

King County House Prices

Recommendations for Thomas Hansen

Kristin Sander, KS Real Estate, 27th January 2022

Outline

- Introduction
- General information about the data
- Data overview
- Hypotheses
- General results
- Insights and recommendations for the stakeholder
- Summary

Introduction

Kristin Sander

- Founder of KS Real Estate in 2020
- 3 employees, still increasing
- Characteristic: recommendations on data science basis
- Our motto: We don't want to work for you again!

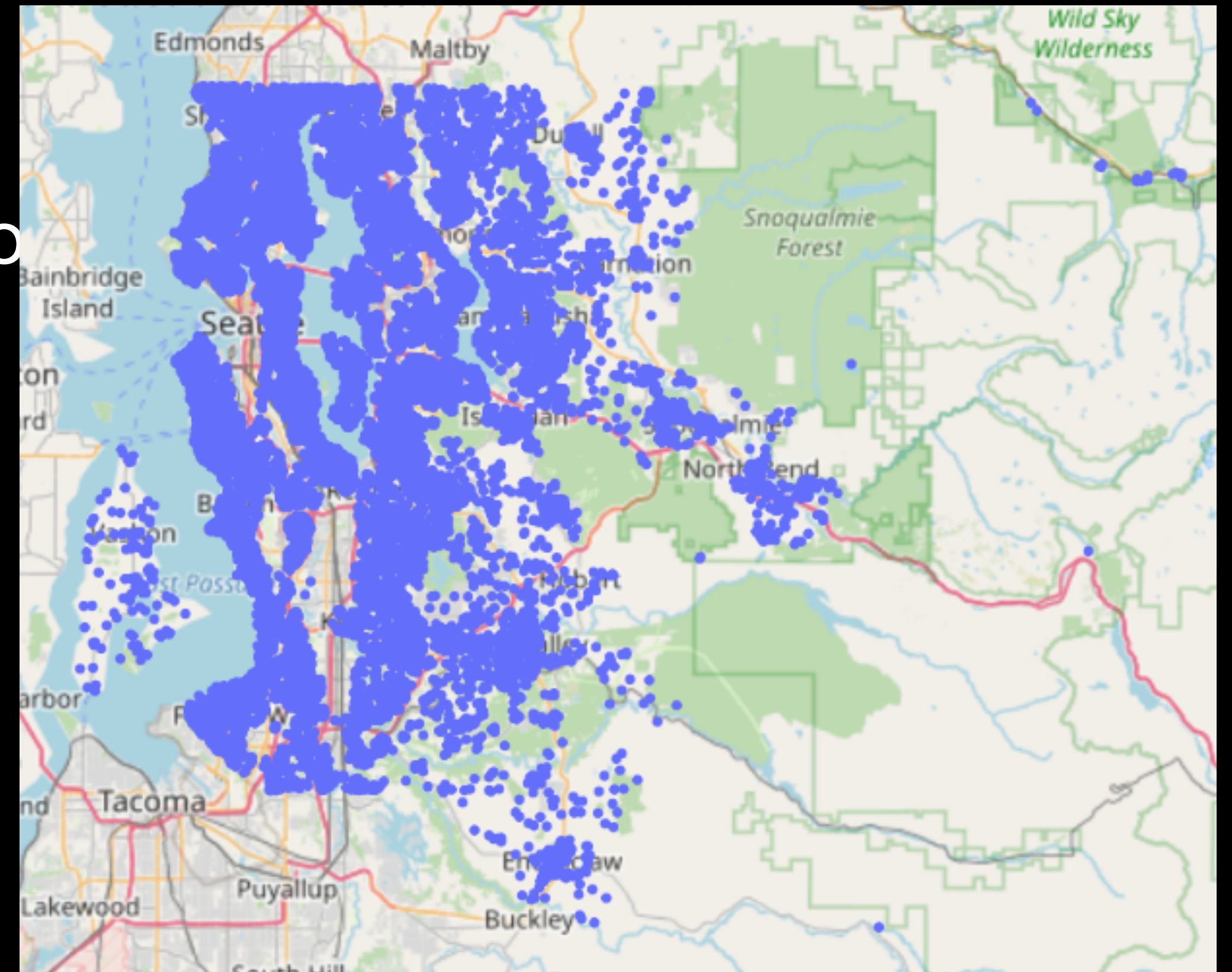
Introduction

Thomas Hansen

- Wants to buy a house in King County
- Requirements:
 - Not too expensive
 - Enough space for 5 kids
 - Nice (social) neighborhood
- Questions:
 - When to buy?
 - Where to buy?

General information about the data

- Topic: House sale prices
- Origin: [kc_house.data.csv](#) at [www.kaggle.com](#)
- Time span: May 2014 to May 2015
- Location: King County, including Seattle
- Size:
 - 21597 house sales
 - 21 information per house sale



Data overview

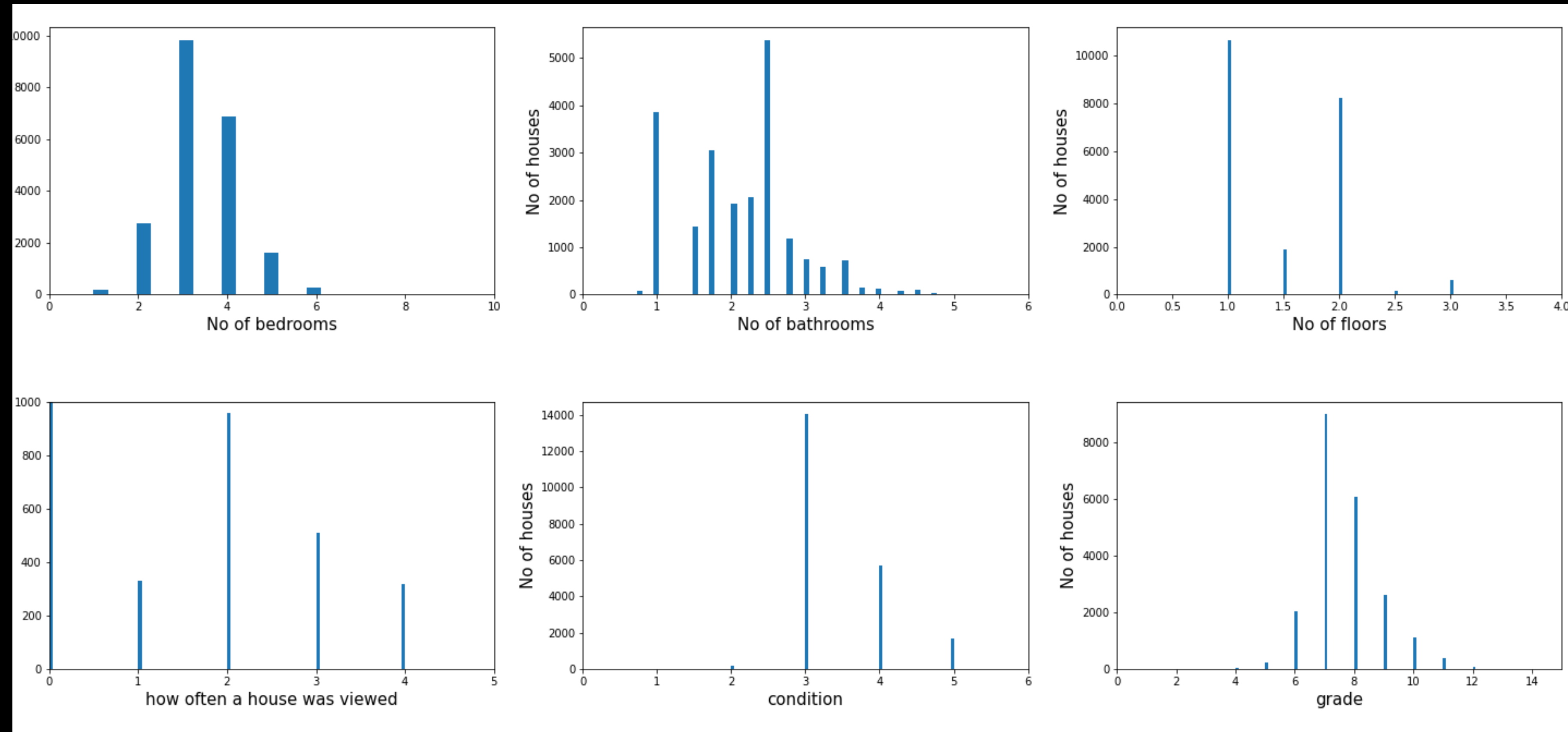
Kind of data

Category	Column name	Unity	Description
agency-related	id	-	unique identified for a house
	view	-	how often has the house been viewed
price	price	USD	is prediction target
time	date	-	date the house was sold
	yr_built	-	year when house was built
	yr_renovated	-	year when house was renovated
footage	sqft_living	squarefeet	square footage of the home
	sqft_lot	squarefeet	square footage of the lot
	sqft_above	squarefeet	square ootage of house apart from basement
	sqft_basement	squarefeet	square footage of the basement
	sqft_living15	squarefeet	square footage of interior housing living space for the nearest 15 neighbors
	sqft_lot15	squarefeet	square footage of the land lots of the nearest 15 neighbors
comfort	bedrooms	-	# of bedrooms
	bathrooms	-	# of bathrooms
	floors	-	# of floors (levels) in house
	waterfront	boolean	house which has a view to a waterfront
evaluation	condition	-	how good the condition is (Overall) (1-5)
	grade	-	overall grade given to the housing unit, based on King County grading system (3-13)
location	zipcode	-	zip
	lat	-	latitude coordinate
	long	-	longitude coordinate

