

# Airbnb calculator

EPITECH Innovation Hub project, 2023

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# The project



## Topics Covered

Product Idea, CustDev

How we organised our job

Frameworks we used

Future product development

What problems we encountered

What we have learned

# Idea description

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# Price per night - main metric for Airbnb users

- House owners wish to profit their real estate

- People who rent wish to save money

- Airbnb does not provide their own PPN estimation tool

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Therefore, price per night estimation tool will be in demand for all three groups

# MVP templates

We decided to create a **Web Application**:

- cross-platform solution
- easier to build and release than IOS / Android / Desktop application
- We already have several skills from similar projects

## The Idea

Do you want to know the best price for your rental accomodation?

Use Airbnb Calculator to discover the best price to rent out your accomodation, set the perfect price with the help of Artificial Intelligence and stay two steps ahead of the competition.

[Calculate Now](#)



# How we organised our job

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# Three main components of the product

- Backend component

- Model for prediction

- Frontend component

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This job division allowed us to build a product on time and gain new skills for each team member



# Notion as a project space – keep things organised

The screenshot shows a Notion page with the following structure:

- Header:** Programming / Innovation Hub, Share, ...
- Section:** Innovation Hub
  - ▶ BrainStorm
  - ▶ Calendar
  - ✓ Task List
- Section:** Technical documentation file
  - Section header:** Technical documentation for Innovation Hub Project (B-INN-000)
  - Team:** Vera Koliverda, Dorjan Kos, Aqsa Muzaffar ahmed
  - Name of the project:** "Airbnb calculator"
  - Description:** We want to create a web site to estimate the best price for an apartment/room per night. The user enters the location, type of the accommodation, date and some more parameters about the apartment and immediately gets the estimated price. Initially the model will be trained based on Airbnb open dataset. This product can be used by the host owner to get the best revenue from his/her apartment or by travelers to check whether the price for accommodation is adequate.
  - Numerical and color definition of technical documentation block:** (This part is a placeholder with a redacted content area.)
- Page footer:** Technical Documentation (Innovation Hub), Last modified by Dorjan Kos 9 days ago, docs.google.com

## Technical documentation headers:

numbers:

section 1: 1 - frontend, 2 - back end, 3 - dev ops, 4 - ai

section 2: number of sprint

📄 [Input for predicting model](#)

📄 [Database credentials](#)

📄 [Final defense](#)

- ▶ Description of idea "Airbnb calculator"
- ▶ Technical requirements
- ▶ Organisational issues

