연습문제 (2) - 2 - 추가 내용

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`neighborhood` 변수를 포함한 경우에 대한 결과 체크

```
from pandas import read_excel, DataFrame, merge, melt
from matplotlib import pyplot as plt
import seaborn as sb


import sys
import os
sys.path.append(os.path.dirname(os.path.dirname(os.getcwd())))
from helper import my_ols, scalling, get_best_features, setCategory
```

```
df = read_excel("https://data.hossam.kr/E04/manhattan.xlsx")
df
```

	rent	bedrooms	bathrooms	size_sqft	min_to_subway	floor	building_
0	2550	0.0	1	480	9	2.0	17
1	11500	2.0	2	2000	4	1.0	96
2	4500	1.0	1	916	2	51.0	29

연습문제 (2) - 2 - 추가 내용

	rent	bedrooms	bathrooms	size_sqft	min_to_subway	floor	building_
3	4795	1.0	1	975	3	8.0	31
4	17500	2.0	2	4800	3	4.0	136
...	...	...	...	...	...	...	...
3534	4210	1.0	1	532	3	8.0	16
3535	6675	2.0	2	988	5	10.0	9
3536	1699	0.0	1	250	2	5.0	96
3537	3475	1.0	1	651	6	5.0	14
3538	4500	1.0	1	816	4	11.0	9

3539 rows × 17 columns

```
df.value_counts('neighborhood')
```

```
neighborhood
Upper West Side        579
Upper East Side        500
Midtown East           460
Midtown West           314
Financial District     268
Chelsea                182
Flatiron               132
```

연습문제 (2) - 2 - 추가 내용

```
Tribeca                 119
Midtown                 119
East Village            108
Battery Park City       104
Midtown South            85
Central Harlem           82
West Village             67
Greenwich Village        66
Gramercy Park            61
Soho                     58
Washington Heights       54
Lower East Side          41
East Harlem              41
Central Park South       23
Hamilton Heights         16
Morningside Heights      13
Inwood                   12
Nolita                    9
Chinatown                 8
Roosevelt Island          5
Long Island City          4
Stuyvesant Town/PCV       3
Little Italy              3
West Harlem               2
Manhattanville            1
Name: count, dtype: int64
```

```
df2 = df.drop('borough', axis=1)
df3 = setCategory(df2, 'neighborhood')
```

연습문제 (2) - 2 - 추가 내용

```
df3.value_counts('neighborhood')
```

```
neighborhood
28    579
27    500
18    460
20    314
7     268
3     182
8     132
26    119
17    119
6     108
0     104
19     85
1      82
31     67
10     66
9      61
24     58
29     54
15     41
5      41
2      23
11     16
21     13
12     12
22      9
4       8
23      5
```

연습문제 (2) - 2 - 추가 내용

```
14      4
25      3
13      3
30      2
16      1
Name: count, dtype: int64
```

```
x_train_std_df, y_train_std_df = scalling(df3, 'rent')
```

```
x_train_std_df.head()
```

	bedrooms	bathrooms	size_sqft	min_to_subway	floor	building_age_yr
0	-1.397410	-0.611790	-0.962011	0.730862	-0.904097	-0.888763
1	0.669863	1.056257	2.218694	-0.176116	-0.995343	1.117593
2	-0.363774	-0.611790	-0.049651	-0.538908	3.566974	-0.584000
3	-0.363774	-0.611790	0.073811	-0.357512	-0.356619	-0.533206
4	0.669863	1.056257	8.077886	-0.357512	-0.721604	2.133470

```
y_train_std_df.head()
```

	rent
0	-0.818669

연습문제 (2) - 2 - 추가 내용

	rent
1	2.011480
2	-0.202044
3	-0.108760
4	3.908786

```
feature, topfeat_df = get_best_features(x_train_std_df)
feature
```

```
[pca] >Extracting column labels from dataframe.
[pca] >Extracting row labels from dataframe.
[pca] >The PCA reduction is performed to capture [95.0%] explained varia
[pca] >Fit using PCA.
[pca] >Compute loadings and PCs.
[pca] >Compute explained variance.
[pca] >Number of components is [12] that covers the [95.00%] explained v
[pca] >The PCA reduction is performed on the [15] columns of the input d
[pca] >Fit using PCA.
[pca] >Compute loadings and PCs.
[pca] >Outlier detection using Hotelling T2 test with alpha=[0.05] and n
[pca] >Multiple test correction applied for Hotelling T2 test: [fdr_bh]
[pca] >Outlier detection using SPE/DmodX with n_std=[3]
```

연습문제 (2) - 2 - 추가 내용

```
['no_fee',
 'has_elevator',
 'min_to_subway',
 'size_sqft',
 'has_roofdeck',
 'has_gym',
 'has_patio',
 'neighborhood',
 'has_dishwasher',
 'building_age_yrs']
```

```
mdf = merge(x_train_std_df, y_train_std_df, left_index=True, right_index
ols_result = my_ols(mdf, y='rent', x=feature)
ols_result.summary
```

OLS Regression Results

Dep. Variable:	rent	**R-squared:**	0.757
Model:	OLS	**Adj. R-squared:**	0.756
Method:	Least Squares	**F-statistic:**	1098.
Date:	Thu, 27 Jul 2023	**Prob (F-statistic):**	0.00
Time:	10:49:22	**Log-Likelihood:**	-2519.3
No. Observations:	3539	**AIC:**	5061.
Df Residuals:	3528	**BIC:**	5129.

연습문제 (2) - 2 - 추가 내용

Df Model:	10		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	-9.346e-17	0.008	-1.13e-14	1.000	-0.016	0.016
no_fee	-0.0095	0.009	-1.087	0.277	-0.027	0.008
has_elevator	0.0036	0.012	0.308	0.758	-0.019	0.026
min_to_subway	-0.0252	0.008	-2.970	0.003	-0.042	-0.009
size_sqft	0.8593	0.008	101.882	0.000	0.843	0.876
has_roofdeck	0.0040	0.010	0.383	0.701	-0.016	0.024
has_gym	-1.995e-05	0.012	-0.002	0.999	-0.023	0.023
has_patio	0.0015	0.008	0.179	0.858	-0.015	0.018
neighborhood	0.0008	0.008	0.100	0.921	-0.016	0.017
has_dishwasher	0.0008	0.009	0.087	0.931	-0.017	0.019
building_age_yrs	-0.1477	0.009	-16.951	0.000	-0.165	-0.131

Omnibus:	885.489	**Durbin-Watson:**	2.058
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	11063.662
Skew:	0.831	**Prob(JB):**	0.00
Kurtosis:	11.501	**Cond. No.**	2.71

연습문제 (2) - 2 - 추가 내용

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.