4. Resumen de datos por agrupación

January 9, 2023

1 Transformación de datos

1.0.1 Resumen de datos por agrupación

Carga de librerías

[2]:
```
import pandas as pd
```

Importado de datos

[3]:
```
df = pd.read_excel("sales-funnel.xlsx")
#df.info()
df.head()
```

[3]:
```
   Account                          Name            Rep       Manager  \
0   714466              Trantow-Barrows   Craig Booker  Debra Henley
1   714466              Trantow-Barrows   Craig Booker  Debra Henley
2   714466              Trantow-Barrows   Craig Booker  Debra Henley
3   737550  Fritsch, Russel and Anderson   Craig Booker  Debra Henley
4   146832                 Kiehn-Spinka  Daniel Hilton  Debra Henley

       Product  Quantity  Price     Status
0          CPU         1  30000  presented
1     Software         1  10000  presented
2  Maintenance         2   5000    pending
3          CPU         1  35000   declined
4          CPU         2  65000        won
```

Referencia

https://pbpython.com/pandas-pivot-table-explained.html

Extraer valores únicos

[5]:
```
# Valores únicos de la columna product
df['Product'].unique().tolist()
```

[5]:
```
['CPU', 'Software', 'Maintenance', 'Monitor']
```

Función groupby La función groupby calculará la información para aquellas variables que los permitan, es decir, si se busca hallar la sumatoria, la operación solo se llevará a cabo con las columnas de typo numérico.

[7]:
```
df1 = df.groupby(['Manager']).sum()[['Quantity','Price']]
df1
```

[7]:
```
                Quantity   Price
Manager
Debra Henley          13  235000
Fred Anderson         17  287000
```

Los valores faltantes pueden ser identificados

[15]:
```
l = [[1, 2, 3],
     [1, None, 4],
     [2, 1, 3],
     [1, 2, 2]]
dfx = pd.DataFrame(l, columns=["a", "b", "c"])
dfx.groupby(by=["b"], dropna=False).sum()
#dfx.groupby(by=["b"], dropna=True).sum()
```

[15]:
```
     a  c
b
1.0  2  3
2.0  2  5
NaN  1  4
```

[16]:
```
df1 = df.groupby(['Manager','Name']).sum()[['Quantity','Price']]
df1
```

[16]:
```
                                          Quantity   Price
Manager       Name
Debra Henley  Barton LLC                         1   35000
              Fritsch, Russel and Anderson       1   35000
              Jerde-Hilpert                      2    5000
              Kiehn-Spinka                       2   65000
              Kulas Inc                          3   50000
              Trantow-Barrows                    4   45000
Fred Anderson Herman LLC                         2   65000
              Kassulke, Ondricka and Metz        3    7000
              Keeling LLC                        5  100000
              Koepp Ltd                          4   70000
              Purdy-Kunde                        1   30000
              Stokes LLC                         2   15000
```

Group by: Una columna

[1]:
```
import pandas as pd
df = pd.read_csv("https://raw.githubusercontent.com/mwaskom/seaborn-data/master/
 ↪tips.csv")
```

[9]:
```
df.groupby(by = 'sex').mean(numeric_only = True)
```

[9]:

sex	total_bill	tip	size
Female	18.056897	2.833448	2.459770
Male	20.744076	3.089618	2.630573

Group by: Varias columnas

[11]:
```
df.groupby(by=['sex', 'smoker']).sum(numeric_only = True)
```

[11]:

sex	smoker	total_bill	tip	size
Female	No	977.68	149.77	140
	Yes	593.27	96.74	74
Male	No	1919.75	302.00	263
	Yes	1337.07	183.07	150

[15]:
```
df.groupby(by = ['sex', 'smoker']).agg(max_total_bill = ('total_bill', 'max'),
                                       min_total_bill = ('total_bill', 'min'))
```

[15]:

sex	smoker	max_total_bill	min_total_bill
Female	No	35.83	7.25
	Yes	44.30	3.07
Male	No	48.33	7.51
	Yes	50.81	7.25