- Missing data for:
 - waterfront
 - view
 - yr_renovated
- Cells with no information for:
 - sqft_basement
- Not optimal data types for:
 - Date: str
 - Price: float
 - sqft_basement: str
 - yr_renovated: float
 - Waterfront: float
 - View: float
- Some unexpected data types for:
 - bathrooms: e.g. 1.25
 - floors: e.g. 1.5

Data overview

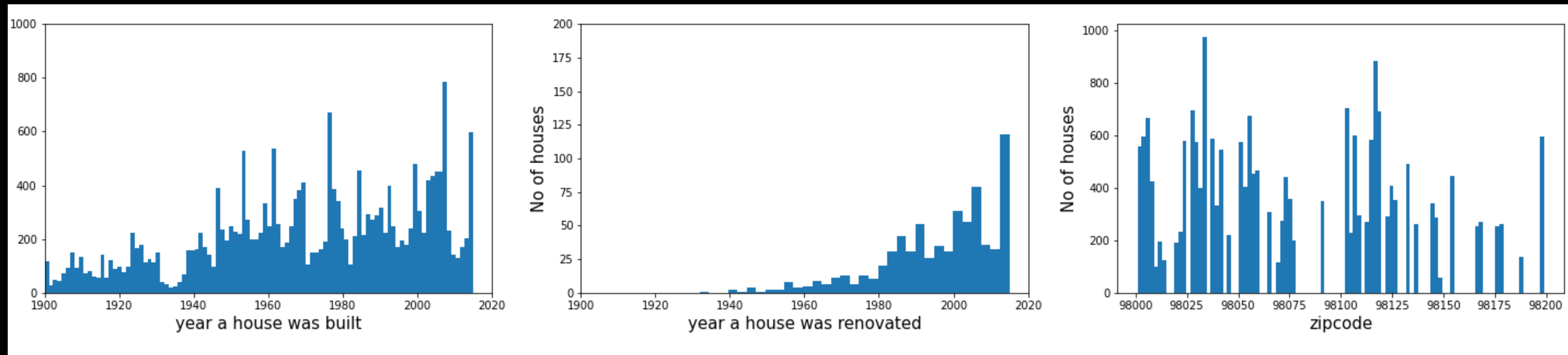
Something unexpected?



- Everything looks reasonable
- Many (19422) new houses on the market
- condition and grade show a comparable distribution

Data overview

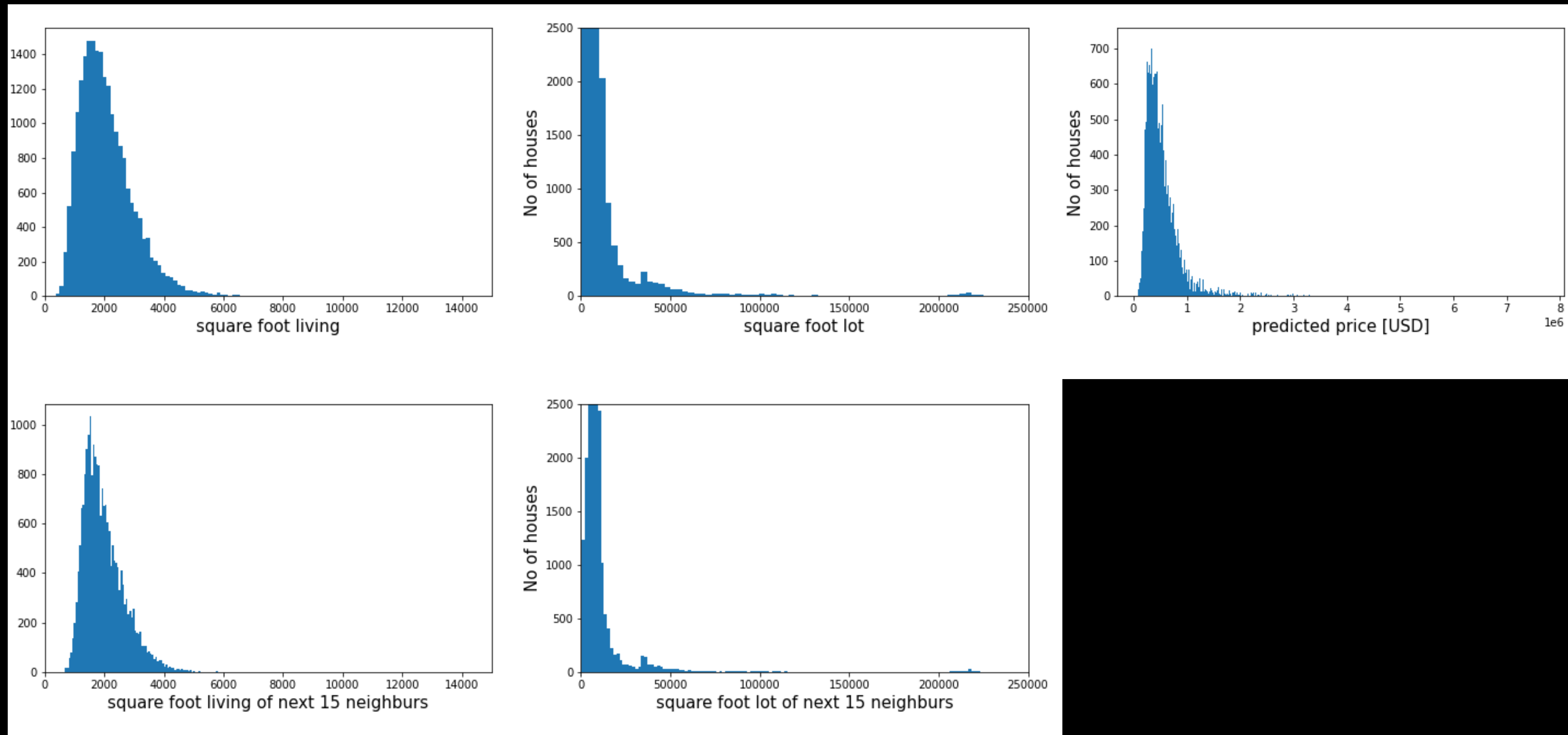
Something unexpected?



- Everything looks reasonable
- Number of new and renovated houses increases with time

Data overview

Something unexpected?



- Everything looks reasonable
- Comparable distribution for footages and price
- Only few really big houses / lots on the market

Hypotheses

General

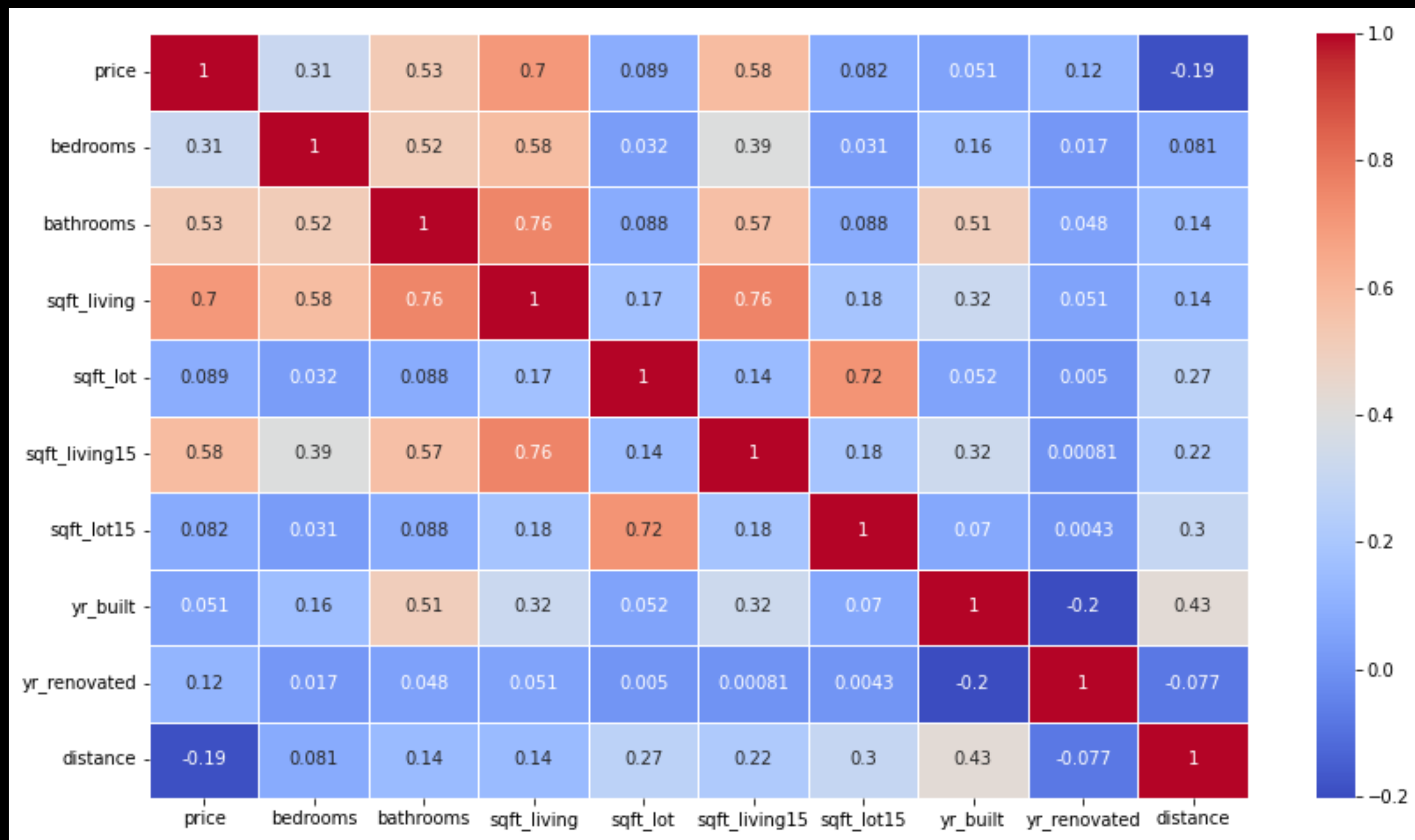
- Increasing house price with increasing square footage of house and lot?
- Decreasing house price with increasing distance to Seattle's center?
- Higher prices for newer and renovated houses?

Hypotheses for Thomas Hansen

- Cheap houses with more than 2 bathrooms and 3 bedrooms available?
- To have a nice neighborhood with many children:
Cheap houses with large neighboring houses available?
- Houses cheaper at a specific month?

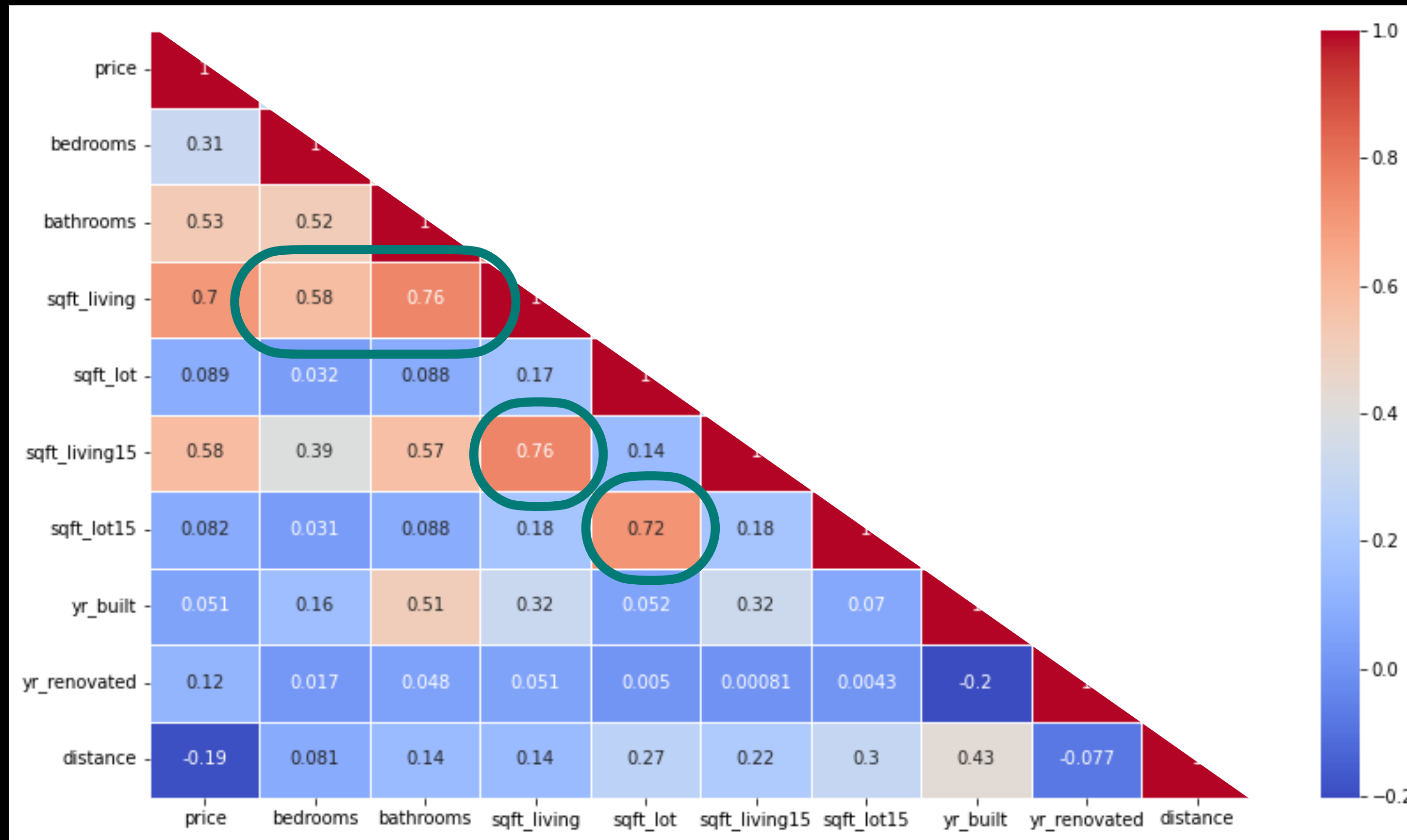
General results

Correlation heat map



General results

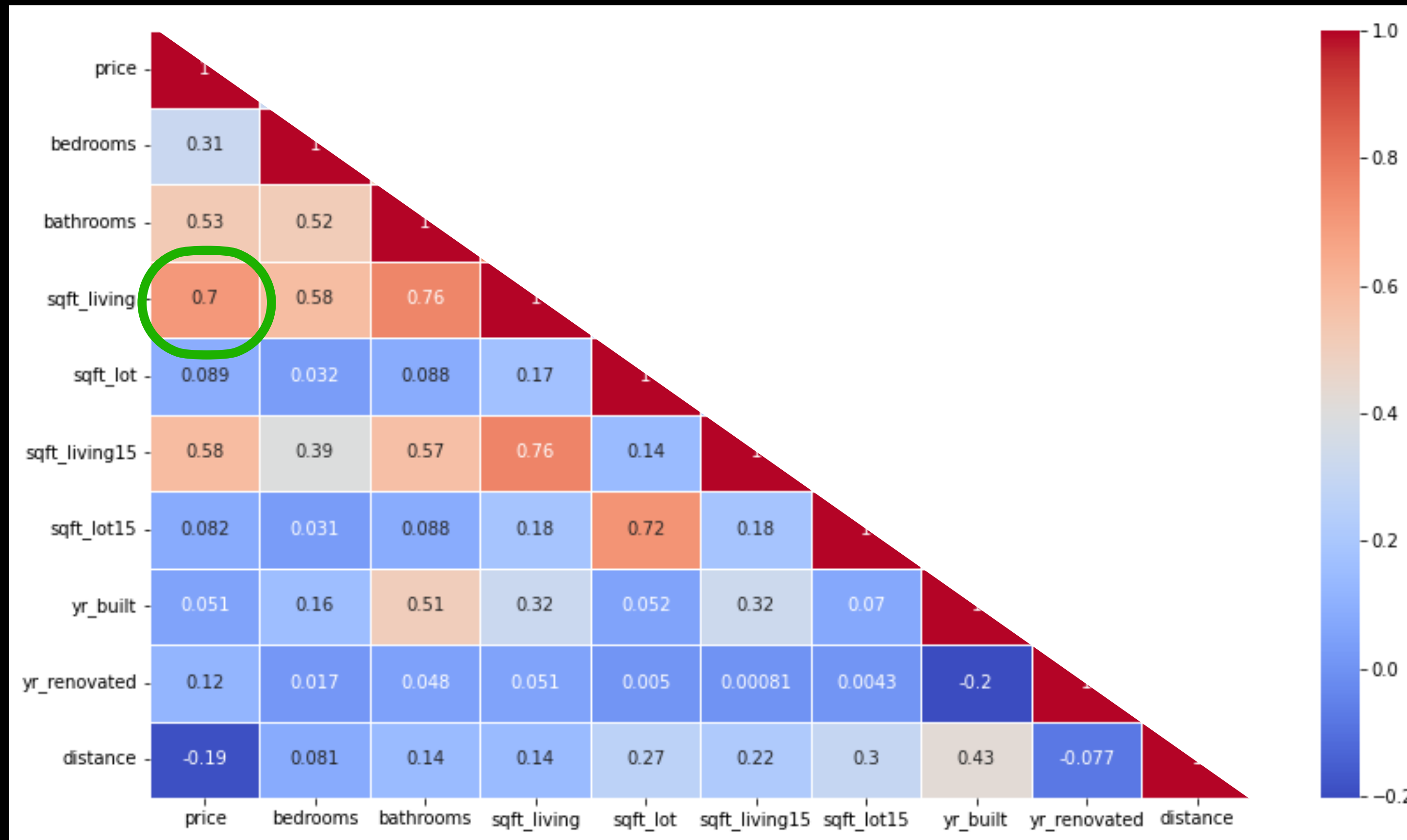
Correlation heat map - general



- Neighborhoods seem to be uniform concerning house and lot size
> maybe bad news for Thomas Hansen
- Large houses have many bed- and bathrooms

