(Best) Airbnb Team

MSBX 5410

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Introduction

Our team has analyzed and identified the cheapest and most expensive neighborhoods Denver has to offer based on Airbnb listings. The observations made can help Airbnb in isolating neighborhoods for improving listing price generation and number of listings in Denver. In addition, we will give our best prediction of what price a certain unit should be rented out for, and offer suggestions on what should be highlighted in its listing based on various analyses. Finally we'll cover what percentage of Denver Airbnb units are full time rental properties and give suggestions to boost their occupancy and profitability which benefits both owners and Airbnb itself.

Data Assumptions

The data utilized for purposes of this analysis was collected from Inside Airbnb, which utilizes public information obtained from the Airbnb website available at a particular point in time (March 29th, 2022), with the data verified, cleansed, analyzed and aggregated by Inside Airbnb and does not reveal sensitive information. The neighborhood names for each listing are compiled using the listing's geographic coordinates and compared to a city's definition of neighborhoods, with these definitions not changed by our team. All prices shown and analyzed are in USD.

Data Preparation

In order to properly analyze the data, we cleaned the data so that incomplete records would not affect our data analysis. We excluded 6.14% of the original rows of data, as there was incomplete and inconsistent data in these rows that would mislead our analysis. We also conducted primary market research with Garrett DiPasquale, a property owner who lists his home as a full-time Airbnb property in Austin, TX, which has a similar city profile and size to Denver. We incorporated his insights into our research, specifically how he handles pricing and what he highlights in his listings. Please see cleaned data in the appendix.

Denver Neighborhoods Overview

To identify the cheapest and the most expensive neighborhoods in Denver, the entire cleaned listings data was analyzed, independent of the type of rooms or the number of bathrooms/bedrooms available. Two methods were used to evaluate the cost of the listings. The first was calculating the average price per night

for each neighborhood based on the listing's price, while the second was calculating the average price per person for each neighborhood based on the listing price and the number of people a listing can accommodate.

The first method identified Cherry Creek as the neighborhood with the highest average price per night, with Montbello being the least expensive neighborhood. The second method identified Indian Creek as the most expensive and Harvey Park South as the least expensive. See Figures 1-4 in the appendix. Although the overall findings from the methods are different, it was observed that the most expensive neighborhoods are mostly located in Southeast Denver, with Southwest Denver generally being the cheapest. This clear distinction can be observed in the GeoSpatial Visualization in Figures 5 and 6 in the appendix.

It could be reasonably concluded from the analysis that Cherry Creek and surrounding neighborhoods have higher property prices, and hence a higher listing price, factoring in the costs associated with maintaining such a property. Additionally, it was discovered that neighborhoods near downtown typically had the most listings, showing where people visiting from out of town desire to stay.

Occupancy and Pricing Summary

Airbnb listings in Denver have a 54% occupancy rate on an average over the next 365 days. Popular Neighborhoods like Five Points have a relatively higher occupancy rate in Fall, as compared to the overall listings in Denver. While some listings in Denver, around the CBD area use a surge pricing in the summer months, most listings maintain a stable pricing, round the year.

Listing Charges Analysis

An analysis undertaken in order to calculate the charge per night to rent out the property in question involved statistical analysis in combination with a more straightforward breakeven approach, taking into account various factors, including monthly payments, cost of maintenance and predicted occupancy rate for Airbnb renters in the Five Points neighborhood.

For the breakeven analysis, using a key assumption that the purchase of the property would entirely be financed via a mortgage with no down payment and the provided information on the listings about monthly payments, we also factored in estimated utility and other costs related to the maintenance,

compliance, and hospitality aspects of the listing. Also factoring in analyzed occupancy rates for the Five Points neighborhood, we calculated that the owner of the property would need to charge $327/night, inclusive of cleaning fees and prior to the inclusion guest fees to Airbnb, in order to cover monthly expenses related to the property. This also factors in the standard Airbnb cut of a listing price of 3% to the host.[1] This estimate compares favorably to statistical analysis conducted by our team in relation to similar listings in the Five Points area as seen in the appendix in Figure 7.