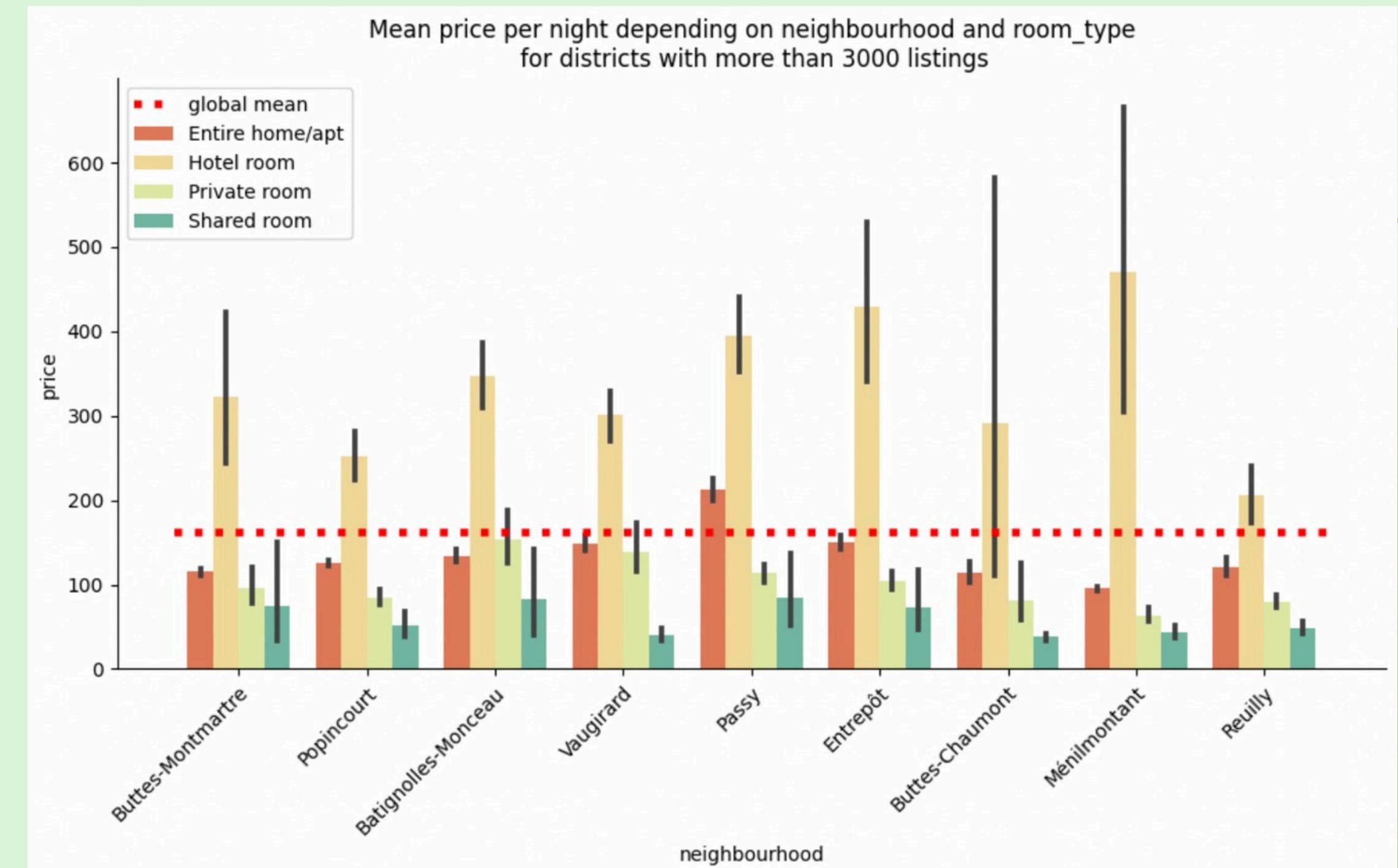
# Frameworks that we used

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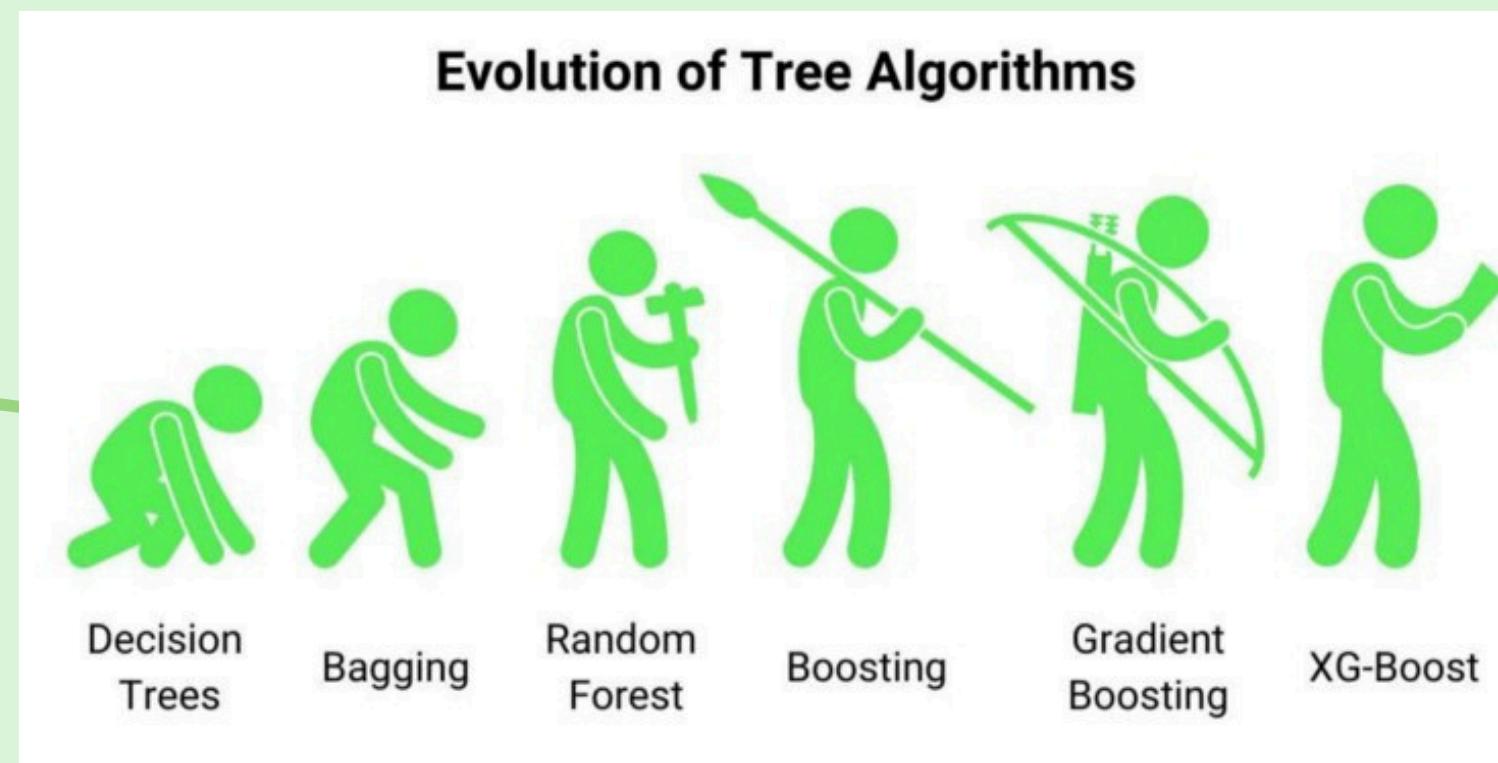
# Frameworks used: EDA