Group by: Diferentes grupos de agregación

[21]:
```
df.groupby(by = ['sex','smoker']).agg({'total_bill':['sum', 'mean'],
                                       'tip':['sum','mean']})
```

[21]:

		total_bill		tip	
		sum	mean	sum	mean
sex	smoker				
Female	No	977.68	18.105185	149.77	2.773519
	Yes	593.27	17.977879	96.74	2.931515
Male	No	1919.75	19.791237	302.00	3.113402
	Yes	1337.07	22.284500	183.07	3.051167

[2]:
```
agg_criteria = {'total_bill': 'sum',
                'tip': 'mean'}

df.groupby(by=['sex', 'smoker']).agg(agg_criteria)
```

[2]:
```
                total_bill       tip
sex    smoker
Female No           977.68  2.773519
       Yes          593.27  2.931515
Male   No          1919.75  3.113402
       Yes         1337.07  3.051167
```

Group by: Diferentes grupos de agregación eliminando índices

[3]:
```
df.groupby(by = ['sex', 'smoker'], as_index = False).agg(agg_criteria)
```

[3]:

	sex	smoker	total_bill	tip
0	Female	No	977.68	2.773519
1	Female	Yes	593.27	2.931515
2	Male	No	1919.75	3.113402
3	Male	Yes	1337.07	3.051167

Función pivottable Primero, transformamos la columna 'Status' en categorías (no es obligatorio)

[61]:
```
df1 = df.copy()
df1["Status"] = df1["Status"].astype("category")
df1['Status'] = df1["Status"].cat.
 ↪set_categories(["won","pending","presented","declined"])
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 17 entries, 0 to 16
Data columns (total 8 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   Account   17 non-null     int64
 1   Name      17 non-null     object
 2   Rep       17 non-null     object
 3   Manager   17 non-null     object
 4   Product   17 non-null     object
 5   Quantity  17 non-null     int64
 6   Price     17 non-null     int64
 7   Status    17 non-null     category
dtypes: category(1), int64(3), object(4)
memory usage: 1.3+ KB
```

[62]:
```
# Por defecto, la función calcula la media
df2 = pd.pivot_table(df1, index = ['Manager','Rep'], values = ['Quantity'],␣
 ↪aggfunc = np.sum)
df2
```

[62]:

		Quantity
Manager	Rep	
Debra Henley	Craig Booker	5
	Daniel Hilton	5
	John Smith	3
Fred Anderson	Cedric Moss	5
	Wendy Yule	12

[64]:
```
df2 = pd.pivot_table(df1, index = ['Manager','Rep'], values = ['Price'],␣
 ↪aggfunc = [np.mean,len])
df2
```

[64]:

		mean	len
		Price	Price
Manager	Rep		
Debra Henley	Craig Booker	20000.000000	4
	Daniel Hilton	38333.333333	3
	John Smith	20000.000000	2
Fred Anderson	Cedric Moss	27500.000000	4
	Wendy Yule	44250.000000	4

[67]:
```
df2 = pd.pivot_table(df1,
                     index=["Manager","Rep"],
                     values=["Price"],
                     columns=["Product"],
                     aggfunc=[np.sum])
df2
```

[67]:

		sum			
		Price			
Product		CPU	Maintenance	Monitor	Software
Manager	Rep				
Debra Henley	Craig Booker	65000.0	5000.0	NaN	10000.0
	Daniel Hilton	105000.0	NaN	NaN	10000.0
	John Smith	35000.0	5000.0	NaN	NaN
Fred Anderson	Cedric Moss	95000.0	5000.0	NaN	10000.0
	Wendy Yule	165000.0	7000.0	5000.0	NaN

[68]:
```
df2 = pd.pivot_table(df1,
                     index=["Manager","Rep"],
                     values=["Price"],
                     columns=["Product"],
                     aggfunc=[np.sum],
                    fill_value = 0)
df2
```

[68]:
```
                                sum
                              Price
Product                         CPU Maintenance Monitor Software
Manager       Rep
Debra Henley  Craig Booker    65000        5000       0    10000
              Daniel Hilton  105000           0       0    10000
              John Smith      35000        5000       0        0
Fred Anderson Cedric Moss     95000        5000       0    10000
              Wendy Yule     165000        7000    5000        0
```

[71]:
```
df2 = pd.pivot_table(df1,
                     index=["Manager","Rep"],
                     values=["Price", 'Quantity'],
                     columns=["Product"],
                     aggfunc=[np.sum],
                    fill_value = 0)
df2
```

[71]:
```
                                sum                                    \
                              Price                                Quantity
Product                         CPU Maintenance Monitor Software      CPU
Manager       Rep
Debra Henley  Craig Booker    65000        5000       0    10000        2
              Daniel Hilton  105000           0       0    10000        4
              John Smith      35000        5000       0        0        1
Fred Anderson Cedric Moss     95000        5000       0    10000        3
              Wendy Yule     165000        7000    5000        0        7


Product                     Maintenance Monitor Software
Manager       Rep
Debra Henley  Craig Booker            2       0        1
              Daniel Hilton           0       0        1
              John Smith              2       0        0
Fred Anderson Cedric Moss             1       0        1
              Wendy Yule              3       2        0
```

[72]:
```
df2 = pd.pivot_table(df1,
                     index=['Manager','Rep','Product'],
                     values=['Price', 'Quantity'],
                     aggfunc=[np.sum],
                     fill_value = 0)
df2
```

[72]:
```
                                      sum
                                    Price Quantity
```

```
Manager       Rep           Product
Debra Henley  Craig Booker  CPU           65000        2
                            Maintenance    5000        2
                            Software      10000        1
              Daniel Hilton CPU          105000        4
                            Software      10000        1
              John Smith    CPU           35000        1
                            Maintenance    5000        2
Fred Anderson Cedric Moss   CPU           95000        3
                            Maintenance    5000        1
                            Software      10000        1
              Wendy Yule    CPU          165000        7
                            Maintenance    7000        3
                            Monitor        5000        2
```

[76]:
```
# Agregar los totales
df2 = pd.pivot_table(df1,
                     index=['Manager','Rep','Product'],
                     values=['Price', 'Quantity'],
                     aggfunc=[np.sum,np.mean],
                     fill_value = 0,
                     margins = True,
                     margins_name = "Total")
df2
```

[76]:
```
                                          sum                  mean  \
                                        Price Quantity         Price
Manager       Rep           Product
Debra Henley  Craig Booker  CPU           65000        2  32500.000000
                            Maintenance    5000        2   5000.000000
                            Software      10000        1  10000.000000
              Daniel Hilton CPU          105000        4  52500.000000
                            Software      10000        1  10000.000000
              John Smith    CPU           35000        1  35000.000000
                            Maintenance    5000        2   5000.000000
Fred Anderson Cedric Moss   CPU           95000        3  47500.000000
                            Maintenance    5000        1   5000.000000
                            Software      10000        1  10000.000000
              Wendy Yule    CPU          165000        7  82500.000000
                            Maintenance    7000        3   7000.000000
                            Monitor        5000        2   5000.000000
Total                                    522000       30  30705.882353


                                        Quantity
Manager       Rep           Product
Debra Henley  Craig Booker  CPU         1.000000
```

```
                            Maintenance  2.000000
                            Software     1.000000
                 Daniel Hilton CPU       2.000000
                            Software     1.000000
                 John Smith    CPU       1.000000
                            Maintenance  2.000000
Fred Anderson Cedric Moss   CPU          1.500000
                            Maintenance  1.000000
                            Software     1.000000
                 Wendy Yule    CPU       3.500000
                            Maintenance  3.000000
                            Monitor      2.000000
Total                                    1.764706
```

[79]:
```
# El orden de las categorías coincide con el orden anteriormente desarrollado
df2 = pd.pivot_table(df1,
                     index=['Manager','Status'],
                     values=['Price'],
                     aggfunc=[np.sum],
                     fill_value = 0,
                     margins = True,
                     margins_name = "Total")
df2
```

[79]:
```
                              sum
                            Price
Manager       Status
Debra Henley  won           65000
              pending       50000
              presented     50000
              declined      70000
Fred Anderson won          172000
              pending       5000
              presented     45000
              declined      65000
Total                      522000
```

