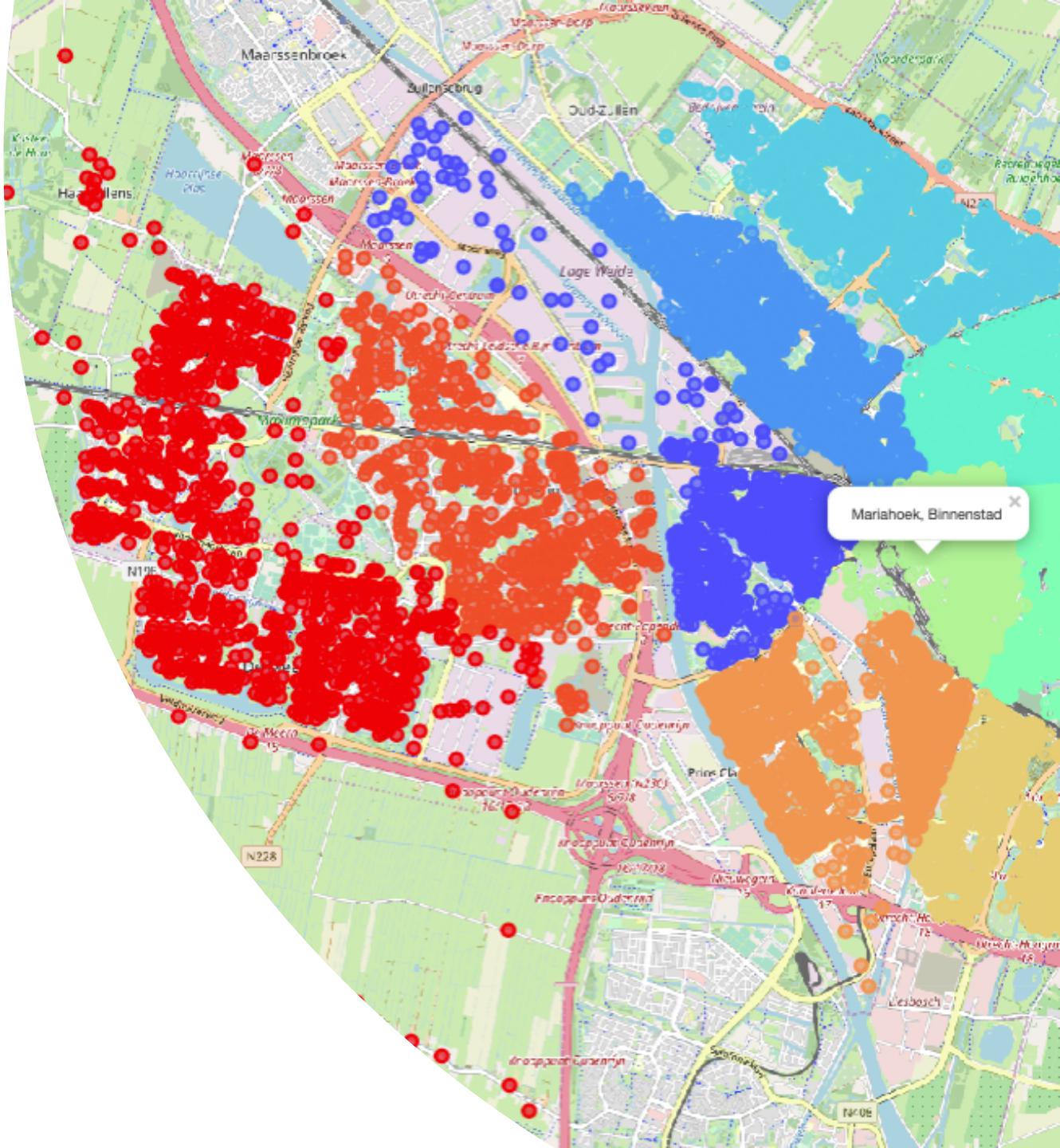
Evaluating Rental Prices in Utrecht City

- Rental houses is a business continuously growing in most of Europe, with a higher rate in cities where expats' market is predominant, thanks to presence of mainstream Universities and High Tech hubs.