General results

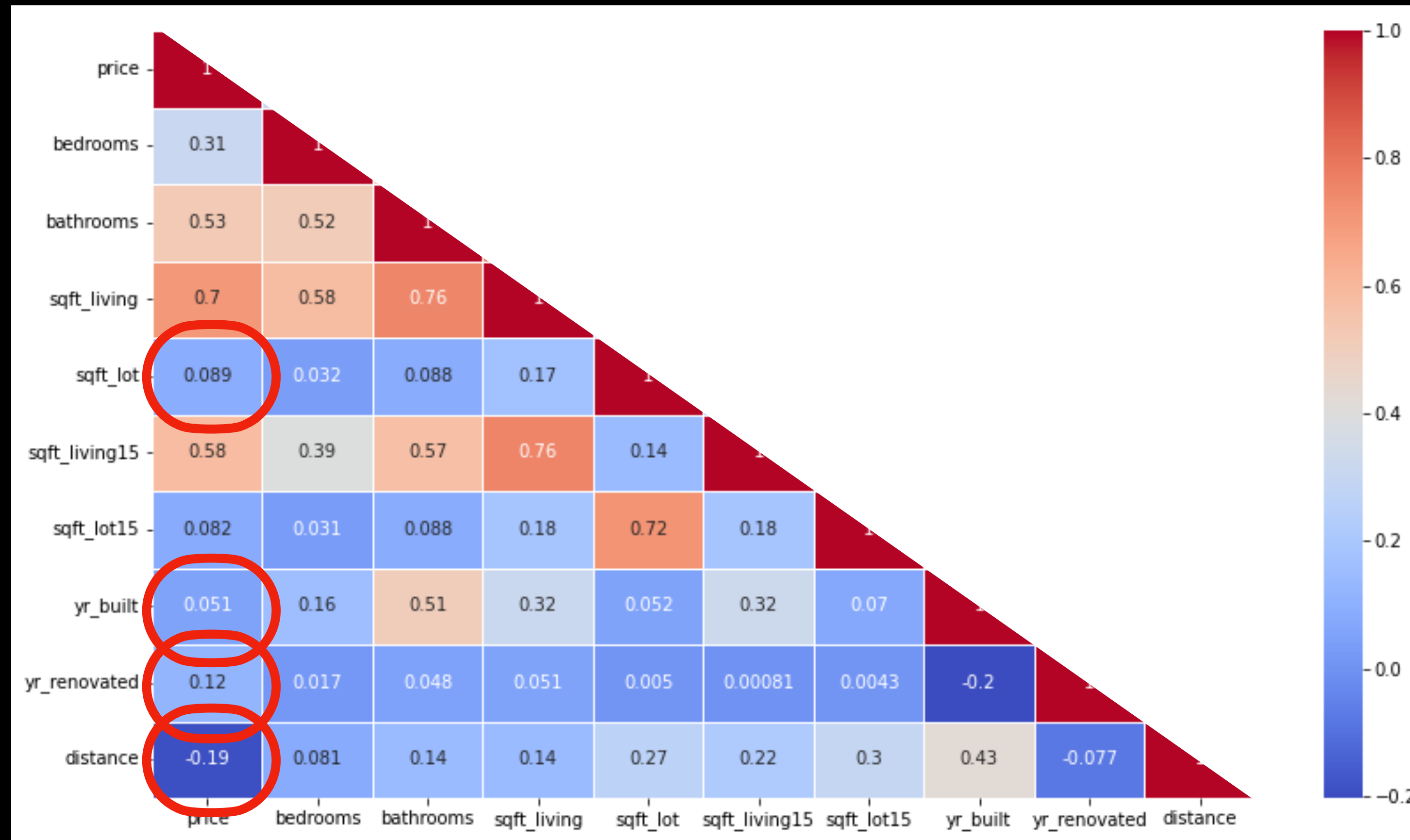
Correlation heat map - expected



- Neighborhoods seem to be uniform concerning house and lot size
> maybe bad news for Thomas Hansen
- Large houses have many bed- and bathrooms
- Correlation between price and footage of the house