With a wide range ($75 to $1109) of 'Price per Night' in the Five Points neighborhood, to understand the differentiating factor, a correlation analysis was performed on the variables available in the listings dataset. The Analysis indicated a strong, positive correlation between the number of bedrooms in the listing and the price per night as seen in the figure to the right**.** See Figure 8 in the appendix.

Based on this correlation analysis, the number of bedrooms listed in a property had a strong influence on the price per night as expected. Linear regression using the number of bedrooms was implemented to predict the price per night. From the results we see the model that prediction equation was identified as:

Price per night = (-46*09) + 132.42 (Number of Bedrooms)

Applying this formula, (Figure 9 in appendix) to the 3 bedroom listing in the Five Points neighborhood returns a suggested price per night of $351**.** Considering the property is newly renovated in the listings, the property owner should adjust the pricing accordingly to reflect the additional costs and luxury afforded to guests.

Listing Highlights

A free text analysis of the 26,563 past reviews available for the Five Points neighborhood indicate that guests predominantly regard the proximity of the location to the Downtown and cleanliness as the major selling points for the property. Please see word cloud analysis in Figure 10 in the appendix.

In addition, the neighborhood also has a high walkability score (90/10) and bikeability score (99/100), according to Zillow neighborhood ratings, allowing guests easy access to traverse the city. As Denver has a reputation for being an active town, these factors should be highlighted in the listing information. The

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[1] https://www.airbnb.com/resources/hosting-homes/a/how-much-does-airbnb-charge-hosts-288

listing is walking distance from the main Five Points shopping area on Larimer Street, filled with some of the trendiest shops, bars and restaurants in Denver, as well as being walking distance from Coors Field, a huge draw in the summer months. The listing is also close to Union Station, which provides train transportation to Denver International Airport, and Ball Arena, hosts of sporting events and concerts.

Denver Airbnb Listing Profile

In order to determine what percentage of Denver listings are listed full-time on Airbnb, for purposes of our analysis we had to make sure that the host had no opportunity to live at their listing in order to provide a conservative estimate. If the host's address didn't equate with the address of their listing, that would indicate the host doesn't primarily live at the listing. However, if the host has set the maximum rental days of the property at less than a year, that could mean the host lives there from time to time, and it wouldn't be considered a full-time rental property. Conversely, if the unit is available for rent for a year or more, and the host's address is the same as that of the rental unit, that could mean the host lives at the unit while it's being listed.

Following the logic above, for purposes of our conducted analysis, full-time rental properties are the listings where the hosts rent it out for a year or more AND the hosts have a different address than the listing address. By dividing this subset of listings by the total number of listings, we find out that roughly 35% of listings are full-time rental properties for purposes of this definition. Please see appendix for specific R code used to determine the occupancy.

These full time rental properties are losing a lot of revenue based on a low yearly occupancy rate of 54% (see Occupancy Data in appendix). Our suggestion would be to lower rental costs for these full time listings, improving occupancy by a higher percentage than the lowered costs, therefore increasing profit made per unit.

Conclusion

Our conducted analysis regarding Airbnb listings in Denver has revealed actionable insights in order to improve the overall Airbnb experience in Denver. Our analysis regarding the most expensive and cheapest neighborhoods in Denver can help isolate areas in which Airbnb isn't operating at an optimized level and can help adjust suggested pricing accordingly for these areas. In addition, we discovered which were the biggest draws for various neighborhoods in order to help homeowners determine which features to

highlight in listings, which benefits both Airbnb and the listing owners. Finally, our analysis into occupancy among Denver properties can shed some light on overall housing practices and could help owners determine pricing. Please see the appendix for a visual overview of our findings.