- Using **Jupyter notebook** environment and **Python** as a main language to work with raw dataset
- Data science Python libraries to work with data: **pandas, numpy**
- Python libraries to visualise data:
- **seaborn, matplotlib**
- Python libraries to prepare data for modelling: **scikit-learn**



# Frameworks used: model

- After cleaning, filling nan values and scaling data, several model baselines were tested
- Gradient boosting algorithm is one of the most powerful for linear regression tasks
- A lot of gradient boosting implementations are available: LightGBM, CatBoost, XGBoost
- **XGBoost** baseline achieved the highest score for our PPN prediction task



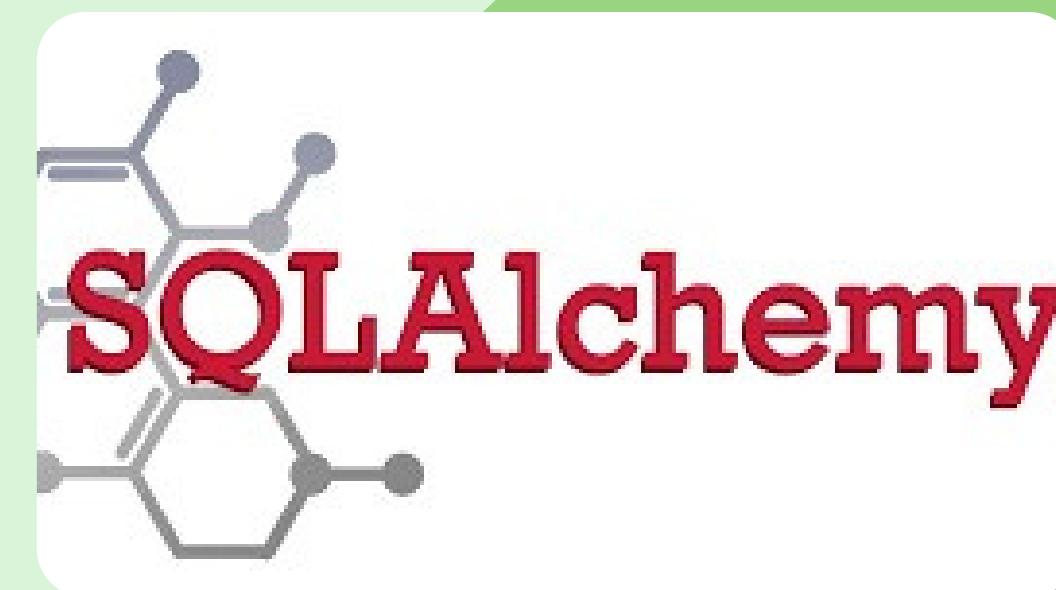
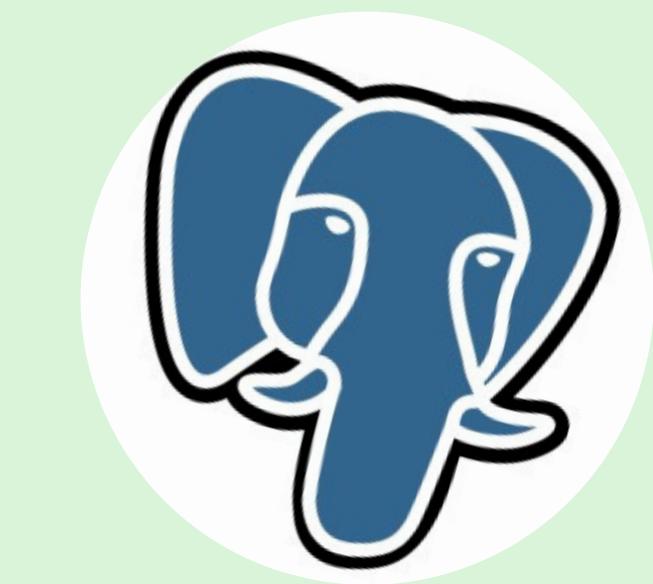
Training MSE: 0.1532  
Validation MSE: 0.2789

