The truth about data science in real estate

From a classical use case to the everyday challenges

bulwiengesa

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Women in Data Science
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Agenda

Introduction

Use Case: RIWIS Prospect

Challenges

Final remarks

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bulwiengesa inside.

In-depth data combined with experience, expertise and competence.
Independent. Objective. Excellent.

40 years of experience covering 4 market cycles for all sectors

More than 1000 variables from **over 30** sources

Over 10 million facts on more than **130,000** objects

60 professional researchers plus a large network of market experts

RIWIS perfectly informed through all investment phases.

Classical data science use cases

Price – purchase/rent – prediction

Property valuation

Forecasting (demographical and economical variables)

Location analysis with GIS

Agenda

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Use Case: RIWIS Prospect

1. Data
2. Model
3. Accuracy and limitations

Challenges

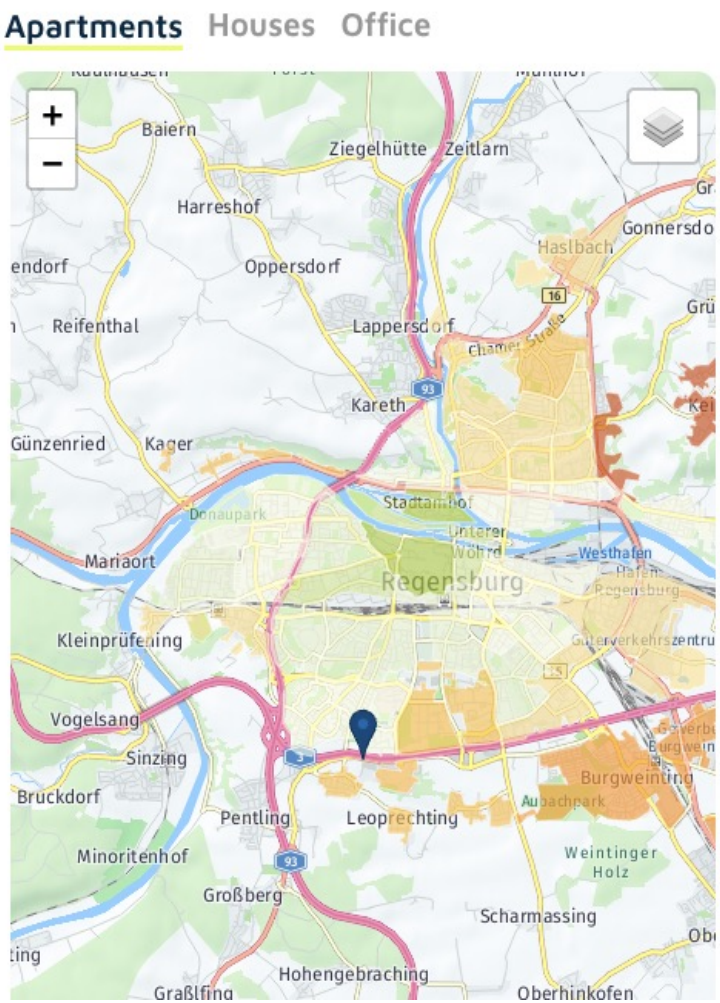
Final remarks

RIWIS Prospect

RIWIS Prospect determines *rental and purchase prices* of flats and houses in just a few seconds.

With this tool we can also estimate very large portfolios.

Prospect is currently available for *residential and office segments*. Logistic is work in progress.

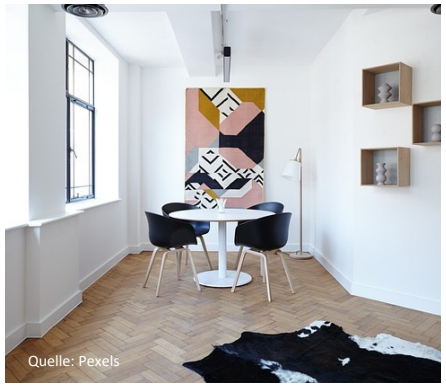


RIWIS Prospect – Data and features

Riwis Prospect uses ca. 10^6 property listings/year.

- Address

- Year of construtions
- ….



- Living space
- Floor
- …

Model

Prospect is a hedonic pricing GAM model

$$\log(\boldsymbol{Price}) = \boldsymbol{f}(\boldsymbol{W}) * \boldsymbol{X} + \boldsymbol{Q} + \varepsilon$$

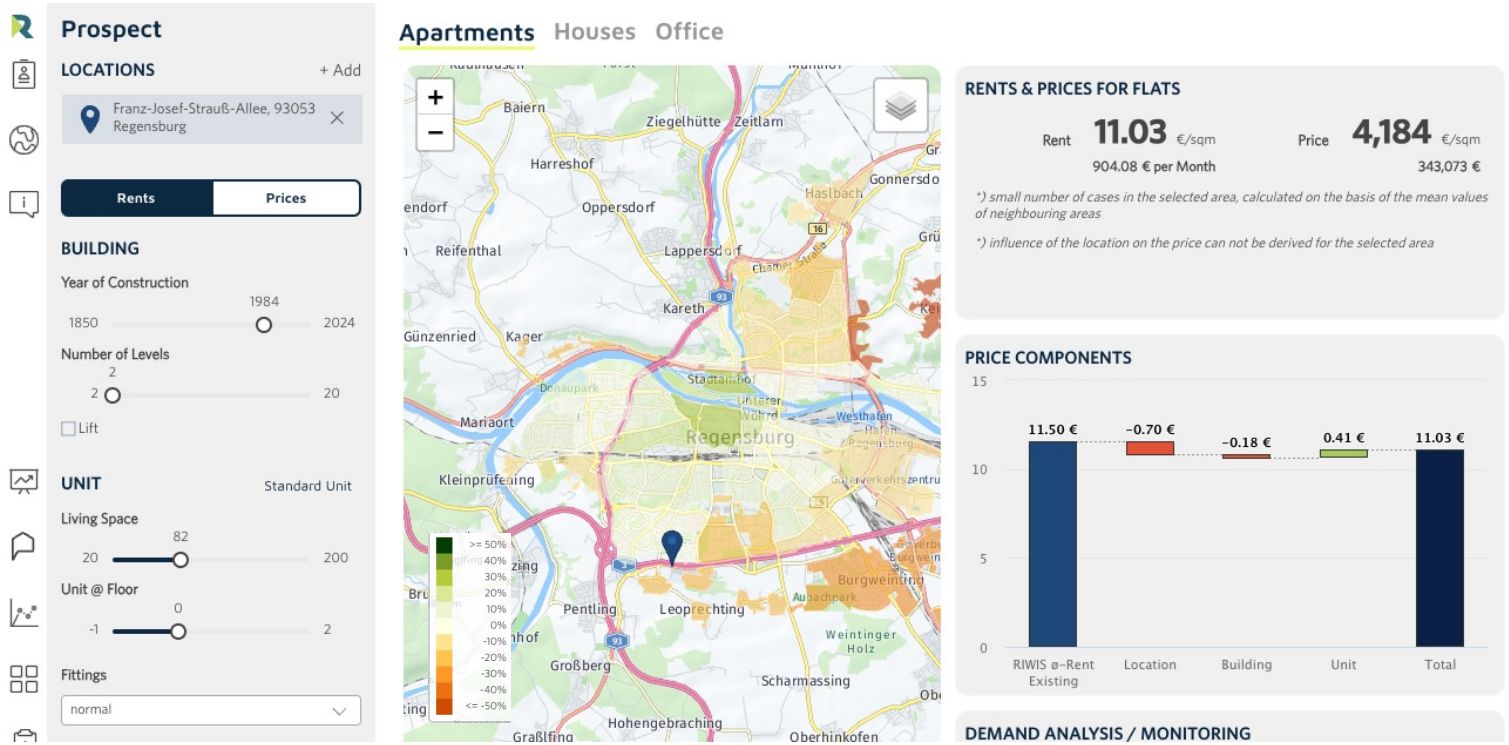
With:

- $\boldsymbol{X}$: features
- $\boldsymbol{W}$: weights
- $\boldsymbol{Q}$: intercept

A separate model is calculated for each district (*Landkreis*) on a quarterly basis.

- *Hedonic model:*
  - used for heterogenous classes of goods, such as buildings
  - Assumption: the composite good can be reduced to its constituent parts
- *log model* to get normal (or at least symmetric) distributed price data
- *GeoGAM*:
  - allows for smooth results within a polygon
  - quick to train, easy to understand and explain.

RIWIS Prospect



Geo polygons are *KGS12 entities* – within each of these the price cannot change.

Limitations and improvements

Limits of the model

- In areas with few listings, only aggregated statements are possible
- The current model has several *intrinsic* limitations, and it doesn't account for e.g., external factors, such as taxes and interest rates.

Improvements

- Feature engineering, again and again…
- Expand features with other data we have available
- Introduce new models (*xgboost*), which might be harder to interpret and handle

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Challenges

Stakeholders are **often skeptical** about data science and ML methods – make them easier to access through e.g., ExplainableAI – and are worried about **legal issues.**

Purchase value of the properties is *not accurate*. In addition, some input variables cannot be foreseen (*causal inference*).

Many data sources are still **not digitalized** (e.g., *Bodenrichtwerte*), hosted in outdated systems or no API is available.

Some variables are available at **different geographical** levels, e.g., the unemployment rate.

Data science in real estate

The Role of Data Science in Deriving Greater Insights into Property Market Dynamics

- 2022, CoreLogic Survey
- Only 42% of PropTech companies actively use data science to generate valuable insights to improve their business
- Main issues:
  - Fragmented data sources
  - Integration challenges
  - Lack of internal maturity in DS/ML/AI
  - Data scientist lack domain knowledge
- But the trend is clearly going in the *right* direction

Quelle: gif im Fokus, 1/2024, KI als Game-Changer in der Immobilienwirtschaft, ISSN Print 2198-6894, Online 2198-8013

CoreLogic Survey: The Role of Data Science in Deriving Greater Insights into Property Market Dynamics

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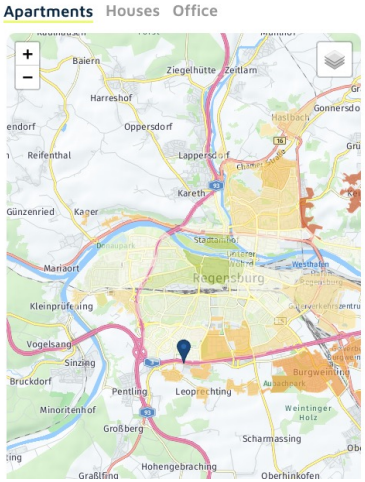

Riwis Prospect

The geoGAM in background was presented, with its advantages and disadvantages.

Challenges

Data availability, data integration, acceptance of ML-methods

Key takeaway

Explain, teach, communicate, mentor about data science!

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