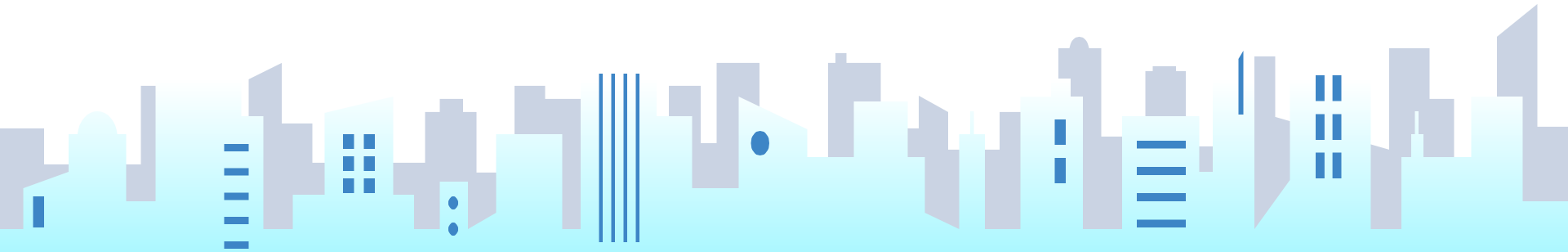


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MAR 8TH, 2018

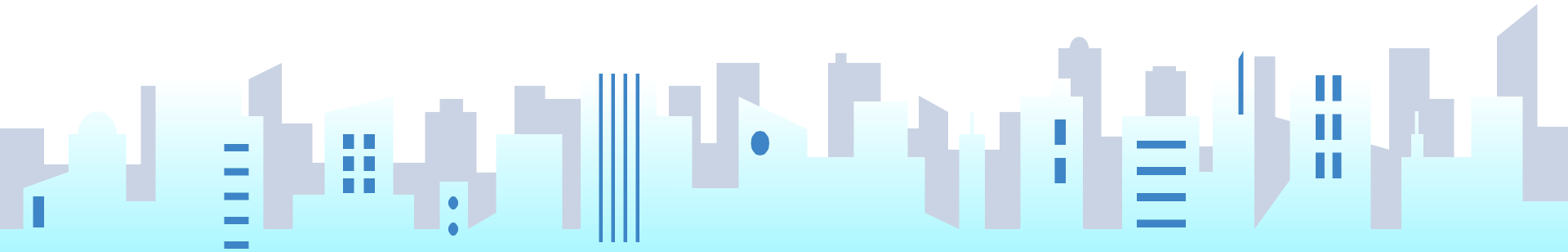
Group 6: San Diego Real Estate Price Analysis

Jinzhao Feng, Zhengfang Gao, Shuai Huang
Zhouhang Shao, Jiang Yu, Gilbert Zhao, Jiyang Zhao



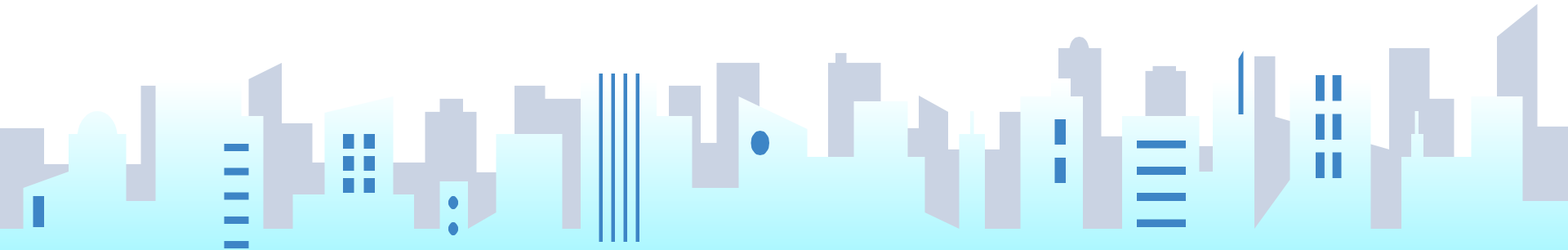
Problem Introduction

- Due to limited on-campus housing spaces, each year, thousands of UCSD students need to seek off-campus housing in San Diego Area. However, finding the best neighborhood with a fair rent price can be a complicated task.
- Those looking to buy homes or invest in real estate need to have a good understanding of historical home values in the San Diego area and the price trends in order to decide when/where to buy.



Presentation Outline

- Rent Analysis (median price per sq. ft. within San Diego)
 - Trends based on zip code and # of rooms
 - Are prices lower at certain times of the year?
- Real Estate Price Analysis
 - Sale price in San Diego over time
 - Sale price prediction (Linear Regression Model)
 - Potential investment return



Data Source



Zillow is a very well-known company in the real estate industry; the historical data from their website is the primary source of data for our project.

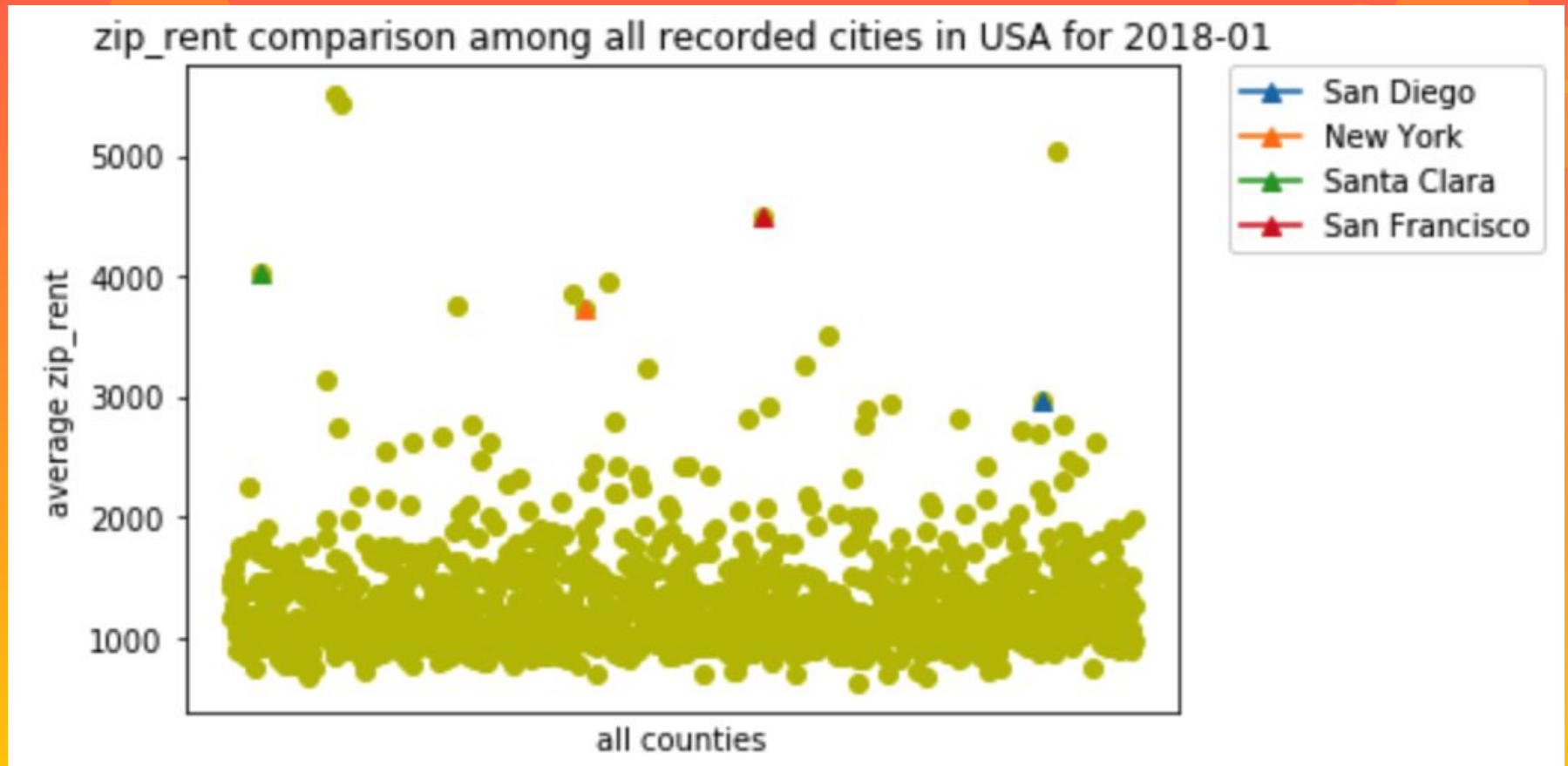
| | RegionID | RegionName | State | Metro | CountyName | SizeRank | 1996-04 | 1996-05 | 1996-06 | |
|---|----------|--------------|-------|--------------------------------|--------------|----------|----------|----------|----------|----|
| 0 | 6181 | New York | NY | New York | Queens | 1 | NaN | NaN | NaN | |
| 1 | 12447 | Los Angeles | CA | Los Angeles-Long Beach-Anaheim | Los Angeles | 2 | 155000.0 | 154600.0 | 154400.0 | 15 |
| 2 | 17426 | Chicago | IL | Chicago | Cook | 3 | 109700.0 | 109400.0 | 109300.0 | 10 |
| 3 | 13271 | Philadelphia | PA | Philadelphia | Philadelphia | 4 | 50000.0 | 49900.0 | 49600.0 | 4 |
| 4 | 40326 | Phoenix | AZ | Phoenix | Maricopa | 5 | 87200.0 | 87700.0 | 88200.0 | 8 |
| 5 | 18959 | Las Vegas | NV | Las Vegas | Clark | 6 | 121600.0 | 120900.0 | 120400.0 | 12 |
| 6 | 54296 | San Diego | CA | San Diego | San Diego | 7 | 161100.0 | 160700.0 | 160400.0 | 16 |
| 7 | 38128 | Dallas | TX | Dallas-Fort Worth | Dallas | 8 | NaN | NaN | NaN | |
| 8 | 33839 | San Jose | CA | San Jose | Santa Clara | 9 | 224500.0 | 224900.0 | 225400.0 | 22 |
| 9 | 25290 | Jacksonville | FL | Jacksonville | Duval | 10 | 77500.0 | 77200.0 | 76800.0 | 7 |

