Strava Activities in Italy

This is a VERY brief look at some simple data on some activities that I published on Strava when I was living in Catania, Italy and working with refugees. This notebook is a simple data exploration on these activities, with 2 visuals outlining my cycling and running patterns.

To start, Let's import the libraries needed to examine the data

In [1]:
```
# Libraries
import pandas as pd
import matplotlib as mpl
import matplotlib.pyplot as plt
import numpy as np

# Import data
data = pd.read_csv('activities.csv', decimal=',')
data = data.dropna(thresh=len(data) - 2, axis=1)
data.columns
```

Out[1]:
```
Index(['ID attività', 'Data dell'attività', 'Nome attività', 'Tipo attività',
       'Tempo complessivo', 'Distanza', 'Spostamenti vari', 'Nome del file',
       'Peso dell'atleta', 'Tempo in movimento', 'Distanza.1',
       'Velocità massima', 'Dislivello complessivo', 'Dislivello minimo',
       'Dislivello massimo', 'Pendenza massima', 'Pendenza media'],
      dtype='object')
```

In [2]:
```
# Let's get a feeling for this data
print('Shape of data: ', data.shape)
data.head()
```

Out[2]:
```
Shape of data:  (44, 17)
```

	ID attività	Data dell'attività	Nome attività	Tipo attività	Tempo complessivo	Distanza	Spostamenti vari	Nome del file	Peso dell'atleta	Tempo in movimento
0	1537701862	28 apr 2018, 19:39:53	Giro pomeridiano	Ciclismo	11974	53.82	False	activities/1537701862.gpx	0.0	9417.0
1	1541822998	30 apr 2018, 21:38:51	Primo giro del nord	Ciclismo	9682	52.27	False	activities/1541822998.gpx	0.0	8135.0
2	1558764452	08 mag 2018, 16:07:41	Giro mattutino	Ciclismo	11047	58.89	False	activities/1558764452.gpx	0.0	10466.0
3	1565541423	11 mag 2018, 19:11:52	Giro pomeridiano	Ciclismo	4219	23.24	False	activities/1565541423.gpx	0.0	3465.0
4	1645641516	18 giu 2018, 00:16:53	Sunday funday	Corsa	3463	10.66	False	activities/1645641516.gpx	0.0	3188.0

It looks like we've got the world's small dataset! It looks I did about 44 events over the course of the two years on Strava. Let's take a look at some summary statistics.

In [3]:
```
#Change time to be in minutes
data['Tempo complessivo'] = data['Tempo complessivo'].astype('float64')/60

#Pull out numerical columns
stats = data[['Tempo complessivo', 'Distanza', 'Peso dell'atleta', 'Tempo in movimento', 'Distanza.1',
              'Velocità massima', 'Dislivello complessivo', 'Dislivello minimo',
              'Dislivello massimo', 'Pendenza massima', 'Pendenza media']].astype('float64').describe()
print(stats)
```

```
       Tempo complessivo   Distanza  Peso dell'atleta  Tempo in movimento  \
count          44.000000  44.000000         42.0           44.000000
mean           83.949421  17.069091          0.0         3859.818182
std            68.772870  17.136309          0.0         3146.543975
min             6.750000   1.610000          0.0          405.000000
25%            26.745833   4.917500          0.0         1443.000000
50%            65.550000   9.895000          0.0         2909.500000
75%           115.679167  22.737500          0.0         5527.750000
max           327.650000  70.340000          0.0        15590.000000

       Distanza.1  Velocità massima  Dislivello complessivo  \
count   44.000000         44.000000               44.000000
mean   17072.154710      10.656818              236.724109
std    17136.320016       5.206677              339.771168
min     1611.900024       2.600000                7.658333
25%     4921.049927       5.575000               45.452693
50%     9897.899902      10.050000              120.339390
75%    22740.675781      14.525000              273.776062
max    70342.101562      24.600000             1923.893433

       Dislivello minimo  Dislivello massimo  Pendenza massima  Pendenza media
count          44.000000           44.000000         44.000000       44.000000
mean          589.011364          818.740913         18.143182       -0.284717
std           723.558152          808.758784         11.469340        1.259337
min            -4.700000           22.400000          4.500000       -5.071309
25%            21.475000          144.100006         10.700000       -0.194745
50%           133.400002          467.650009         14.300000       -0.008395
75%          1271.799988         1535.325043         21.174999        0.000000
max          2779.000000         3219.199951         50.000000        2.875679
```