[82]:
```
# Ejecutar varias operaciones a un grupo de columnas
df2 = pd.pivot_table(df1,
                     index=['Manager','Status'],
                     columns=['Product'],
                     values=['Quantity','Price'],
                     aggfunc ={"Quantity":len,"Price":np.sum},
                     fill_value = 0)
df2
```

[82]:

		Price				Quantity
Product		CPU	Maintenance	Monitor	Software	CPU
Manager	Status					
Debra Henley	won	65000	0	0	0	1
	pending	40000	10000	0	0	1
	presented	30000	0	0	20000	1
	declined	70000	0	0	0	2
Fred Anderson	won	165000	7000	0	0	2
	pending	0	5000	0	0	0
	presented	30000	0	5000	10000	1
	declined	65000	0	0	0	1

Product		Maintenance	Monitor	Software
Manager	Status			
Debra Henley	won	0	0	0
	pending	2	0	0
	presented	0	0	2
	declined	0	0	0
Fred Anderson	won	1	0	0
	pending	1	0	0
	presented	0	1	1
	declined	0	0	0

[83]:
```
# Ejecutar varias operaciones a un grupo de columnas
df2 = pd.pivot_table(df1,
                     index=['Manager','Status'],
                     columns=['Product'],
                     values=['Quantity','Price'],
                     aggfunc ={"Quantity":len,"Price":[np.sum,np.mean]},
                     fill_value = 0)
df2
```

[83]:

		Price				Price	
		mean				sum	
Product		CPU	Maintenance	Monitor	Software	CPU	
Manager	Status						
Debra Henley	won	65000	0	0	0	65000	
	pending	40000	5000	0	0	40000	
	presented	30000	0	0	10000	30000	
	declined	35000	0	0	0	70000	
Fred Anderson	won	82500	7000	0	0	165000	
	pending	0	5000	0	0	0	
	presented	30000	0	5000	10000	30000	
	declined	65000	0	0	0	65000	

		Quantity	

					len	
Product		Maintenance	Monitor	Software	CPU	Maintenance
Manager	Status					
Debra Henley	won	0	0	0	1	0
	pending	10000	0	0	1	2
	presented	0	0	20000	1	0
	declined	0	0	0	2	0
Fred Anderson	won	7000	0	0	2	1
	pending	5000	0	0	0	1
	presented	0	5000	10000	1	0
	declined	0	0	0	1	0

Product		Monitor	Software
Manager	Status		
Debra Henley	won	0	0
	pending	0	0
	presented	0	2
	declined	0	0
Fred Anderson	won	0	0
	pending	0	0
	presented	1	1
	declined	0	0

Es posible filtrar las tablas generadas anteriormente...

[84]:
```
df2 = pd.pivot_table(df1,
                     index=['Manager','Status'],
                     columns=['Product'],
                     values=['Quantity','Price'],
                     aggfunc ={"Quantity":len,"Price":[np.sum,np.mean]},
                     fill_value = 0)
df2.query('Manager == ["Debra Henley"]')
```

[84]:

		Price						\
		mean				sum		
Product		CPU	Maintenance	Monitor	Software	CPU	Maintenance	
Manager	Status							
Debra Henley	won	65000	0	0	0	65000	0	
	pending	40000	5000	0	0	40000	10000	
	presented	30000	0	0	10000	30000	0	
	declined	35000	0	0	0	70000	0	

		Quantity			
		len			
Product		CPU	Maintenance	Monitor	Software
Manager	Status				

```
Debra Henley won              0        0        1           0       0        0
             pending          0        0        1           2       0        0
             presented        0    20000        1           0       0        2
             declined         0        0        2           0       0        0
```

[85]:
```
df2 = pd.pivot_table(df1,
                     index=['Manager','Status'],
                     columns=['Product'],
                     values=['Quantity','Price'],
                     aggfunc ={"Quantity":len,"Price":[np.sum,np.mean]},
                     fill_value = 0)
df2.query('Status == ["pending","won"]')
```

