Example_chapter_6

October 15, 2021

[1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from statsmodels.graphics.mosaicplot import mosaic
```

[2]:
```
# Read .csv data
df = pd.read_csv("eg06-01degrees.csv")
df
```

[2]:

	Degree	Sex	Count
0	Associate	women	639
1	Bachelor	women	1087
2	Master	women	460
3	Professional or Doctor	women	97
4	Associate	men	402
5	Bachelor	men	804
6	Master	men	329
7	Professional or Doctor	men	87

[3]:
```
df_new = pd.DataFrame(np.repeat(df[['Degree','Sex']].values, df.Count, axis =␣
↪0),
                      columns = df[['Degree','Sex']].columns)
df_new
```

[3]:

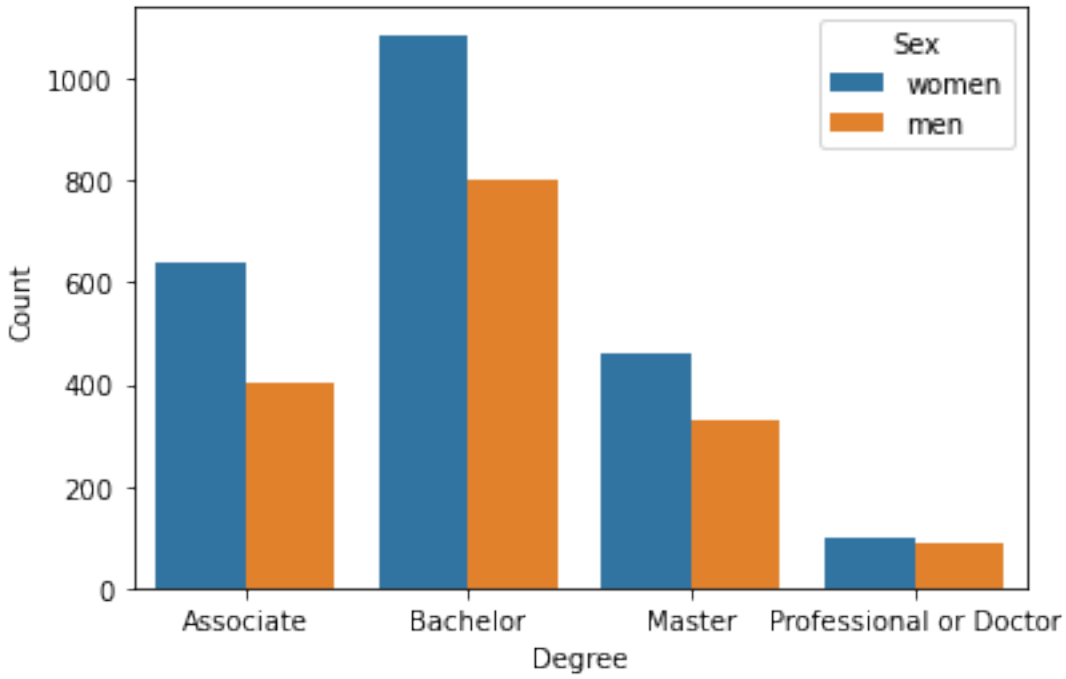
	Degree	Sex
0	Associate	women
1	Associate	women
2	Associate	women
3	Associate	women
4	Associate	women
…	…	…
3900	Professional or Doctor	men
3901	Professional or Doctor	men
3902	Professional or Doctor	men
3903	Professional or Doctor	men
3904	Professional or Doctor	men

```
[3905 rows x 2 columns]
```

[4]:
```
ct = pd.crosstab(index = df_new["Sex"], columns = df_new["Degree"], margins =␣
↪True)
ct
```

[4]:
```
Degree  Associate  Bachelor  Master  Professional or Doctor   All
Sex
men           402       804     329                      87  1622
women         639      1087     460                      97  2283
All          1041      1891     789                     184  3905
```

[5]:
```
sns.barplot(x = "Degree", hue = "Sex", y = "Count", data = df)
plt.show()
```



[6]:
```
# calculating the proportions of types of degrees conferred conditional on sex
conditional_sex = pd.crosstab(index = df_new["Sex"],
                              columns = df_new["Degree"], normalize = 'index')
conditional_sex
#help(pd.crosstab)
```

[6]:
```
Degree  Associate  Bachelor    Master  Professional or Doctor
Sex
```

```
men      0.247842  0.495684  0.202836                0.053637
women    0.279895  0.476128  0.201489                0.042488
```

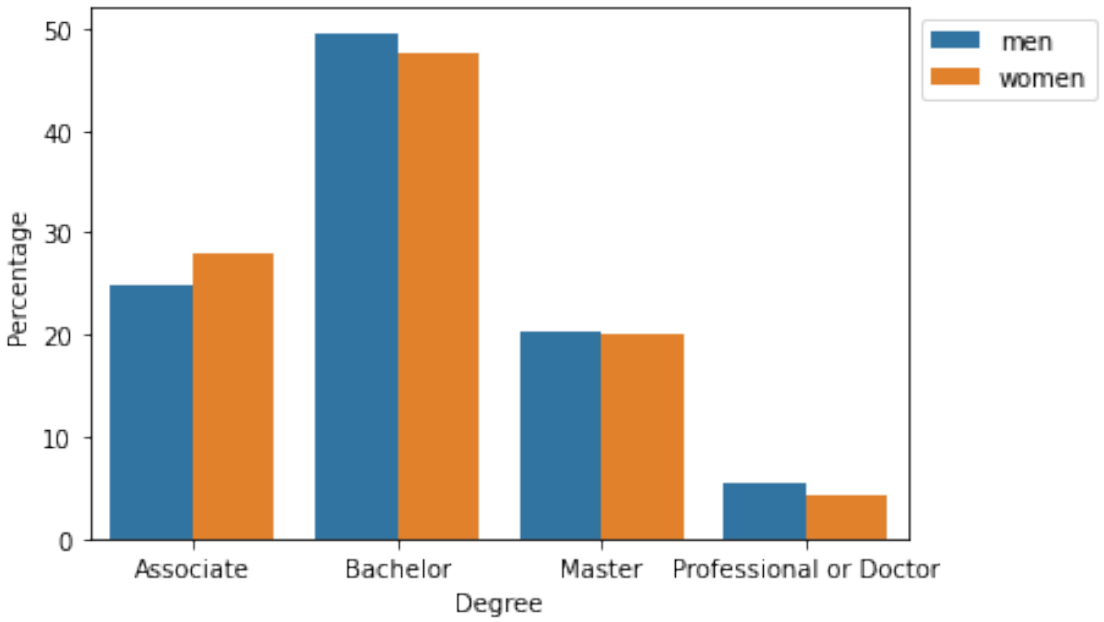
[7]:
```
# calculating the proportions of men and women conditional on degree type
conditional_degree = pd.crosstab(index = df_new["Sex"],
                                 columns = df_new["Degree"], normalize =␣
↪'columns')
conditional_degree
```

[7]:
```
Degree  Associate  Bachelor    Master  Professional or Doctor
Sex
men      0.386167  0.425172  0.416984                0.472826
women    0.613833  0.574828  0.583016                0.527174
```

[8]:
```
stacked = conditional_sex.stack().reset_index().rename(columns = {0:
↪'Percentage'})
stacked['Percentage'] = stacked['Percentage']*100
stacked
```

[8]:
```
     Sex                 Degree  Percentage
0    men              Associate   24.784217
1    men               Bachelor   49.568434
2    men                 Master   20.283600
3    men  Professional or Doctor    5.363748
4  women              Associate   27.989488
5  women               Bachelor   47.612790
6  women                 Master   20.148927
7  women  Professional or Doctor    4.248795
```

[9]:
```
sns.barplot(x = "Degree", hue = "Sex", y = "Percentage", data = stacked)
plt.legend(bbox_to_anchor = (1, 1), loc = 2)
plt.show()
```

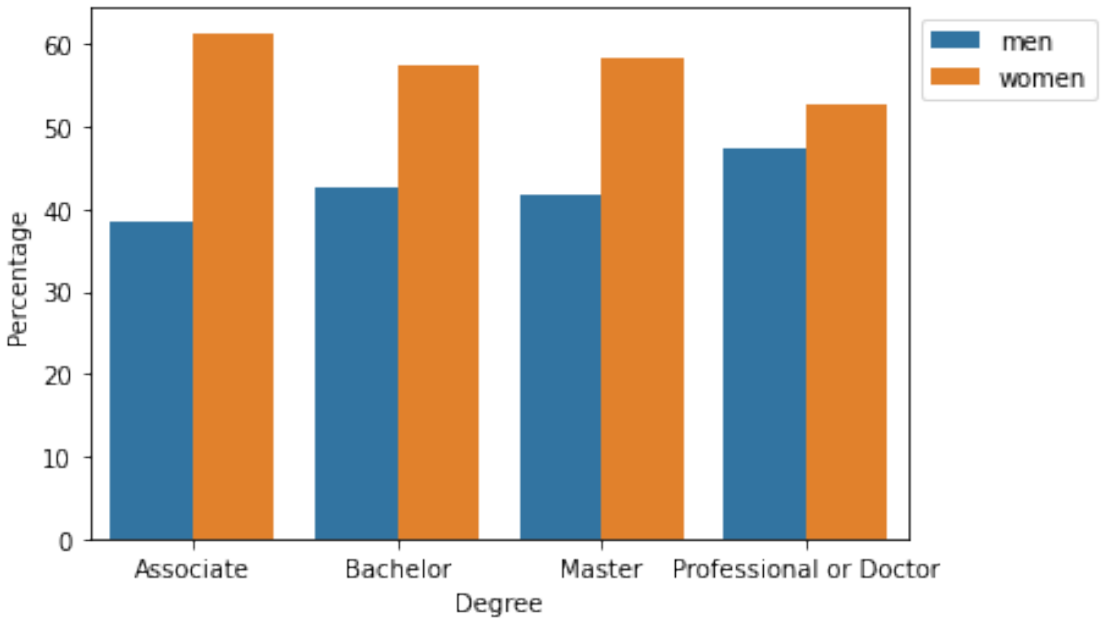


[10]:
```
stacked_degree = conditional_degree.stack().reset_index().rename(columns = {0:
↪'Percentage'})
stacked_degree['Percentage'] = stacked_degree['Percentage']*100
stacked
```

[10]:

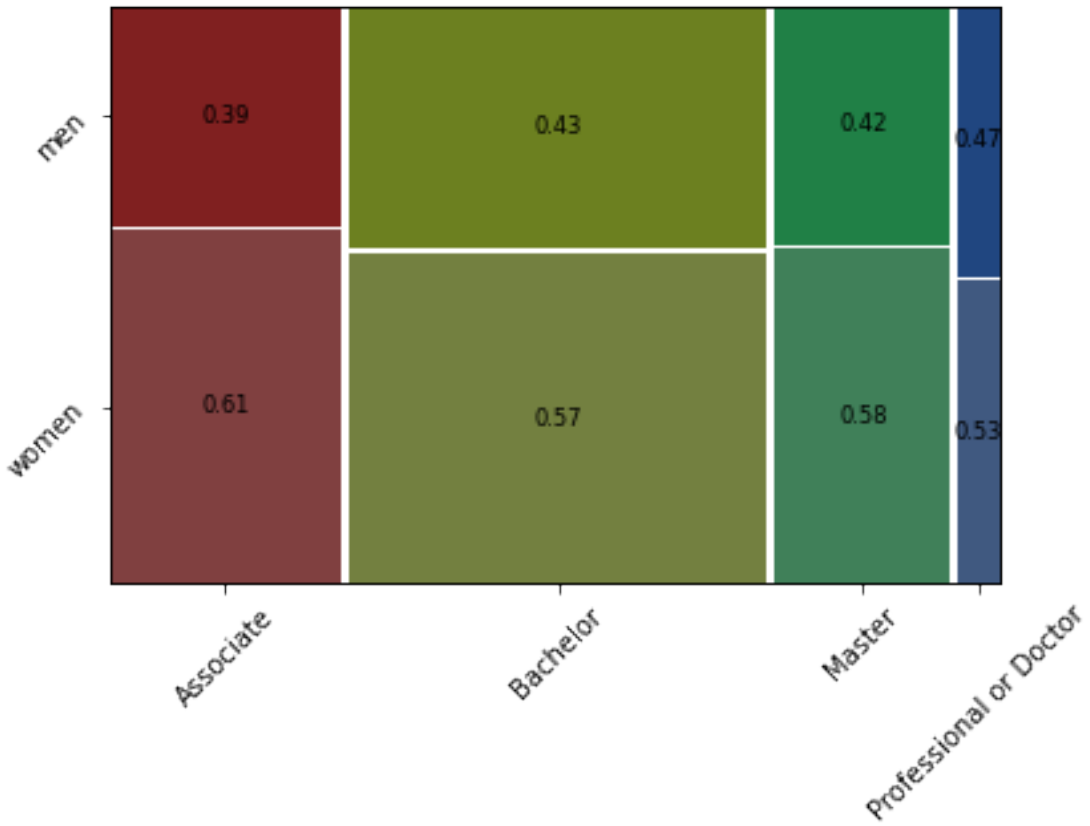
	Sex	Degree	Percentage
0	men	Associate	24.784217
1	men	Bachelor	49.568434
2	men	Master	20.283600
3	men	Professional or Doctor	5.363748
4	women	Associate	27.989488
5	women	Bachelor	47.612790
6	women	Master	20.148927
7	women	Professional or Doctor	4.248795

[11]:
```
sns.barplot(x = "Degree", hue = "Sex", y = "Percentage", data = stacked_degree)
plt.legend(bbox_to_anchor = (1, 1), loc = 2)
plt.show()
```



[12]:
```
mosaic(df_new, ['Degree', 'Sex'], label_rotation = 45, gap = 0.01)
plt.show()
```

[13]:
```
# bonus! trying to make the mosaic plot look better
labelizer = lambda k:{('Associate', 'men'):0.39, ('Bachelor', 'men'):0.43,
                      ('Master', 'men'):0.42, ('Professional or Doctor', 'men'):
 ↪0.47,
                      ('Associate', 'women'):0.61, ('Bachelor', 'women'):0.57,
                      ('Master', 'women'):0.58, ('Professional or Doctor',␣
 ↪'women'):0.53}[k]
mosaic(df_new, ['Degree', 'Sex'], labelizer = labelizer, label_rotation = 45,␣
 ↪gap = 0.01)
plt.show()
```



[ ]: