

# Analysis of the Hawaiian Islands

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## 1. Introduction

Hawaii, USA is known globally as tropical vacation islands. However closer to home it's reputation is known for being extremely expensive to live in. Out of 51 states (including District of Columbia) Hawaii is ranked 51 for [highest](#) cost of living. Hawaii's median house value is almost triple the national average at \$619,000. One thing that Hawaii ranks low in is land size. In the US it is the fourth smallest state.

Many people think Hawaii would be a great state to live in, and they are probably right. But with such high costs one wants to know the exact island they wish to move to before taking the plunge. Hawaii is comprised of over 130 islands, however this analysis will look deeper into the main 6 of them.

This report will answer the question of what Hawaiian island is the best to move to in terms of house prices and nearby venues. Investors as well as people wishing to move to Hawaii are my main stakeholders in the analysis. It will demonstrate which island has room to grow, and which one if any has seen its day.

## 2. Data

### 2a. Data Source

The data I have acquired for the analysis.

1. Zip codes and cities of Hawaii
2. Median house price for the cities
3. Longitude and latitude for each
4. Nearby venues for each

## 1. Zip Codes and Cities

I scraped the data off of <https://www.zipcodestogo.com/Hawaii/>. This source produced all 139 zip codes. With 3 columns comprising of zip code, city and county.

## 2. Median House Price

I exported my list of zip codes and cities and used [Zillow](#) to obtain the median house price for the zip codes. This value is “The median Zestimate valuation for a given geographical area on a given day.”

## 3. Longitude and Latitude

I found this information on this [website](#). This downloaded as an Excel file. It originally listed all zip codes across the country. I filtered out every state besides Hawaii.

## 4. Venue Data

For the venue data I accessed [Foursquare](#) API. I used it to search a radius around each city to collect all venues. I chose a radius of 1.5km. My first results using 500m turned up very little. However even with a 1.5km there are still a handful of cities with as little as 2 venues.

## 3. Methodology

### 3a. Creating and cleaning the dataset

First when collecting the house prices from Zillow a lot of the zip codes did not turn up data. This I concluded was because of two reasons. The first being the zip code mainly covered National Parks, therefore there was no housing data to be found. The second was with small, close neighboring cities some cities were recognized by a single zip code.

Next some cities have multiple zip codes and when merging the two tables I needed no duplicate cities. Most of the cities with multiple zip codes only returned one with housing data. So I deleted the one without any housing data. In the case of Honolulu a couple different zip codes returned housing data. I found the mean and used only one entry.

At this point I have two tables. I merge the two on the city column. The dataset is now **178 rows**. However they are incomplete with a lot of missing values. The columns I needed most for the analysis are **house price** and **latitude/longitude**. I then filtered out any row that was null for house price or latitude. The data was then comprised of **48 cities**.

	City	County	House Price	Latitude	Longitude
0	Aiea	Honolulu	704300.0	21.3865	-157.9232
1	Anahola	Kauai	590300.0	22.1455	-159.3151
2	Captain Cook	Hawaii	363800.0	19.4995	-155.8937
3	Eleele	Kauai	495600.0	21.9088	-159.5801
4	Ewa Beach	Honolulu	625100.0	21.3181	-158.0073

For the venue data I used Foursquare API. Making calls to the API I gathered all venues within a 1.5km radius of the given zip code. I limited it to 100 venues and the only city that reached that limit was Honolulu. Across 48 cities, **1277 venues** were found. There was a handful of locations that turned up 2 or less venue within the radius. I added a column with the total count of venues to the dataset.

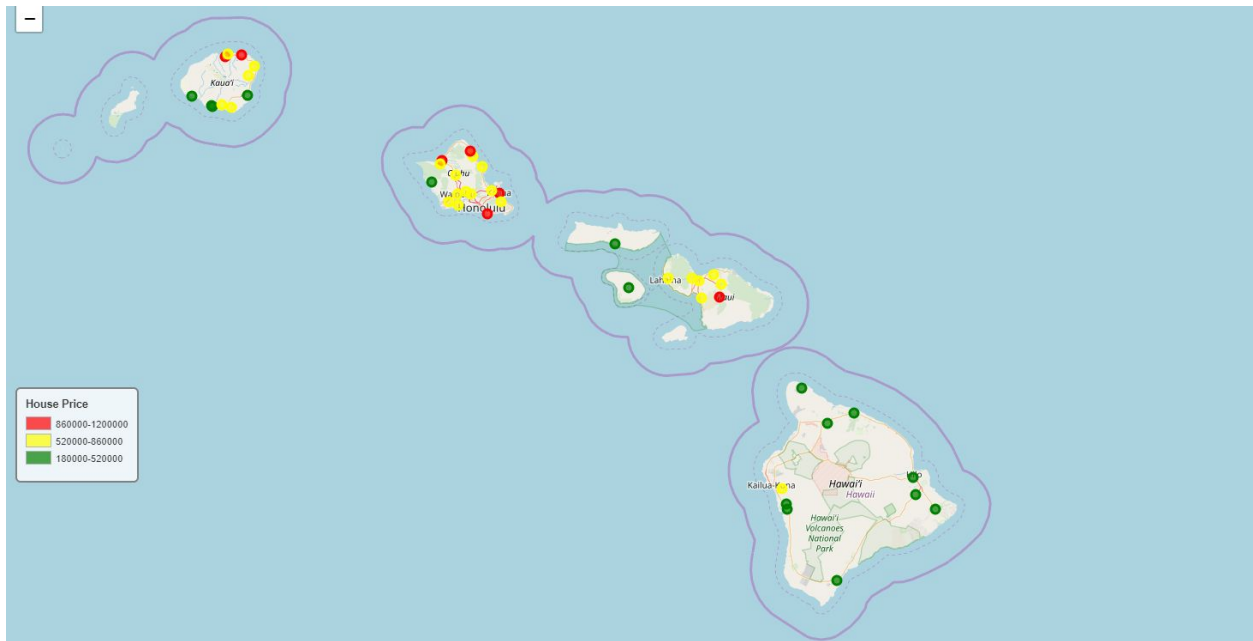
	Neighborhood	County	House Price	Latitude	Longitude	Venue
41	Waianae	Honolulu	422700.0	21.4569	-158.1759	3
42	Wailuku	Maui	576300.0	20.8834	-156.5059	38
43	Waimanalo	Honolulu	742700.0	21.3421	-157.7303	21
44	Waimea	Kauai	451900.0	20.0124	-155.6378	1
45	Waipahu	Honolulu	667000.0	21.3858	-158.0103	47

Next I sorted the venues by category and listed the top 5 most common venues found for each city.

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Aiea	Convenience Store	Fast Food Restaurant	Mexican Restaurant	Food Truck	Park
1	Anahola	Café	Spa	Burger Joint	Gift Shop	Beach
2	Captain Cook	Bookstore	Bed & Breakfast	Farm	Lawyer	Thrift / Vintage Store
3	Eleele	Dessert Shop	Boat or Ferry	Arts & Crafts Store	Gift Shop	Bakery
4	Ewa Beach	Fast Food Restaurant	Pizza Place	Home Service	Sandwich Place	Noodle House
5	Haleiwa	Food Truck	Ice Cream Shop	Surf Spot	Boutique	Board Shop
6	Hanalei	Beach	Food Truck	Seafood Restaurant	BBQ Joint	Pizza Place
7	Hanapepe	Boat or Ferry	Bakery	Arts & Crafts Store	Shopping Plaza	Bookstore
8	Hauula	Trail	Food	Surf Spot	Pharmacy	Grocery Store
9	Hilo	Convenience Store	Video Store	Planetarium	Asian Restaurant	None
10	Holualoa	Farm	None	None	None	None

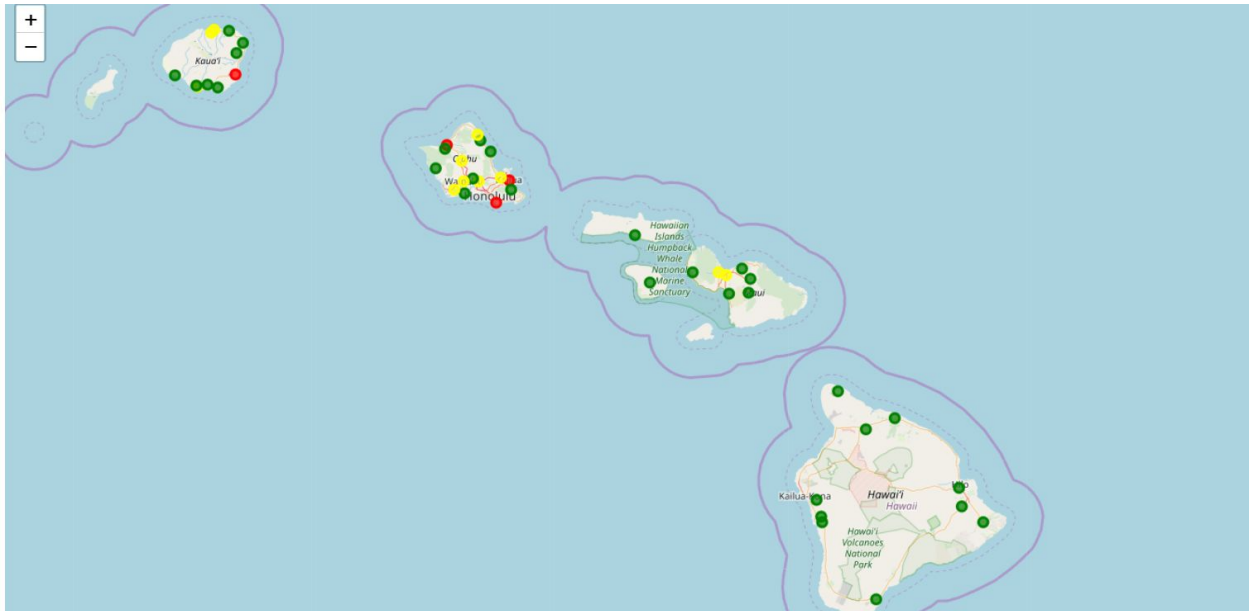
### 3a. Map the house prices

Visually I wanted to see if there was an island that overall had more affordable cities to purchase a house. For this analysis I used the Folium library. I categorized the house price column into low, medium and high. I calculated the minimum and the maximum house price. Which gave a range of (\$180,000-\$1,200,000). Then separated the house price column into equal bins.



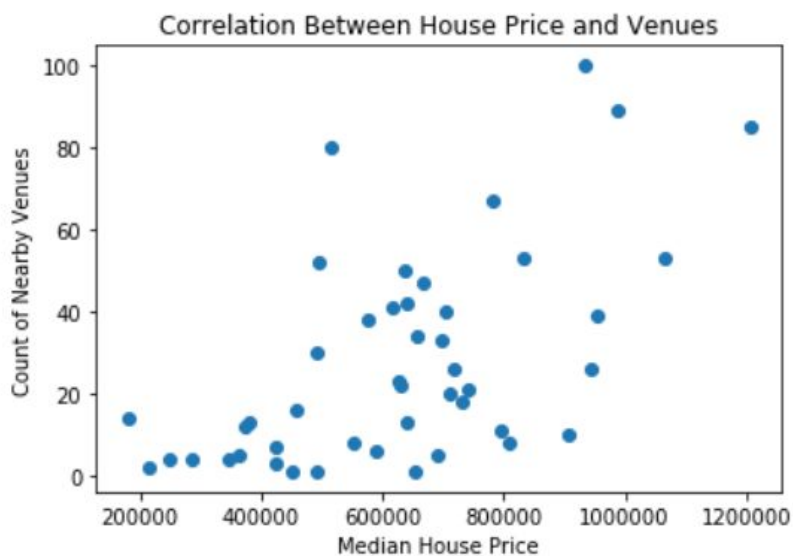
### 3b. Map the number of venues

I did the same with the number of venues for each city. Being able to visually see the count would give me an overall idea of each island.



### 3c. House price and venue correlation

I was interested to see that a handful of cities returned very little nearby venues in the radius. I was wondering if there was some correlation between a low house price and a low number of nearby venues. For this I created a scatter plot to visually see any correlation. I then computed Pearson's Correlation Coefficient, which was .587. This is considered a moderate correlation



## 4. Results

Finding the “best place” is an arbitrary term, so it is difficult to come to a precise conclusion. Many people describe “best” differently. Here are some conclusions that can be made from this analysis. The island of Hawaii has the most affordable housing on it while also the least number of venues. On the flip side is Oahu, this island has the most expensive housing and it is also the busiest. One explanation for this is the state’s capital is on this island, Honolulu. There are more affordable housing options on Kauai than Maui, but also has more venues.

## 5. Discussion

Some assumptions had to be made when creating this project. The biggest one being that only a single latitude and longitude were used for each city. It is unknown to me if these locations were central to the city, or how they were chosen. This could be a reason for the low number of venues in certain locations. Especially looking at Molokai and Lanai both of these islands have a single zip code and are not very large. It’s hard to get an overall idea of these islands with only one data point.

Also while the search for venues came up with smaller amounts it’s hard to say whether the terrain offers the opportunity for new developments. It looks like there is room to grow, but there are 8 National Parks across Hawaii and with such small land mass this takes up quite a bit of space.

## 6. Conclusion

It’s undeniable that Hawaii has a lot to offer, in terms of a beautiful place to live and a plethora of outdoor activities. However something that can’t be overlooked is the cost of houses as well as the remoteness of being on an island. This restricts what, when and how goods can be received. The good news is there are still affordable areas as well as quieter areas to relax and enjoy the island vibe.

Mahalo 🌴