Appendix

Clean Data

Clean Data

Figure 1

neighbourhood_cleansed	Count	price_num
Cherry Creek	38	316.7368
Civic Center	47	271.1489
Cory - Merrill	14	260.5714
Overland	24	250.4583
Country Club	14	241.8571

Figure 1. (Price only in USD) Top 5 most expensive neighborhoods in Denver

Figure 2

neighbourhood_cleansed	Count	price_num
Montbello	14	67.92857
Southmoor Park	8	75.12500
Valverde	23	81.26087
Marston	5	90.00000
College View - South Platte	12	94.08333

Figure 2. (Price only) Top 5 cheapest neighborhoods in Denver

Figure 3

neighbourhood_cleansed	Count	price_per_person
Indian Creek	12	124.52083
East Colfax	37	93.58946
Overland	24	91.59417
Country Club	14	78.67000
Cherry Creek	38	63.67079

Figure 3.(Price per person) Top 5 most expensive neighborhoods in Denver.

Figure 4

neighbourhood_cleansed	Count	price_per_person
Harvey Park South	9	21.90556
Mar Lee	19	23.12947
Barnum	15	24.48533
Valverde	23	26.14565
Marston	5	26.33200

Figure 4.(Price per person) Top 5 cheapest neighborhoods in Denver.
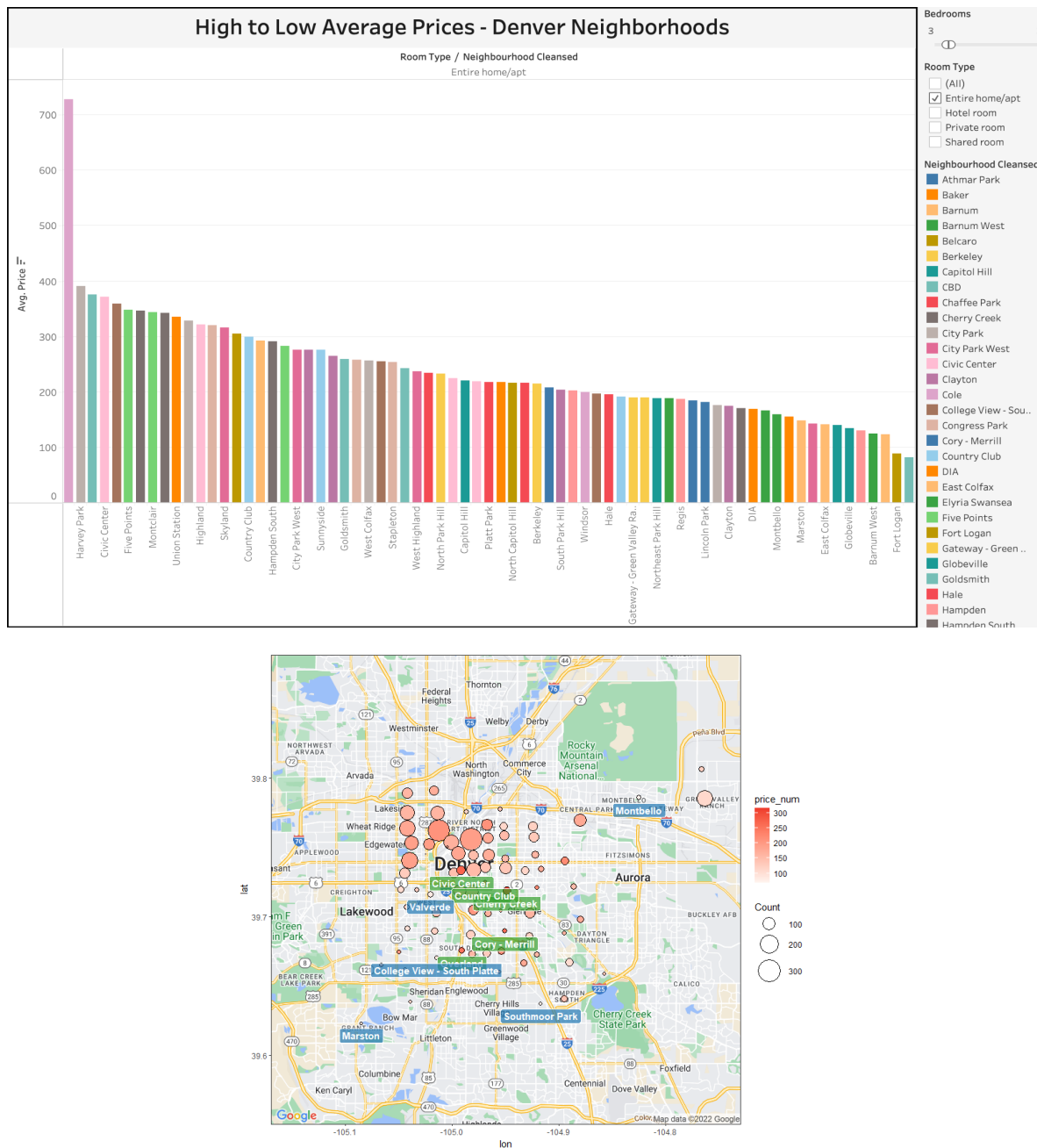
Figure 5

