(
    x=data["Day"],
    y=data["VeryActiveMinutes"],
    name='Very Active',
    marker_color='purple'
))
fig.add_trace(go.Bar(
    x=data["Day"],
    y=data["FairlyActiveMinutes"],
    name='Fairly Active',
    marker_color='green'
))
fig.add_trace(go.Bar(
    x=data["Day"],
    y=data["LightlyActiveMinutes"],
    name='Lightly Active',
    marker_color='pink'
))
fig.update_layout(barmode='group', xaxis_tickangle=-45)
fig.show()
```

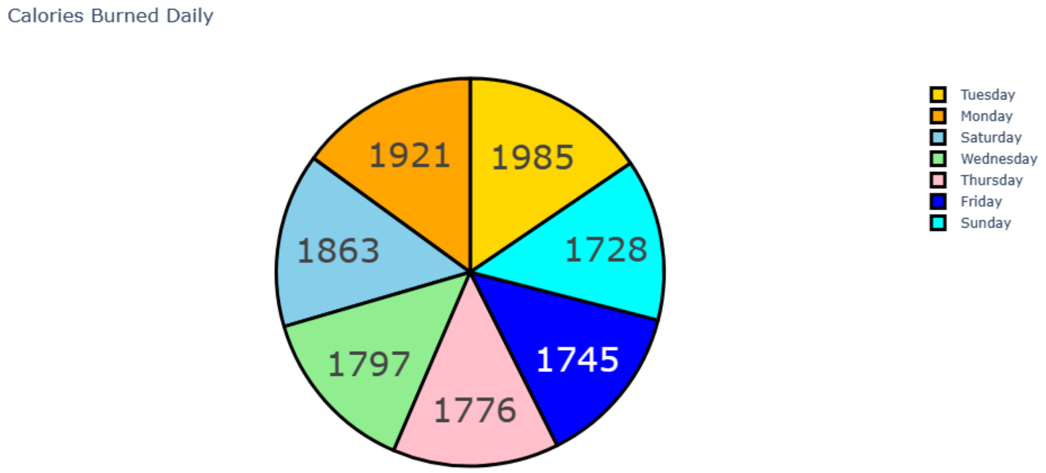


In [14]:

```
day = data["Day"].value_counts()
label = day.index
counts = data["SedentaryMinutes"]
colors = ['gold','lightgreen', "pink", "blue", "skyblue", "cyan", "orange

fig = go.Figure(data=[go.Pie(labels=label, values=counts)])
fig.update_layout(title_text='Inactive Minutes Daily')
fig.update_traces(hoverinfo='label+percent', textinfo='value', textfont_s
                  marker=dict(colors=colors, line=dict(color='black', wid
fig.show()
```



```
In [15]: calories = data["Day"].value_counts()
         label = calories.index
         counts = data["Calories"]
         colors = ['gold','lightgreen', "pink", "blue", "skyblue", "cyan", "orange

         fig = go.Figure(data=[go.Pie(labels=label, values=counts)])
         fig.update_layout(title_text='Calories Burned Daily')
         fig.update_traces(hoverinfo='label+percent', textinfo='value', textfont_s
                           marker=dict(colors=colors, line=dict(color='black', wid
         fig.show()
```



Summary

So this is how you can analyze the data collected by a smartwatch about fitness using Python. Smartwatches are preferred by people who like to take care of their fitness. Analyzing the data collected on your fitness is one of the use cases of Data Science in healthcare. I hope you liked this article on Smartwatch data analysis using Python. Feel free to ask valuable questions in the comments section below.

THANK YOU!

GitHub Link: https://github.com/anujtiwari21?tab=repositories