I looks like I tended to do about half runs and half rides, judging by the percentiles of of the 'Distanza' distance column, with an average amount of time of around an hour. A distance mean of 17.1 and median of 9.8 remind us that there is more than one type of activity in this dataset. Let's sort this dataset by activity to get a better feel of the distribution.

Measuring Runs

In [4]:
```
#Mark elevation change as a float
data['Dislivello complessivo'] = data['Dislivello complessivo'].astype('float64')

#Sorting by activity type
run = data[data['Tipo attività'] == 'Corsa']
cycle = data[data['Tipo attività'] == 'Ciclismo']

print('Running Data')
print(run[['Tempo complessivo', 'Distanza', 'Peso dell'atleta', 'Tempo in movimento', 'Distanza.1',
           'Velocità massima', 'Dislivello complessivo', 'Dislivello minimo',
           'Dislivello massimo', 'Pendenza massima', 'Pendenza media']].astype('float64').describe
())
```

```
Running Data
       Tempo complessivo   Distanza  Peso dell'atleta  Tempo in movimento  \
count          25.000000  25.000000              25.0           25.000000
mean           49.891333   7.961600               0.0         2681.92000
std            40.194814   5.388457               0.0         2151.24979
min             6.750000   1.610000               0.0          405.000000
25%            22.883333   4.170000               0.0         1356.000000
50%            27.783333   5.410000               0.0         1643.000000
75%            78.233333  11.060000               0.0         4396.000000
max           155.083333  22.570000               0.0         8813.000000

       Distanza.1  Velocità massima  Dislivello complessivo  \
count    25.000000         25.000000               25.000000
mean   7965.032036          8.568800              118.153977
std    5387.631847          5.198695              132.408140
min    1611.900024          4.400000                7.658333
25%    4177.799805          5.300000               26.347252
50%    5417.200195          6.300000               63.445129
75%   10059.599609          8.800000              132.579483
max   22574.300781         24.600000              505.061859

       Dislivello minimo  Dislivello massimo  Pendenza massima  Pendenza media
count          25.000000           25.000000         25.000000       25.000000
mean          573.283996          681.872008        17.280000       -0.272926
std           639.124237          662.218677        12.281219        1.346564
min            -4.700000           22.400000         4.900000       -5.071309
25%           97.900002          163.800003        10.400000       -0.077785
50%          134.399994          290.000000        14.300000       -0.013752
75%         1189.400024         1366.099976        26.500000        0.000000
max         1680.199951         1939.000000        48.599998        2.875679
```

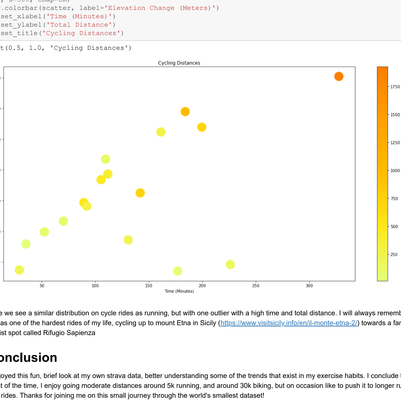
The running data shows that most runs were between 20 and 80 minutes, with the longest at 2 1/2 hours. We also see that most runs were around 5km with a reasonably consistent pace. Very few runs had a large altitude change 'Dislivello complessivo'.

Let's plot a quick view of the runs, comparing distance, elevation, and time, to better understand the distribution.

