

# Rentier

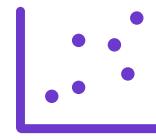


# What is Rentier?



## Problem Statement

How can we empower renters and landlords in Singapore to help determine what is a reasonable rental price on AirBNB?



## Rentier

Rentier is an AI enabled service that tries to predict the listing rental price given the features of the rental unit.

# User Journey



## Problem

A user is hoping to rent an AirBNB in Singapore, and he's not sure if the listing he's eyeing is worth its price.



## Discovery

He comes across Rentier, and decides to register an account. He logs into his account, and heads for the prediction page.



## Prediction

He fills up the listing details, and receives the prediction of the model. This prediction is saved to his unique user history. He makes several more predictions on similar listings.



## Result

Hence, he was able to make a more informed choice on what listing to book.



## Comparison

Using the history feature, he is able to compare the features of the listings, and pick the listing which the model values highly, but still has a low price.

# On-boarding Process



**Rentier**  
Rentier is an app that uses machine learning to help you make the right choice when picking or creating an Airbnb listing.

[Register](#) [Login](#)

**Finding the best deal has never been so easy!**  
Our AI has been trained on past Airbnb listings in Singapore, and knows what factors affect the price of the listing, helping you know what the market rate should be for a flat.

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## Home Page

Before creating an account, access to the prediction and personalized history is disabled.

## Sign Up

Email address

We'll never share your email with anyone else.

Password

Passwords should be at least 8 characters long, containing at least one uppercase, lowercase, number and special character.

Confirm password

[Submit](#)

Already have an account? [Login](#)

## Account Creation

The account creation process is simple: just fill up an email and password.

## Login

Email address

We'll never share your email with anyone else.

Password

Remember me?

[Submit](#)

New Here? [Sign Up](#)

## Login

When logging in, your user ID is stored in a secured cookie, which may be deleted upon the closure of the browser, or kept for a more convenient experience.

# Making a prediction

Making a prediction is easy!  
Just fill up the details of the listing, and press submit!

## Make a prediction

Simply type down the details of the listing in question, and our AI model will make a prediction for you!

Number of Beds	<input type="text" value="1"/>
Number of Bathrooms	<input type="text" value="1"/>
Accommodates	<input type="text" value="3"/>
Minimum Nights	<input type="text" value="92"/>
Room Type	<input type="text" value="Private room"/>
Neighborhood	<input type="text" value="Tampines"/>
<input checked="" type="checkbox"/> Wifi	
<input type="checkbox"/> Elevator Access?	
<input type="checkbox"/> Pool?	
Actual Listing Price in SGD (Optional)	<input type="text" value="82"/>
Link to Listing (Optional)	<input type="text" value="https://www.airbnb.com.sg/rooms/71896"/>
<input type="button" value="Submit"/>	<input type="button" value="Reset"/>

### The predicted rental fee is...

SGD 66.76 per night which is \$15.24 less than the listing price.

[Why?](#) [See history](#)

### Private room in residential home hosted by Belinda

3 guests · 1 bedroom · 1 bed · Shared toilet with sink



#### Enhanced Clean

This host has committed to Airbnb's 5-step enhanced cleaning process. [Show more](#)

#### Self check-in

Check yourself in with the keypad.

#### Pets allowed

Guests often search for this popular amenity

#### The space

Vocational Stay Deluxe Bedroom in Singapore.(Near Airport)

#### Located Between

- Simei and Expo Mrt  
- 2 bustop distance or 10-15min walking distant to Simei MRT....

[Show more >](#)

\$82 / night ★ 4.16 (24 reviews)

CHECK-IN Add date	CHECKOUT Add date
GUESTS 1 guest	<input type="button" value="▼"/>
<input type="button" value="Check availability"/>	