General results

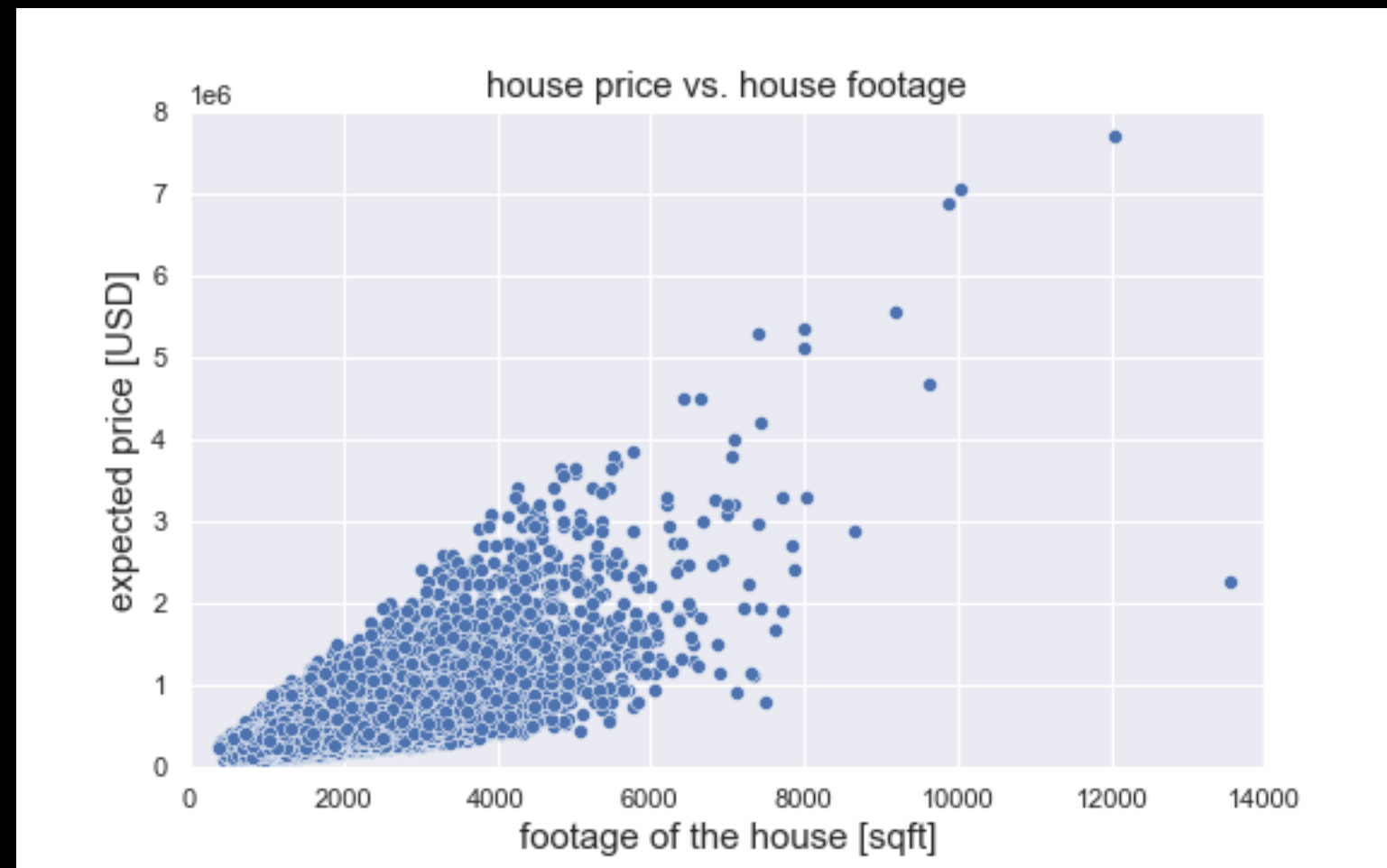
Correlation heat map - unexpected



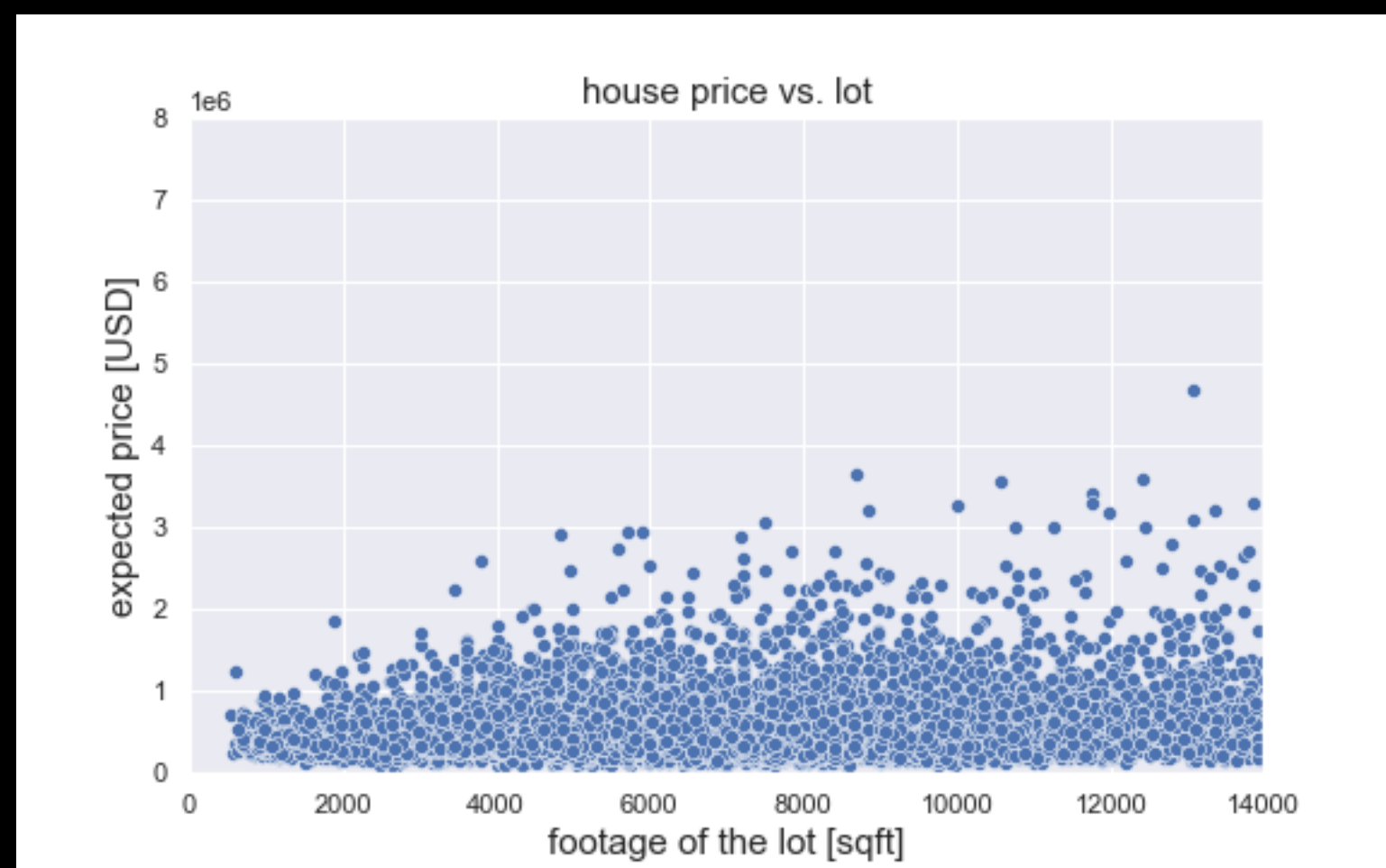
- Neighborhoods seem to be uniform concerning house and lot size > maybe bad news for Thomas Hansen
- Large houses have many bedrooms and bathrooms
- Correlation between price and footage of the house
- No correlation between price and
 - lot size
 - distance to Seattle's center
 - year of renovation > data cleaning needed
 - age of the house > deeper look into the data needed

General results - Hypothesis testing

Increasing house price with increasing square footage of home and lot?



- Increasing house price with increasing house footage
- But there are more impacts

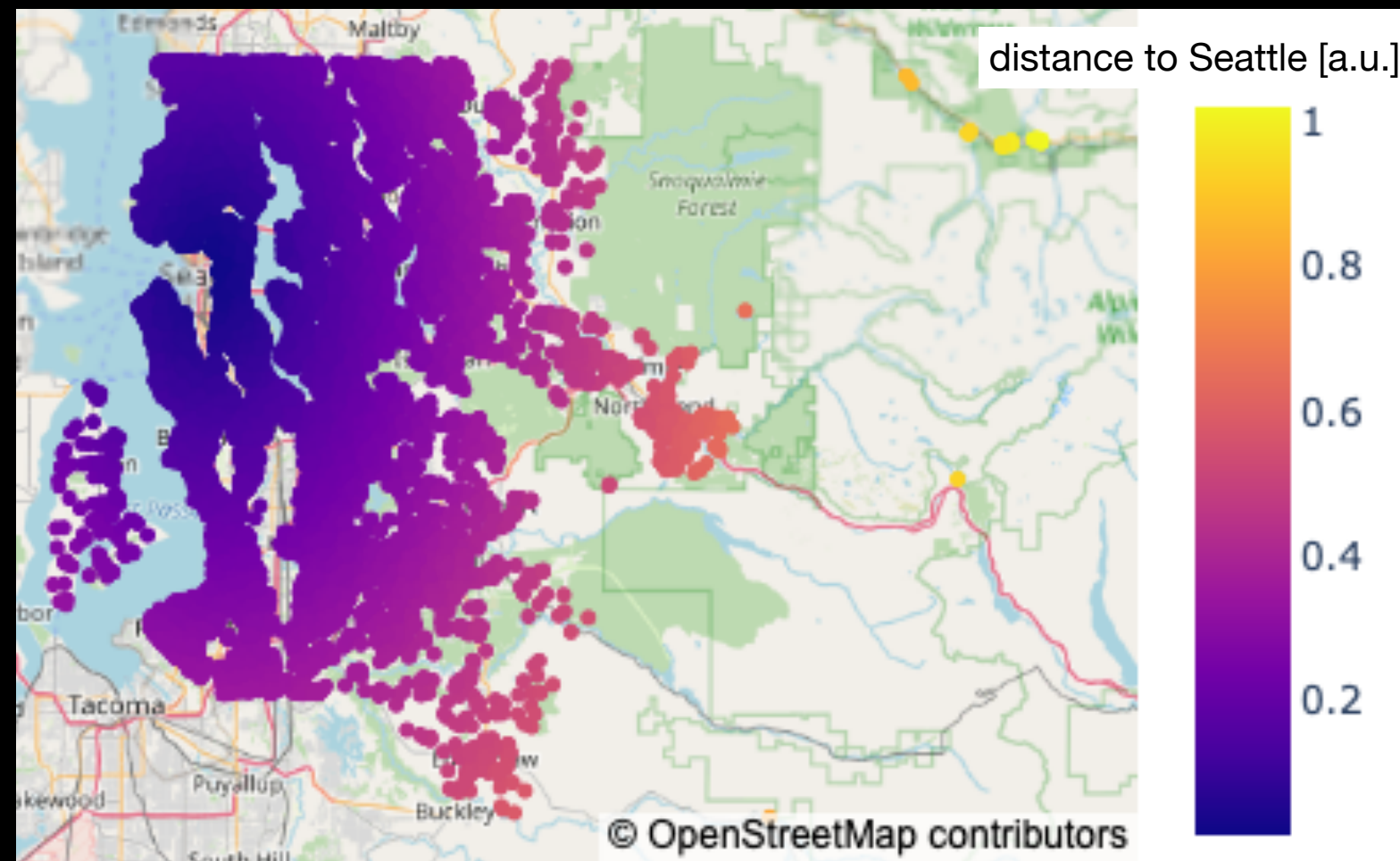


- No correlation between price and lot footage
- Houses are more valuable than lots!

