

Real Estate Market Analysis

Discover Your Ideal Home in Lausanne

Group B

Section 1

Introduction and Objectives

Project description and objectives

- Create an intuitive and efficient interface for Lausanne residents, enabling them to easily find properties for rent by using data from a prominent real estate website `immoscout`.
- *Step 1* : R Package Creation (`immoswiss`) - R package named '`immoswiss`' designed to estimate property rents in Lausanne based on specified features and to identify the most similar properties available in the market.
- *Step 2*: Shiny App Creation - serving as an interactive interface for users interested in exploring the Lausanne real estate market. Users can input specific features and preferences to estimate property rents and discover the most similar properties available.

Section 2

Webscraping

Immoscout website

The screenshot shows the Immoscout24 website interface. At the top, there is a navigation bar with links for "Search", "Mortgages", "Moving", "Create an ad", "Favourites", "Sign in", and "Menu". A large search overlay is centered on the page, featuring the text "The best-known real estate marketplace in Switzerland". The overlay includes tabs for "Search" and "Appraise FREE", and buttons for "Rent" and "Buy". It also has fields for "Where?" (set to "Lausanne") and "What?" (set to "Flat, House"). There are dropdowns for "CHF (max)" and "Rooms (min)", both set to "Any". A green button labeled "Show 268 properties" is at the bottom of the overlay. Below the overlay, a man is sitting on a couch, smiling and holding a black coffee mug. The background of the page features a blurred image of a living room with a potted cactus on a table.

Lausanne dataset

The screenshot shows a real estate listing for a new building. At the top left, there's a small 'NEW BUILDING' badge. Below it, a 'PREMIUM' badge with a yellow ribbon. The main image is a rendering of a modern, multi-story white building with large windows. To the right of the image, there's a red-bordered box containing the text '3.5 rooms, 79 m², CHF 3120.-'. Below this, another red-bordered box contains the address 'Avenue de Sainte-Luce 9, 1003 Lausanne, VD'. A small heart icon is located above the address. To the left of the address, there's a short description: 'En plein cœur du centre-ville, superbes appartements de 35 pièces neufs'. Below this, a longer description reads: 'Idéalement située, en plein cœur du centre-ville de Lausanne, dans un environnement calme et résidentiel, cette construction neuve de standing saura vous séduire grâce à ses prestations de qualité. Disponibles dès le 15 décembre 2023, ces superbes...'. At the bottom left, there are three smaller thumbnail images showing interior rooms. At the bottom center, there's a button labeled 'Contact the advertiser'. At the very bottom left, there's a link to 'Lausanne station'. On the right side, there are icons for a bus (6'), a car (6'), and a bicycle (2').

Final dataset with 230 instances, everyone representing a property currently available in Lausanne. 4 variables collected among all website pages :

- **rooms** : Number of rooms in the property
- **meter_square** : Number of square meters in the property
- **price** : monthly rent of the property
- **location** : zipcode of the property location

Section 3

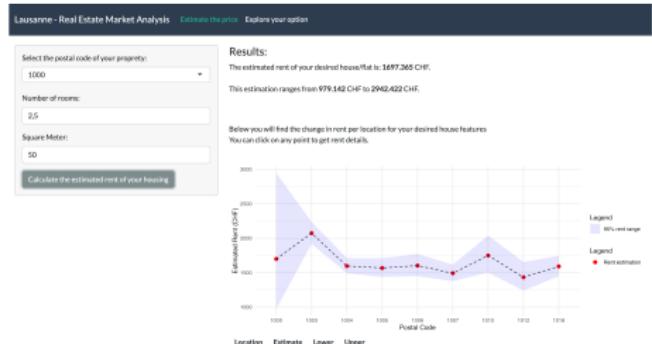
R Package creation : main functions

Multiple Linear Regression

$$\log(\text{price}) = \beta_0 + \beta_1 \times \text{rooms} + \beta_2 \times \text{meter_square} + \beta_3 \times \text{location} + \beta_4 \times \text{meter_square} \times \text{location} + \beta_5 \times \text{rooms} \times \text{location} + \epsilon$$

- β_0 is the intercept,
- β_1 is the coefficient for rooms,
- β_2 is the coefficient for meter_square,
- β_3 is the coefficient for location,
- β_4 is the coefficient for meter_square × location,
- β_5 is the coefficient for rooms × location,
- ϵ represents the error term.

Shiny app interface - Price estimation



- *Estimated rent* : Multiple regression model estimates the rent prices for the specified zipcode, number of rooms, and square meters
- *Confidence interval*: 95% probability that the estimated rent price is between a lower bound and an upper bound.
- *Estimated rent depending on the location zipcode plot* : Rent price variation of a specified property features in different locations in Lausanne and 95% confidence interval for every zipcode rent price estimation

Shiny app interface - Find the k most similar properties

- ① Insert the property features the user is looking for
- ② Compute the features distance between the features inserted and the properties in lausanne dataset.
- ③ Select the k nearest neighbors.
- ④ Table representing the k most similar properties in Lausanne.

Section 4

Conclusion

Limitations

- Limited data due to webscraping
- Non- ethical way of collecting data
- Frequently updated website - dataset used in our package might change

Further improvements

- Shiny app that could benefit future incoming students in Lausanne.
- Adding more data sources (real estate agencies, student accommodation entities, social media groups).
- Analysis part : redirection to url corresponding to the property.