



ImmoAnalysis

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The mission

Data Operations

- Data acquisition
- Data cleaning

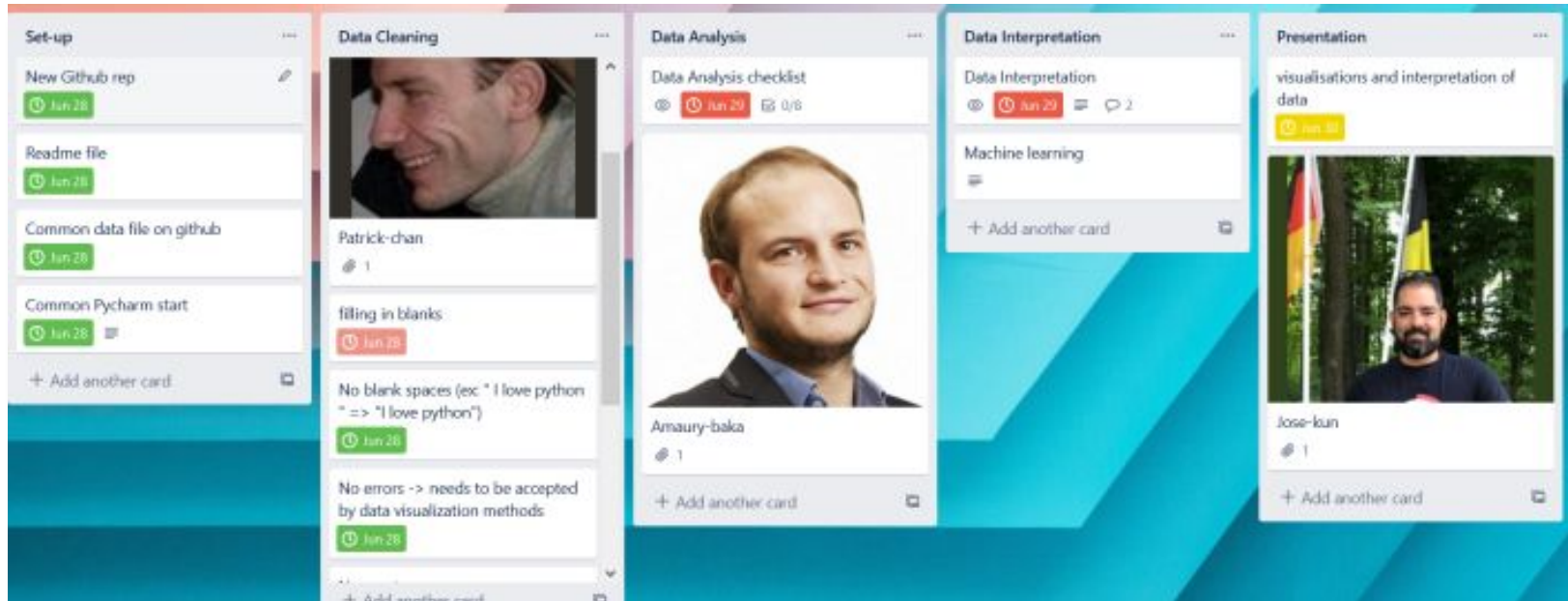
Data Analysis

- Target Variable
- Correlations
- Influences
- Quality vs Quantity
- Percentages

Data Interpretation

- Outliers
- Prices in Belgium

The project management



Data Operations





Data Operations

Data Acquisition

house_list_houses_dataset.csv

Data Cleaning

1. **NaN values:**
 - a. `df[column].mean()`
2. **Drop empty [*“price”*] rows**
 - a. Target variable = Price
 - b. Accurate values only
 - c. 35 out of 10000
3. **See fig.1**

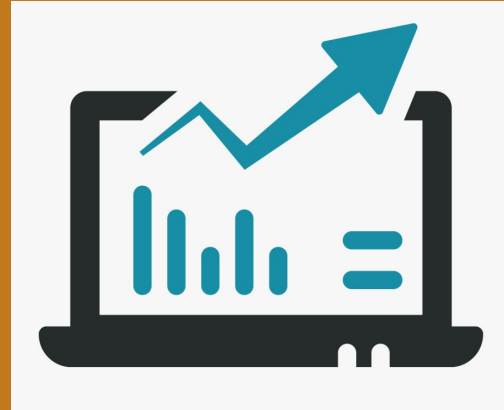
	area	price	building_state	facades	bedrooms	kitchen_equipped	furnished	open_fire	locality
0	123.000000	200000.0	good	3.000000	2.0	installed	False	1.144966	3294
1	255.000000	698000.0	just renovated	4.000000	4.0	installed	False	1.144966	2070
2	234.000000	499000.0	as new	2.970242	5.0	undefined	False	1.144966	8800
3	219.000000	717000.0	as new	2.970242	4.0	undefined	False	1.144966	8000
4	156.000000	429000.0	good	4.000000	4.0	installed	False	1.144966	8800
5	140.000000	279000.0	good	2.000000	5.0	installed	False	1.144966	9000
6	256.000000	210000.0	good	3.000000	4.0	installed	False	1.144966	7080
7	850.000000	849000.0	good	2.000000	9.0	undefined	False	1.144966	3300
8	161.000000	295500.0	as new	2.970242	4.0	hyper equipped	False	1.144966	5590
9	61.000000	42000.0	to renovate	2.970242	1.0	undefined	False	1.144966	1460
10	160.000000	229000.0	good	2.000000	3.0	installed	False	1.144966	6230

DataSet Cleaned

land_surface	terrace	terrace_surface	swimming_pool	property_type	property_subtype	garden	garden_surface
429.0	False	0	False	house	house	True	350
1210.0	False	0	False	house	villa	False	0
744.0	False	0	False	house	villa	False	0
760.0	False	0	False	house	house	False	0
419.0	False	0	False	house	villa	True	90
85.0	True	40	False	house	house	False	0
201.0	False	0	False	house	house	False	0
615.0	True	20	False	house	mixed	False	0
533.0	False	0	False	house	house	True	631
194.0	False	0	False	house	house	False	0
480.0	True	10	False	house	house	True	400

Fig. 1

Data Analysis



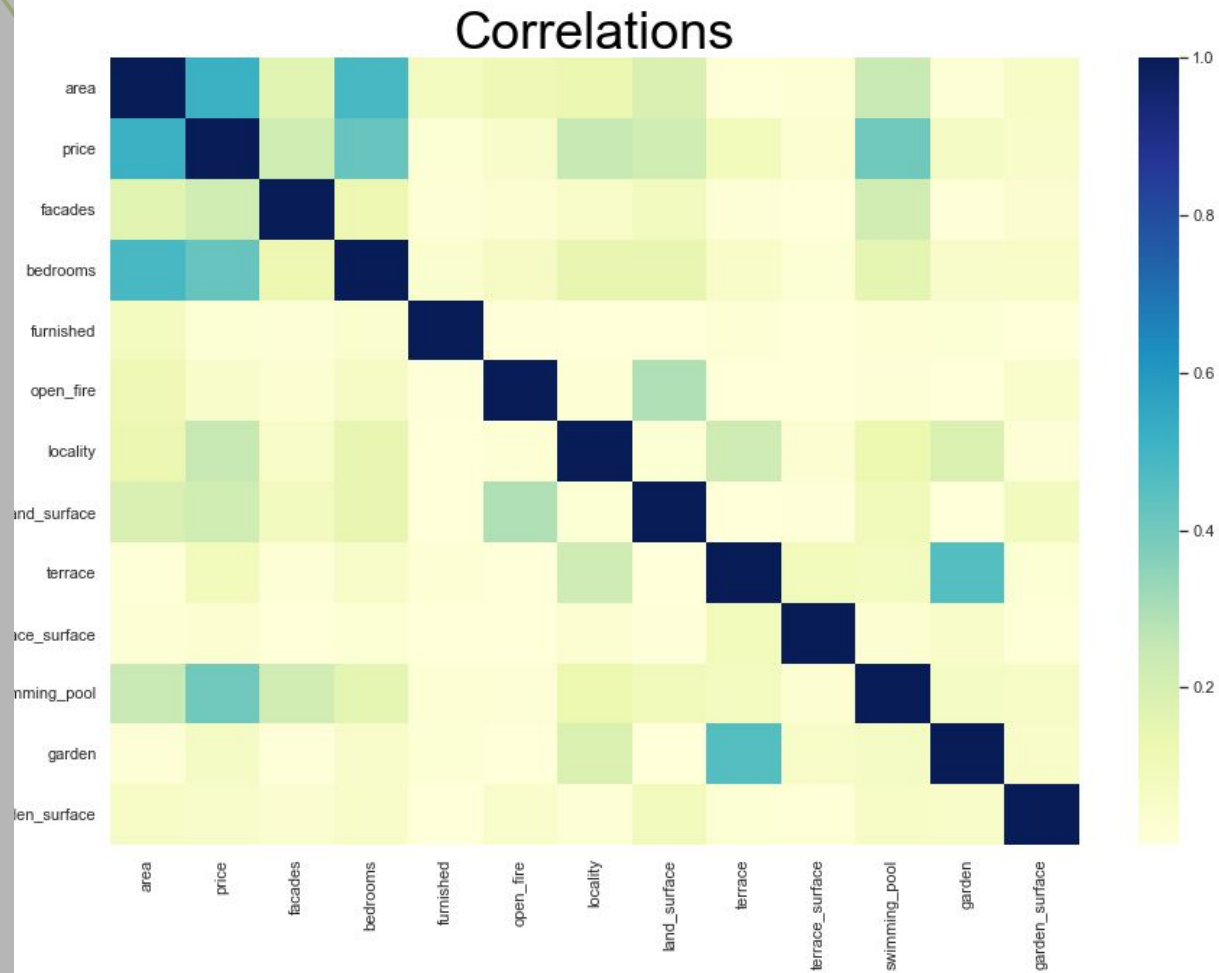
**Target
Variable**



['price']

```
1 price 10058 non-null float64
```


Correlations



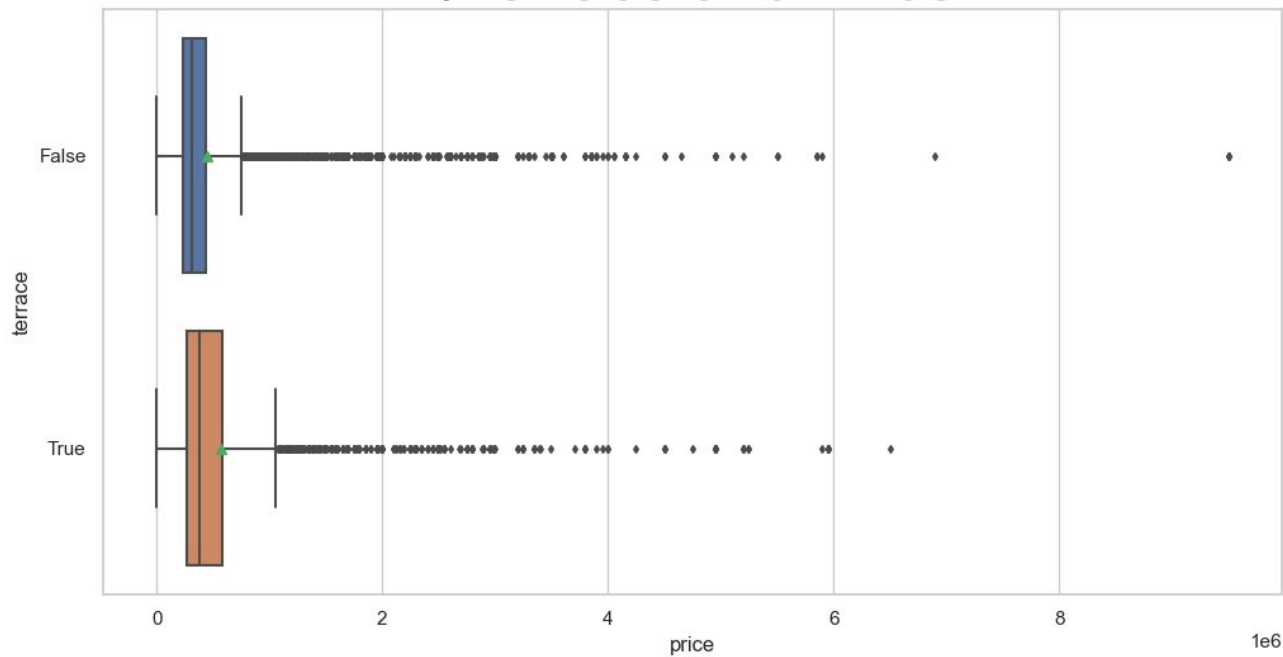
Influences



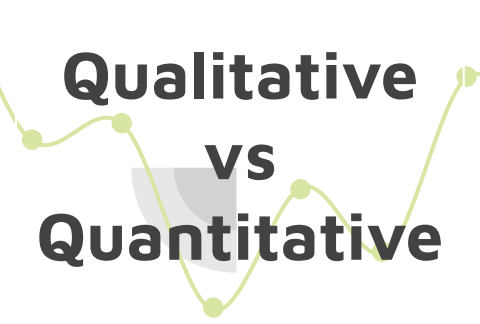
Influence ++	Influence --
Area	Furnished
Nº bedrooms	Kitchen equipment
Land surface	Facades
Swimming Pool	Open Fire
Terrace & Garden	

Influences

./Terrace and Price



Qualitative vs Quantitative



Qualitative variables	Quantitative variables
Building State	Area
Kitchen equipment	Price
Furnished	Facades
Locality	Bedrooms
Terrace	Open Fire
Swimming Pool	Land Surface
Property Type	Terrace Surface
Property Subtype	Garden Surface
Garden	

Missing Values

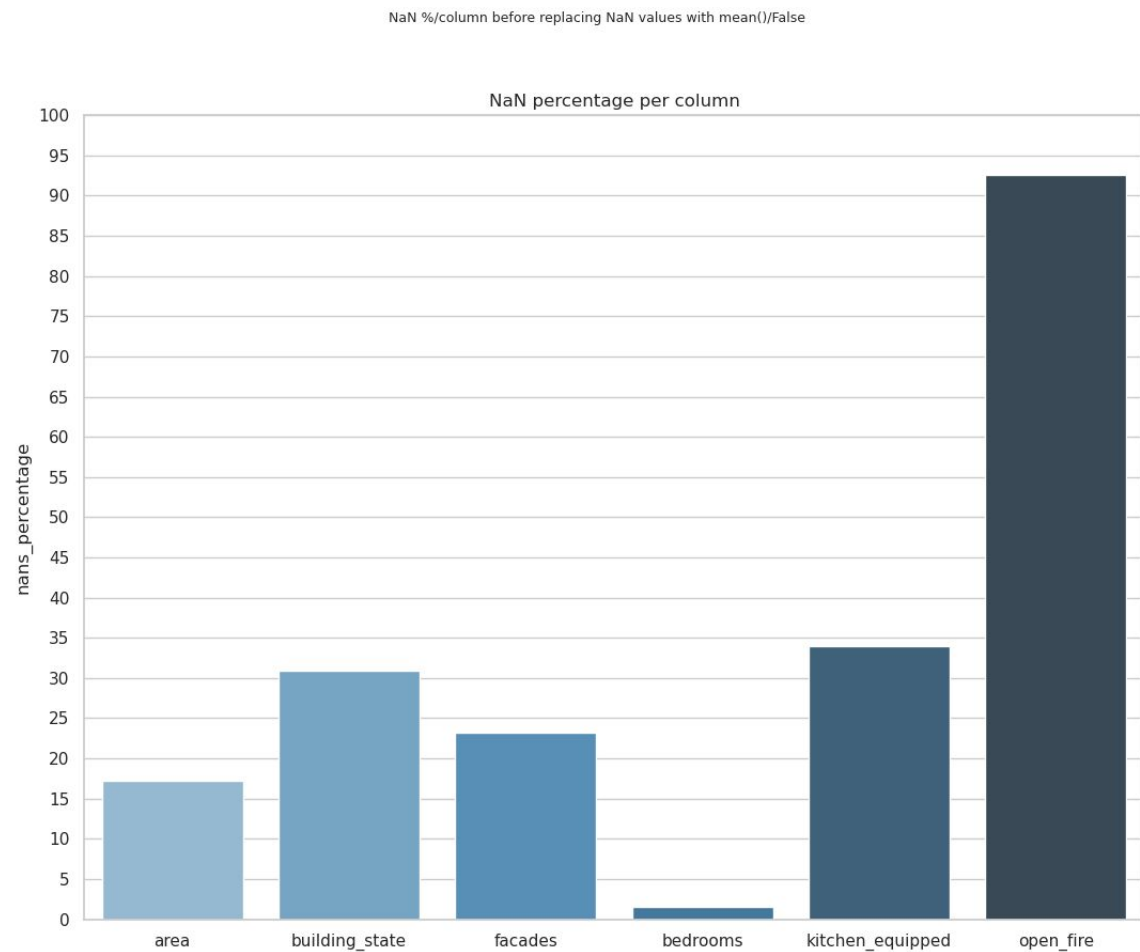
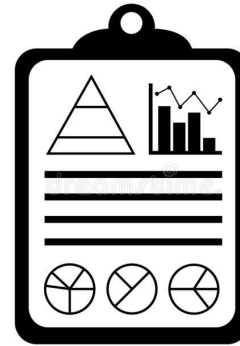


Fig. 1

Data Interpretation



Outliers ↑



Castle

€9,500,000

12 bdr. · 1100 m²
3090 Overijse



LAP
LATOUR & P



```
area          1100.0
price         9500000.0
building_state as new
facades       4.0
bedrooms      12.0
kitchen_equipped installed
furnished     False
open_fire     1.144966
locality      3090
land_surface  500000.0
terrace       False
terrace_surface 0
swimming_pool True
property_type house
property_subtype castle
garden        False
garden_surface 0
Name: 2090, dtype: object
```

```
area          945.0
price         9500000.0
building_state as new
facades       4.0
bedrooms      7.0
kitchen_equipped undefined
furnished     False
open_fire     1.144966
locality      8300
land_surface  2348.0
terrace       False
terrace_surface 0
swimming_pool True
property_type house
property_subtype house
garden        False
garden_surface 0
Name: 4956, dtype: object
```



NEW



Exceptional property

€9,500,000

7 bdr. · 945 m²
8300 Knokke-Heist

CAMBIER
DE NIL
KNOKKE - ZOUTE

Outliers ↓

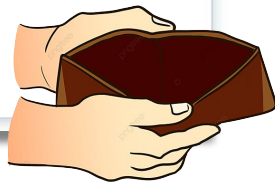


House

Reserve price : €5,000

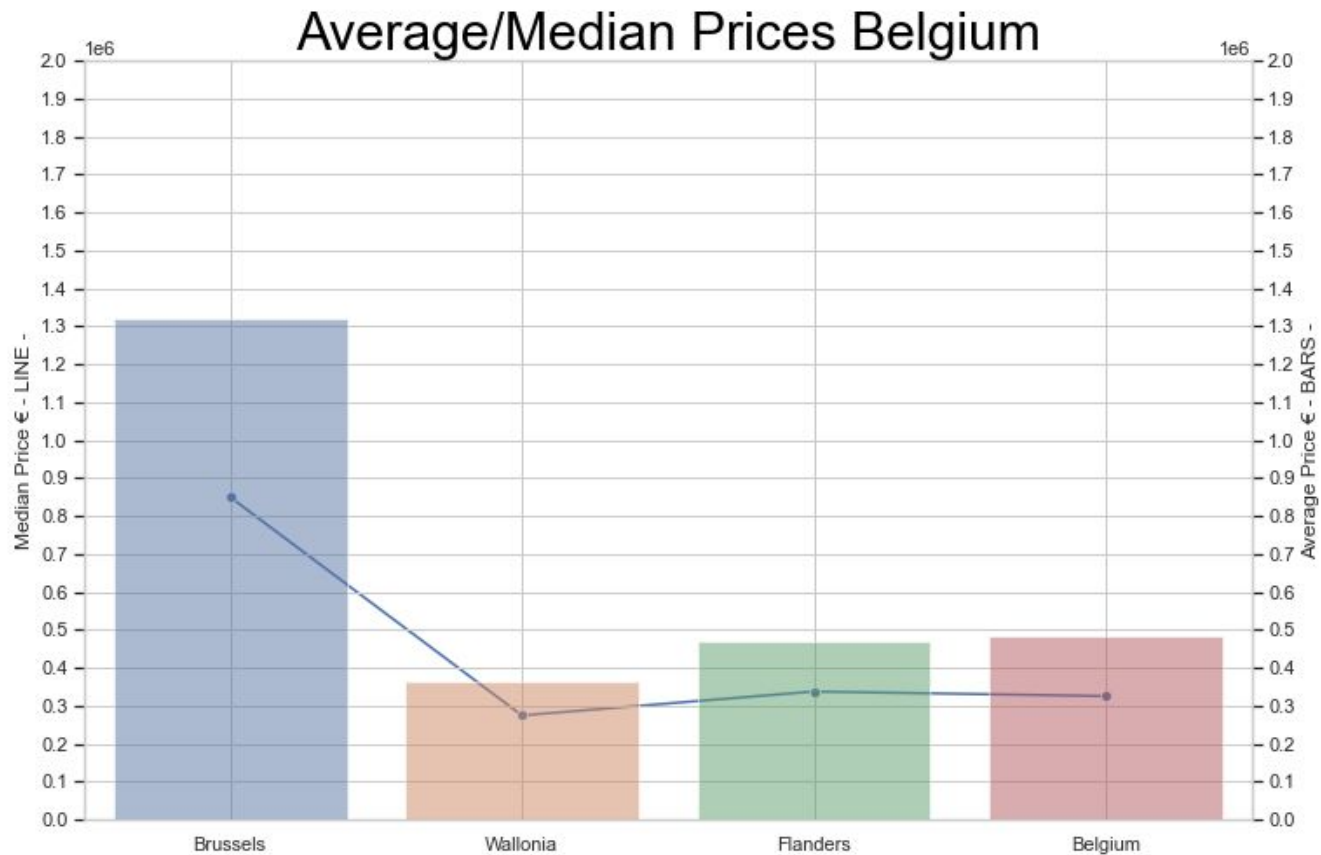
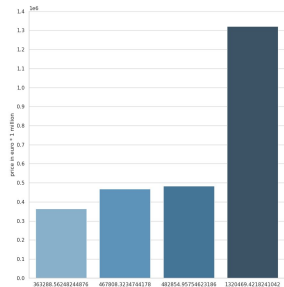
2 bdr. · 121 m²

6870 Saint-Hubert



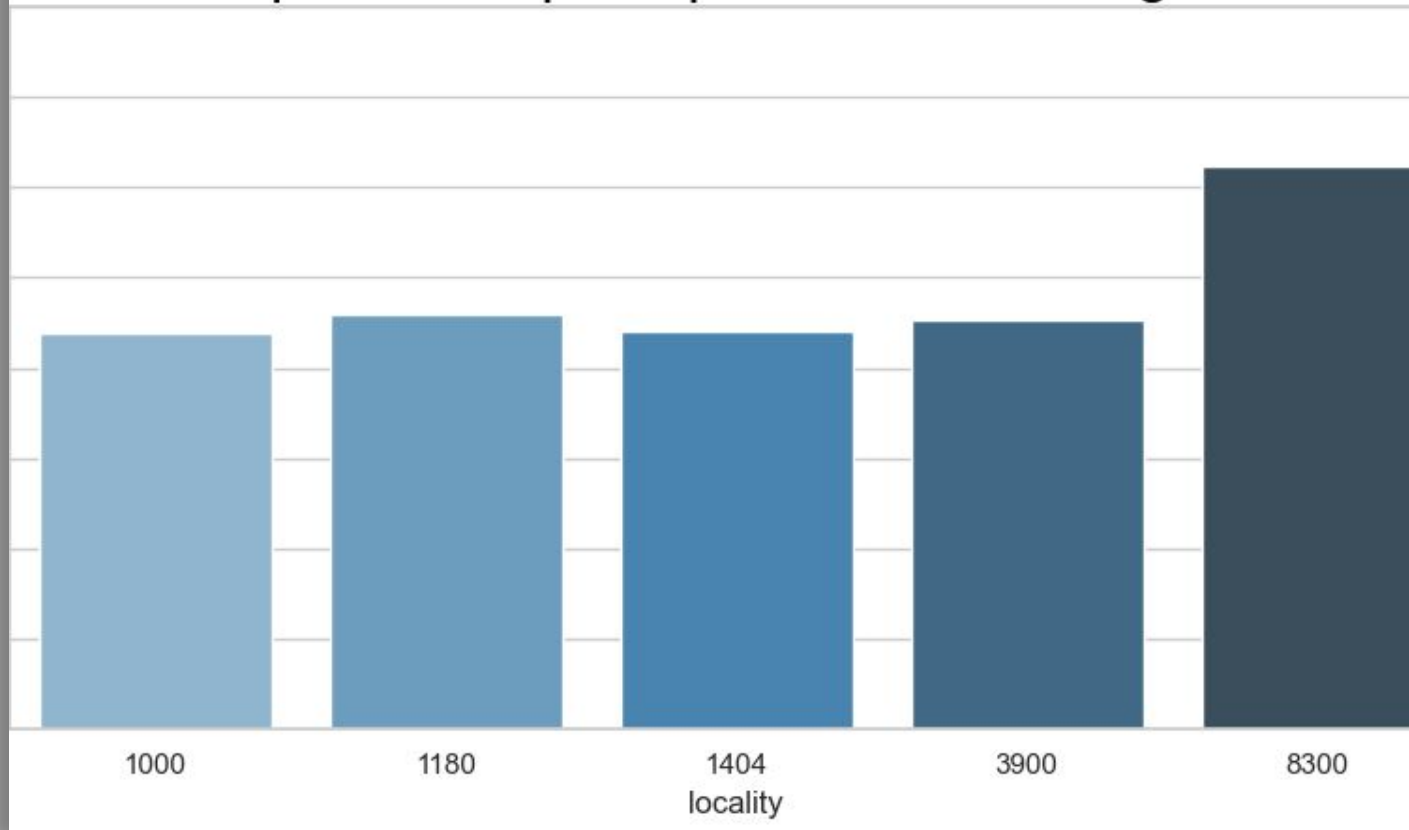
```
area          121.0
price         5000.0
building_state to restore
facades       2.0
bedrooms      2.0
kitchen_equipped undefined
furnished     False
open_fire     1.144966
locality      6870
land_surface  285.0
terrace       False
terrace_surface 0
swimming_pool False
property_type house
property_subtype house
garden        False
garden_surface 0
Name: 6399, dtype: object
```


Prices in Belgium



Prices in Belgium

Top 5 Prices per square meter in Belgium



1000
Brussels

1180
Brussels

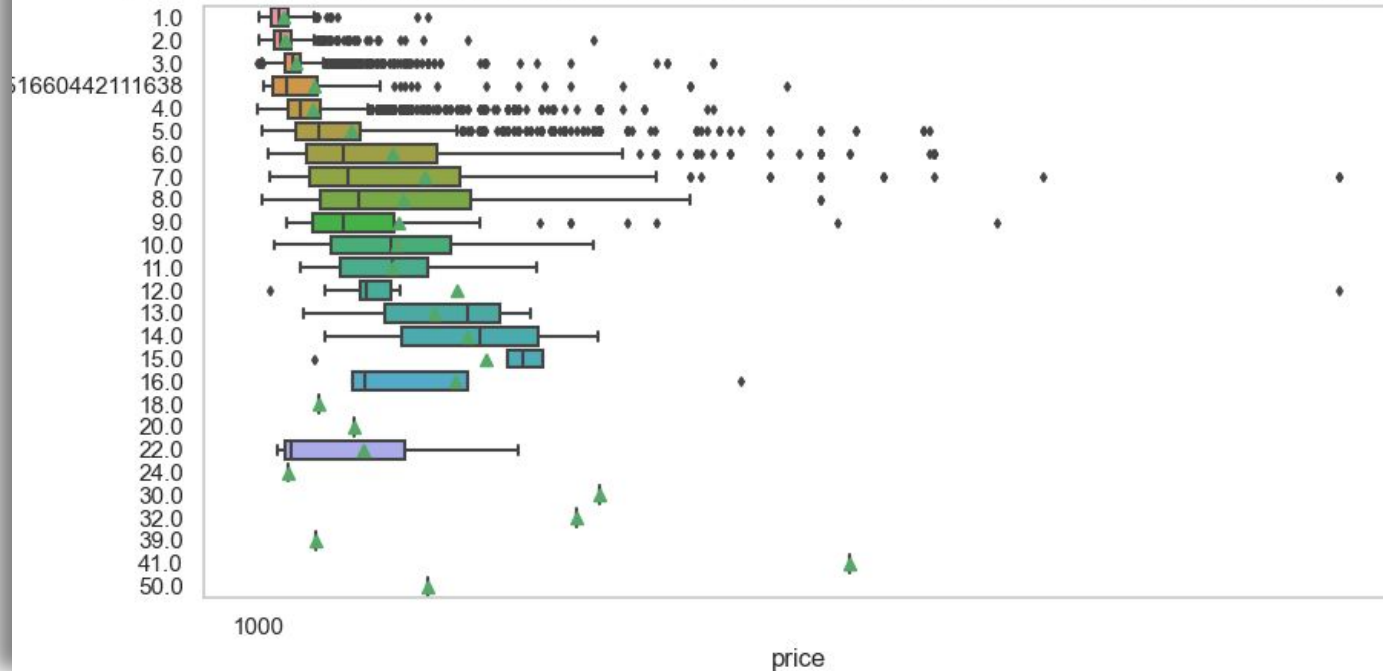
1404
Nivelles

3900
Overijse

8300
Knokke-Heist

Prices in Belgium

Price in function of number of bedrooms



Machine Learning bonus

“**Price** prediction problem is formulated as a **regression** analysis which is a statistical technique used to estimate the relationship between a dependent/target variable and single or multiple independent (interdependent) variables. In regression, the target variable is numeric.”





Conclusions

Conclusions



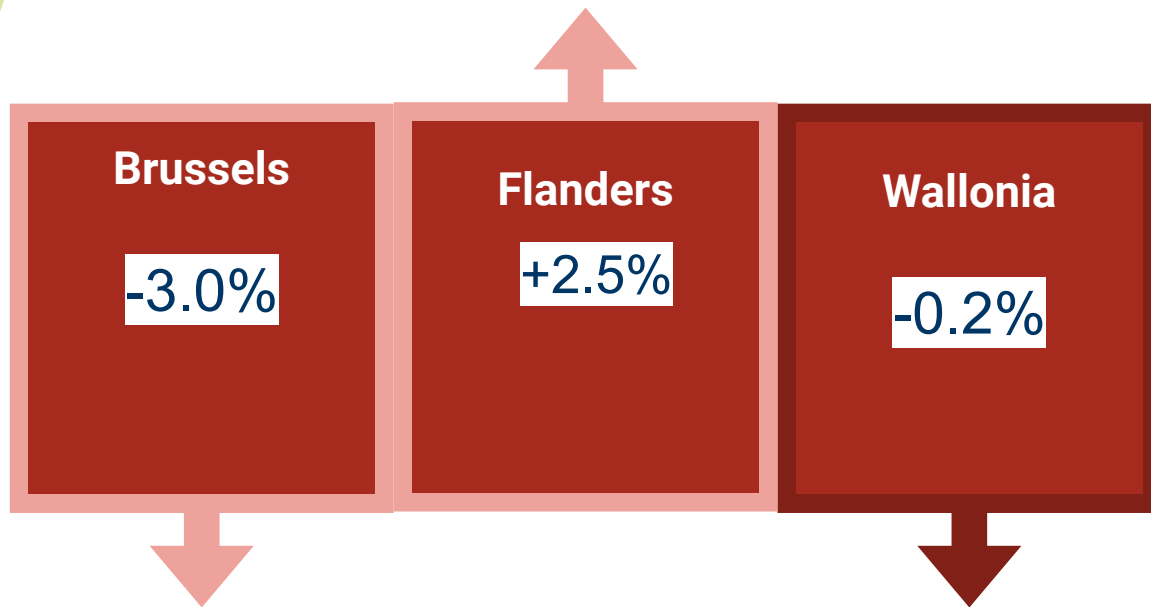
Most Expensive Municipalities in Belgium:

1. Brussels
2. Nivelles
3. Overijse
4. Knokke-Heist

Less Expensive Municipalities in Belgium:

1. Saint-Hubert
2. Wevelgem
3. Veurne
4. Chatelet

Conclusions



2021 (1st Qtr): **Slight fall on the housing market!**