

# 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.

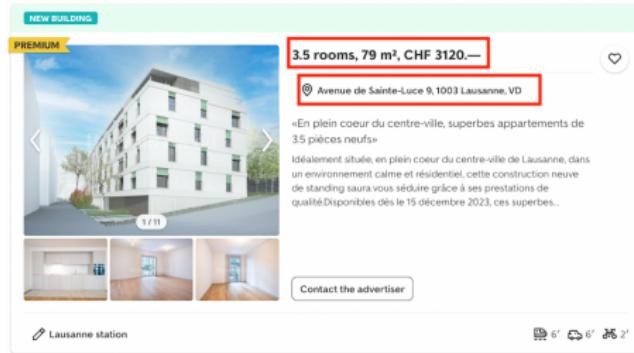
## Section 2

### 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. The overlay has tabs for "Search" and "Appraise FREE". Below these tabs, the text reads: "The best-known real estate marketplace in Switzerland". There are two main buttons: "Rent" (highlighted in green) and "Buy". A search field labeled "Where? (City, part of town, postcode, canton, region)" contains "Lausanne" with a clear button and a radius dropdown set to "+ 0 km". A dropdown menu for "What?" shows "Flat, House". Filter options include "CHF (max)" and "Rooms (min)", both set to "Any". A large green button at the bottom of the overlay says "Show 268 properties". Below this button is a link "More search criteria". In the background, a man is sitting on a couch, smiling and holding a coffee mug. The background also features several potted cacti and a window. On the right side of the image, there is a decorative graphic of a green plant with a grid of red "X" marks overlaid on it.

# Lausanne dataset



Final dataset with 230 instances, each one representing an advertisement of a property 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

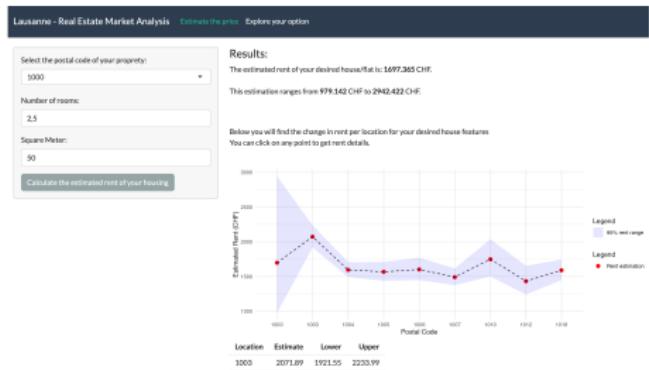
R Package creation : main functions

# Multiple Linear Regression

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

- $\beta_0$  is the intercept,
- $\beta_1$  is the coefficient for rooms,
- $\beta_2$  is the coefficient for meter\_square,
- $\beta_3$  is the coefficient for location,
- $\beta_4$  is the coefficient for meter\_square × location,
- $\beta_5$  is the coefficient for rooms × location,
- $\epsilon$  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

Lausanne - Real Estate Market Analysis   Estimate the price   Explore your option

Test the postal code of your property:

Select the number of rooms:

Select the squares meters:

Select how many similar apartments should be given:

Here you can find the most similar apartments based on your requirements:

	Rooms	Surface	Price	Location	Distance
122	2	51	1400	1000	0.39
160	1.5	23	1480	1000	0.99
161	1.5	23	1480	1000	0.99
110	1	26	1200	1000	1.28
57	2.5	49	1500	1007	1.41

Showing 1 to 5 of 5 entries

Previous   **1**   Next

- 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

- Webscraped data : limited data, non- ethical way of collecting data, frequently updated website
- Github repository organization

# 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.