In [5]:
```
#Clearly we need to turn this into English, but we can have some fun none the less
cm =plt.cm.get_cmap('Wistia')

fig, ax = plt.subplots(figsize=(20, 10))
scatter = ax.scatter(x=run['Tempo complessivo'], y=run['Distanza'], c=run['Dislivello complessivo'], s=
500, cmap=cm)
fig.colorbar(scatter, label='Elevation Change (Meters)')
ax.set_xlabel('Time (minutes)')
ax.set_ylabel('Total Distance (km)')
ax.set_title('Running Distances')
```

Out[5]:
```
Text(0.5, 1.0, 'Running Distances')
```



We can see that the data is quite skew to the right, with most runs at or below 5k, but a few really long runs with a high elevation change.

Measuring Cycle Rides

We will use the same methodology as running here.

In [6]:
```
#Printing the description of cycling data
print('Cycling Data')
print(cycle[['Tempo complessivo', 'Distanza', 'Peso dell'atleta', 'Tempo in movimento', 'Distanza.1',
             'Velocità massima', 'Dislivello complessivo', 'Dislivello minimo',
             'Dislivello massimo', 'Pendenza massima', 'Pendenza media']].astype('float64').describe
())
```

```
Cycling Data
       Tempo complessivo   Distanza  Peso dell'atleta  Tempo in movimento  \
count          17.000000  17.000000              17.0           17.000000
mean          132.037255  31.958235               0.0         5561.352941
std            76.030920  18.979875               0.0         3772.919740
min            29.183333   6.990000               0.0         1086.000000
25%            89.366667  17.140000               0.0         2895.000000
50%           111.783333  29.280000               0.0         5041.000000
75%           177.016667  43.420000               0.0         6813.000000
max           327.650000  70.340000               0.0        15590.000000

       Distanza.1  Velocità massima  Dislivello complessivo  \
count   17.000000         17.000000               17.000000
mean  31960.865091         14.474671              419.673275
std   18980.813952          2.141416              472.517264
min    6990.899902         11.100000               11.678770
25%   17140.500000         12.900000              122.031281
50%   29282.699219         14.400000              257.256714
75%   43423.000000         16.200001              503.826111
max   70342.101562         18.299999             1923.893433

       Dislivello minimo  Dislivello massimo  Pendenza massima  Pendenza media
count          17.000000           17.000000         17.000000       17.000000
mean          667.847066         1085.264703         15.105882       -0.337392
std           870.611692          974.816645          6.882448        1.236063
min            -4.100000          140.199997          4.500000       -4.462987
25%            15.700000          144.100006         12.000000       -0.265007
50%           133.300003          839.299988         14.300000       -0.000711
75%          1516.900024         1683.800049         16.400000        0.000509
max          2779.000000         3219.199951         36.400002        1.635956
```

In [7]:
```
# Comparing distance, elevation, and time
cm =plt.cm.get_cmap('Wistia')

fig, ax = plt.subplots(figsize=(20, 10))
scatter = ax.scatter(x=cycle['Tempo complessivo'], y=cycle['Distanza'], c=cycle['Dislivello complessiv
o'], s=500, cmap=cm)
fig.colorbar(scatter, label='Elevation Change (Meters)')
ax.set_xlabel('Time (Minutes)')
ax.set_ylabel('Total Distance')
ax.set_title('Cycling Distances')
```

Out[7]:
```
Text(0.5, 1.0, 'Cycling Distances')
```


Here we see a similar distribution on cycle rides as running, but with one outlier with a high time and total distance. I will always remember this as one of the hardest rides of my life, cycling up to mount Etna in Sicily (https://www.visitsicily.info/en/il-monte-etna-2/) towards a famous tourist spot called Rifugio Sapienza

Conclusion

I enjoyed this fun, brief look at my own strava data, better understanding some of the trends that exist in my exercise habits. I conclude that most of the time, I enjoy going moderate distances around 5k running, and around 30k biking, but on occasion like to push it to longer runs and rides. Thanks for joining me on this small journey through the world's smallest dataset!

In [ ]:
```
```