Median Listing Price Data Example

How does the rent in San Diego compare to other counties in the USA?

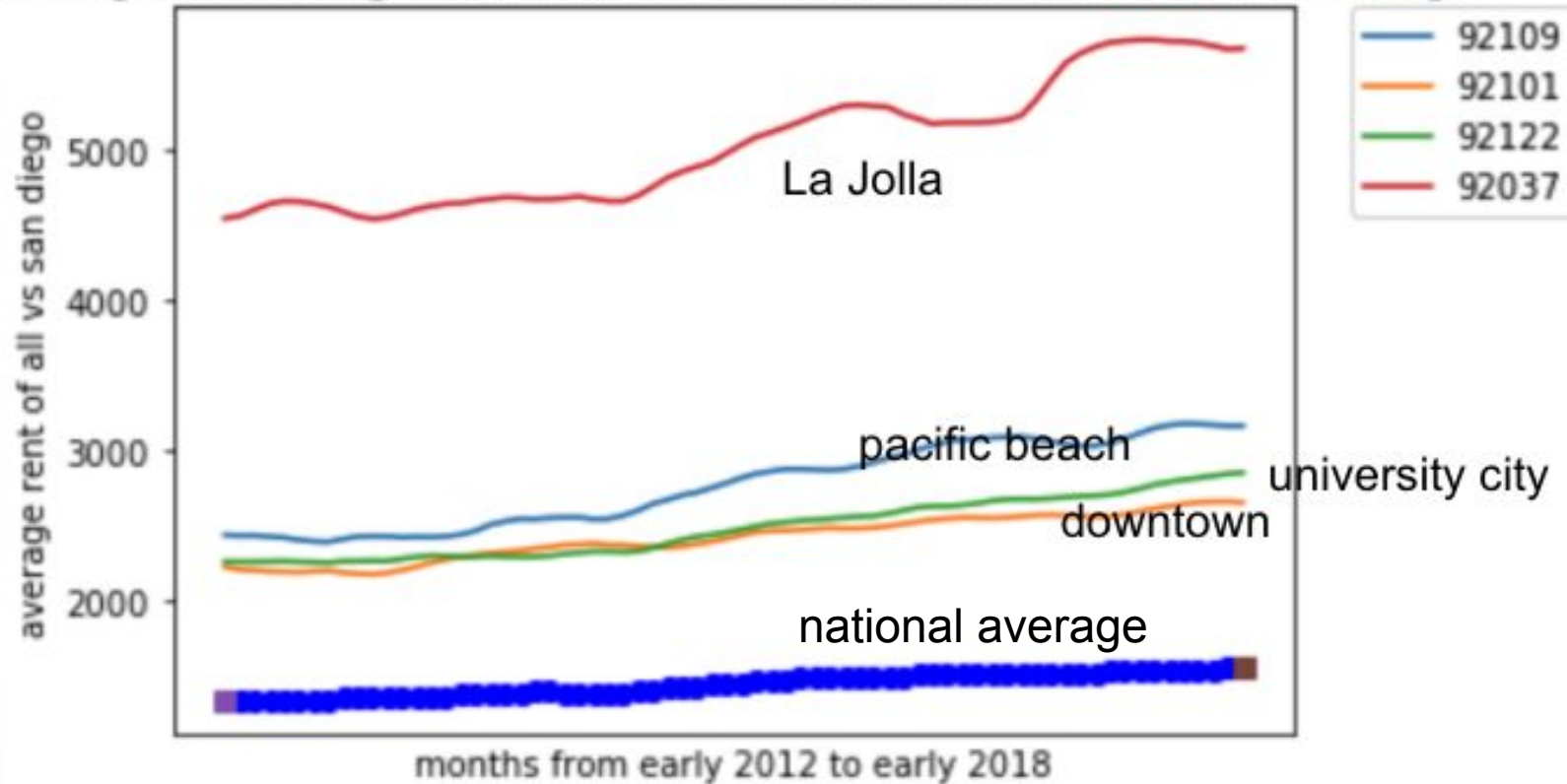
- Data of 13123 rows consisting of area info and rent prices from 2010 to 2018
- Visual comparison between San Diego and all other areas for month January 2018, highlighting several areas:
 - Queens, NY
 - San Francisco, CA
 - Santa Clara, CA
 - San Diego, CA
 - Marin, CA



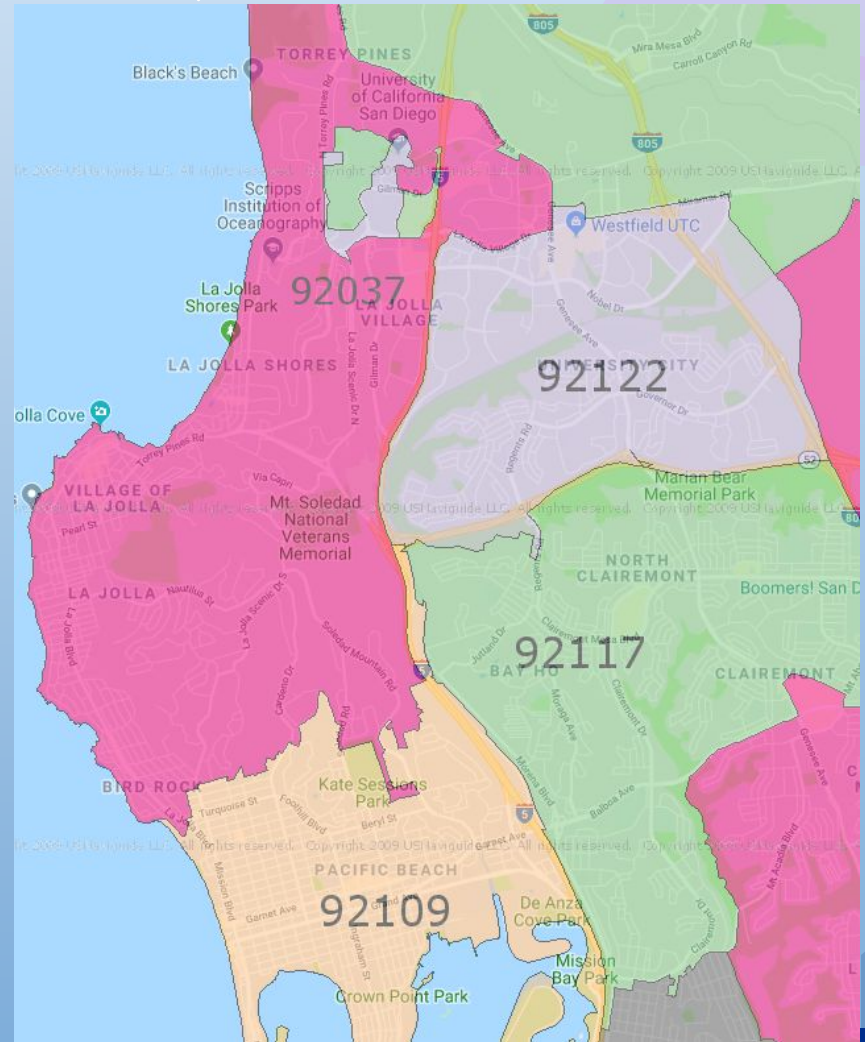
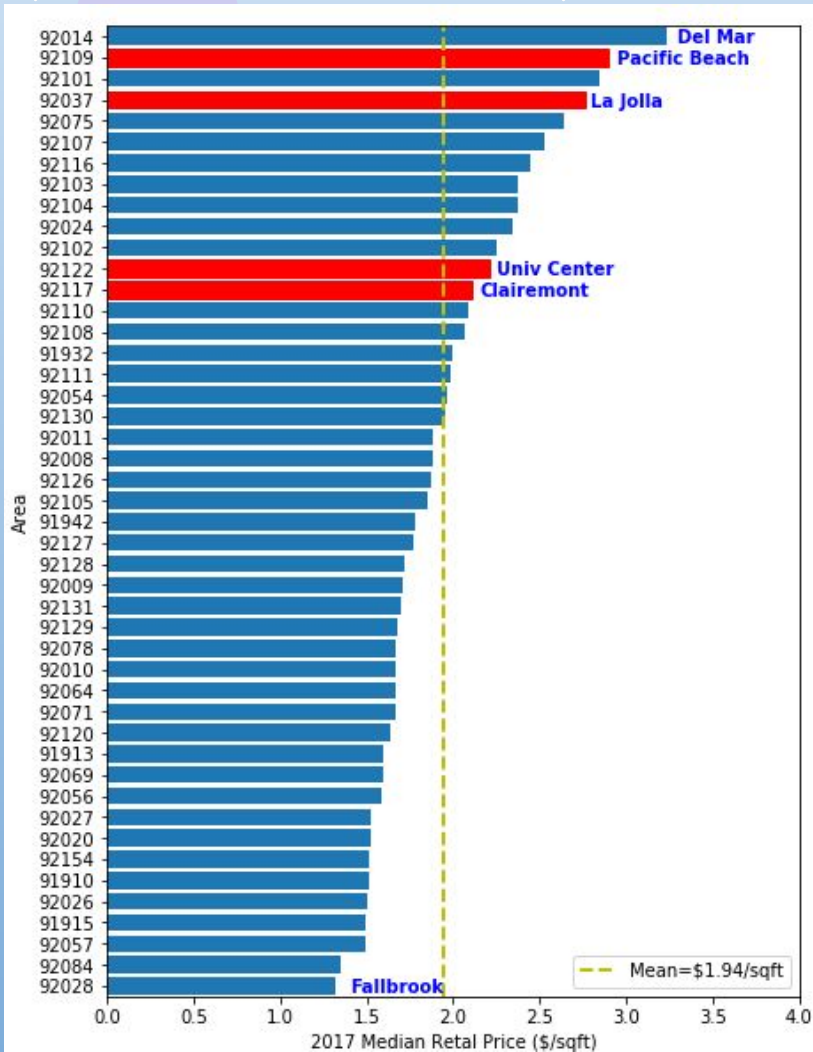