[85]:
```
                        Price                                                \
                         mean                                         sum
Product                   CPU Maintenance Monitor Software     CPU Maintenance
Manager       Status
Debra Henley  won       65000           0       0        0   65000           0
              pending   40000        5000       0        0   40000       10000
Fred Anderson won       82500        7000       0        0  165000        7000
              pending       0        5000       0        0       0        5000

                                    Quantity
                                         len
Product                  Monitor Software      CPU Maintenance Monitor Software
Manager       Status
Debra Henley  won              0        0        1           0       0        0
              pending          0        0        1           2       0        0
Fred Anderson won              0        0        2           1       0        0
              pending          0        0        0           1       0        0
```

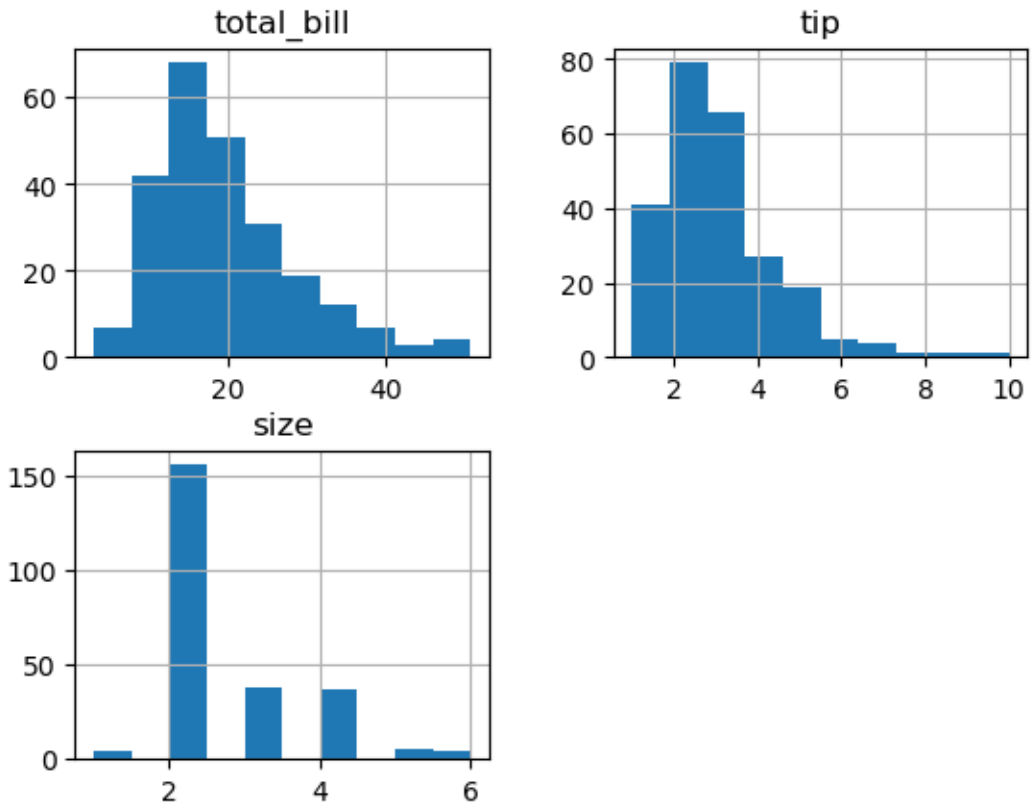
Tablas de frecuencia para variables continuas

[4]:
```
import pandas as pd
df = pd.read_csv("https://raw.githubusercontent.com/mwaskom/seaborn-data/master/
 ↪tips.csv")
```

El método hist() crear un histograma para cada variable numérica en el dataset. Provee información útil de caracter exploratorio

[7]:
```
df.hist()
```

[7]:
```
array([[<AxesSubplot: title={'center': 'total_bill'}>,
        <AxesSubplot: title={'center': 'tip'}>],
       [<AxesSubplot: title={'center': 'size'}>, <AxesSubplot: >]],
      dtype=object)
```



El método cut() permite crear los saltos o los intervalos para cada sección del histograma