Figure 5. (Price only) Labeling the most expensive/cheapest neighborhoods on the map, with poing color mapping with price and point size represent the count of the listing in each neighborhood. The darker the red, the more expensive the neighborhood.
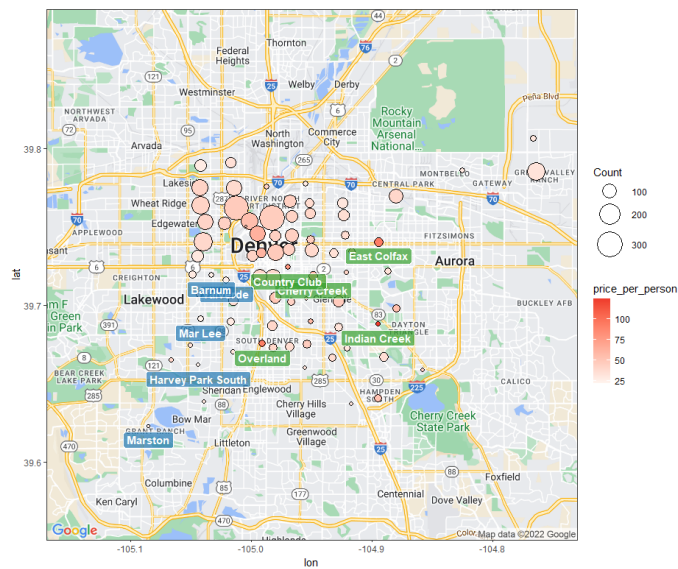
Figure 6

Figure 6. (Price per person) Labeling the most expensive/cheapest neighborhoods on the map, with poing color mapping with price and point size represent the count of the listing in each neighborhood. The darker the red, the more expensive the neighborhood.
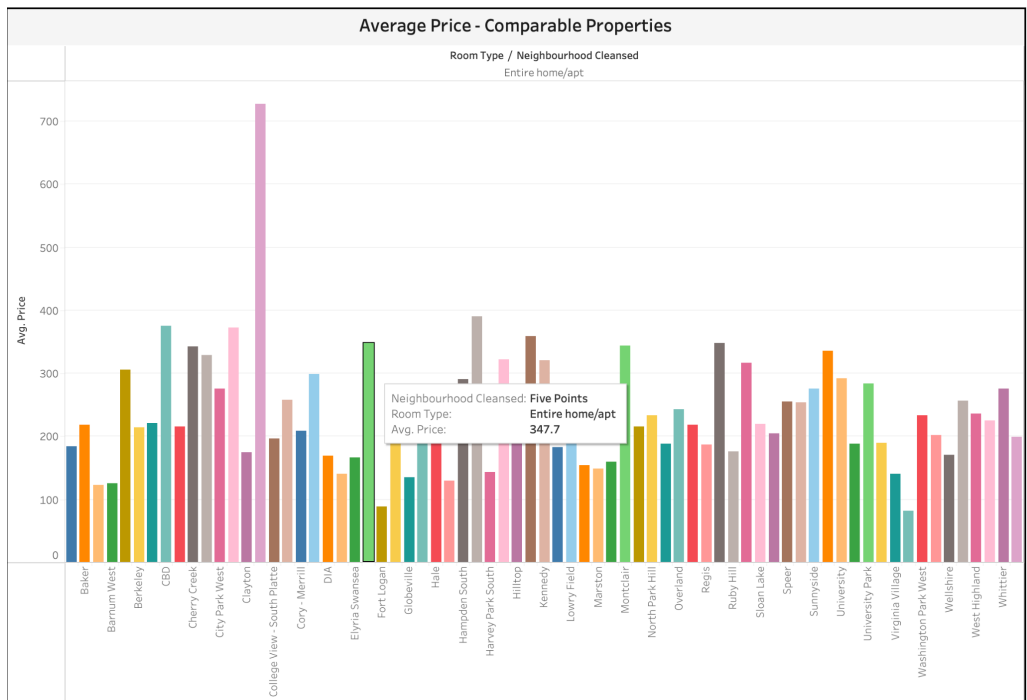
Figure 7