SD Rent Price vs Nationwide Overall Rent Price

average rent change with months in recorded cities in USA vs. San Diego

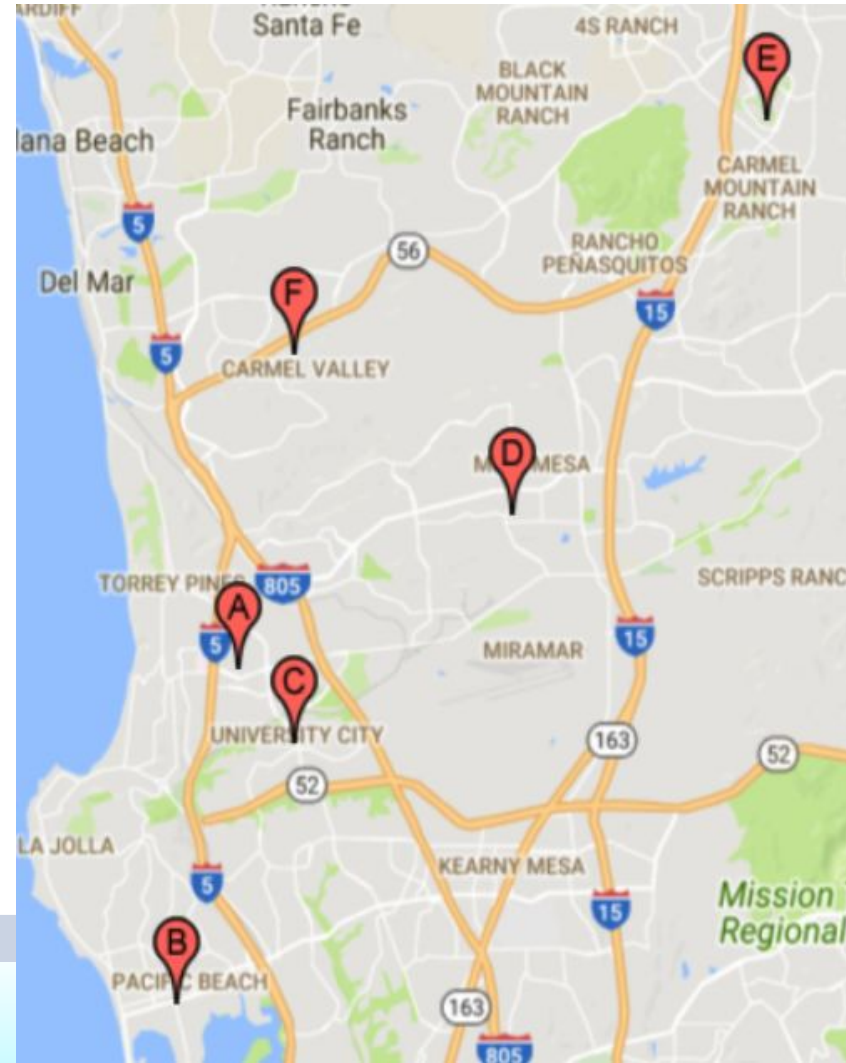


San Diego County Zip Code Comparison



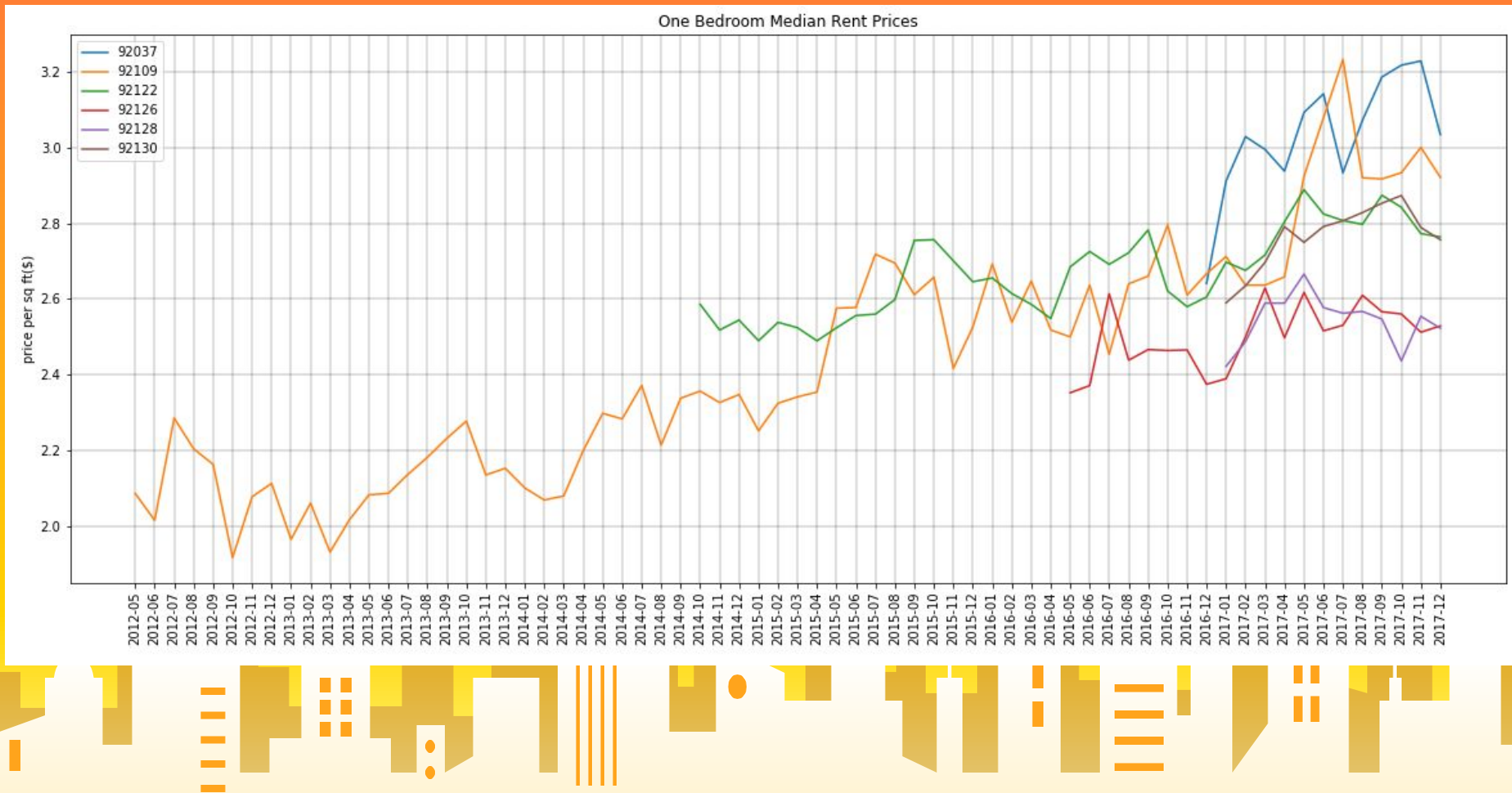
Median rent prices within San Diego

- Visual analysis of price per sq ft for one to three bedroom residences
- Picked six zip codes that have historical data for all four
 - 92037 (La Jolla Beach/UCSD)
 - 92109 (Pacific Beach)
 - 92122 (University City)
 - 92126 (Mira Mesa)
 - 92128 (West Poway)
 - 92130 (Carmel Valley)

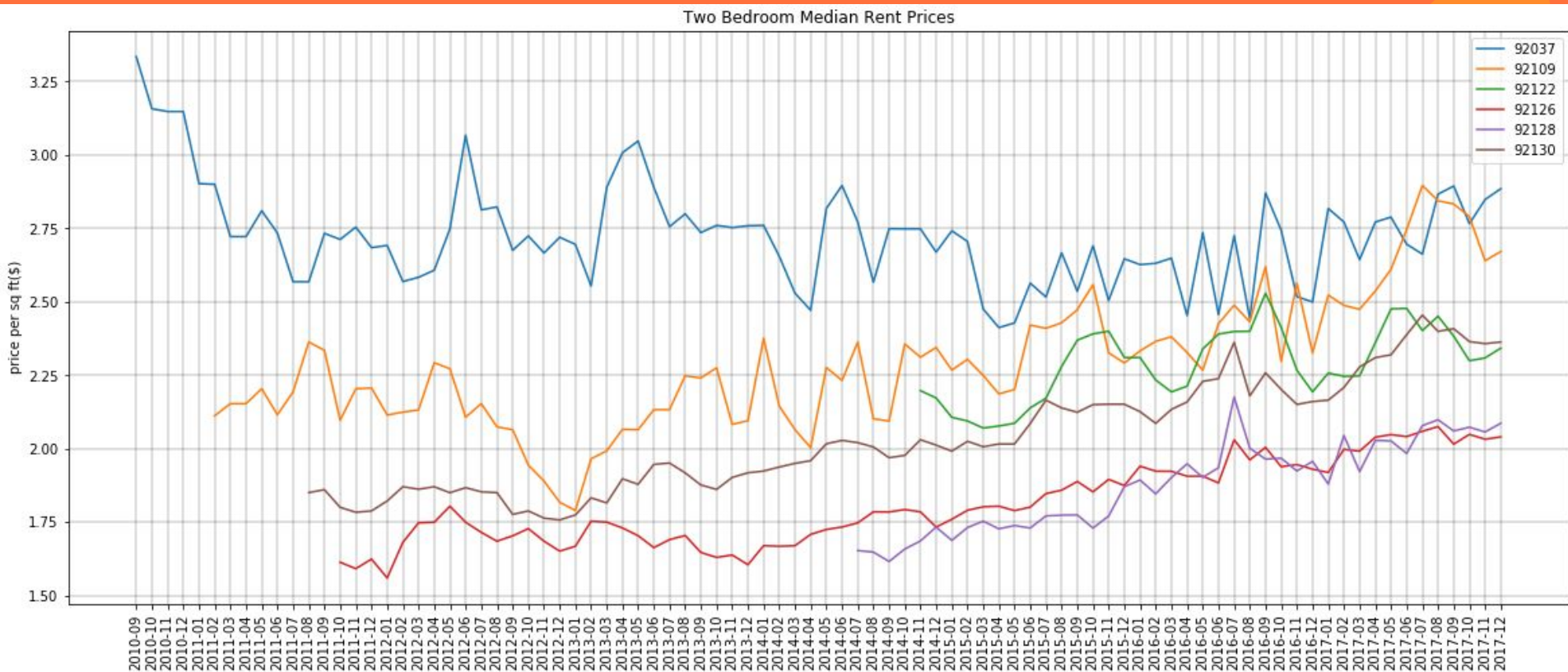


Historical prices of all three residence types (split into three slides)

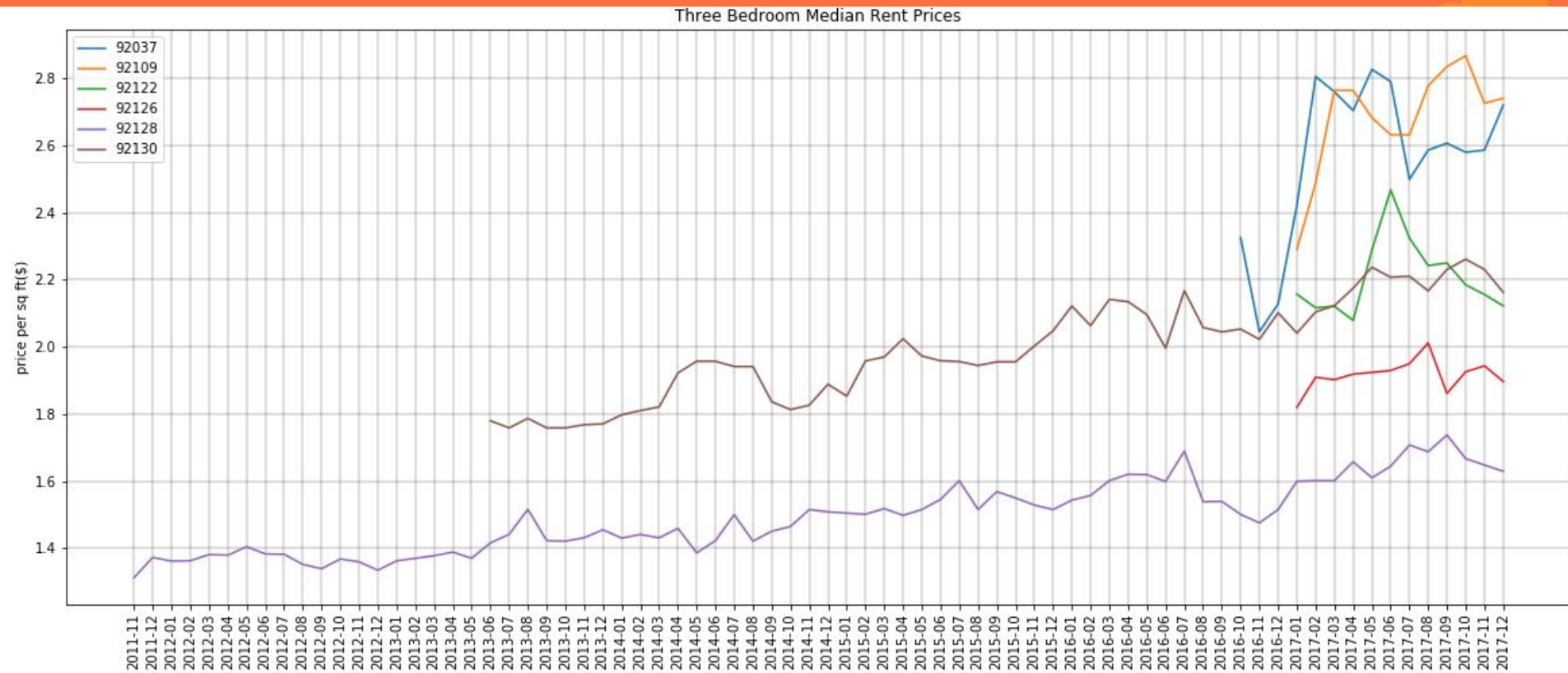
(One Bedroom Median Rent Prices)



(Two Bedroom Median Rent Prices)



(Three Bedroom Median Rent Prices)



Immediate Conclusions

- Not having a complete, robust dataset does skew certain mean/median results but generally speaking, we can conclude that
- Three bedroom residences have had the least amount of variance over the years followed by one bedroom, two bedroom
- The floor cost of one bedroom places has always been the highest amongst the three
- A three bedroom home in 92130 has always been the cheapest price per square feet amongst these zip code/bedroom number pairs

How do rent prices vary as the seasons change?

