Python

November 10, 2018

0.1 Python

Import the libraries that we are going to use

```
In [1]: import pandas as pd
        import matplotlib.pyplot as plt
        import seaborn as sns
```

0.2 Adding the data

```
In [2]: df = pd.read_csv('density.csv')
```

At this point is a good idea to **check** the information, this way we will know if the process has been done correctly and we will have an idea of the structure of the dataset

```
In [3]: df.head()
```

```
Out[3]:    OID1  C_Distri_2     N_Distric  C_Neighbou  \
        0   0.0           1  Ciutat Vella           1
        1   1.0           1  Ciutat Vella           2
        2   2.0           1  Ciutat Vella           3
        3   3.0           1  Ciutat Vella           4
        4   4.0           2      Eixample           5

                                    Neighbou_1    Man_1  Women_1  Total_1  \
        0                             el Raval  26553.0  21850.0  48403.0
        1                       el Barri Gòtic   8368.0   7508.0  15876.0
        2                       la Barceloneta   7581.0   7631.0  15212.0
        3  Sant Pere, Santa Caterina i la Ribera  11466.0  11390.0  22856.0
        4                        el Fort Pienc  15039.0  16924.0  31963.0

           Area_km2_1    Pop_dens_1  \
        0    1.098393  44067.108766
        1    0.841905  18857.232750
        2    1.313868  11578.027776
        3    1.114299  20511.553762
        4    0.928901  34409.477864
```

```
                                                  WEB_45  Household1
0  http://www.bcn.cat/estadistica/catala/dades/in...        74.6
1  http://www.bcn.cat/estadistica/catala/dades/in...       110.5
2  http://www.bcn.cat/estadistica/catala/dades/in...        84.8
3  http://www.bcn.cat/estadistica/catala/dades/in...        97.8
4  http://www.bcn.cat/estadistica/catala/dades/in...       105.0
```

0.3 Start the processing: your part

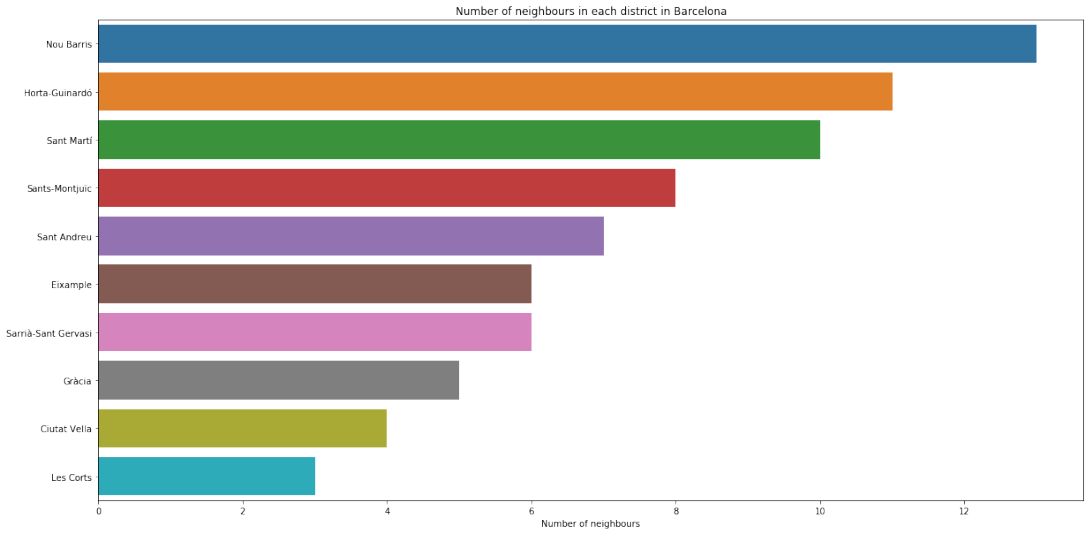
Something easy to start: we can think how many neightbours we have in every district

```
In [4]: print(df['N_Districc'].value_counts())
```

```
Nou Barris              13
Horta-Guinardó          11
Sant Martí              10
Sants-Montjuïc           8
Sant Andreu              7
Eixample                 6
Sarrià-Sant Gervasi      6
Gràcia                   5
Ciutat Vella             4
Les Corts                3
Name: N_Districc, dtype: int64
```

```
In [5]: ne_dis = df['N_Districc'].value_counts()

        plt.figure(figsize=(20, 10))
        sns.barplot(y=ne_dis.index.values, x=ne_dis.values, order=ne_dis.index)
        plt.title('Number of neighbours in each district in Barcelona')
        plt.xlabel('Number of neighbours')
        plt.show()
```



