upwork

May 20, 2020

1 Micro example of the proyect for upwork

First of all a cordial greeting, the purpose of this notebook is to demonstrate with a small file, that represents at least 1% of the information handled, and the main methods used to process and present the results.

[1]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

1.1 1. Importing the database

the file to read is a csv file with 4 columns and more of 5600 rows. Inside is the info of two of the many methods of only one laboratory of all the laboratories.

The original database consists of 17 columns, less that half of the were relevant to the study carried out, due to the particularity of the infomation contained.

A query to the database generated the csv file below: One laboaratory, two methods and their submethods if they have them, more that a decade of data, the priority of each with their status. The rest was omitted to comply with te company's internal laws and regulations.

[2]:

```
df = pd.read_csv('upwork.csv', sep=';', index_col='N.')
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 5648 entries, 1 to 5648
Data columns (total 4 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   Prioridad  5648 non-null   object
 1   Fecha      5648 non-null   object
 2   Ensayo     5648 non-null   object
 3   Estatus    5648 non-null   object
dtypes: object(4)
memory usage: 220.6+ KB
```

1.1.1 1.1 General study of the methods over time.

The information was grouped using filters to carry out a general study of the behavior of the methods over time. 1. The methods to be studied were grouped as the main category. 2. Second the Priority of each one, this is divided into three categories. 3. Third, the Status of each assay which is also divided into three categories. 4. And finally the count of each assay, using the date as reference for this example.

[3]:
```
data = df.groupby(['Ensayo', 'Prioridad', 'Estatus'])[['Fecha']].count()
data
```

[3]:
```
                                   Fecha
Ensayo Prioridad Estatus
IT-515 green     pipeta_check         71
                 pipeta_estrella     107
                 pipeta_retirado       3
       red       pipeta_check         14
                 pipeta_estrella      11
                 pipeta_retirado       1
       yellow    pipeta_check        121
                 pipeta_estrella     514
                 pipeta_retirado      11
IT-532 green     pipeta_check        374
                 pipeta_estrella     500
                 pipeta_retirado     145
       red       pipeta_check        368
                 pipeta_estrella      48
                 pipeta_retirado      40
       yellow    pipeta_check        923
                 pipeta_estrella    2235
                 pipeta_retirado     147
IT-655 red       pipeta_check         15
```

1.1.2 1.2 Database cleanup.

The assay STQA-IT-655 is discarded, because it is a recent submethod and applied under specials conditions.

[4]:
```
data.reset_index(inplace=True)
data = data.loc[(data['Ensayo'] != 'IT-655')]
data
```

[4]:
```
   Ensayo Prioridad          Estatus  Fecha
0  IT-515     green     pipeta_check     71
1  IT-515     green  pipeta_estrella    107
2  IT-515     green  pipeta_retirado      3
3  IT-515       red     pipeta_check     14
```

```
4   IT-515      red  pipeta_estrella     11
5   IT-515      red  pipeta_retirado      1
6   IT-515   yellow     pipeta_check    121
7   IT-515   yellow  pipeta_estrella    514
8   IT-515   yellow  pipeta_retirado     11
9   IT-532    green     pipeta_check    374
10  IT-532    green  pipeta_estrella    500
11  IT-532    green  pipeta_retirado    145
12  IT-532      red     pipeta_check    368
13  IT-532      red  pipeta_estrella     48
14  IT-532      red  pipeta_retirado     40
15  IT-532   yellow     pipeta_check    923
16  IT-532   yellow  pipeta_estrella   2235
17  IT-532   yellow  pipeta_retirado    147
```

1.1.3 1.3 Transformation of the data in the columns for the report.

1. The columns are renamed:
    1. Ensayo to Method.
    2. Prioridad to Priority.
    3. Estatus to Fulfilment.
    4. Fecha to Demand.
2. In the Priority column we change the values:
    1. red a Urgent.
    2. yellow a Prompt.
    3. green a Normal
3. In the fulfilment column we change the values:
    1. pipeta_estrella a Absolute.
    2. pipeta_check a Partial.
    3. pipeta_retirado a Withdrawn.