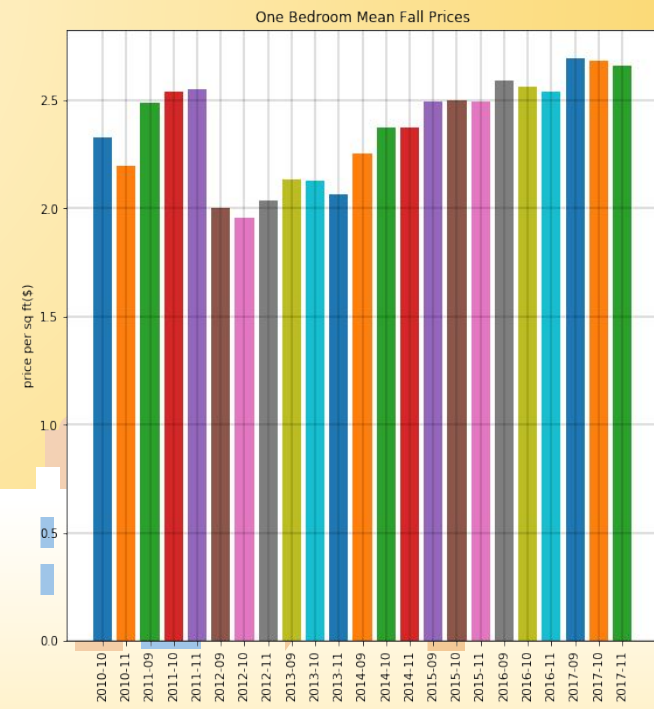
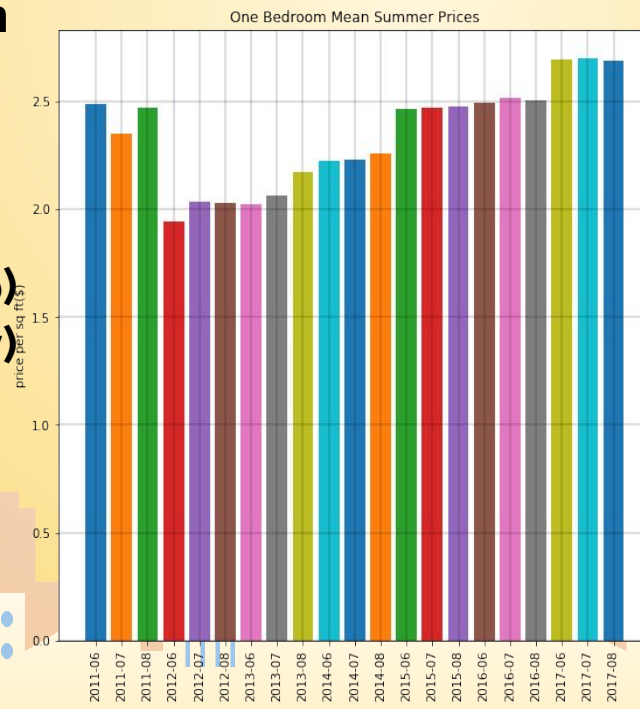
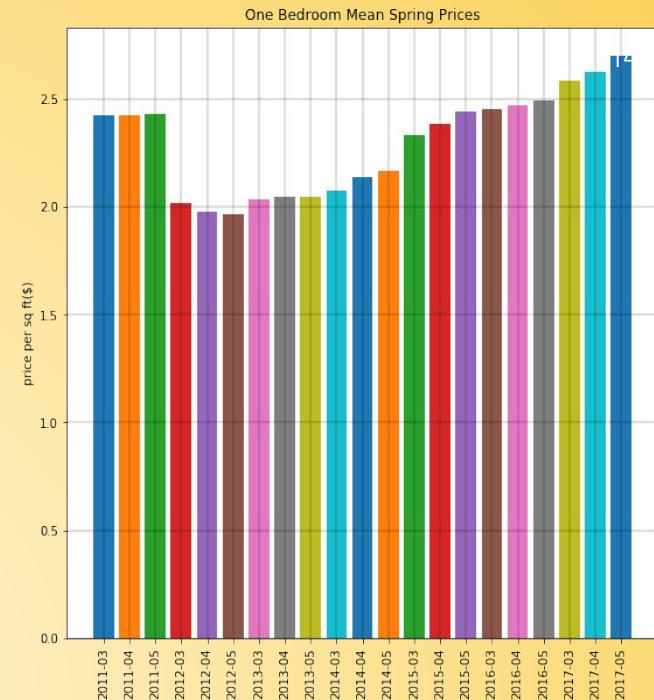
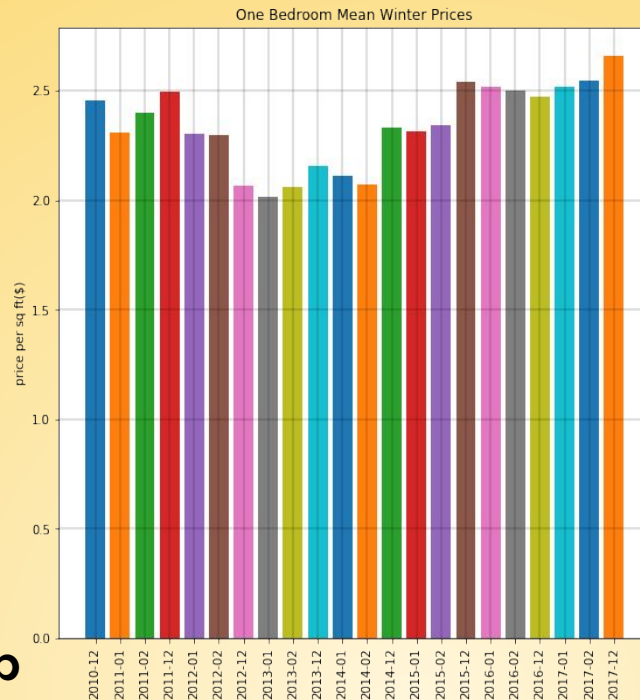
We took median rent price per sqft of all zip codes for each month and placed them in four bins:

Winter = (Dec Jan Feb)

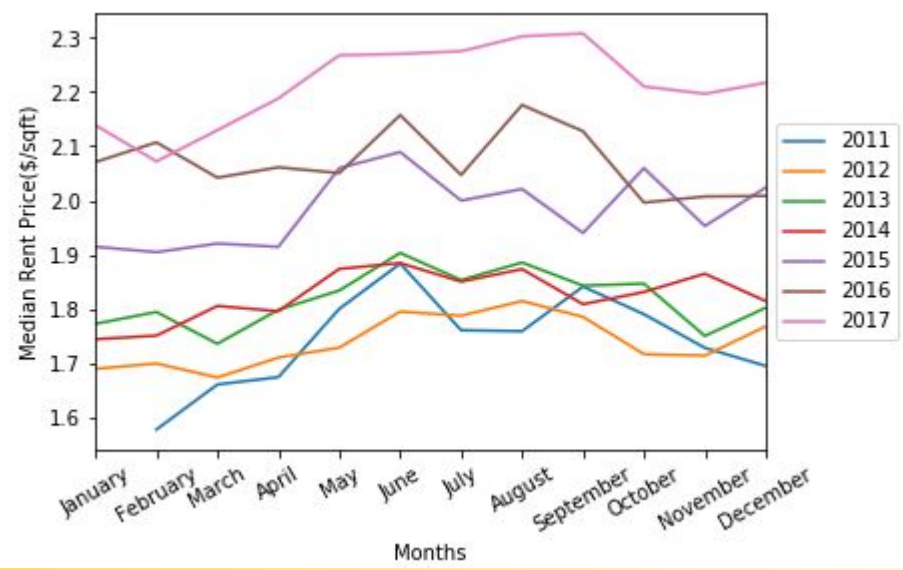
Spring = (Mar Apr May)

Summer = (Jun Jul Aug)

Fall = (Sep Oct Nov)

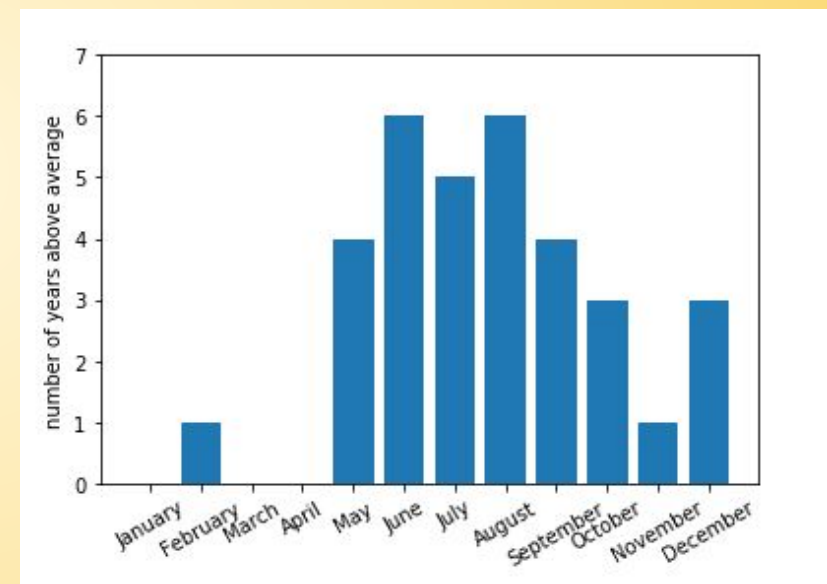


Closer analysis (University Center 92122)



Trend shows that summer might have higher price, but not clear enough!

