

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

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

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

Programming / Innovation Hub

Share

Innovation Hub

- ▶ BrainStorm
- ▶ Calendar
- ✓ Task List

Technical documentation file

Technical documentation for Innovation Hub Project (B-INN-000)

Team:

Vera Koliverda
Dorijan Kos
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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:

Technical Documentation (Innovation Hub)
Last modified by Dorijan 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

Evolution of Tree Algorithms



Training MSE: 0.1532

Validation MSE: 0.2789

Training RMSE: 0.3915

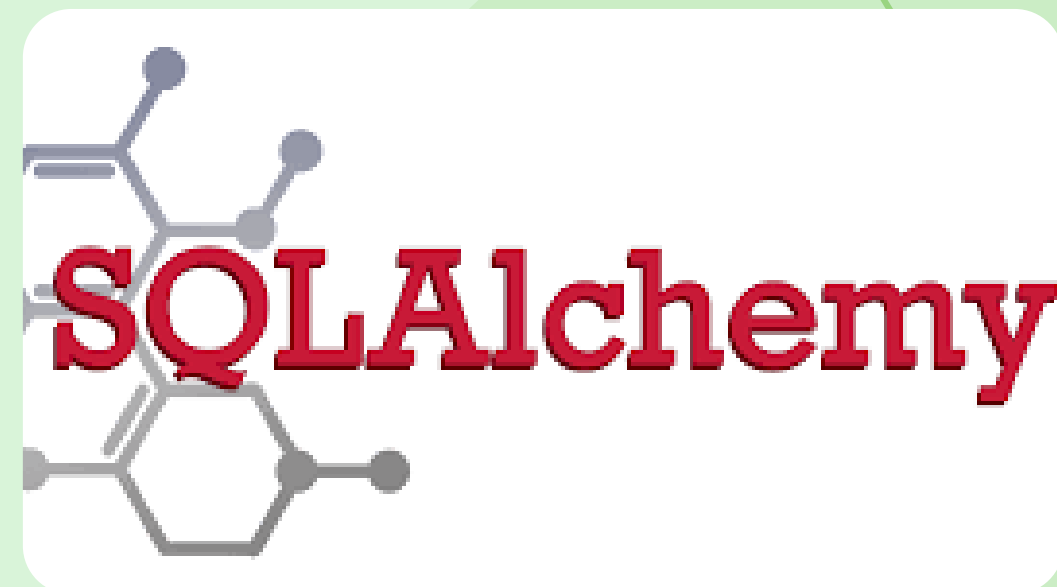
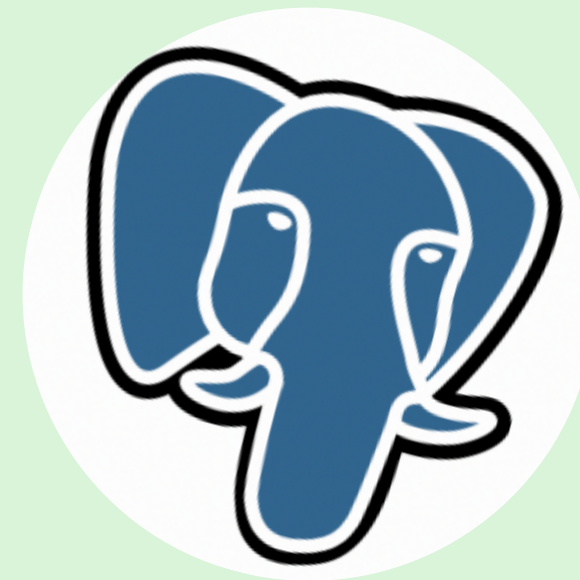
Validation RMSE: 0.5282