[5]:

```
replac = ['pipeta_estrella', 'pipeta_retirado',
          'pipeta_check', 'red', 'green', 'yellow']
fulfilmen = ['Absolute', 'Withdrawn', 'Partial',
             'Urgent',  'Normal', 'Prompt']
renam={"Ensayo": "Method", "Prioridad": "Priority",
       "Estatus":"Fulfilment", "Fecha":"Demand"}
data = data.replace(to_replace=replac, value=fulfilmen)
data = data.rename(columns=renam)
data
```

[5]:

```
    Method Priority Fulfilment  Demand
0   IT-515   Normal    Partial      71
1   IT-515   Normal   Absolute     107
2   IT-515   Normal  Withdrawn       3
3   IT-515   Urgent    Partial      14
```

```
4   IT-515   Urgent   Absolute      11
5   IT-515   Urgent  Withdrawn       1
6   IT-515   Prompt    Partial     121
7   IT-515   Prompt   Absolute     514
8   IT-515   Prompt  Withdrawn      11
9   IT-532   Normal    Partial     374
10  IT-532   Normal   Absolute     500
11  IT-532   Normal  Withdrawn     145
12  IT-532   Urgent    Partial     368
13  IT-532   Urgent   Absolute      48
14  IT-532   Urgent  Withdrawn      40
15  IT-532   Prompt    Partial     923
16  IT-532   Prompt   Absolute    2235
17  IT-532   Prompt  Withdrawn     147
```

1.1.4 1.4 Database molding.

1. The Priority column must be ordened in Urgent, Prompt, Normal.
2. The Fulfilment column must be ordened in Absolute, Partial, Withdrawn.

Note we use Categorical method of pandas because we dont always can use sort alphabetic.

[6]:

```
priority = ['Urgent', 'Prompt', 'Normal']
data['sort1'] = pd.Categorical(data['Priority'], priority)

fulfilment = ['Absolute', 'Partial', 'Withdrawn']
data['sort2'] = pd.Categorical(data['Fulfilment'], fulfilment)

data.sort_values(['Method', 'sort1', 'sort2'], inplace=True)
data.reset_index(drop=True, inplace=True)
data.drop(columns=['sort1', 'sort2'], inplace=True)
data
```

[6]:

```
    Method Priority Fulfilment  Demand
0   IT-515   Urgent   Absolute      11
1   IT-515   Urgent    Partial      14
2   IT-515   Urgent  Withdrawn       1
3   IT-515   Prompt   Absolute     514
4   IT-515   Prompt    Partial     121
5   IT-515   Prompt  Withdrawn      11
6   IT-515   Normal   Absolute     107
7   IT-515   Normal    Partial      71
8   IT-515   Normal  Withdrawn       3
9   IT-532   Urgent   Absolute      48
10  IT-532   Urgent    Partial     368
11  IT-532   Urgent  Withdrawn      40
12  IT-532   Prompt   Absolute    2235
```

```
13  IT-532   Prompt    Partial     923
14  IT-532   Prompt  Withdrawn     147
15  IT-532   Normal   Absolute     500
16  IT-532   Normal    Partial     374
17  IT-532   Normal  Withdrawn     145
```

1.1.5 1.5 Determing percentage of demand for each method.

The percentage of demand for each method is determined and included in the database as an additional column name ”Demand_pct”.

[7]:

```
method = list(data['Method'].value_counts().index)
data['%Demand'] = 0

for i in range(len(method)):
    mask = data['Method'] == method[i]
    data[i] = ((data.loc[mask]['Demand']*100)/
                           data.loc[mask]['Demand'].values.sum())
    data[i] = data[i].fillna(value=0)
    data['%Demand'] = data['%Demand'] + data[i]
    data = data.drop([i], axis=1)
data
```

[7]:

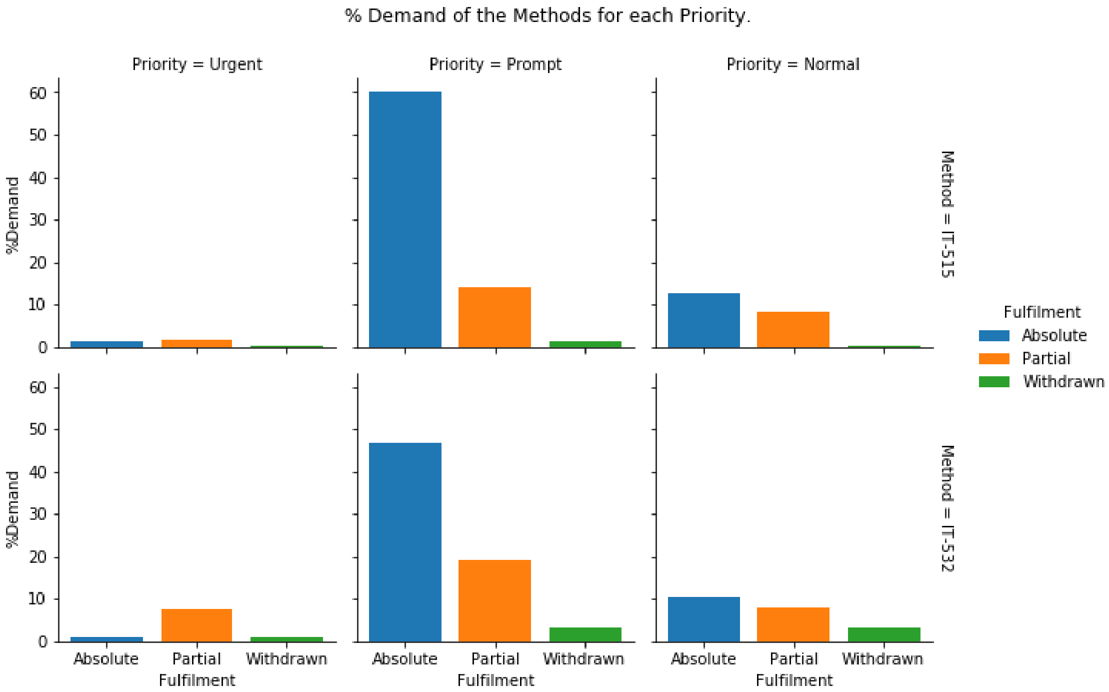
```
    Method Priority Fulfilment  Demand    %Demand
0   IT-515   Urgent   Absolute      11   1.289566
1   IT-515   Urgent    Partial      14   1.641266
2   IT-515   Urgent  Withdrawn       1   0.117233
3   IT-515   Prompt   Absolute     514  60.257913
4   IT-515   Prompt    Partial     121  14.185229
5   IT-515   Prompt  Withdrawn      11   1.289566
6   IT-515   Normal   Absolute     107  12.543962
7   IT-515   Normal    Partial      71   8.323564
8   IT-515   Normal  Withdrawn       3   0.351700
9   IT-532   Urgent   Absolute      48   1.004184
10  IT-532   Urgent    Partial     368   7.698745
11  IT-532   Urgent  Withdrawn      40   0.836820
12  IT-532   Prompt   Absolute    2235  46.757322
13  IT-532   Prompt    Partial     923  19.309623
14  IT-532   Prompt  Withdrawn     147   3.075314
15  IT-532   Normal   Absolute     500  10.460251
16  IT-532   Normal    Partial     374   7.824268
17  IT-532   Normal  Withdrawn     145   3.033473
```

1.1.6 1.6 Graphing results.

Using the bar plot, and the librery Seaborn and FacetGrid, we maps the dataset onto multiplex axes arrayed in a grid of rows and columns that correspond to the Method, the Priority and Fulfilment of variables.

[8]:
```
g = sns.FacetGrid(data, col="Priority", col_order=priority, row="Method",
                  hue="Fulfilment", hue_order=fulfilment, margin_titles=True)

g.fig.suptitle('% Demand of the Methods for each Priority.', x=0.5, y=1.05)
g = g.map(plt.bar, "Fulfilment", "%Demand").add_legend()
```



1.1.7 1.7 Saving the imagen

Last but not least, we save the resulting graphic in an image file.

[9]:
```
g.savefig('upwork.png', format='png')
```

Note for more information check my github folder project https://github.com/josean7link/upwork-project