Plot below shows number of years the median price in that month was greater than the average median price in that year since 2011.



In 6 out of 7 years, rent price in June and August was above average!

However, Jan and Mar had rent price below average in all 7 years!

This suggests that winter is the best time to rent in the UTC area specifically.

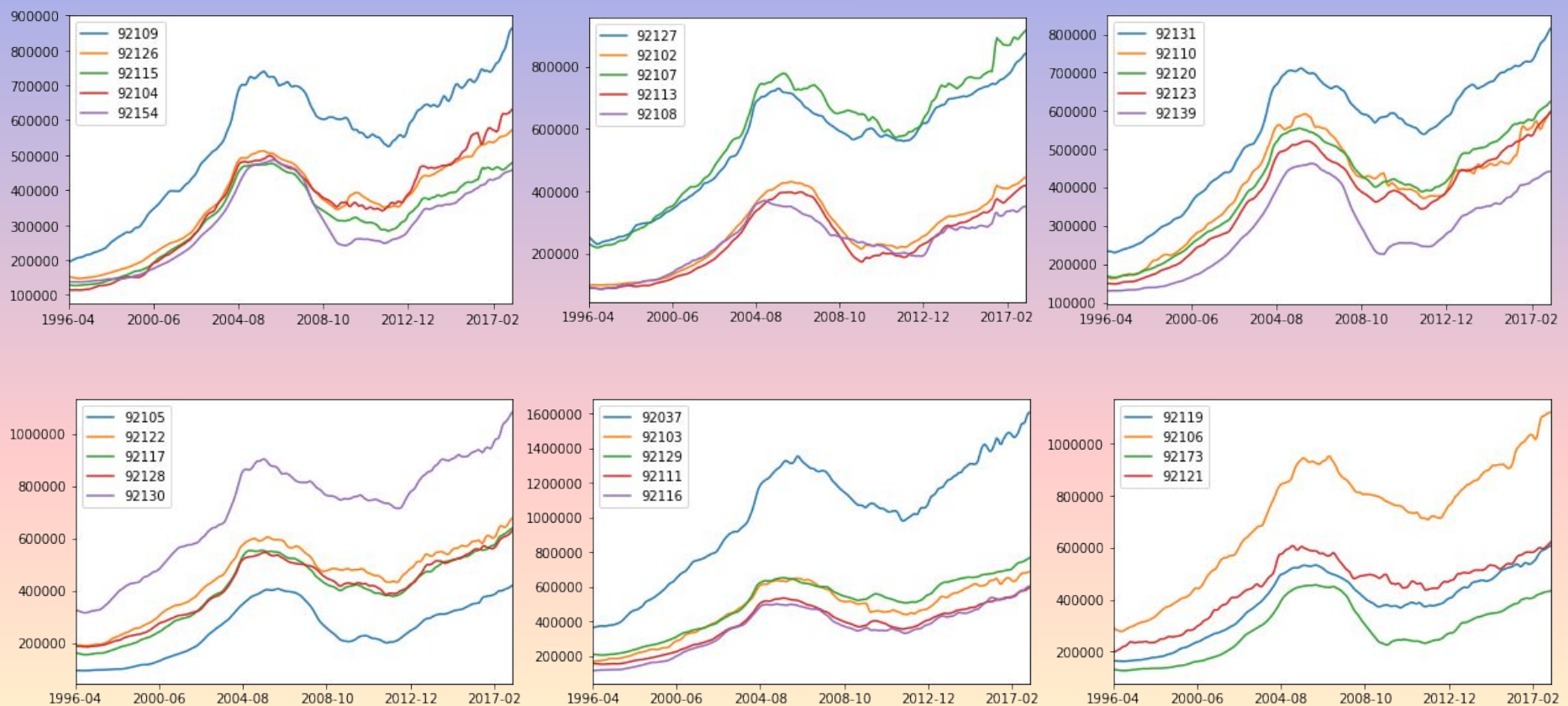


General Statistical Results

- For one bedroom homes, rent prices per square feet are most expensive in the fall and least expensive in winter and spring, a difference of about \$0.07-0.08
- For two bedrooms, there is less disparity in price overall but winter is on average the cheapest time to rent by around \$0.03 per sq ft; also the standard deviations in both winter and fall are at least double that of spring and summer
- For three bedrooms, winter/fall prices are around \$0.04-0.05 cheaper than in spring/summer; the middle 25%-75% range of summer prices is very narrow

Time VS. Median Sale Price in San Diego City since 1996

Plotted data for 29 different zip codes after cleaning the data.



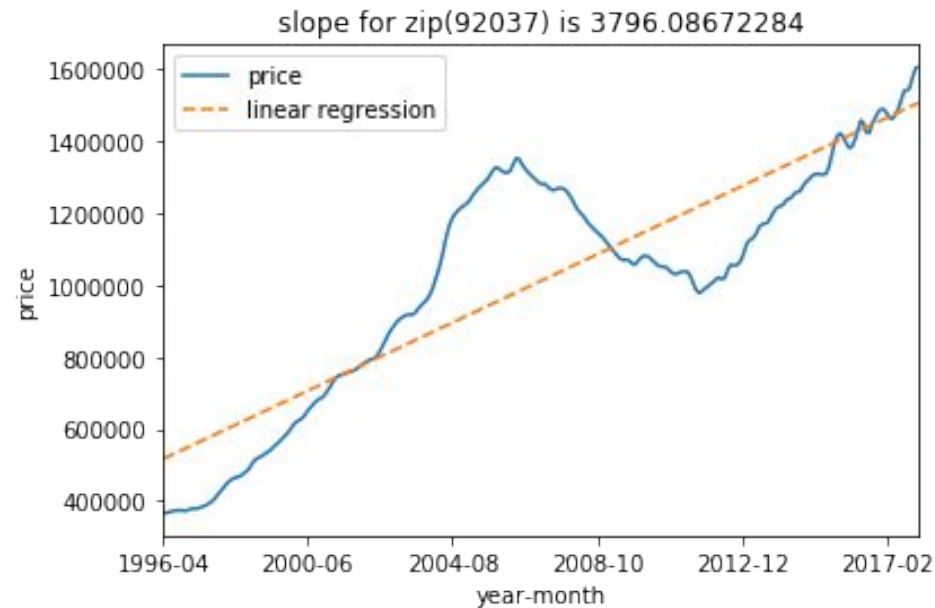
Linear Regression Model

```
y_1 = [1 x_1]*[a b]';
```