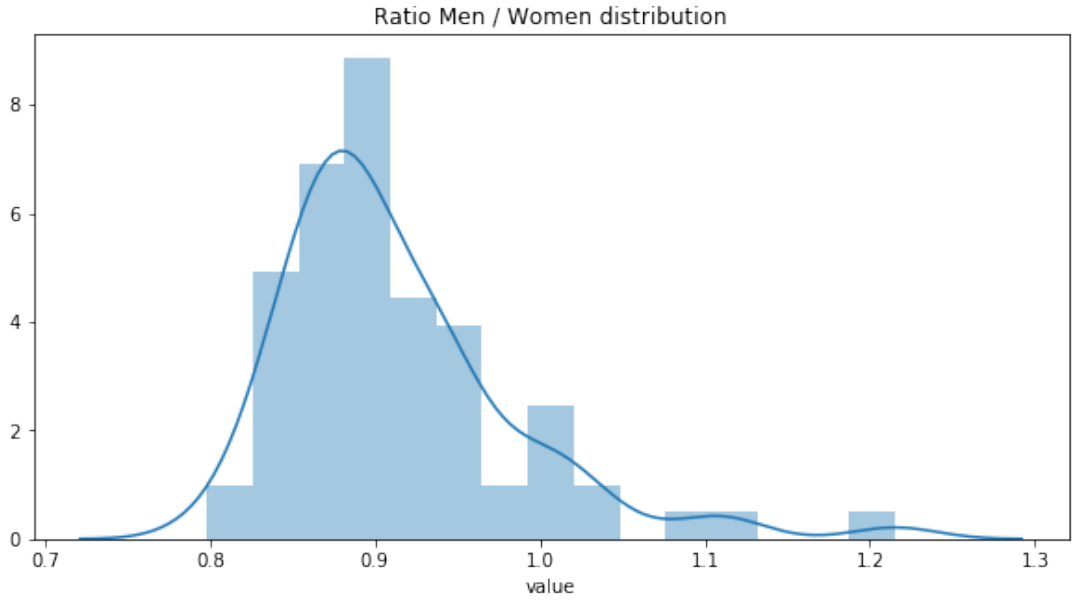
A small challenge, creating new variables from this dataset: the $\frac{man}{women}$ ratio

```
In [6]: df['ratio_MW'] = df['Man_1']/df['Women_1']
        df['ratio_MW'].describe()

Out[6]: count    73.000000
        mean      0.913460
        std       0.072076
        min       0.798030
        25%       0.869040
        50%       0.893113
        75%       0.945862
        max       1.215240
        Name: ratio_MW, dtype: float64

In [7]: plt.figure(figsize=(10, 5))
        sns.distplot(df['ratio_MW'], bins=15)
        plt.xlabel('value')
        plt.title('Ratio Men / Women distribution')
        plt.show()

/Users/manuelgijon/anaconda3/lib/python3.6/site-packages/matplotlib/axes/_axes.py:6462: UserWa
  warnings.warn("The 'normed' kwarg is deprecated, and has been "
```



In which neighbours there are more men than women?

```
In [8]: df[df['ratio_MW'] > 1]['Neighbou_1']
```

```
Out[8]: 0                                  el Raval
        1                             el Barri Gòtic
        3     Sant Pere, Santa Caterina i la Ribera
        11               la Marina del Prat Vermell
        41                                  la Clota
        53                               Torre Baró
        56                          la Trinitat Vella
        58                              el Bon Pastor
        69                      el Besòs i el Maresme
        Name: Neighbou_1, dtype: object
```

What are the most 'extremal' values?

```
In [9]: nei = df[df['ratio_MW'] == max(df['ratio_MW'])]['Neighbou_1']
        rat = df[df['ratio_MW'] == max(df['ratio_MW'])]['ratio_MW']
        print(nei + ' - ' + str(rat))
```

```
0    el Raval - 0    1.21524\nName: ratio_MW, dtype...
Name: Neighbou_1, dtype: object
```

```
In [10]: nei = df[df['ratio_MW'] == min(df['ratio_MW'])]['Neighbou_1']
         rat = df[df['ratio_MW'] == min(df['ratio_MW'])]['ratio_MW']
         print(nei + ' - ' + str(rat))
```

```
39    Montbau - 39    0.79803\nName: ratio_MW, dtype...
Name: Neighbou_1, dtype: object
```

0.4 Exporting the data: back to QGis

```
In [12]: df.to_csv('density_mod.csv')
```