- Utrecht, the fourth largest city of the Netherlands located in the very center of the mainland, surely belongs to this category



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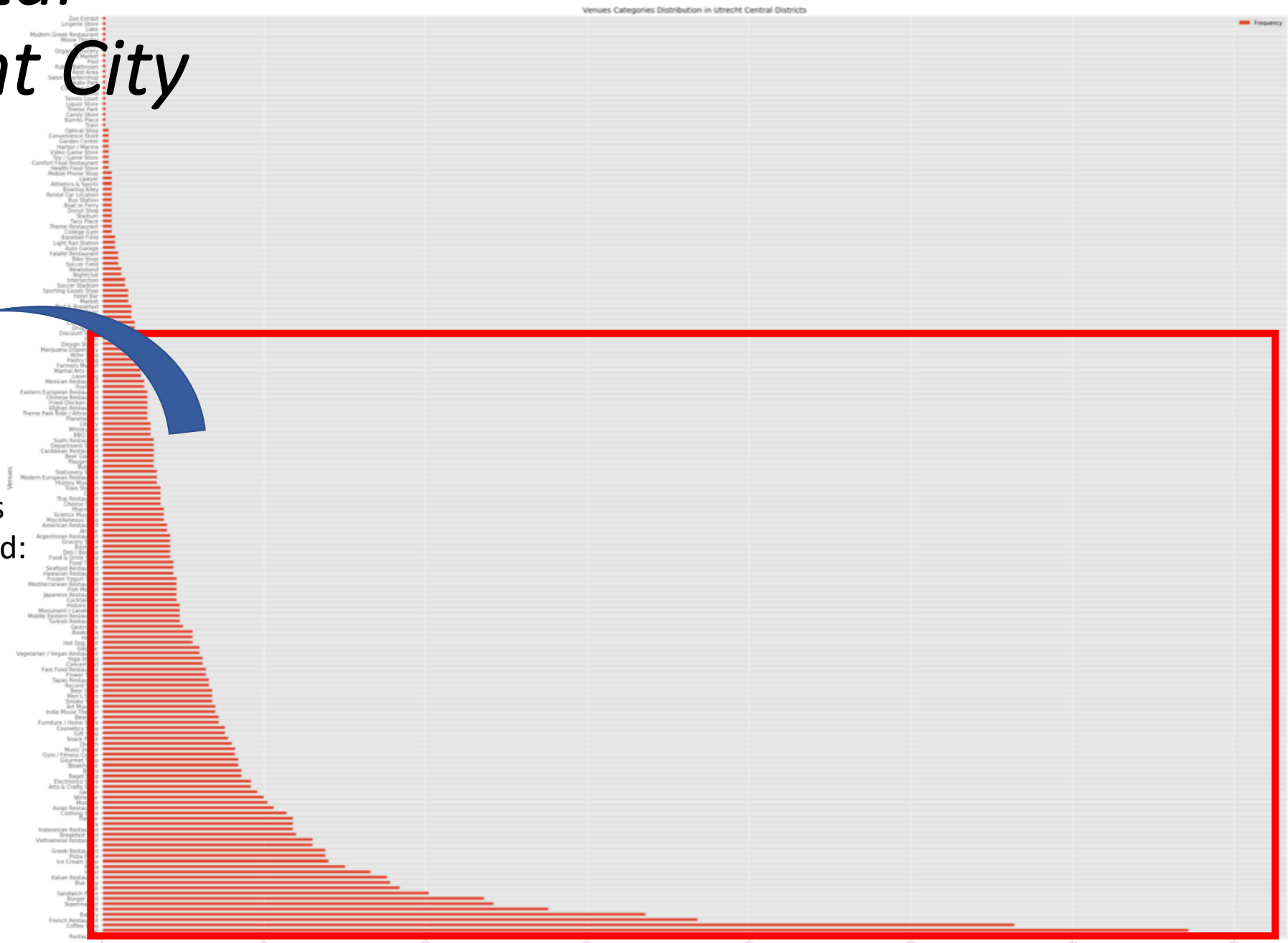
Data Wrangling

Neighborhoods Distribution



For the considered neighborhoods following macro groups are created:

- Food Place
- Drink Place
- Entertainment Place
- Food Place
- Lodging Place
- Shop
- Transport Spot

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Data Wrangling

Resulting Dataframe

```
table.head()
```

Out[123]:

	Street	Size	Rooms	Furnished	Drink Place	Entertainment Place	Food Place	Lodging Place	Shop	Transport Spot	Rent
0	2e Buurkerksteeg	110	2	1	18	11	41	3	20	0	1850
1	3e Buurkerksteeg	77	1	0	18	11	41	3	19	0	1340
2	Abstederdijk	75	2	0	6	7	6	0	9	0	1250
3	Achter St.-Pieter	50	1	0	19	13	40	3	18	0	2457
4	Adelaarstraat	75	2	0	0	3	5	0	2	2	1495

Dataset *rental_central* from [Kaggler]

Macro groups counted from dataset in Foursquare API

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Exploratory Data Analysis

Pearson Correlation

```
table.corr()
```

]:

	Unnamed: 0	Size	Rooms	Furnished	Drink Place	Entertainment Place	Food Place	Lodging Place	Shop	Transport Spot	Rent
Unnamed: 0	1.000000	-0.018959	-0.087987	0.121822	0.009731	0.062464	0.041013	0.066937	-0.059784	-0.040880	-0.012386
Size	-0.018959	1.000000	0.685866	0.136187	0.024399	0.053347	0.065287	-0.059090	0.073393	-0.070552	0.595282
Rooms	-0.087987	0.685866	1.000000	0.163058	-0.234468	-0.223782	-0.195670	-0.225655	-0.186705	0.076129	0.320405
Furnished	0.121822	0.136187	0.163058	1.000000	-0.081608	-0.112189	-0.047399	-0.106125	-0.055722	0.017451	-0.123898
Drink Place	0.009731	0.024399	-0.234468	-0.081608	1.000000	0.905341	0.893286	0.805256	0.896142	-0.397523	0.239228
Entertainment Place	0.062464	0.053347	-0.223782	-0.112189	0.905341	1.000000	0.867730	0.728099	0.841420	-0.360668	0.298294
Food Place	0.041013	0.065287	-0.195670	-0.047399	0.893286	0.867730	1.000000	0.862344	0.861323	-0.381798	0.263411
Lodging Place	0.066937	-0.059090	-0.225655	-0.106125	0.805256	0.728099	0.862344	1.000000	0.704750	-0.404421	0.146148
Shop	-0.059784	0.073393	-0.186705	-0.055722	0.896142	0.841420	0.861323	0.704750	1.000000	-0.310542	0.209611
Transport Spot	-0.040880	-0.070552	0.076129	0.017451	-0.397523	-0.360668	-0.381798	-0.404421	-0.310542	1.000000	-0.118796
Rent	-0.012386	0.595282	0.320405	-0.123898	0.239228	0.298294	0.263411	0.146148	0.209611	-0.118796	1.000000

- Main predictor for the Rental Price of the house seems to be the area of house itself and number of so-called Entertainment Places group in the neighborhoods (red rectangle).
- Neighborhood quantities seems to be in general not a great predictor of rental prices (Pearson coefficient values < 0.3). However, they seem to be mutually connected to each other, with Entertainment Place number of places may eventually be considered as dependent variable of the others (blue rectangle)

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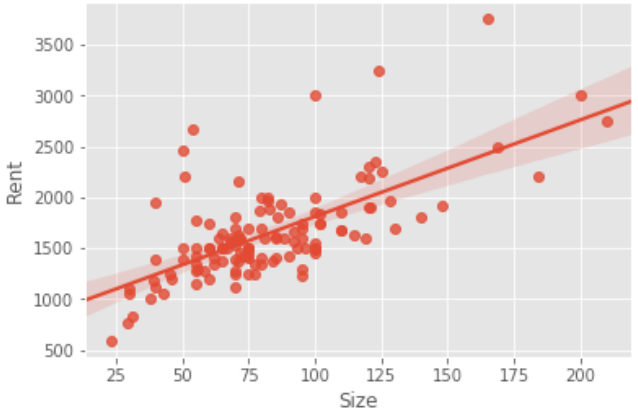
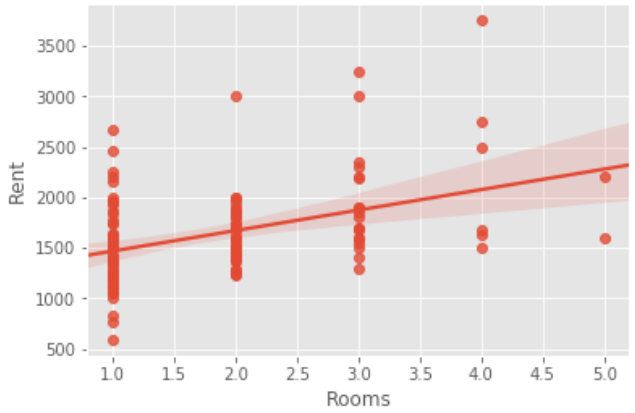
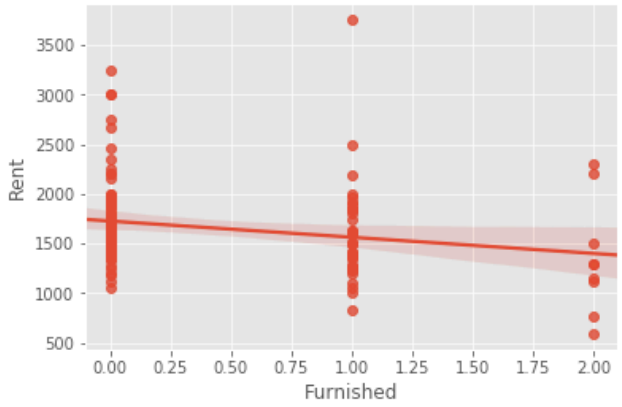
Exploratory Data Analysis

Seaborn Regplot – Rental Central







- Rental Prices all comprised within 1000 and 2500 euros
- Trend of the regression plot size vs price as potential good indicator for prediction of rental prices

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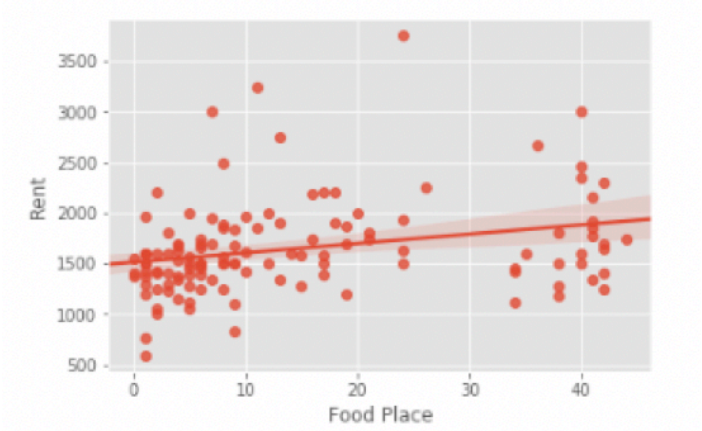
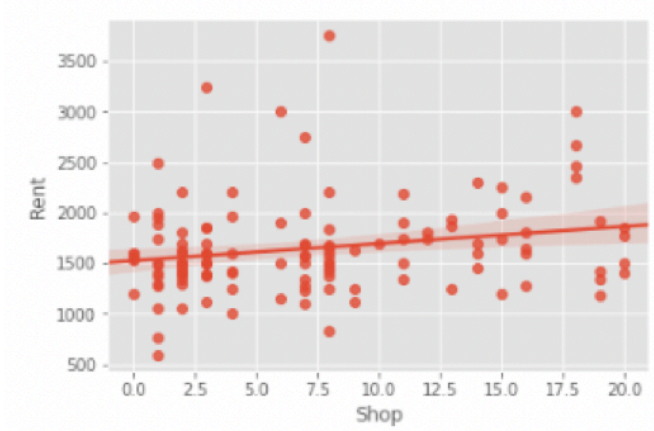
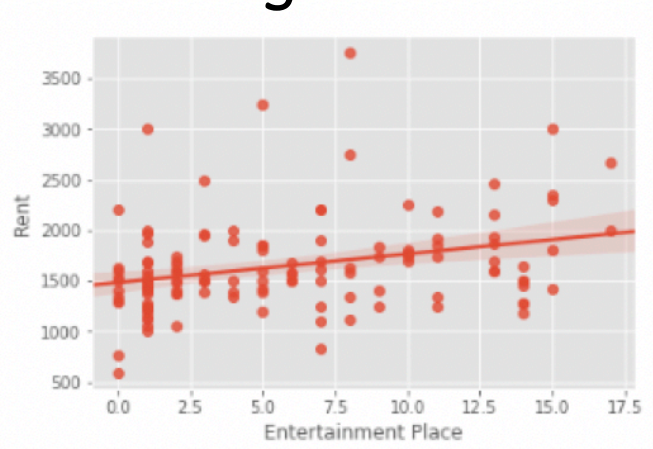
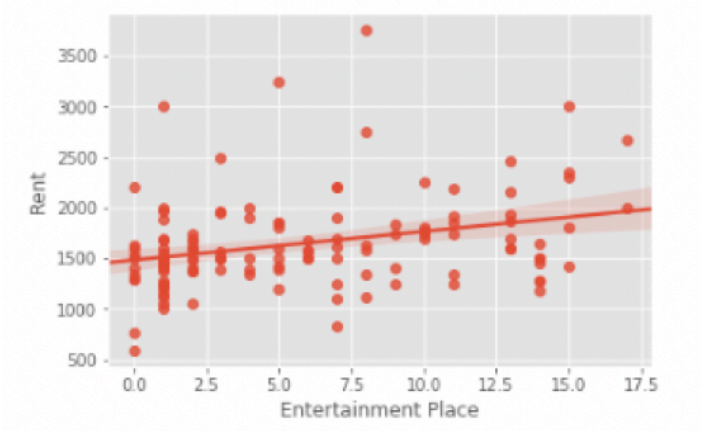
Exploratory Data Analysis

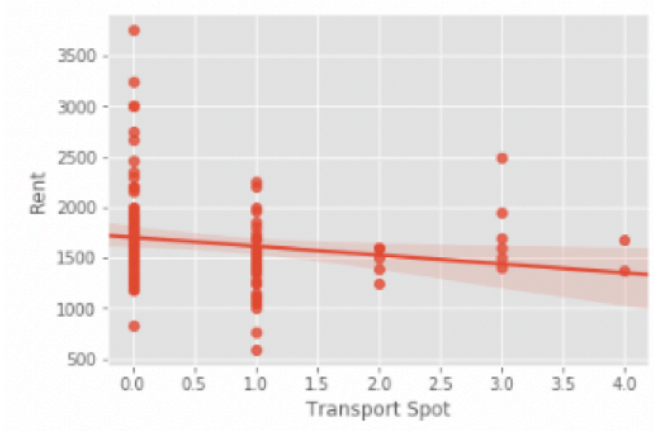
Seaborn Regplot - Neighborhoods

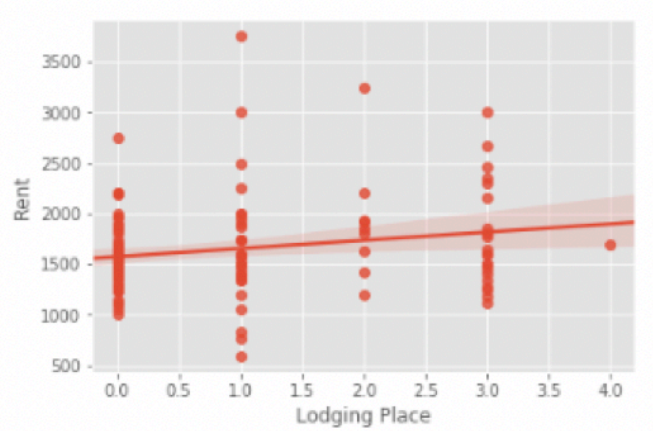












The price generally increase as the services are more available, even though the slope of interpolating line is small. These variables may not be good predictors for the price.

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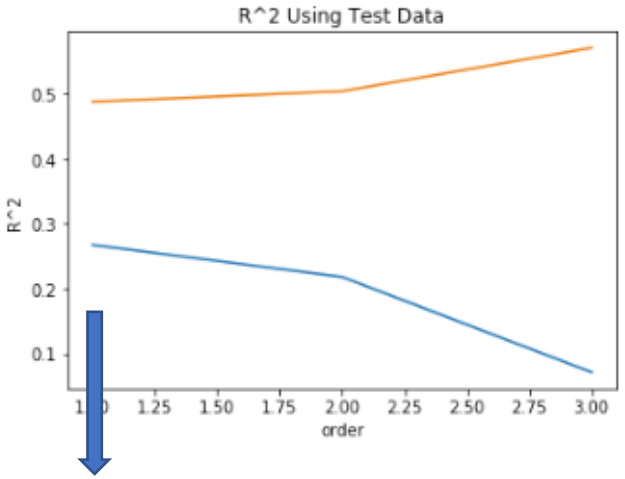
Model Development

Model Evaluation

```
The R-square test is:  [0.26734780069991326, 0.2180597586549654, 0.07114187741892974]
The R-square train is:  [0.48810420790798015, 0.5043464232160804, 0.5711362111594616]
```

Maximum R^2



Polynomial Degree n = 1