Airbnb Calculator

EPITECH Innovation Hub project, 2023

Team:
Vera Koliverda
Dorijan Kros
Aqsa Muzaffar Ahmed

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

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

MVP templates

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

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

How we organised our job

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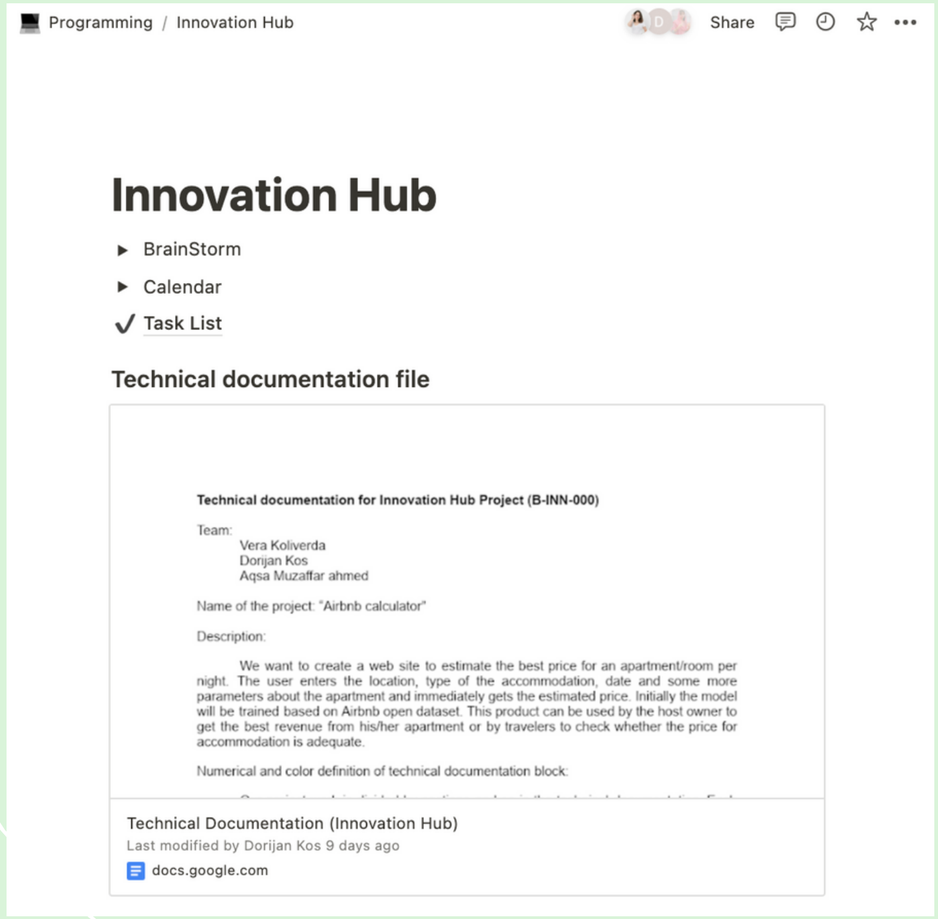
Three main components of the product