[8]:
```
bins = [0, 2, 4, float('inf')]
labels = ['small','medium','high']
df['tip_category'] = pd.cut(df['tip'], bins=bins, labels=labels)
df.head(15)
```

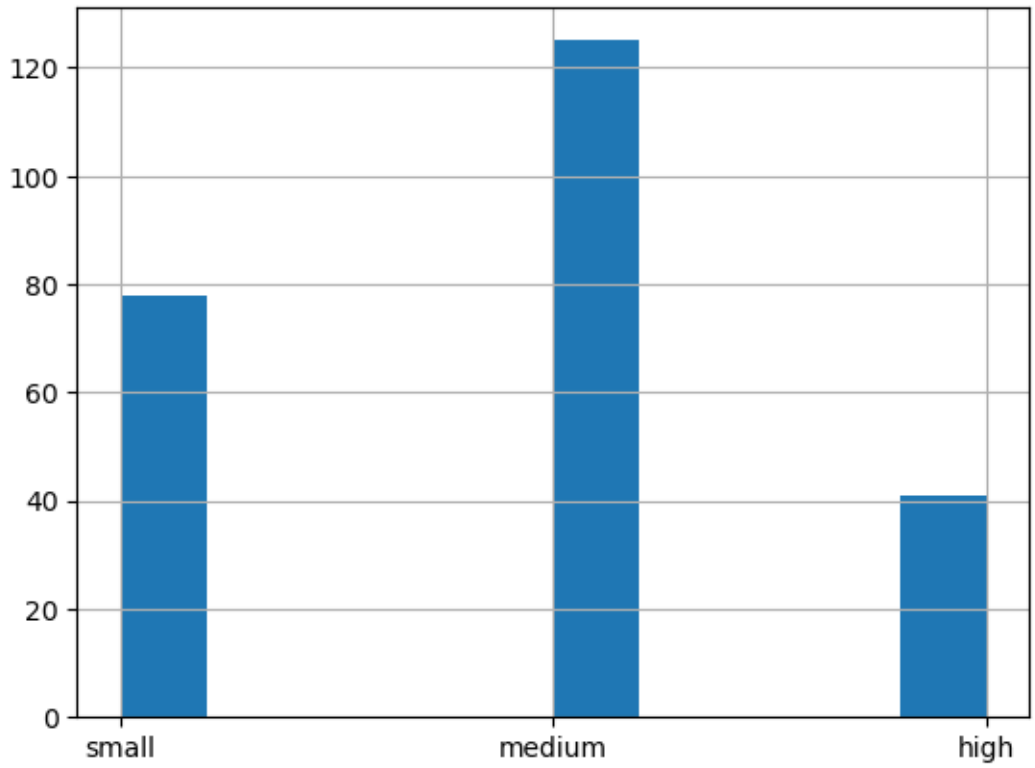
[8]:

	total_bill	tip	sex	smoker	day	time	size	tip_category
0	16.99	1.01	Female	No	Sun	Dinner	2	small
1	10.34	1.66	Male	No	Sun	Dinner	3	small
2	21.01	3.50	Male	No	Sun	Dinner	3	medium
3	23.68	3.31	Male	No	Sun	Dinner	2	medium
4	24.59	3.61	Female	No	Sun	Dinner	4	medium
5	25.29	4.71	Male	No	Sun	Dinner	4	high
6	8.77	2.00	Male	No	Sun	Dinner	2	small
7	26.88	3.12	Male	No	Sun	Dinner	4	medium
8	15.04	1.96	Male	No	Sun	Dinner	2	small
9	14.78	3.23	Male	No	Sun	Dinner	2	medium
10	10.27	1.71	Male	No	Sun	Dinner	2	small
11	35.26	5.00	Female	No	Sun	Dinner	4	high
12	15.42	1.57	Male	No	Sun	Dinner	2	small

```
13        18.43  3.00    Male     No  Sun  Dinner     4       medium
14        14.83  3.02  Female     No  Sun  Dinner     2       medium
```

[9]:
```
df['tip_category'].hist()
```

[9]: <AxesSubplot: >



[ ]:

[ ]:

[ ]:

[ ]: