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April 4, 2021

1 5-22

1.1 №1.

( ) “count (frequency) encoding”.

[31]:
```
from datetime import datetime
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
```

[32]:
```
%matplotlib inline

sns.set(style="ticks")

from IPython.display import set_matplotlib_formats
set_matplotlib_formats("retina")
```

[33]:
```
pd.set_option("display.width", 70)
```

[34]:
```
data = pd.read_csv("telecom_users.csv", index_col = 0)

data.rename(columns={"Unnamed: 0" : "id"}, inplace=True)
```

[50]:
```
data
```

[50]:

	customerID	gender	SeniorCitizen	Partner	Dependents	tenure	\
1869	7010-BRBUU	3050	0	Yes	Yes	72	
4528	9688-YGXVR	2936	0	No	No	44	
6344	9286-DOJGF	2936	1	Yes	No	38	
6739	6994-KERXL	3050	0	No	No	4	
432	2181-UAESM	3050	0	No	No	2	
…	…	…	…	…	…	…	…
3772	0684-AOSIH	3050	0	Yes	No	1	
5191	5982-PSMKW	2936	0	Yes	Yes	23	
5226	8044-BGWPI	3050	0	Yes	Yes	12	

```
5390  7450-NWRTR    3050              1      No         No      12
860   4795-UXVCJ    3050              0      No         No      26

     PhoneService MultipleLines  InternetService  OnlineSecurity  \
1869          Yes           Yes             1291            1291
4528          Yes            No             2627            2982
6344          Yes           Yes             2627            2982
6739          Yes            No             2068            2982
432           Yes            No             2068            1713
…             …              …               …               …
3772          Yes            No             2627            1713
5191          Yes           Yes             2068            1713
5226          Yes            No             1291            1291
5390          Yes           Yes             2627            2982
860           Yes            No             1291            1291

      …     DeviceProtection          TechSupport  \
1869  …  No internet service  No internet service
4528  …                  Yes                  No
6344  …                   No                  No
6739  …                   No                  No
432   …                  Yes                  No
…   …                    …                   …
3772  …                   No                  No
5191  …                  Yes                 Yes
5226  …  No internet service  No internet service
5390  …                  Yes                  No
860   …  No internet service  No internet service

              StreamingTV      StreamingMovies        Contract  \
1869  No internet service  No internet service        Two year
4528                  Yes                  No  Month-to-month
6344                   No                  No  Month-to-month
6739                   No                 Yes  Month-to-month
432                    No                  No  Month-to-month
…                     …                   …               …
3772                  Yes                 Yes  Month-to-month
5191                  Yes                 Yes        Two year
5226  No internet service  No internet service  Month-to-month
5390                  Yes                 Yes  Month-to-month
860   No internet service  No internet service        One year

     PaperlessBilling              PaymentMethod MonthlyCharges  \
1869               No    Credit card (automatic)          24.10
4528              Yes    Credit card (automatic)          88.15
6344              Yes  Bank transfer (automatic)          74.95
6739              Yes           Electronic check          55.90
```

```
432                 No           Electronic check          53.45
…                …                        …             …
3772               Yes           Electronic check          95.00
5191               Yes    Credit card (automatic)          91.10
5226               Yes           Electronic check          21.15
5390               Yes           Electronic check          99.45
860                 No    Credit card (automatic)          19.80

      TotalCharges Churn
1869       1734.65    No
4528        3973.2    No
6344       2869.85   Yes
6739         238.5    No
432          119.5    No
…              …   …
3772            95   Yes
5191        2198.3    No
5226        306.05    No
5390       1200.15   Yes
860          457.3    No

[5986 rows x 21 columns]
```

[36]:

```python
count_map_internet_service = data['InternetService'].value_counts().to_dict()
count_map_online_security = data['OnlineSecurity'].value_counts().to_dict()
count_map_gender = data['gender'].value_counts().to_dict()

data['InternetService'] = data['InternetService'].
 ↪map(count_map_internet_service)
data['OnlineSecurity'] = data['OnlineSecurity'].map(count_map_online_security)
data['gender'] = data['gender'].map(count_map_gender)

count_freq_encod_example = data[['InternetService', 'OnlineSecurity', 'gender']]
count_freq_encod_example.head()


##     №21.

                                      (       )                              ␣
 ↪    .
```

[36]:

	InternetService	OnlineSecurity	gender
1869	1291	1291	3050
4528	2627	2982	2936
6344	2627	2982	2936
6739	2068	2982	3050
432	2068	1713	3050

[45]:
```
df_monthley = data[["MonthlyCharges"]]
def robust_scaling(df):

    df_robust = df.copy()
    for column in df_robust.columns:
        df_robust[column] = (df_robust[column] - df_robust[column].median())  /␣
↪(df_robust[column].quantile(0.75) - df_robust[column].quantile(0.25))
    return df_robust

df_monthley_robust = robust_scaling(df_monthley)

df_monthley_robust
```

[45]:

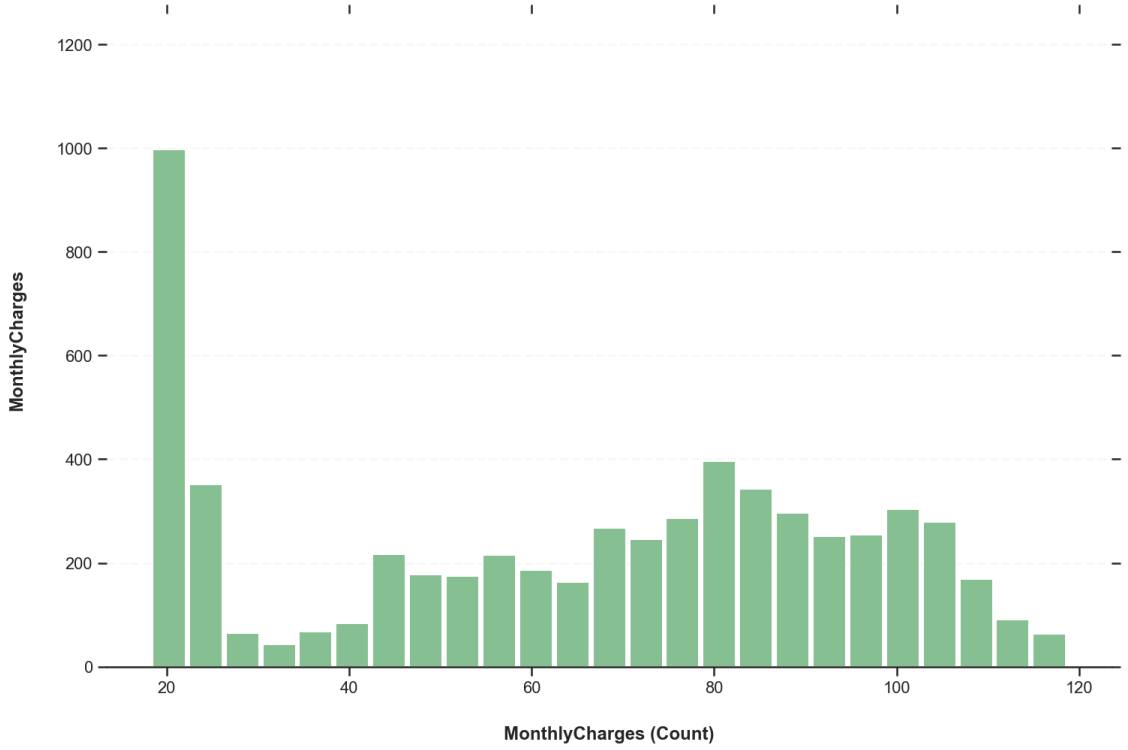
	MonthlyCharges
1869	-0.853456
4528	0.327189
6344	0.083871
6739	-0.267281
432	-0.312442
…	…
3772	0.453456
5191	0.381567
5226	-0.907834
5390	0.535484
860	-0.932719

[5986 rows x 1 columns]

.

[52]:
```
ax = data.hist(column='MonthlyCharges', bins=25, grid=False, figsize=(12,8),␣
↪color='#86bf91', zorder=2, rwidth=0.9)

ax = ax[0]
for x in ax:


    x.spines['right'].set_visible(False)
    x.spines['top'].set_visible(False)
    x.spines['left'].set_visible(False)


    x.tick_params(axis="both", which="both", bottom="off", top="off",␣
↪labelbottom="on", left="off", right="off", labelleft="on")


    vals = x.get_yticks()
```

```
    for tick in vals:
        x.axhline(y=tick, linestyle='dashed', alpha=0.4, color='#eeeeee',␣
↪zorder=1)


    x.set_title("")

    x.set_xlabel("MonthlyCharges (Count)", labelpad=20, weight='bold', size=12)

    x.set_ylabel("MonthlyCharges", labelpad=20, weight='bold', size=12)
```



[ ]: