ANALYSIS OF HOUSE PRICES KING LOUIS ESTATE / USA

PRESENTATION 17.09.2020

Britta Röver

AGENDA

- Approach to the Data / Business Understanding
- Data Cleaning
- Data Analysis and Exploration
- Feature Engineering
- Preditive Modelling
- Data Visualization

- Findings trough the Data

DATA

column		type	values	
id	**Unique identifier**	int		
date	**Date house was sold**	**object**		
price	**price**	float		outliner
bedrooms	**Number of bedrooms**	int	discret/1-11	outliner
bathrooms	**Number of bathrooms**	float	discret/0-7	
Sqft_living	**Square footage/house**	int		
Sqft_lot	**Square footage/lot**	int		
floors	**Number of floors**	float	discret/1-4	
waterfront	**View to the waterfront**	float	1/0	Missing values
view	**Indicator for a special view**	float	ranking 0-4	Missing values
condition	**Indicator for condition**	int	discret/1-5	
grade	**Indicator for grade / base on a local grading system**	int	discret/1-13	

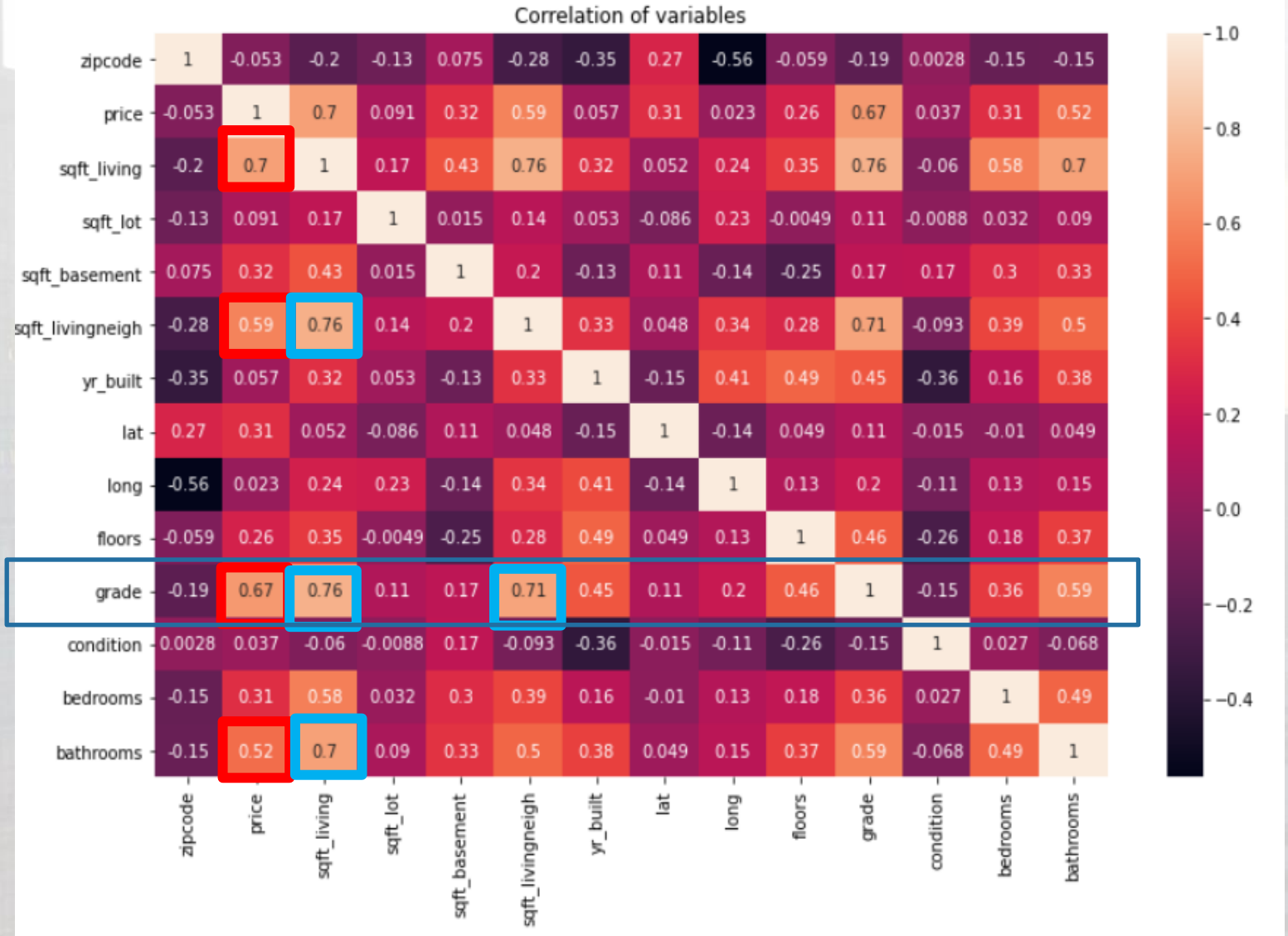
DATA

column		type	values	
Sqft_above	**Square footage without basement/house**	int		Can be skipped
Sqft_basement	**Square footage basement**	**object**		Missing values Wrong data New computation of the value **additional feature basement y/n**
Yr_built	**Built year**	float	discret	**additional features yr_age and yr_built_cat**
Yr_renovated	**View to the waterfront**	float	discret, 1/0	**additional feature renovation**
zipcode	**Indicator for a special view**	float	discret, ranking 0-4	
Lat long	**Coordinates (latitude and longitude)**	Both float		
Sqft_living Sqft_lot	**Square footage /living and lot of the nearest 15 neighbours**	int		

GET A BIG PICTURE!

Matrix of correlations

- There seems to be a couple of stronger correlationen concerning the price
  - Living space
  - Grade
  - Distance to neighbour
  - bedrooms
- But there are also dependencies between the features, see feature **grade**



1. SHOT:
Multilinear Regression

- features used
  - Living and lot space
  - grade
  - distance to neighbour
  - Bed- and bathrooms ..
- result: R2 of 0,704

OLS Regression Results

Dep. Variable:	price	**R-squared:**	0.704
Model:	OLS	**Adj. R-squared:**	0.704
Method:	Least Squares	**F-statistic:**	3946.
Date:	Thu, 17 Sep 2020	**Prob (F-statistic):**	0.00
Time:	08:19:18	**Log-Likelihood:**	-2.9370e+05
No. Observations:	21594	**AIC:**	5.874e+05
Df Residuals:	21580	**BIC:**	5.875e+05
Df Model:	13		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	9.627e+06	2.79e+06	3.445	0.001	4.15e+06	1.51e+07
zipcode	-583.2118	32.000	-18.225	0.000	-645.935	-520.489
waterfront	3.056e+05	8818.216	34.653	0.000	2.88e+05	3.23e+05
yr_built	-2649.0045	64.848	-40.849	0.000	-2776.112	-2521.897
bedrooms	-3.233e+04	1827.460	-17.691	0.000	-3.59e+04	-2.87e+04
bathrooms	4.151e+04	2631.057	15.778	0.000	3.64e+04	4.67e+04
floors	2.654e+04	3048.637	8.705	0.000	2.06e+04	3.25e+04
sqft_living	152.7727	3.185	47.968	0.000	146.530	159.015
sqft_livingneigh	32.7844	3.319	9.878	0.000	26.279	39.290
grade	1.019e+05	2075.170	49.082	0.000	9.78e+04	1.06e+05
condition	2.404e+04	2241.796	10.724	0.000	1.96e+04	2.84e+04
view	5.035e+04	2032.661	24.769	0.000	4.64e+04	5.43e+04
lat	5.879e+05	1.03e+04	56.986	0.000	5.68e+05	6.08e+05
long	-1.972e+05	1.23e+04	-16.017	0.000	-2.21e+05	-1.73e+05
waterfront	3.056e+05	8818.216	34.653	0.000	2.88e+05	3.23e+05

STORY:

A new home for me, my husband and my 3 daughter

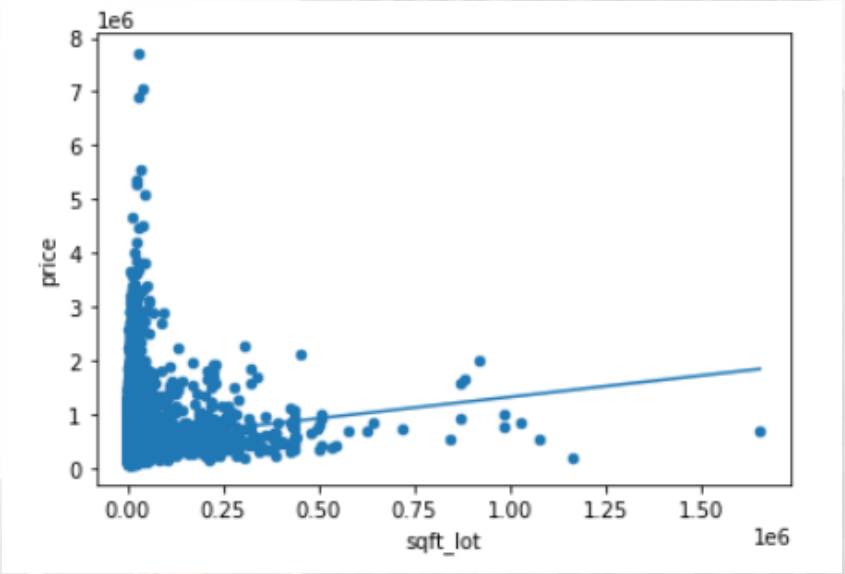
WHAT IS IMPORTANT FOR US?

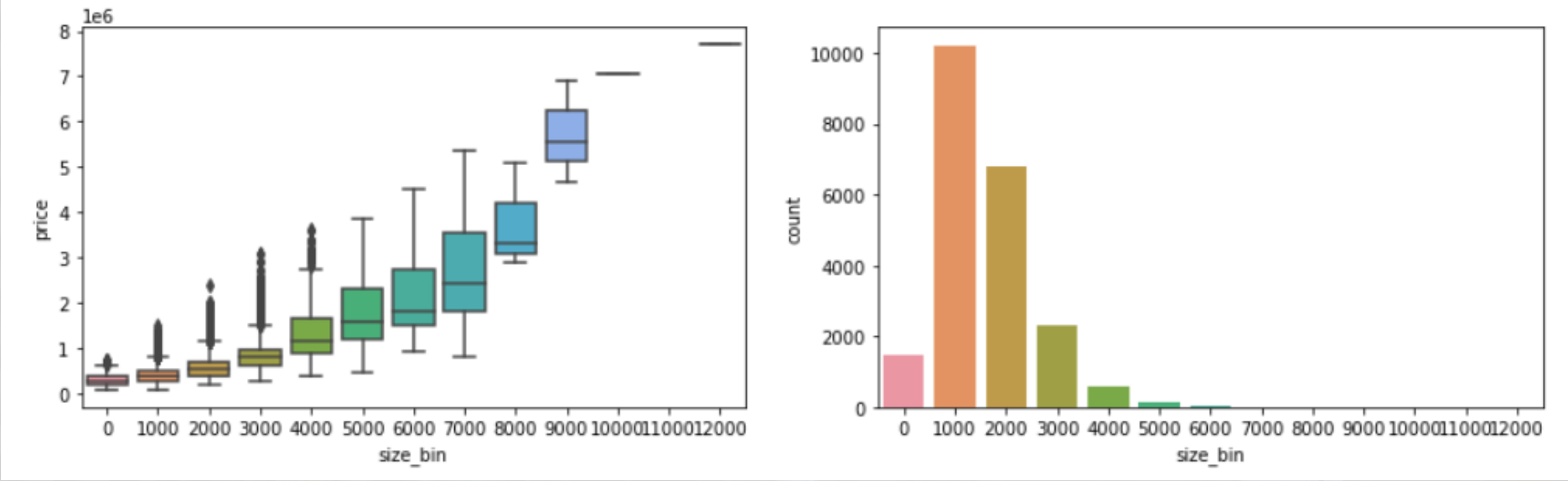
- The size that means sqft_living and sqft_lot, strong condition for sqft_living >=130 qm2
- The number of bath- and bedrooms:
  - bedrooms at least 4
  - bathrooms at least 2
- The house should have a big basement
- It should have a good condition/grade
- Nice Place! Waterfront!
- Old house?

SIZE:

Finding: SIZE LOT RULES SIZE LIVING!

- There is a strong relationship between the size of the house and the price
- But: 77 % of all houses fulfill the size criteria

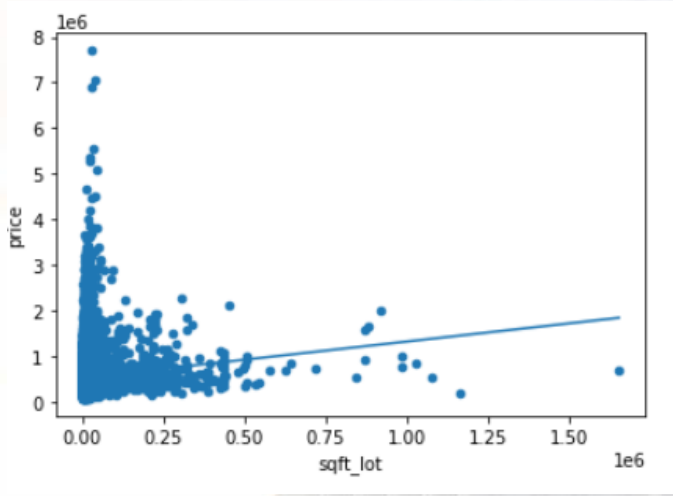


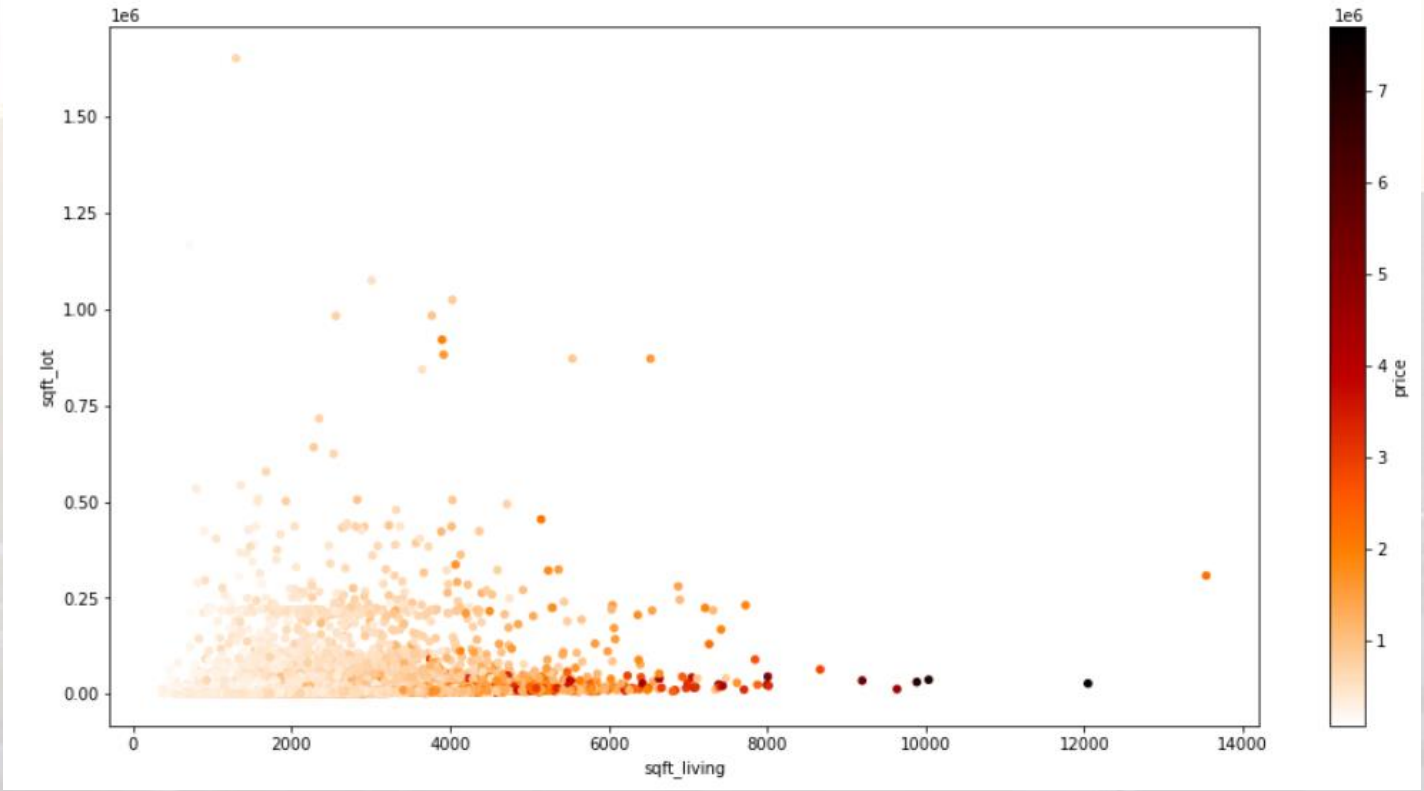


SIZE (2):

Finding: SIZE LOT RULES SIZE LIVING!

- There is no strong relationship between the size of the lot and the price on the one hand and between lot and house size on the other hand
- BIG LOT and MINIMUM HOUSE SIZE





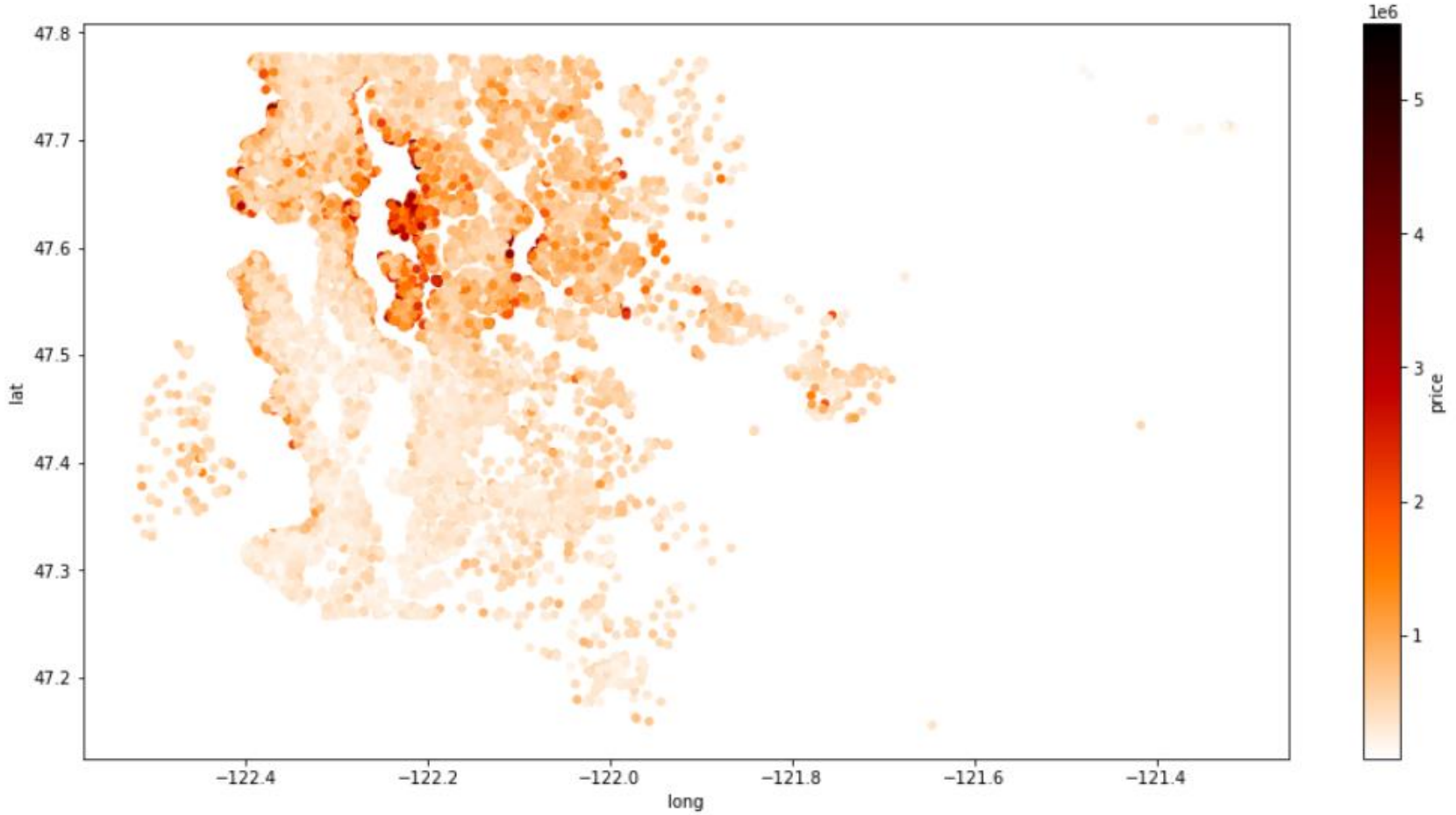
NICE PLACE: Finding : Waterfront is the most expensive option

- But the prices varies
- Maybe the west part of the lake is also nice?

- Have a look!

Analysis of columns long, lat

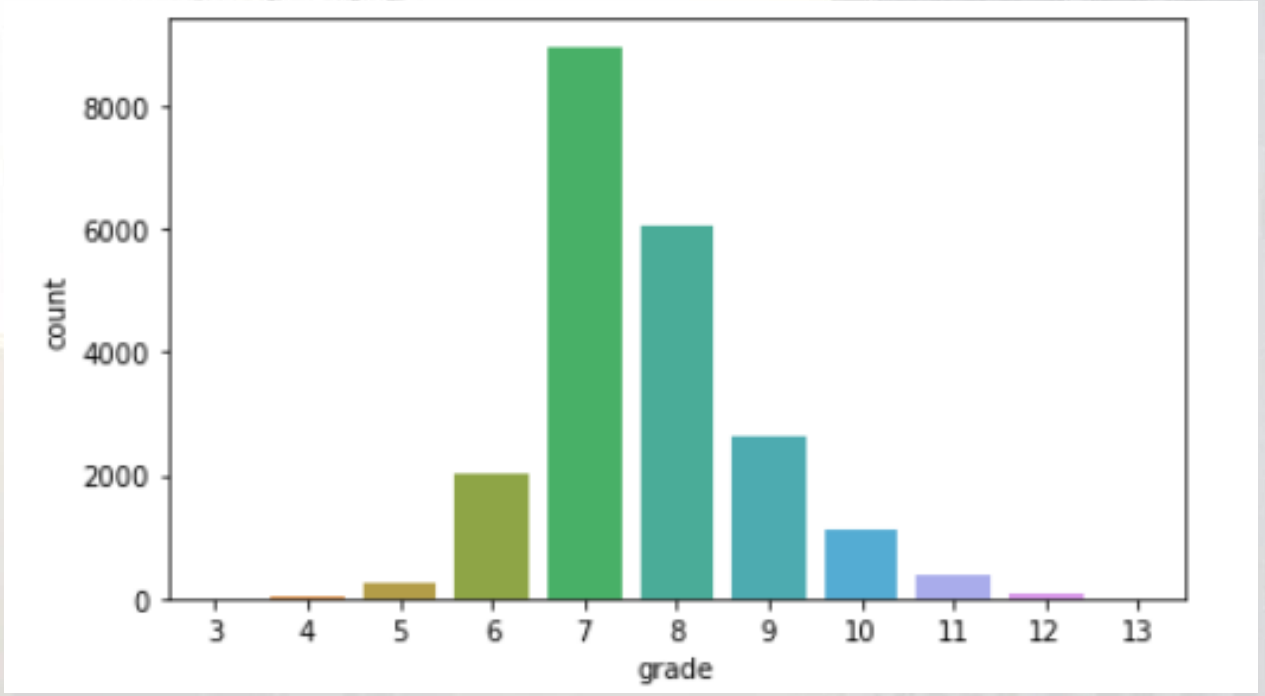
```
immo.plot(kind="scatter", x="long", y="lat", figsize=(16, 8), c="price",
          cmap="gist_heat_r", colorbar=True, sharex=False);
plt.show();
```



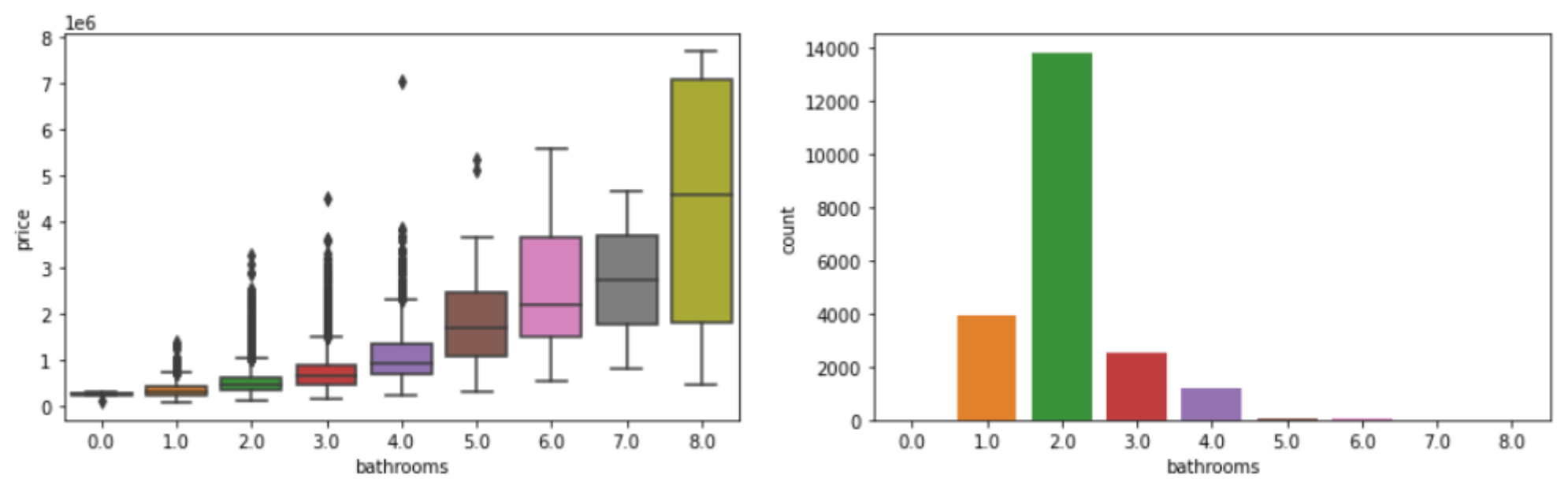
NICE PLACE: Finding 2: the grade is not so important for us!

- Not fully clear by definition
- Strong relationship between grade and bathrooms and bedroomnumbers

- This both is important to us!
- Grade should be at least average (grade==7)
- But at the waterfront only 3 objects have a grade <7

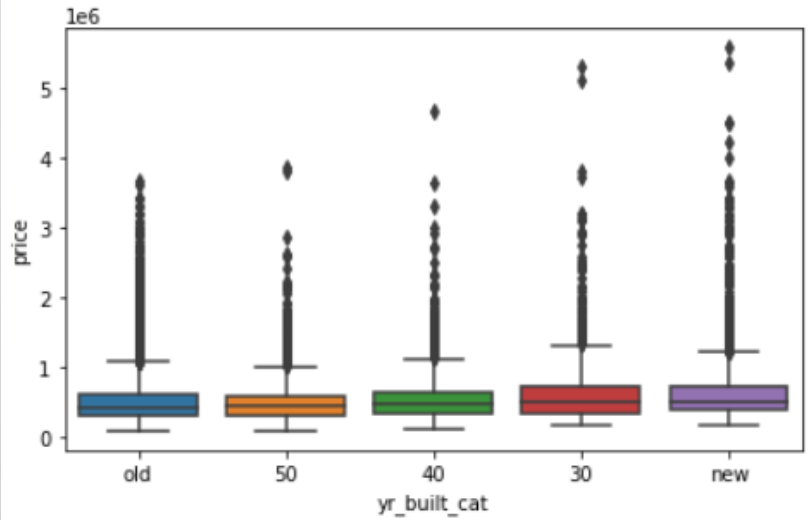


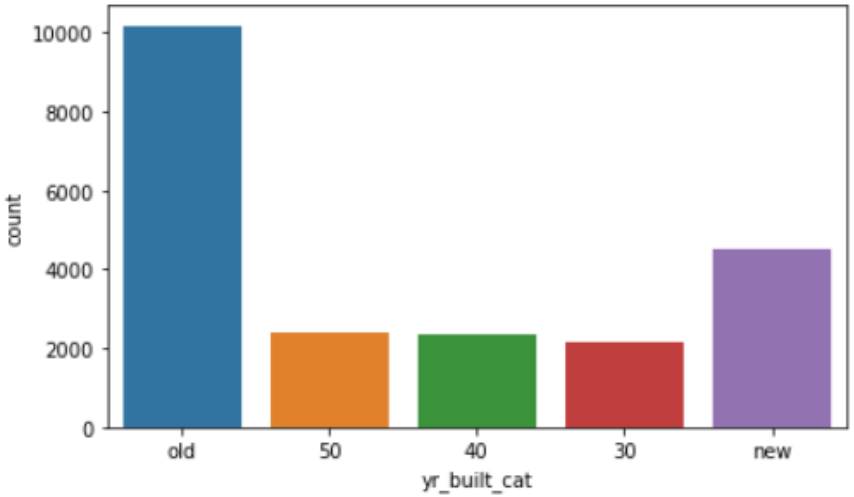
BATHROOMS: Finding 3: 2 Bathrooms are enough!



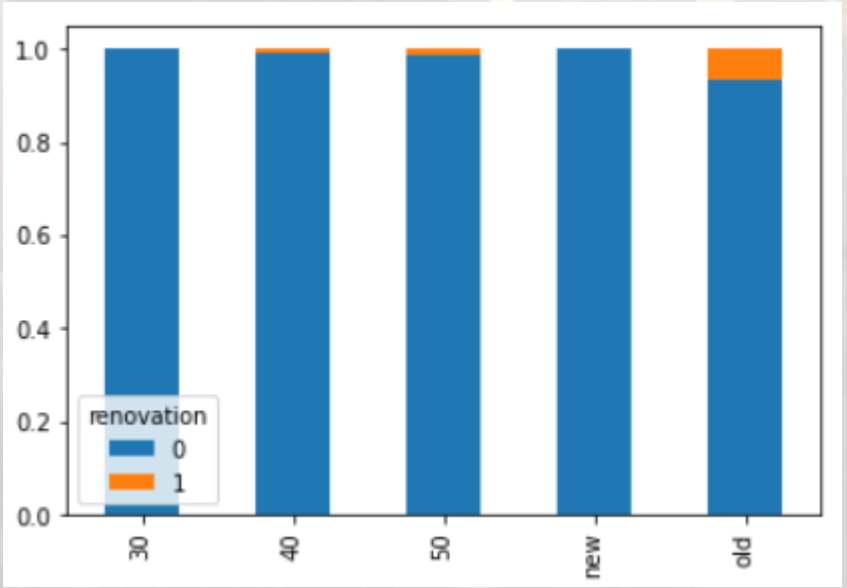
- Bathrooms become more expensive by the size of 2!
- 2 Bathrooms are enough! This also seems to be the standard size

OLD HOUSE: Finding 4: only a small part has been renovated!

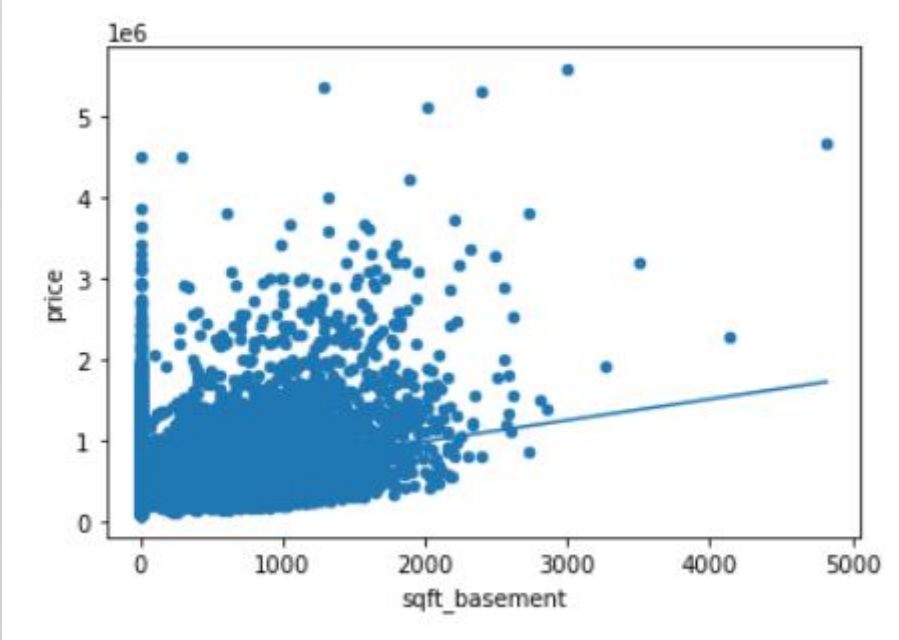


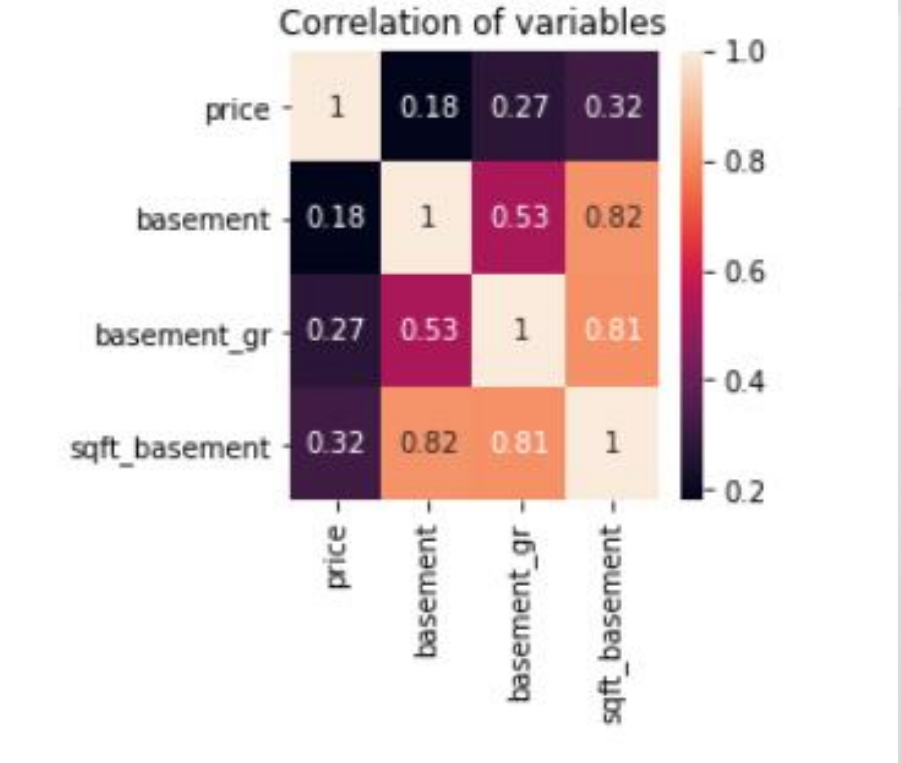


- Have a look!



BASEMENT: Finding 4: size is not so expensive!





- The fact basement yes or no has also a important effect to the price!
- The Size is not so expensive

STORY:

A new home for me, my husband and my 3 daughter

WHAT IS IMPORTANT FOR US?

- The size that means sqft_living and sqft_lot, strong condition for sqft_living >=130 qm2 YES
- The number of bath- and bedrooms:
  - bedrooms at least 4
  - bathrooms at least 2
- The house should have a big basement
- It should have a good condition/grade <=7
- Nice Place! Waterfront may be!
- Old house? may be!

THANKS!