Figure 7. The average price per neighborhood of a listing that is an entire house or apartment.
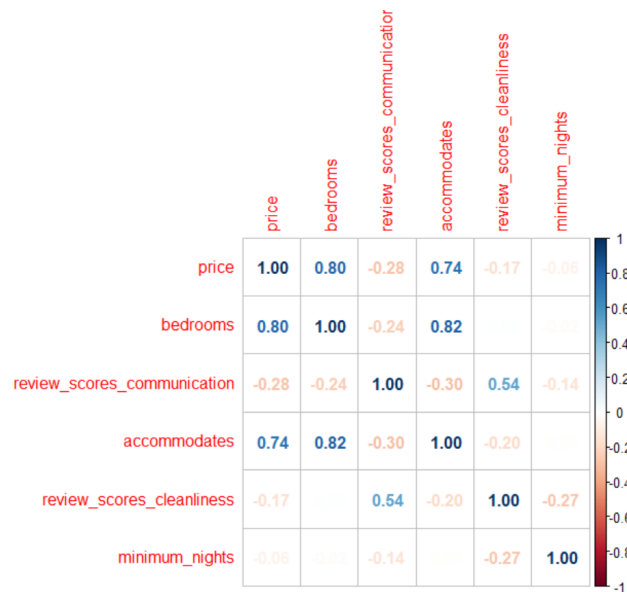
Figure 8

Figure 8. The correlation between various features of an Airbnb listing in Five Points, Denver.
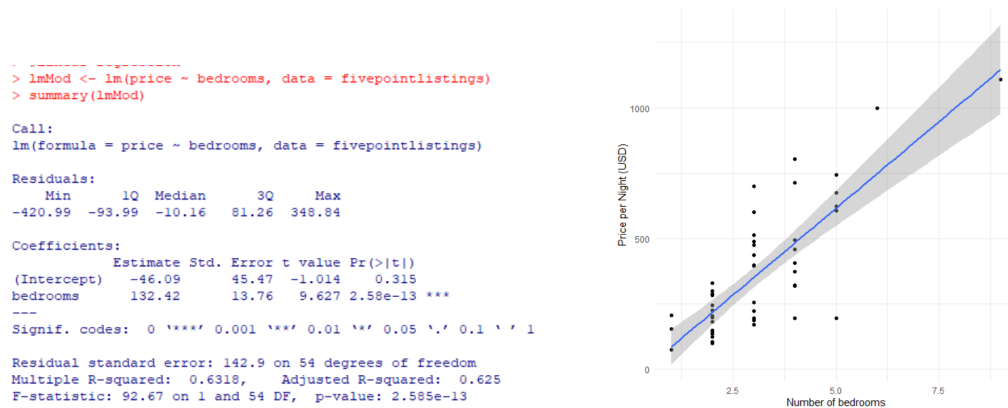
Figure 9

Figure 9. Linear regression Analysis to predict the Price per night using Number of bedrooms as the independent variable.

Figure 10

Figure 10. Text Analysis of the Survey Comments for the Five Points neighborhood.