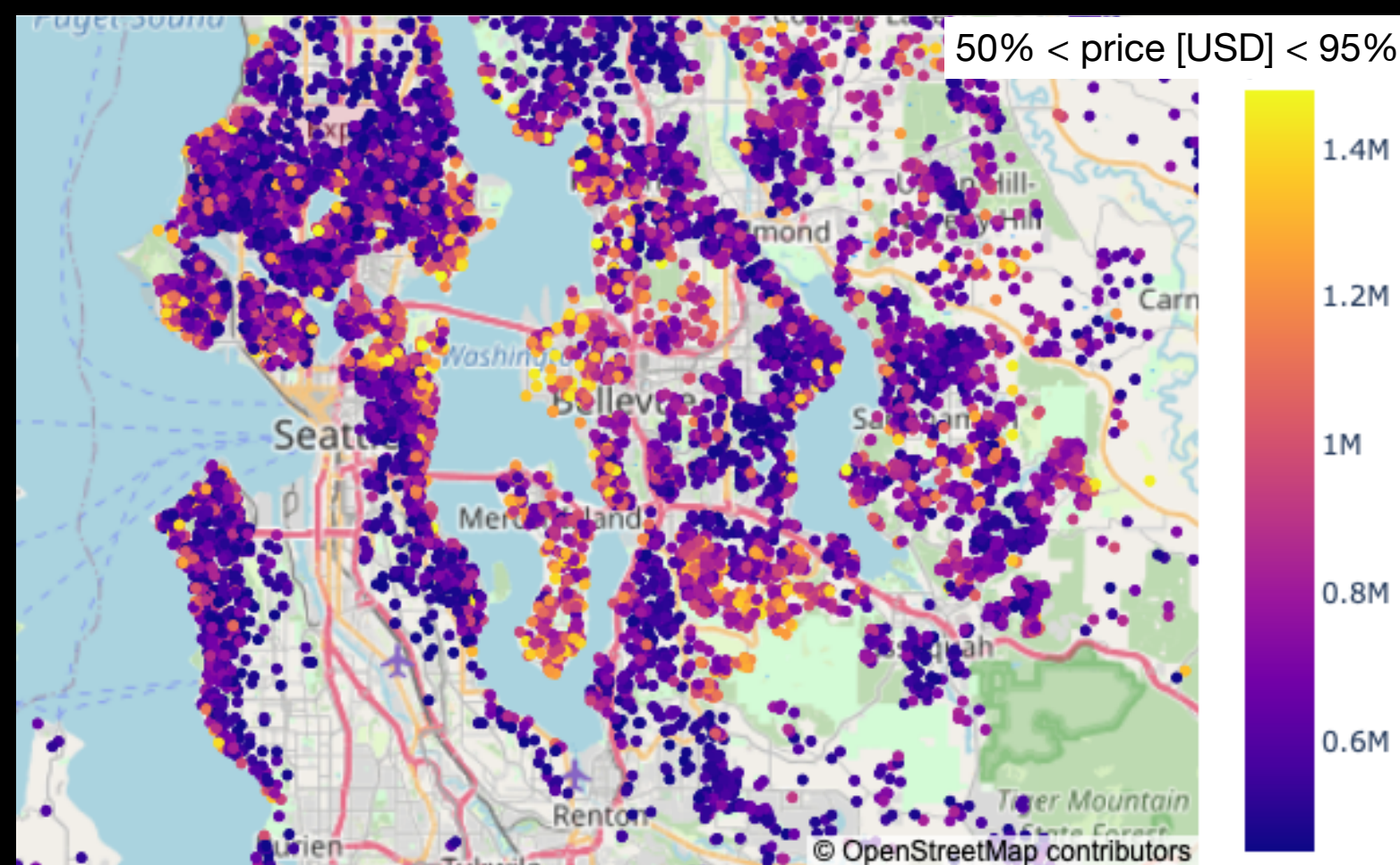


General results - Hypothesis testing

Decreasing house price with increasing distance to Seattle? **✗**



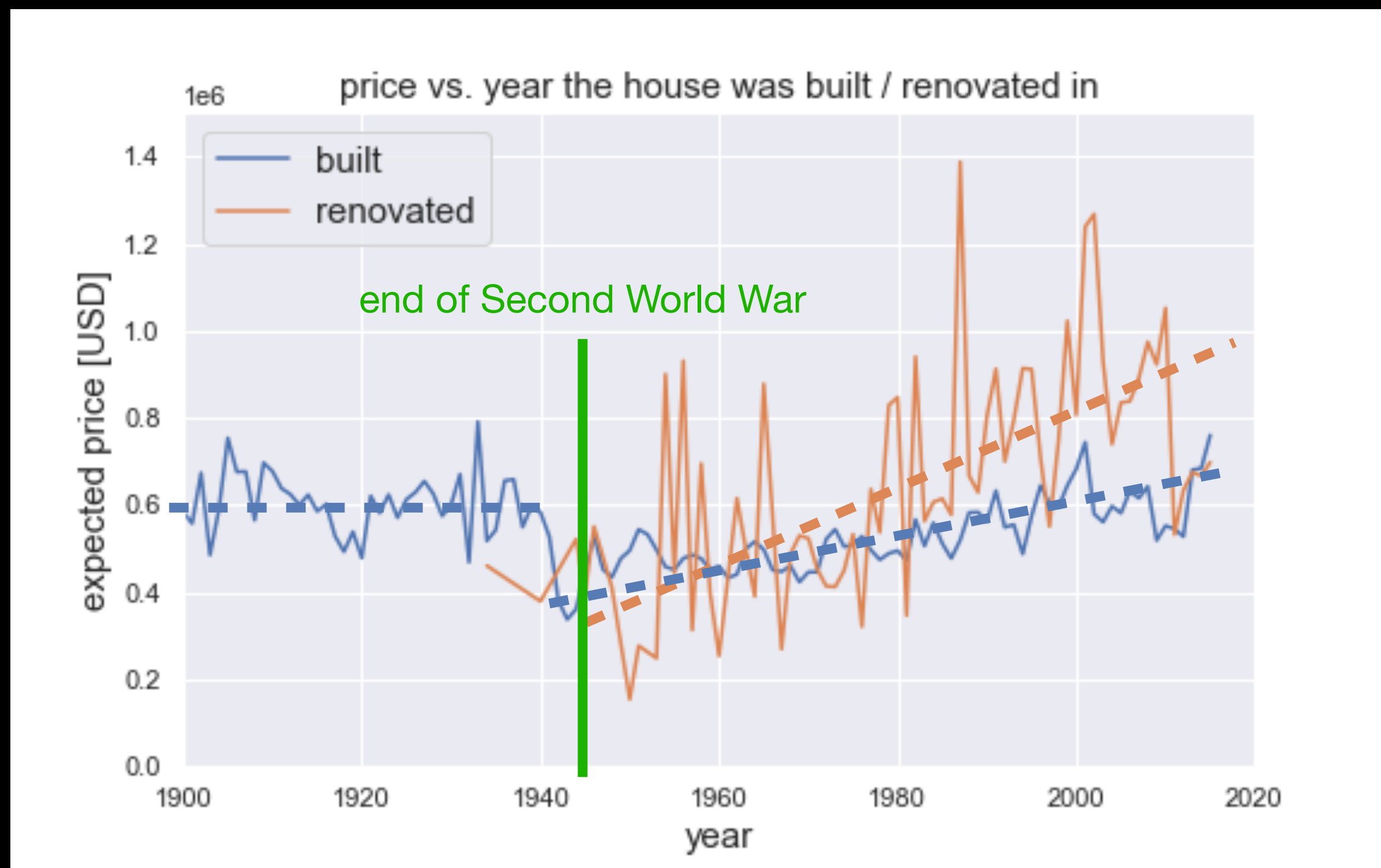
- Calculation was done properly



- Living close to the water, especially on an isle, is most expensive! **!**

General results - Hypothesis testing

Higher prices for newer and renovated houses?

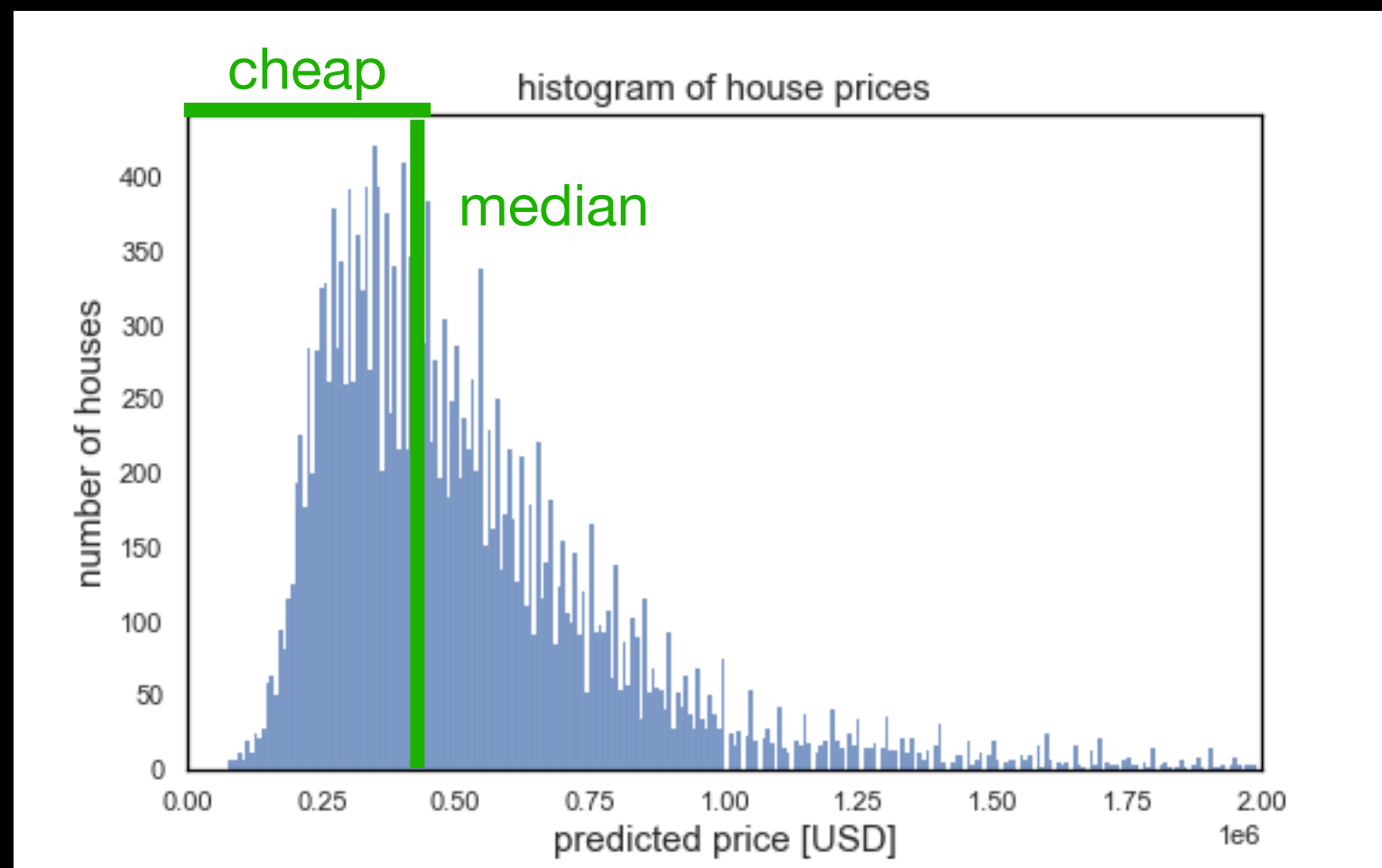


- After Second World War: increasing prices with increasing year the house was built and renovated, respectively
- Old houses (built before 1945) achieve continuously high prices!

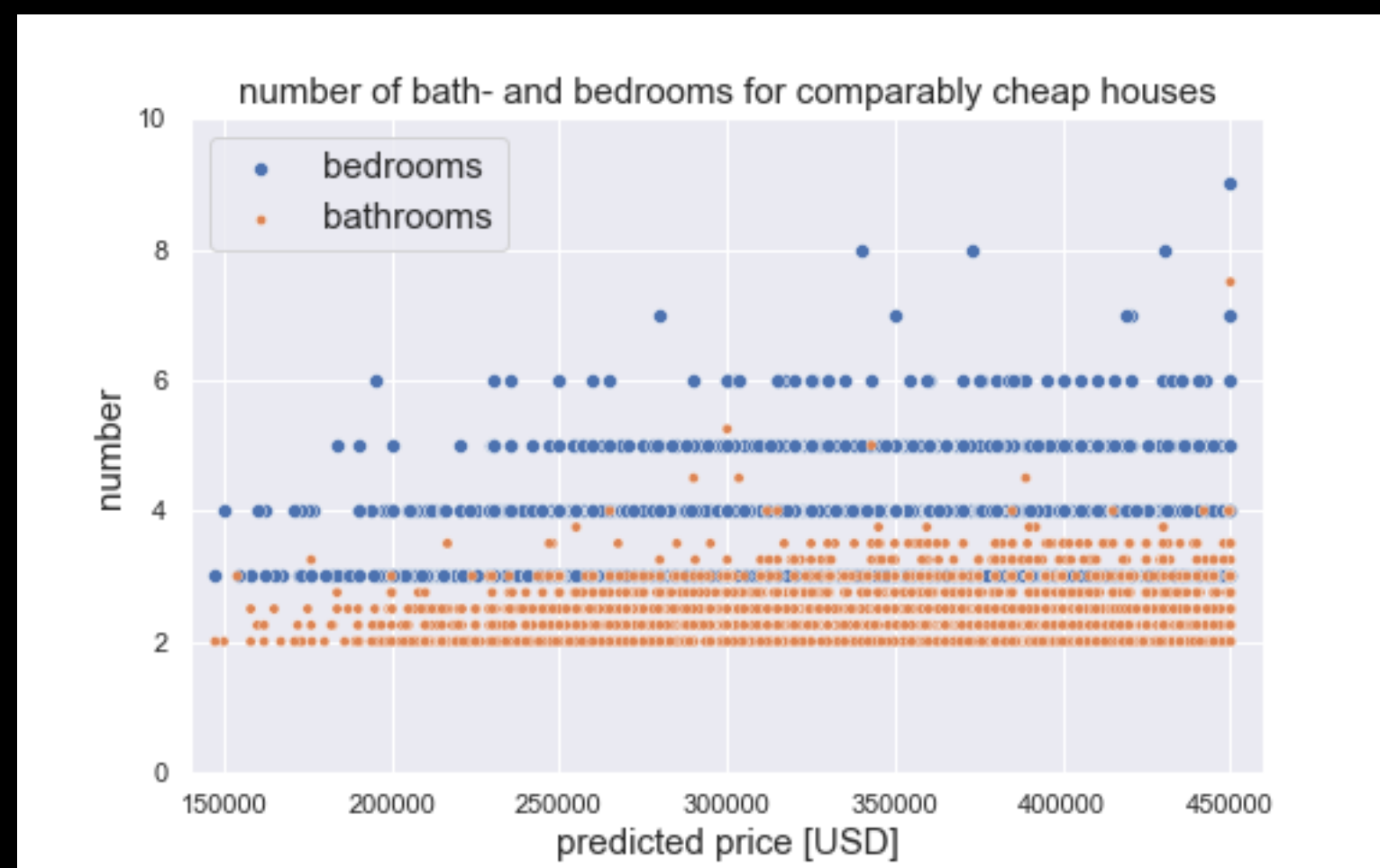


Insights and recommendations for Thomas Hansen

Cheap houses with more than 3 bedrooms and 2 bathrooms?



- Overall price range for houses in King County: (78.000 - 7.770.000) USD
 - Price histogram is right skewed
- > Focus on prices below median (450.050 USD) to keep a large selection

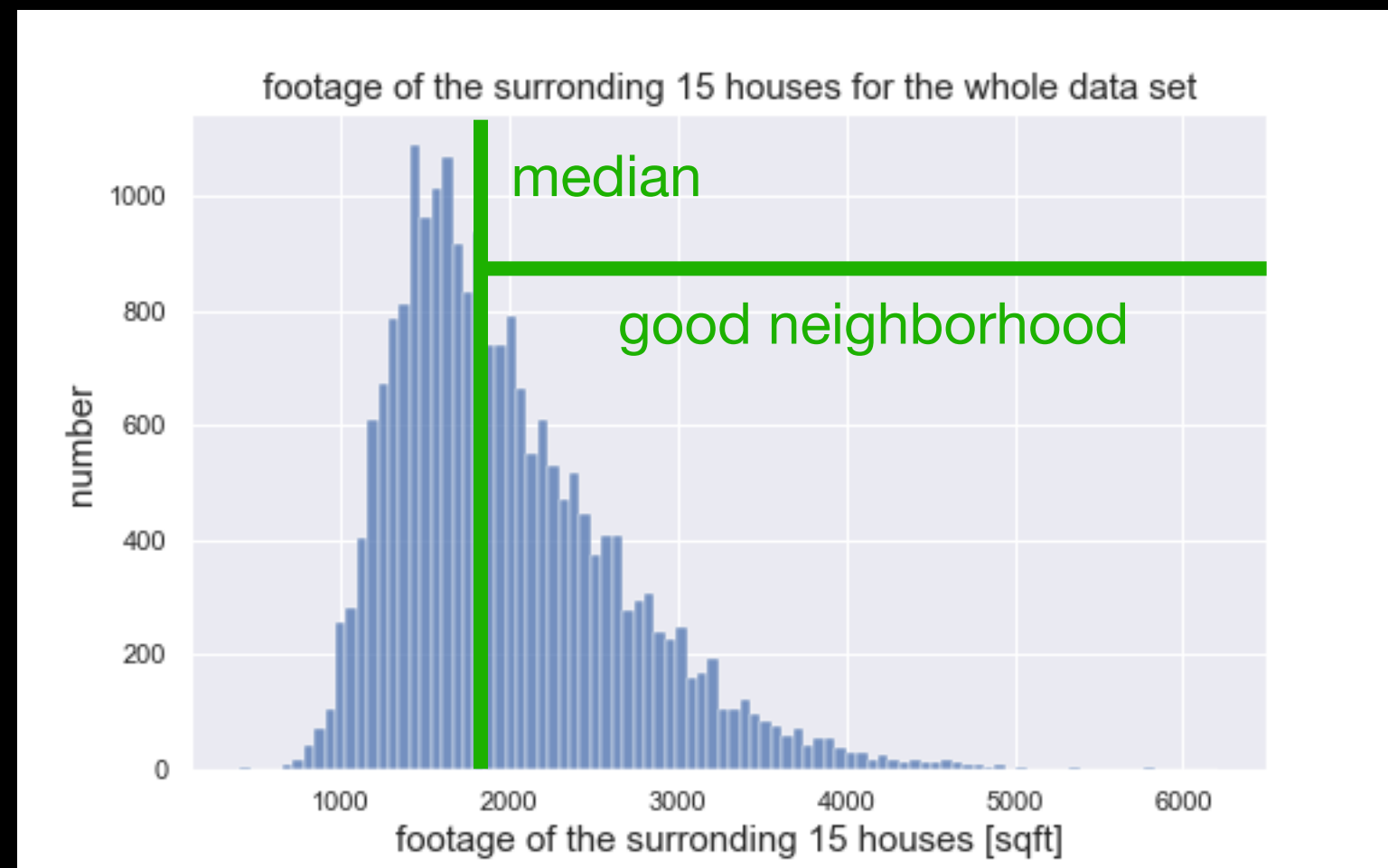


- 4650 comparable cheap houses with at least 3 bedrooms and 2 bathrooms available