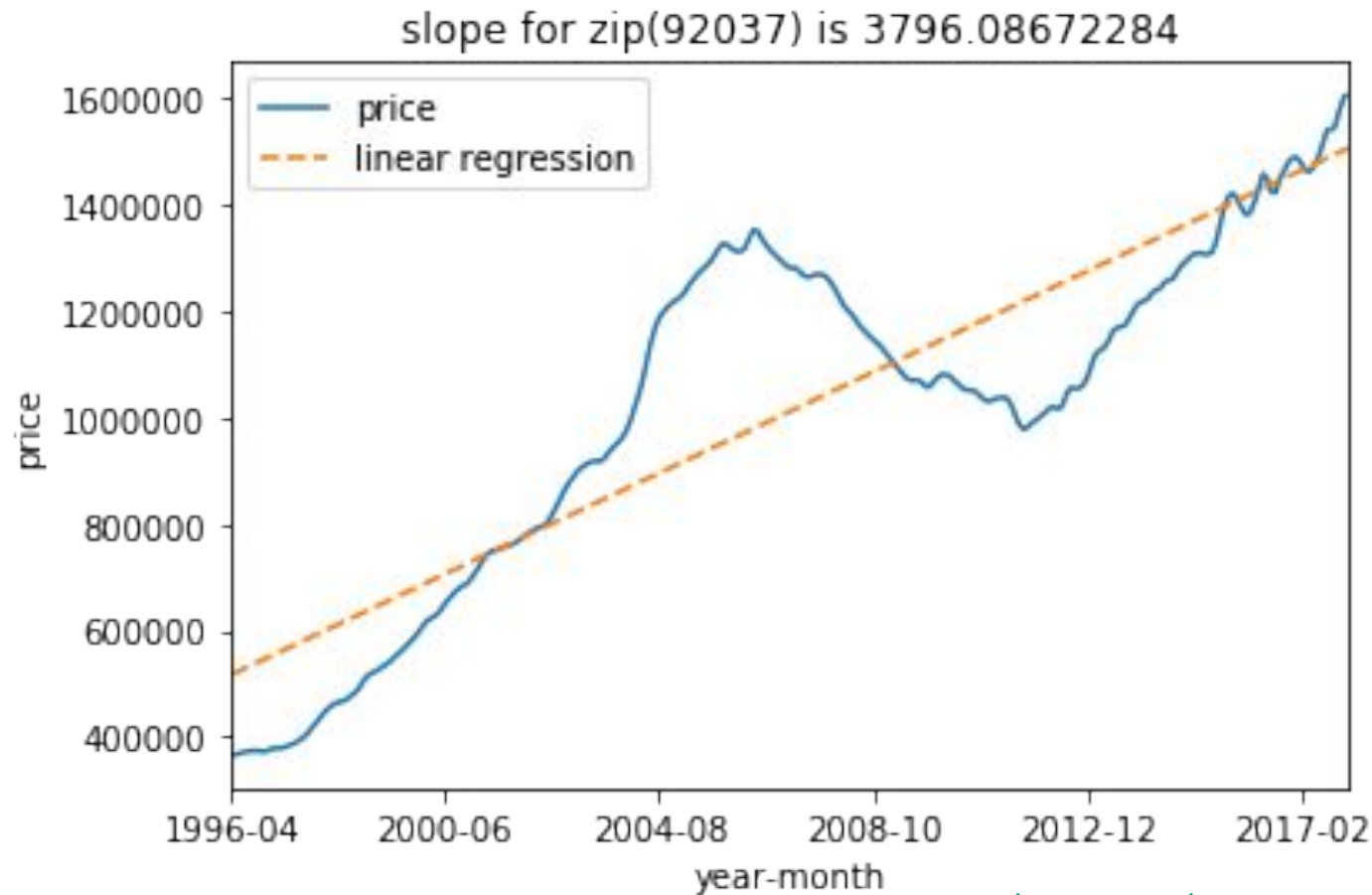
```
y_2 = [1 x_2]*[a b]';
```

```
.....
```

```
y_n = [1 x_n]*[a b]';
```



$$Y = a * X + b$$

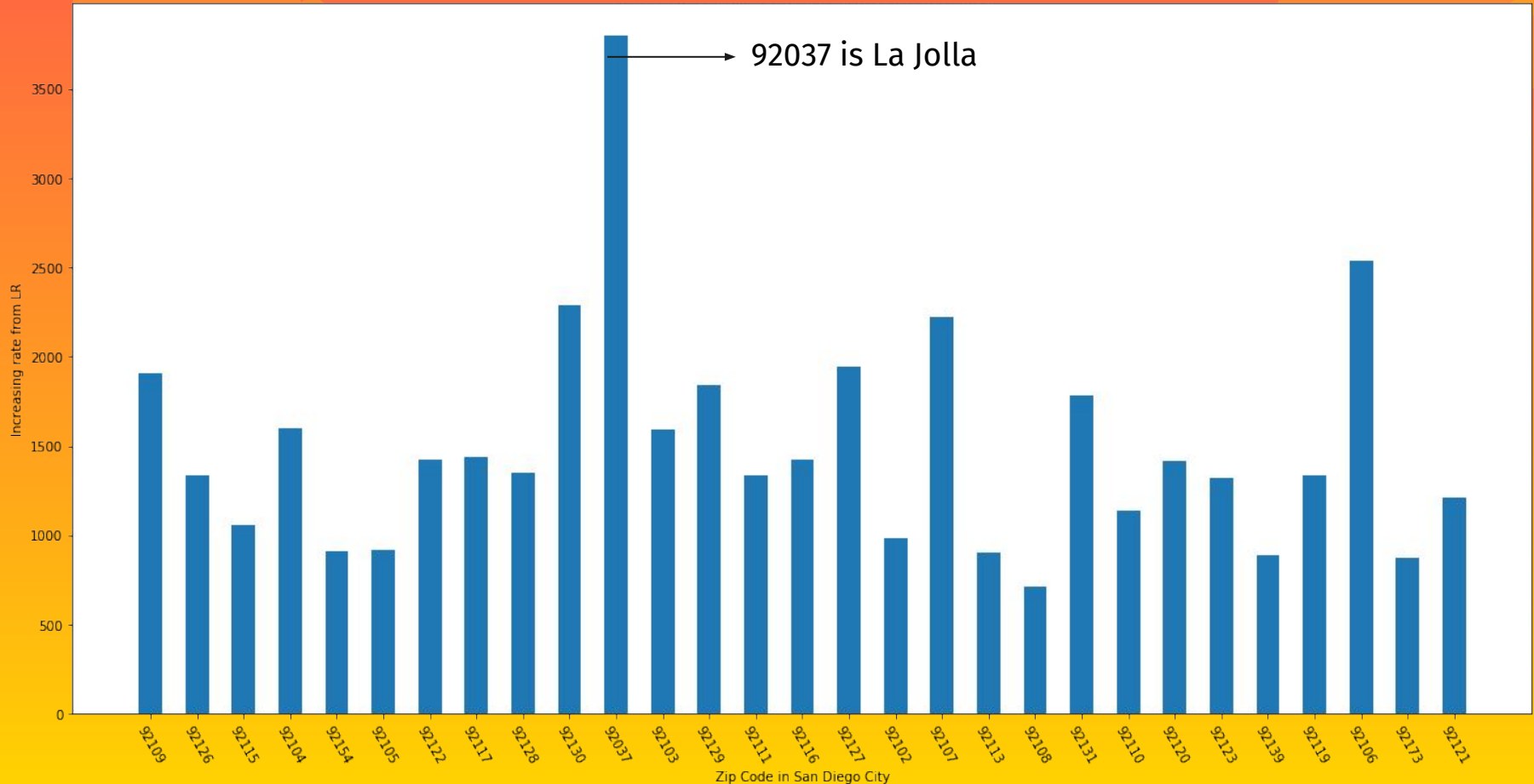


Return on Investment(ROI) =
Slope(Increase in value per month) /
Y-intercept(House Value)

Long-Term

Zipcode VS. Increase in Value (Dollar)