Additional Supporting Information

Code Utilized
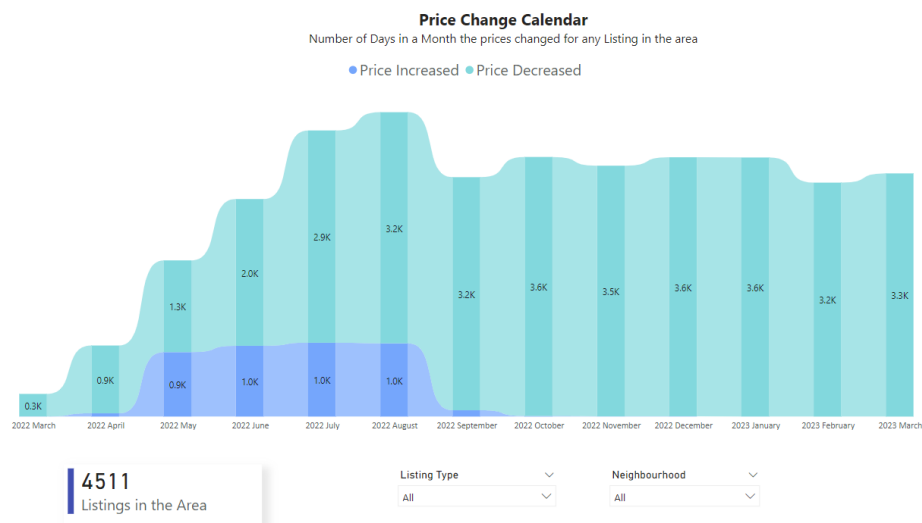
Q1 Code

Q6 Code

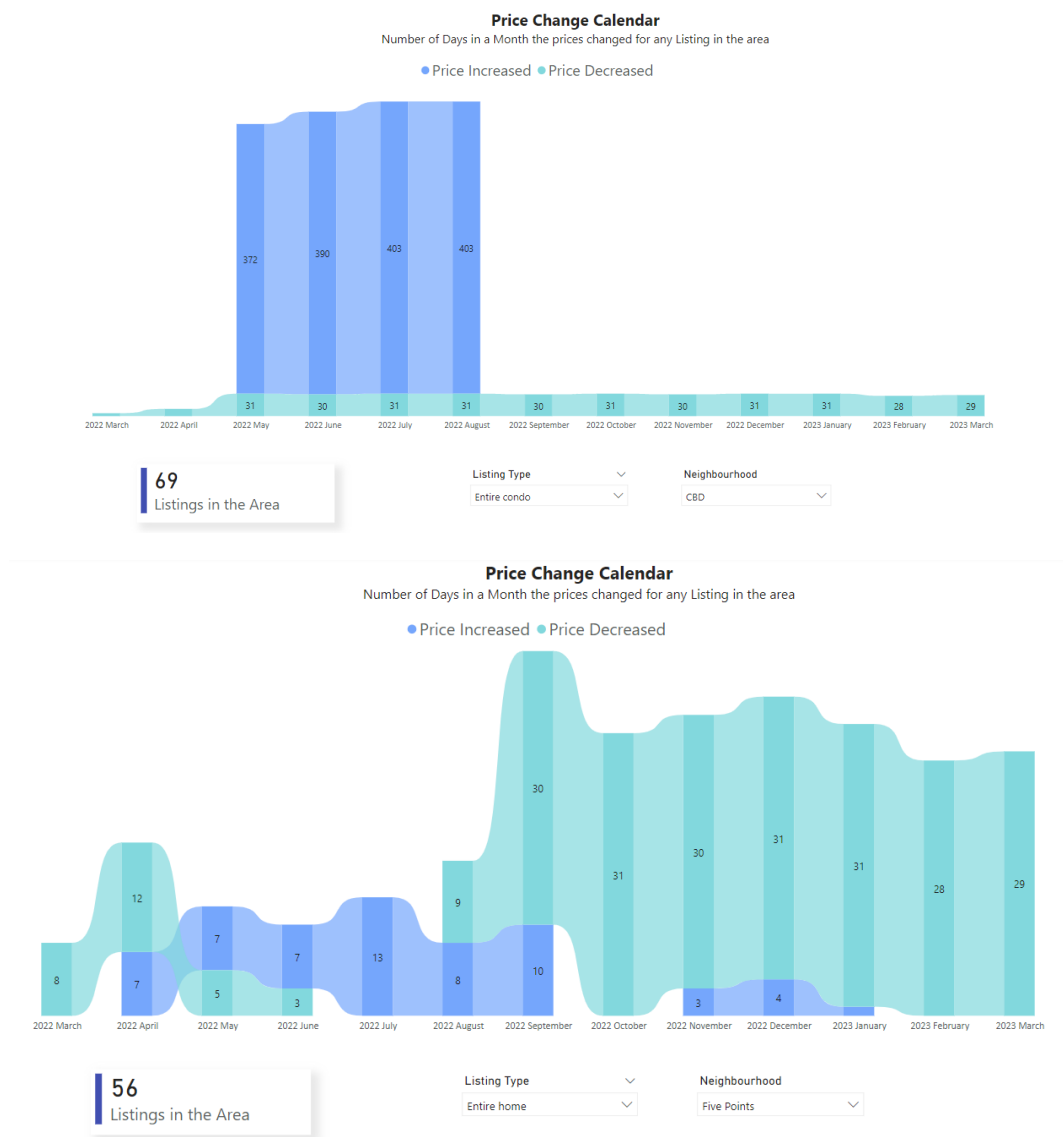**Overall Descriptive Statistics**

There are a total of 4,512 listings in the Denver area, with "Entire Home" being the most popular property type (24% of the total listings). Below are the descriptive statistics (rounded) of the overall listings:

- Mean listing price - $164
- Median listing price - $124
- Mode listing price - $ 91
- Range - $0 to $4,950 (Considering the price is listed as per night, lower and upper range of values are likely to be errors in the data collection/listing process)

Dynamic Pricing

Dynamic pricing in the Denver area is largely focused on decreasing prices. The Five Points neighborhood has seen mostly price reductions for a few months since the data was collected, with increases limited to the summer months and to "Entire House" listings. Surge pricing has only been seen to be applied significantly for CBD-area condos for the summer months. Please see diagrams below.

Price Change Calendar
Number of Days in a Month the prices changed for any Listing in the area

● Price Increased ● Price Decreased

		372	390	403	403							
		31	30	31	31	30	31	30	31	31	28	29
2022 March	2022 April	2022 May	2022 June	2022 July	2022 August	2022 September	2022 October	2022 November	2022 December	2023 January	2023 February	2023 March

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Listings in the Area

Listing Type ∨
Entire condo ∨

Neighbourhood ∨
CBD ∨

Price Change Calendar
Number of Days in a Month the prices changed for any Listing in the area

● Price Increased ● Price Decreased

	12	7	7	13	30	9	31	30	31	31	28	29
8	7	5	3		8	10		3	4			
2022 March	2022 April	2022 May	2022 June	2022 July	2022 August	2022 September	2022 October	2022 November	2022 December	2023 January	2023 February	2023 March

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Listings in the Area

Listing Type ∨
Entire home ∨

Neighbourhood ∨
Five Points ∨

Guest Reviews Analysis

Please see below images for an analysis of customer reviews from listings in the Five Points neighborhood. The highlights from the reviews can be used to promote the listing. There were 26,563 comments for listings in the neighborhood.
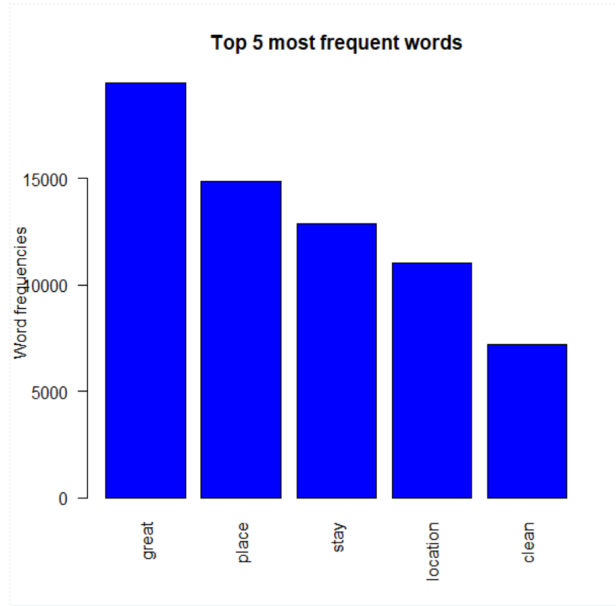
Occupancy Analysis and Instant Booking

Denver-area Airbnb listings have an average forecasted occupancy rate of 54% for the period March 30th, 2022 - March 29th, 2023. Occupancy rates are expected to be below the average in the months of July and August 2022. From the data, the Five Points neighborhood has an occupancy rate above the Denver average until the summer months and slightly below the city average in fall.