- Backend component
- Model for prediction
- Frontend component

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



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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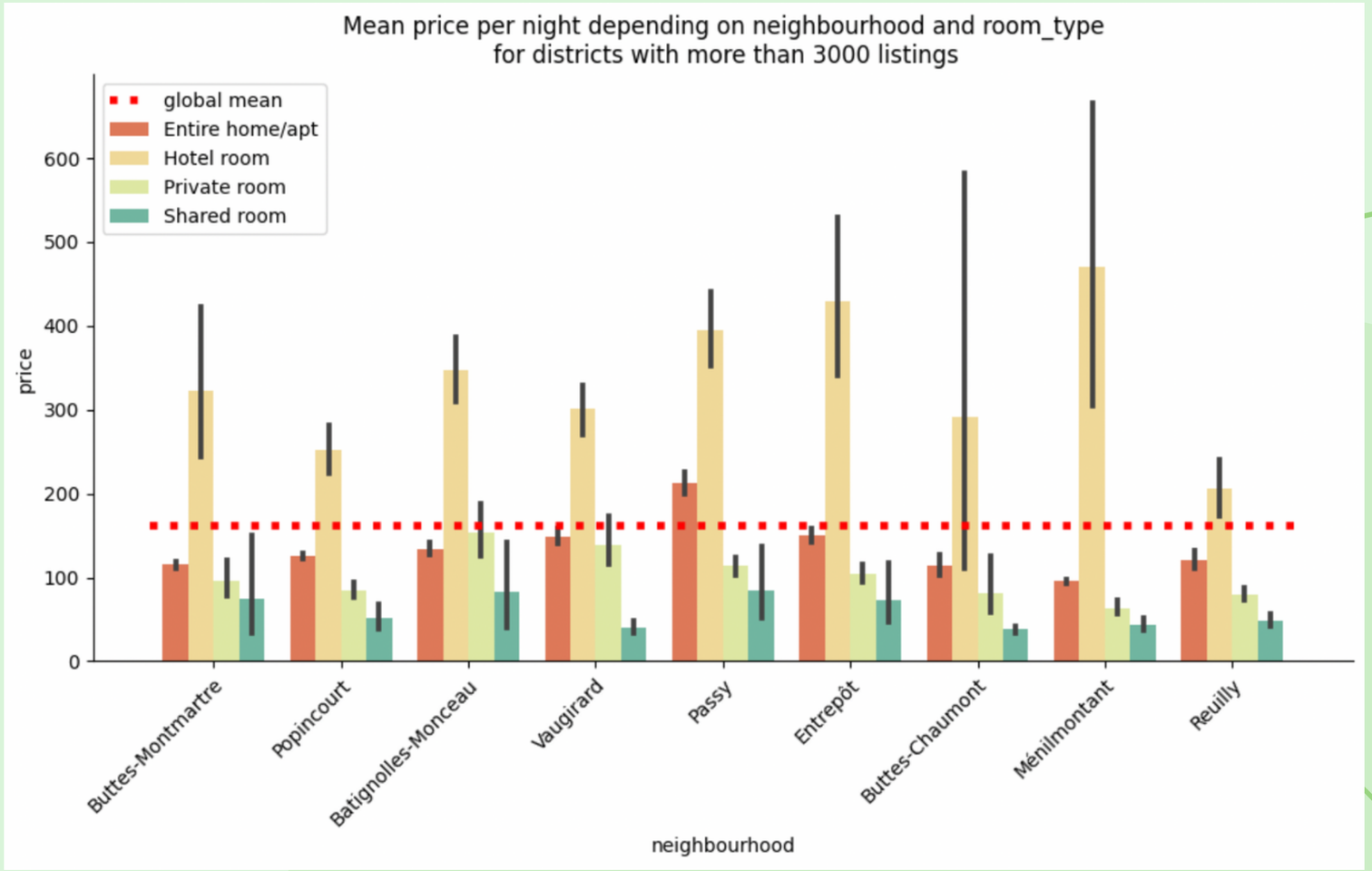
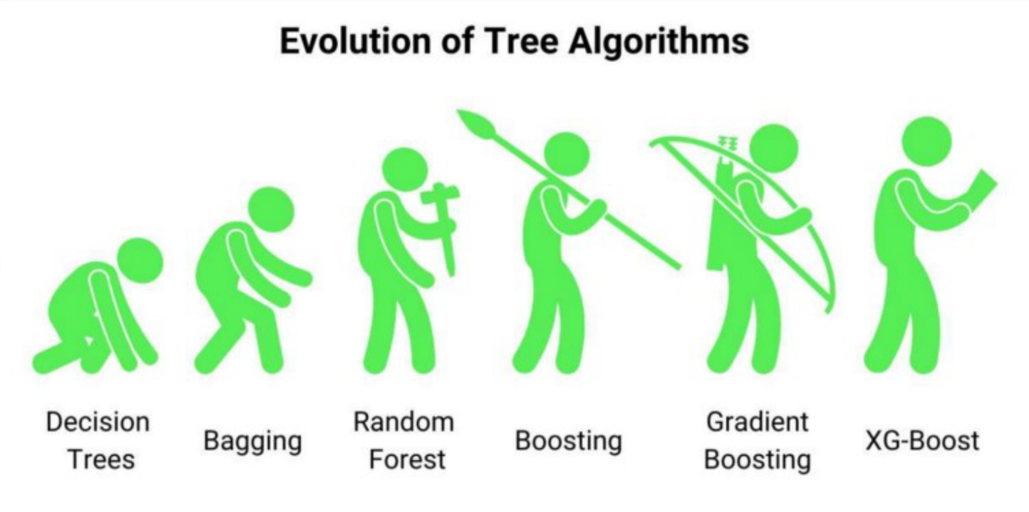
Frameworks used: EDA

- 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
```

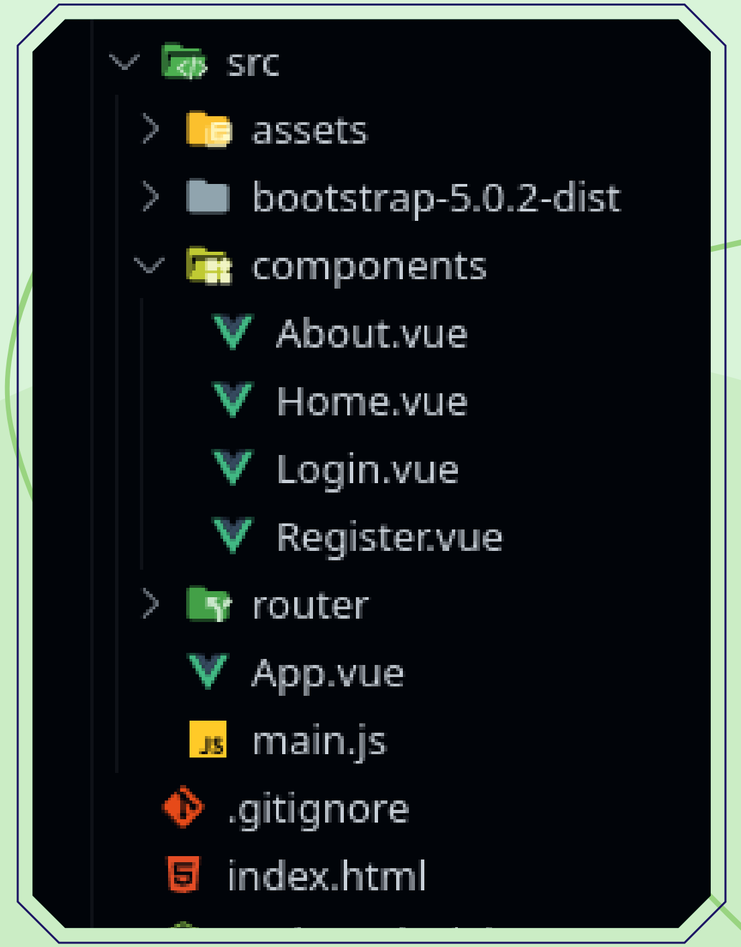
Frameworks used: backend

- 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

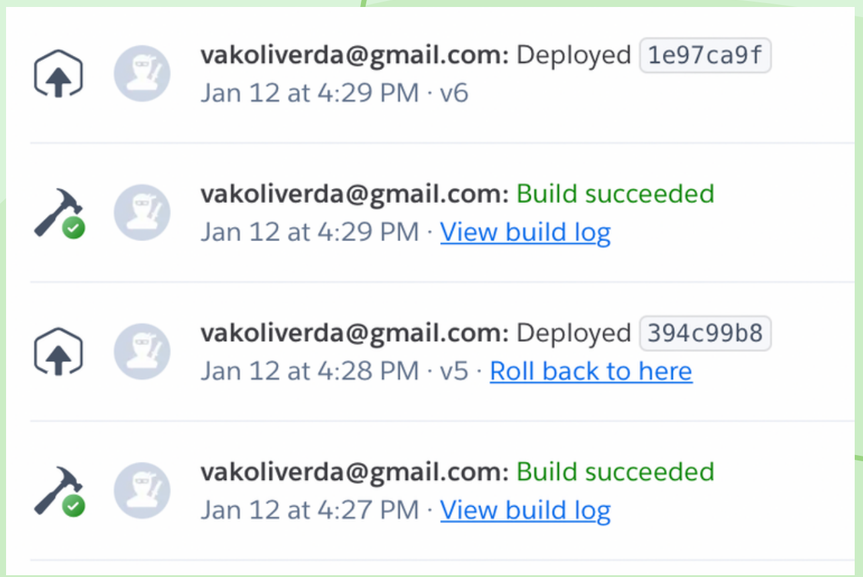
Vue.js

- 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



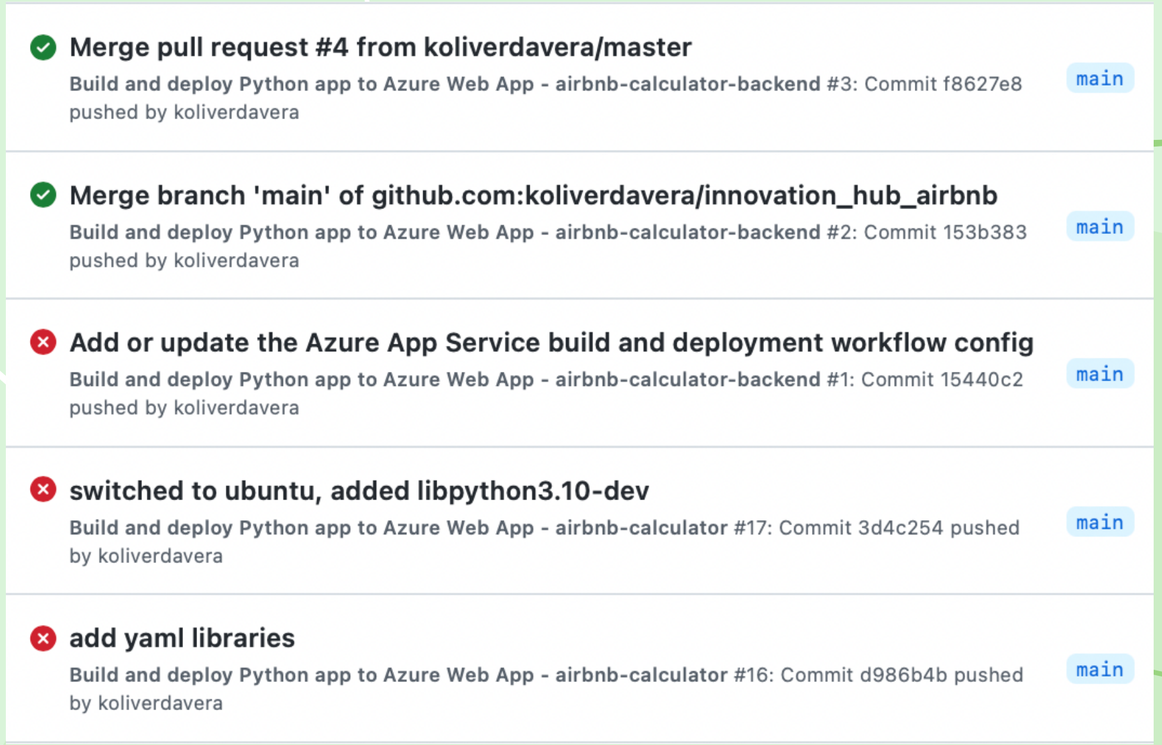
Frameworks used: deployment

- Using **Heroku** as a hosting platform for our web application (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



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



Future product perspectives

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Future product development

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

Improve **personal space** area of a client

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

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.