Zip Code VS. Increasing Rate in in last 20 years

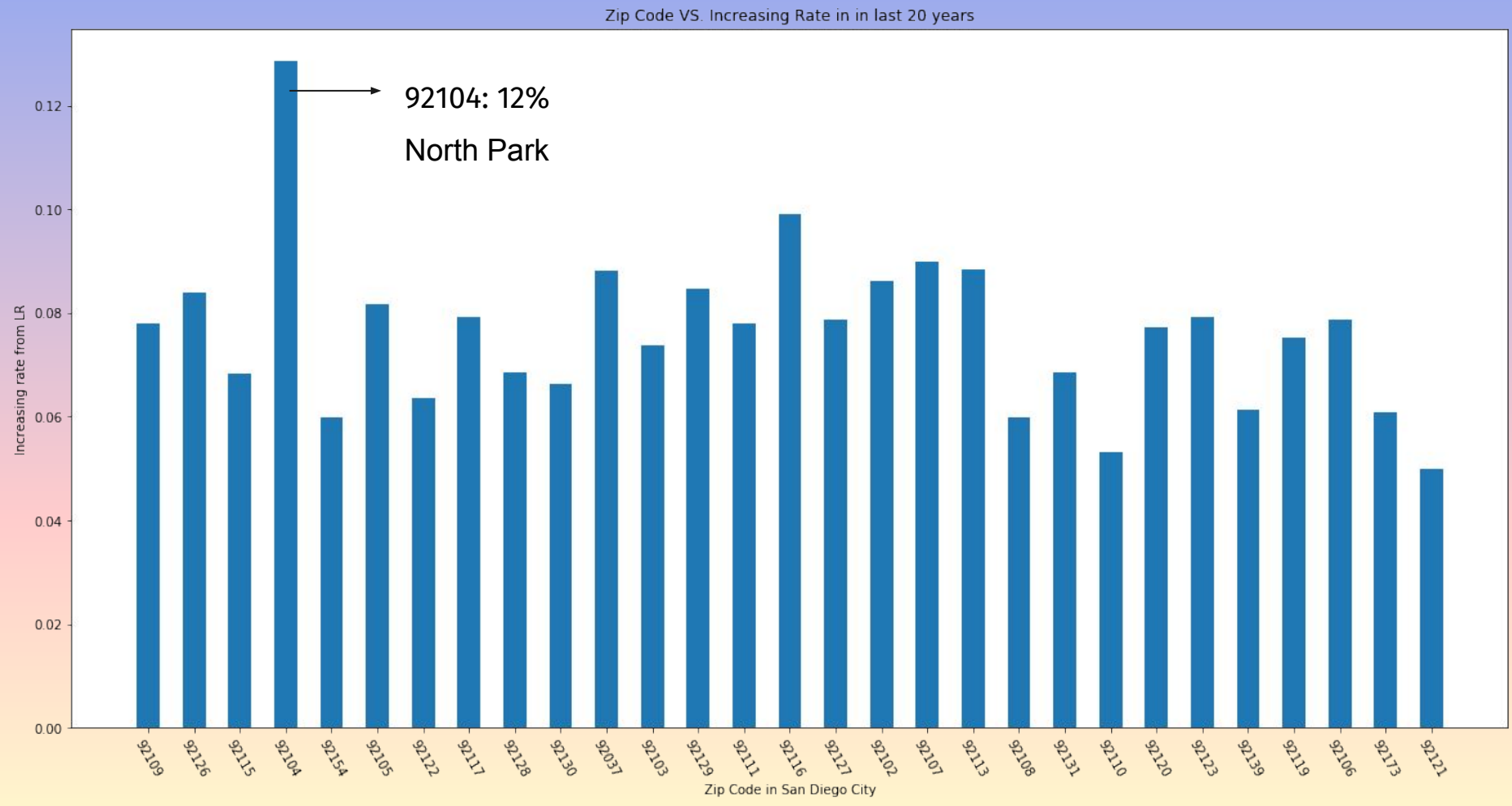


BUT!!!! This is absolute increase!!!!

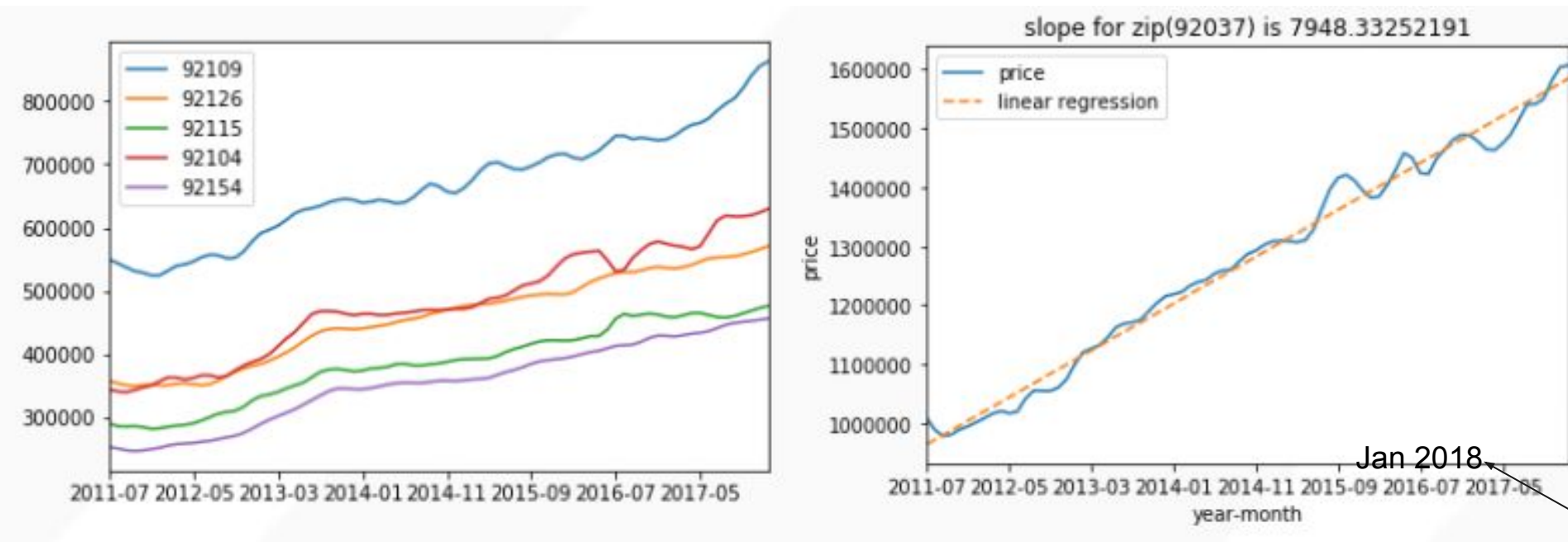
Return on Investment Every Year is approximately 8.82%

Investors only care about Return of Investment !

Zip Code vs. Return of Investment (since 1996)



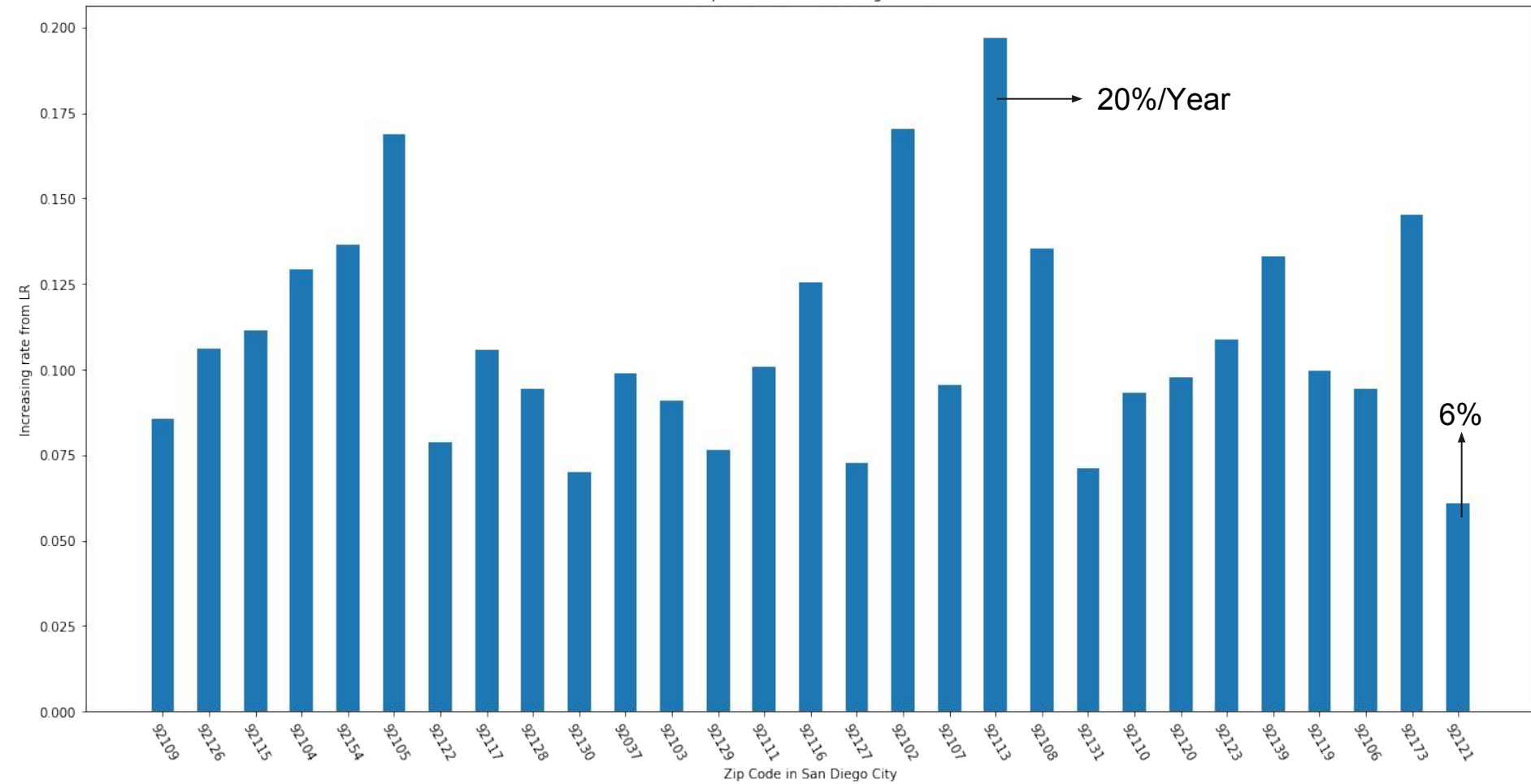
In recent years, the plot looks more linear!



$$Y = 964454.27 + 7948.33 * X$$

Prediction on Median Sale Price(April 2018) in La Jolla:
\$1608269

Zip Code VS. Increasing Rate



Thank you for listening!