Occupancy was calculated by the following formula:

Occupancy Calculation: calendar.csv > 'available'. If 't', available, 'f', occupied.

Occupied % = available*100/(available + occupied)

Contrary to popular studies such as this one conducted by AirDNA (https://www.airdna.co/blog/airbnb-instant-book-or-not), listings with the instant booking feature do not have an increased occupancy Rate in the Denver area. Interestingly, listings without an instant booking feature have a better occupancy rate forecast. Please see the summary images below.
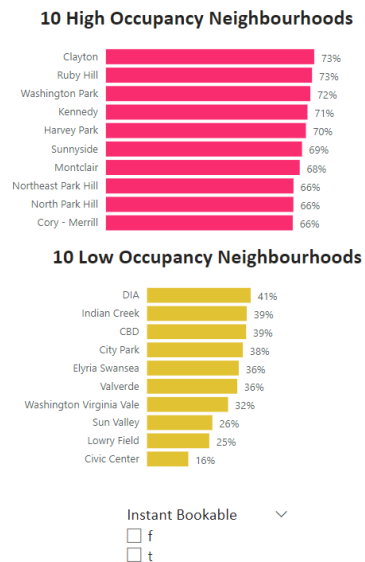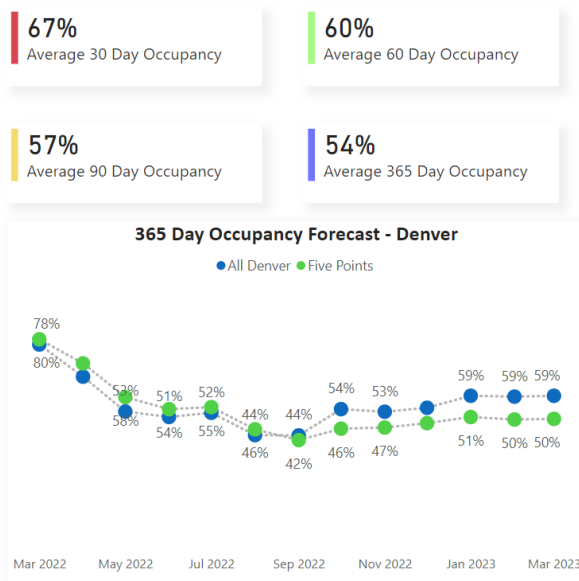
Occupancy with 'Instant Bookable' = t ('True')
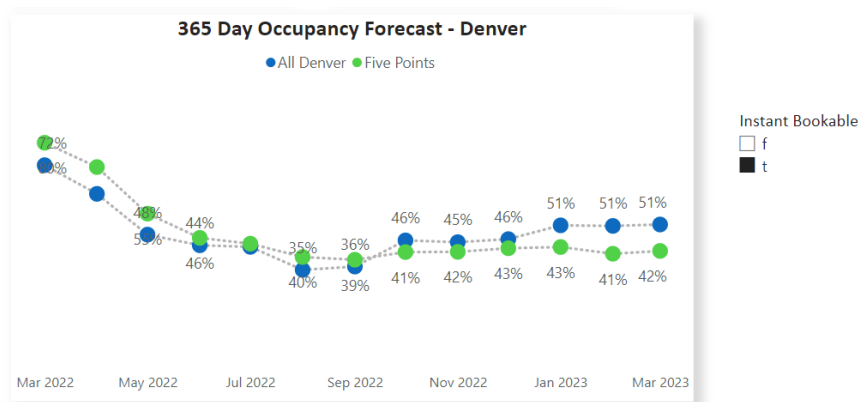
Occupancy with 'Instant Bookable' = f ('False')