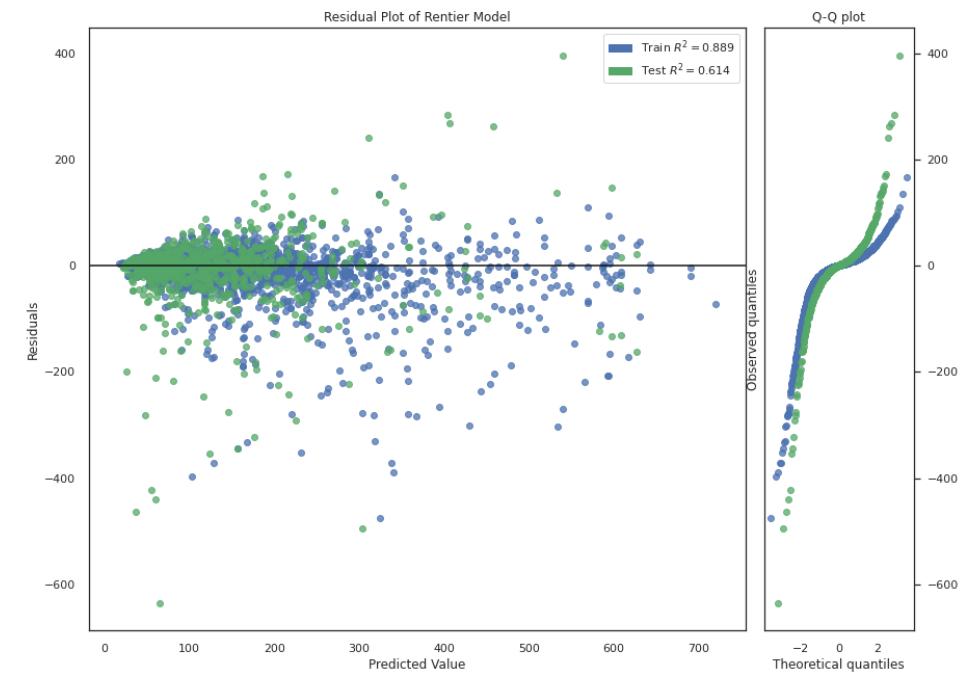
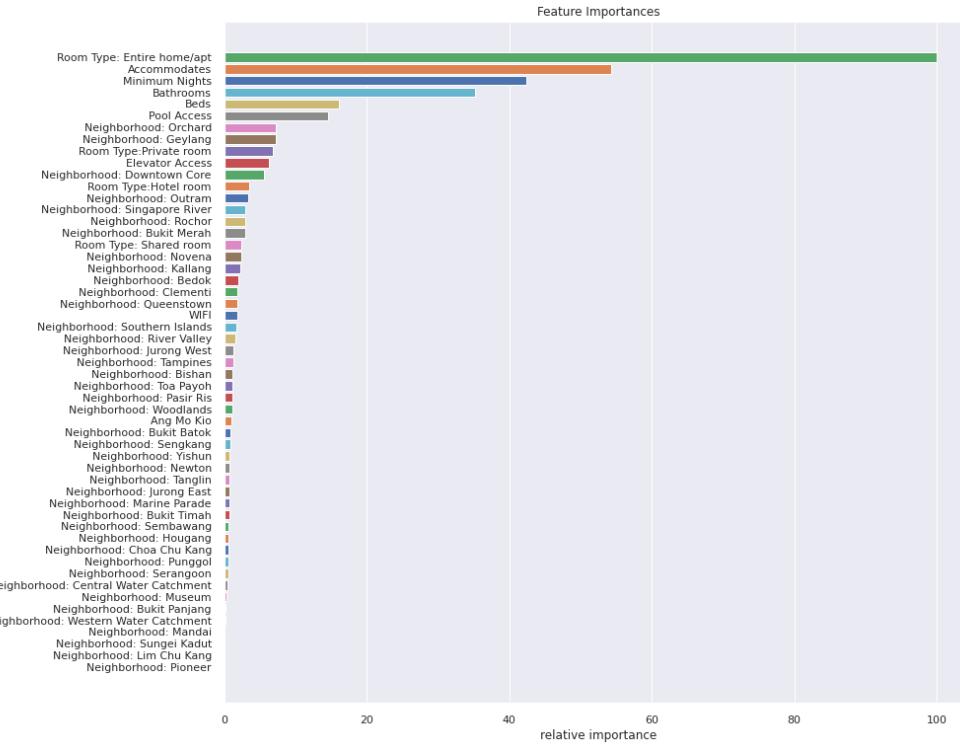
[Report this listing](#)



The Actual AirBnB Listing

# Model

Rentier relies on a Random Forests model to predict the rental prices.



## Feature Engineering

A log transformation is done on the prices to reduce the skewness of the distribution. Additional information like amenities (e.g Pools) is extracted from the dataset and used to help train the model.

## Model Accuracy

MAE on the testing set is \$39, with higher RMSE of \$79. Suggests model does not do well on outliers. This information is shared with the user to allow them to make an informed decision when booking a listing.

# Your History

We keep track of your past submissions to help you make a comparison between different listings.

Sorting 2

Options to sort by various attributes, in ascending and descending order are provided

Entries per page ▼ Sort by ▼

#	Created	Beds	Bathrooms	Accomodates	Minimum Nights	Room Type	Neighborhood	Wifi?	Elevator?	Pool?	Predicted (SGD)	Actual (SGD)	Difference (SGD)	Actions
1	03/12/2021 13:46	1	1.0	3	92	Private room	Tampines	True	False	False	\$66.76	\$82.0	15.24	<span style="color: red;">Delete</span> <span style="color: purple;">Info</span>
2	03/12/2021 13:45	1	1.0	3	92	Private room	Tampines	True	False	False	\$66.76	\$82.0	15.24	<span style="color: red;">Delete</span> <span style="color: purple;">Info</span>
3	03/12/2021 13:36	1	1.0	3	92	Private room	Tampines	True	False	False	\$66.76	\$82.0	15.24	<span style="color: red;">Delete</span> <span style="color: purple;">Info</span>
4	03/12/2021 13:35	1	1.0	3	92	Private room	Tampines	True	False	False	\$66.76	\$82.0	15.24	<span style="color: red;">Delete</span> <span style="color: purple;">Info</span>
5	03/12/2021 13:35	1	1.0	3	92	Private room	Tampines	True	False	False	\$66.76	\$82.0	15.24	<span style="color: red;">Delete</span> <span style="color: purple;">Info</span>

Pagination 1

Pagination helps make it easier to go through entries when there are too many entries

Previous 1 2 3 4 5 Next

Actions: Delete 3

A user can choose to delete any of his history entries

Action: Info 4

If a link was provided during prediction, the user may choose to go to the listing page

# Web APIs

Rentier also provides a web API in addition to the GUI interface

## 1 POST: /api/users

- Register as a new user, passing in an email and password

## 2 POST: /api/login

- Login as an existing user.

## 3 POST: /api/predict

- Obtain a prediction.

## 4 POST: /api/history/<User ID>

- Add an entry to the history

## 5 GET: /api/history/<User ID>

- Get your prediction history

## 6 DELETE: /api/history/<User ID>/<ID>

- Delete an entry in the history



# Conclusion

## Value Proposition

- With the large choices of AirBNB listings, it can be difficult to tell which listing, out of so many, is the best value for your money.
- Rentier helps you decide which listings to target.
- For landlords, it can help give them a rough idea of the worth of their property before making a listing.

## Moving Forward

- Improvements to the model
- Expansion to other cities

## Learning Points

- Learnt how to use PyTest to test out new features
- Learnt the use of Git and GitLab for version control
- Learnt more about Flask and SQLAlchemy