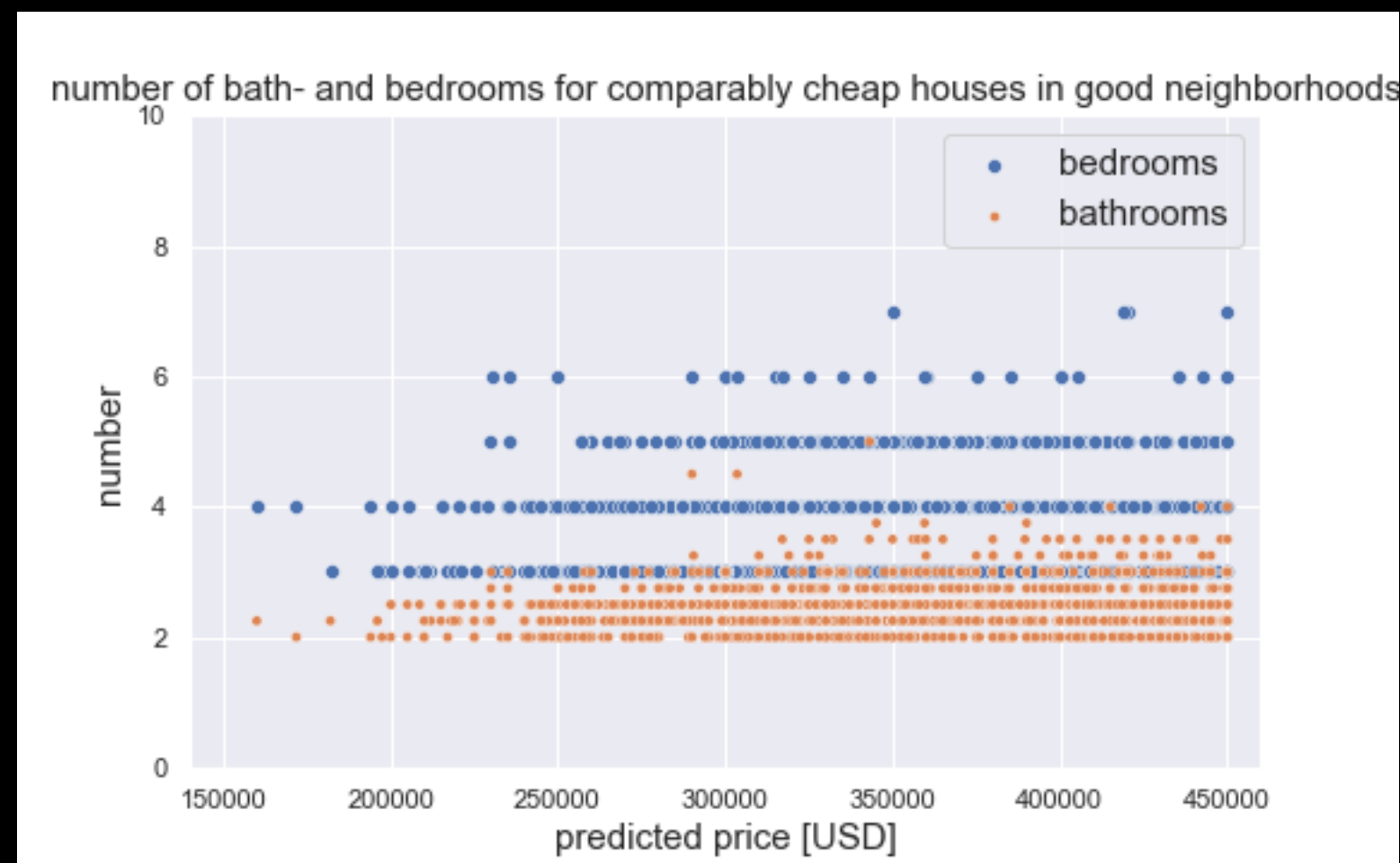


Insights and recommendations for Thomas Hansen

Cheap houses with good neighborhood?



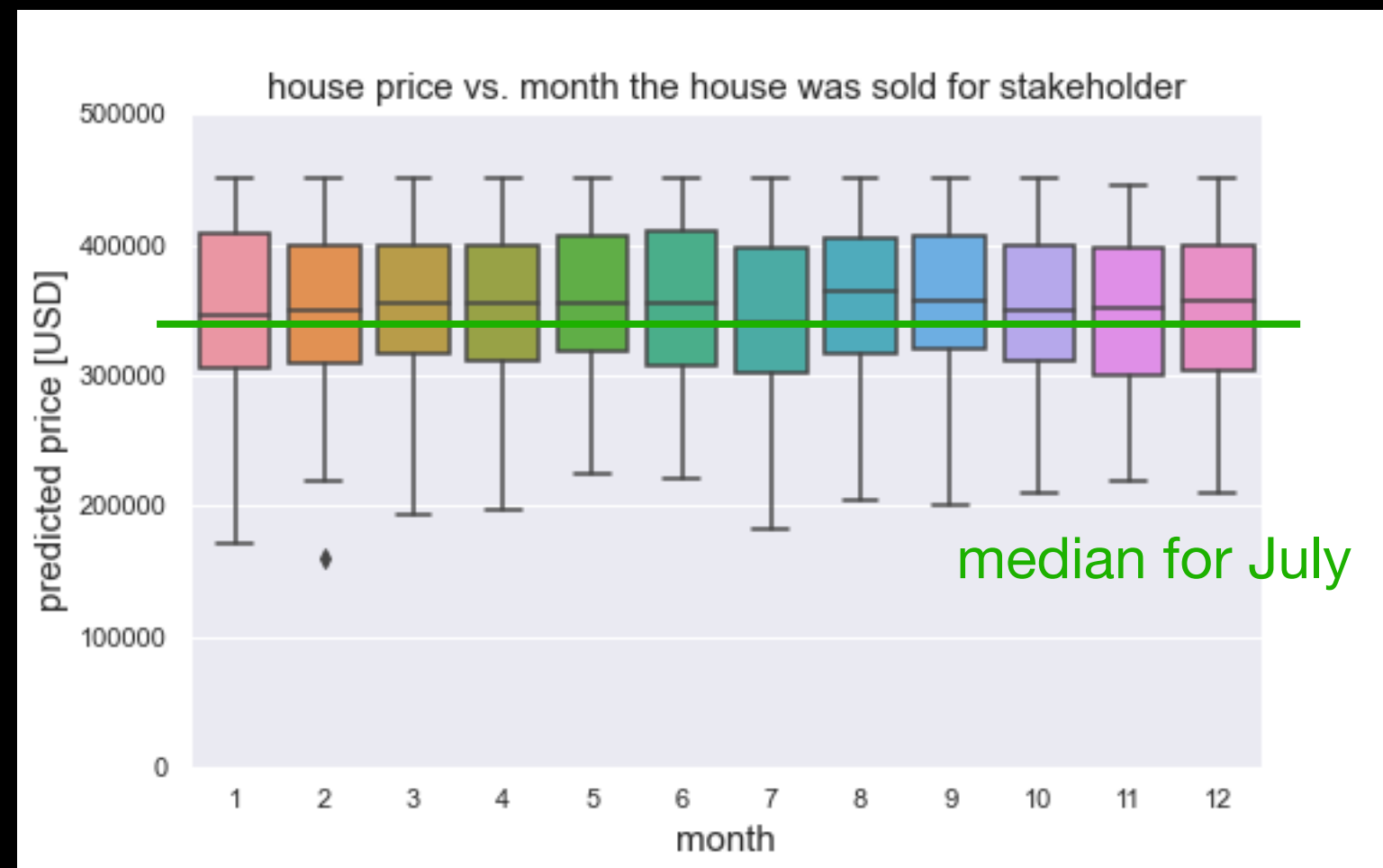
- Overall footage of surrounding 15 houses: (399 - 6.210) sqft
- Price histogram is right skewed
- > Focus on footages above median (1.840 sqft) to have an extraordinary good neighborhood



- 2364 comparable cheap houses with at least 3 bedrooms and 2 bathrooms available in a good neighborhood ✓
- But less really cheap houses

Insights and recommendations for Thomas Hansen

When to buy?



- Small impact of season on house price
- > Buy in July or January



Summary

General

- House prices depend on footage of the house, not of the lot
- House prices depend on closeness to water, not to Seattle's center
- Newer, renovated and very old houses are more expensive

Thomas Hansen

- 4650 houses for comparable prices with at least 3 bedrooms and 2 bathrooms
- 2321 of these houses have a good neighborhood with presumably many children
- Buy in January or July is recommended