Training RMSE: 0.3915  
Validation RMSE: 0.5282

Training r2: 0.8491  
Validation r2: 0.7076

# Frameworks used: backend

- Using **Python 3.10** and its **Flask** framework for web applications
- Flask is easy-to-use and powerful, providing all necessary features for the project
- Using **PostgreSql** database to store users data
- Using **SqlAlchemy** framework to operate database connection



# Frameworks used: frontend **Vue.js**



- open-source JavaScript framework for building user interfaces and single-page applications
- component-based architecture
- fast and lightweight, making it suitable for building fast and responsive applications



# Frameworks used: deployment

as a hosting platform for our web application

- Using **Heroku**  
(both backend and frontend)
- Easy do deploy and release using GitHub or Heroku CLI
- Disadvantages: very limited time of free hosting, no remote database provided anymore
- Using **ElephantSql** to host a database to resolve it
- Additionally, during testing we used **Ngrok** tool to build a "tunnel" to the server running on a localhost



	vakoliverda@gmail.com: Deployed 1e97ca9f
	vakoliverda@gmail.com: Build succeeded Jan 12 at 4:29 PM · <a href="#">View build log</a>
	vakoliverda@gmail.com: Deployed 394c99b8 Jan 12 at 4:28 PM · v5 · <a href="#">Roll back to here</a>
	vakoliverda@gmail.com: Build succeeded Jan 12 at 4:27 PM · <a href="#">View build log</a>

# Frameworks used: deployment



- Tried **Microsoft Azure** to host application and database as a more professional tool
- At first fails because of mysqlclient build error
- This was fixed, but still did not manage to build a database connection  
Final hosting app: Heroku + ElephantSql

<span style="color: green;">✓</span> Merge pull request #4 from koliverdavera/master	Build and deploy Python app to Azure Web App - airbnb-calculator-backend #3: Commit f8627e8	main
<span style="color: green;">✓</span> Merge branch 'main' of github.com:koliverdavera/innovation_hub_airbnb	Build and deploy Python app to Azure Web App - airbnb-calculator-backend #2: Commit 153b383	main
<span style="color: red;">✗</span> Add or update the Azure App Service build and deployment workflow config	Build and deploy Python app to Azure Web App - airbnb-calculator-backend #1: Commit 15440c2	main
<span style="color: red;">✗</span> switched to ubuntu, added libpython3.10-dev	Build and deploy Python app to Azure Web App - airbnb-calculator #17: Commit 3d4c254 pushed	main
<span style="color: red;">✗</span> add yaml libraries	Build and deploy Python app to Azure Web App - airbnb-calculator #16: Commit d986b4b pushed	main

# Future product perspectives

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# Future product development



Adjust model to predict prices for  
**more cities**

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Improve **personal space** area of  
a client

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Add **articles** for landlords and  
those who rent

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Add price estimation **for those**  
**who rent**

What troubles  
we had and how  
we succeeded

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What difficulties we encountered during the project:  
**problem -> solution**



Time management

We had to work harder than ever during weekends before the scope validation

Other studying projects

Prioritization of school deadlines and other personal affairs

Lack of knowledge

Asking advice from teachers, watching multiple tutorials and keep trying

Connecting Flask and Vue

A lot of googling, testing various code snippets. Using Ngrok, Postman to make it easier

# What we have learned

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# Things We Learned

Web applications  
development

Flask

Vue js

Team communication

Time management

CI and CD



# Thank you!

Now let's go testing.