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

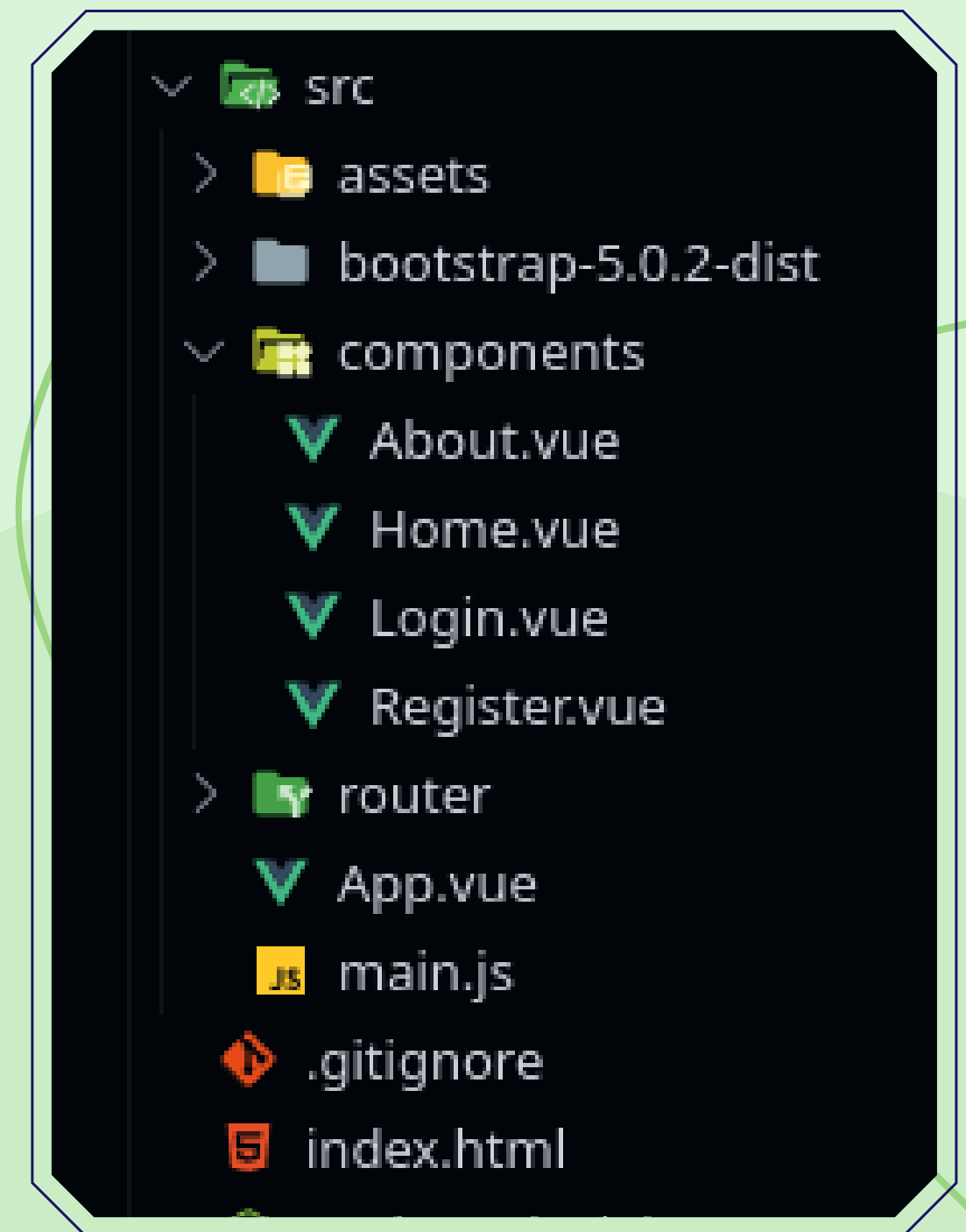


Frameworks used: frontend



Vue.js

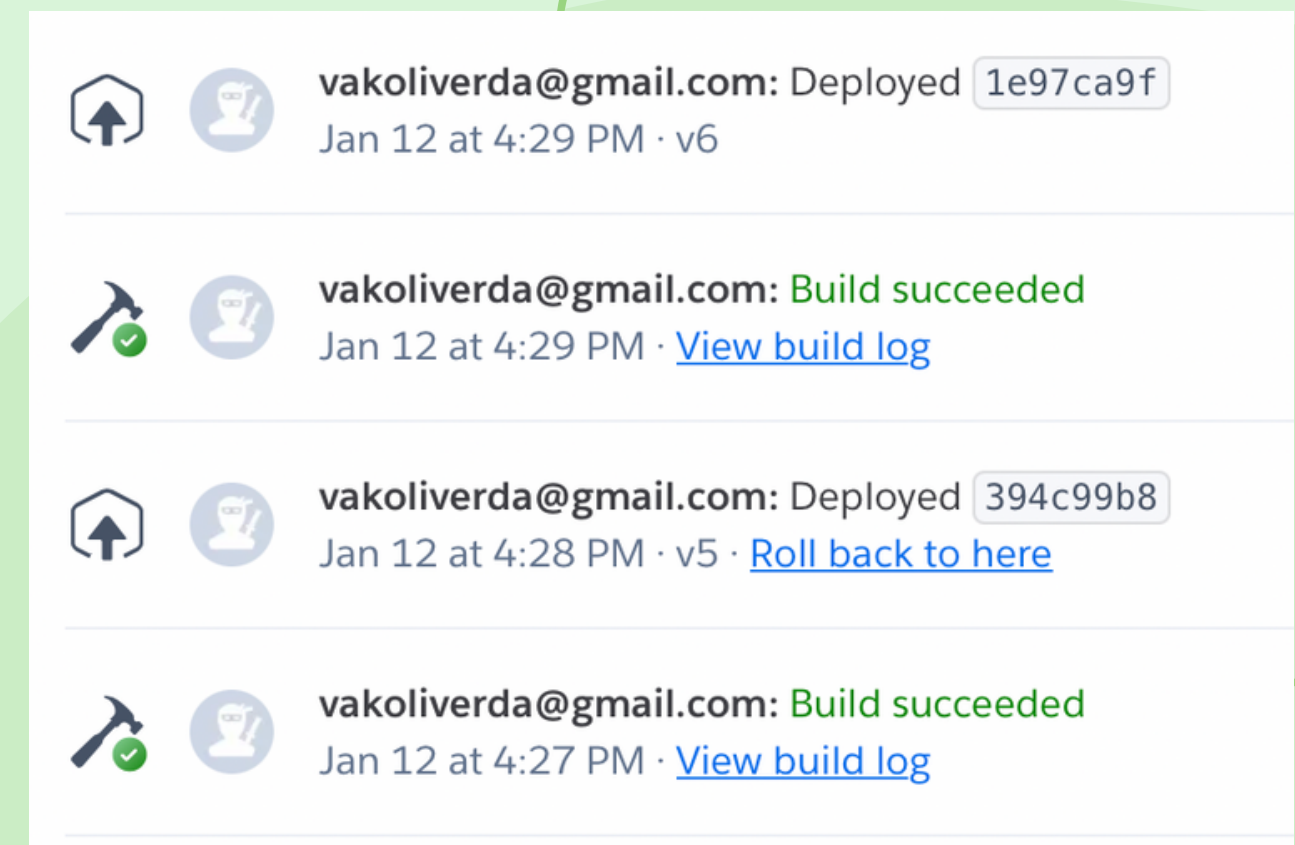
- open-source JavaScript framework for building user interfaces and single-page applications
- component-based architecture
- fast and lightweight, making it suitable for building fast and responsive applications



Frameworks used: deployment



- Using **Heroku** as a hosting platform for our web application (both backend and frontend)
- Easy to 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

- ✓ **Merge pull request #4 from koliverdavera/master**
Build and deploy Python app to Azure Web App - airbnb-calculator-backend #3: Commit f8627e8 pushed by koliverdavera [main](#)
- ✓ **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 pushed by koliverdavera [main](#)
- ✗ **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 pushed by koliverdavera [main](#)
- ✗ **switched to ubuntu, added libpython3.10-dev**
Build and deploy Python app to Azure Web App - airbnb-calculator #17: Commit 3d4c254 pushed by koliverdavera [main](#)
- ✗ **add yaml libraries**
Build and deploy Python app to Azure Web App - airbnb-calculator #16: Commit d986b4b pushed by koliverdavera [main](#)

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



The background is a solid green color. It features several white, wavy, organic lines that sweep across the frame. A large, semi-transparent light green circle is positioned in the upper left quadrant, partially overlapping the wavy lines.

Thank you!

Now let's go testing.