
NEW ABC COMPANY
USA OFFICE OPENING
R HALDANE
4-APR-2021

NEW ABC US OFFICE

In which city should ABC open it's first US office?

Background

- Company ABC is looking to open it's first US office, in a major metropolitan area.
- The company needs a highly skilled and happy workforce.
- The company's workforce love pizza places, gyms, coffee shops and wine bars. This frequency of these locations will be the proxy for a happy workforce.
- We will leverage the foursquare API to rank these items by city.

Background

- We will leverage the foursquare API to rank these items by city.
- Income by capita will be a proxy for a skilled workforce.
- We will then **fit regression models** to see if there is a relationship between income and pizza places, gyms, coffee shops and wine bars, by city.
- This will help decide the new office location.

DATA

Data

- We will leverage the **Foursquare API** for the top 20 cities by per capita income.
- The API requires a lat long. We will pull the city lat/long from from **geopy.geocoders Nominatim module**, to convert an address into latitude and longitude values (see section 3 data)
- **Average per capita income by city** will come from the 2010 US Census.

METHODOLOGY

	City	IncomeCapita	Lat	Long
0	Washington, DC	47411	38.894992	-77.036558
1	San Jose, CA	40392	37.336191	-121.890583
2	Seattle, WA	39322	47.603832	-122.330062
3	San Francisco, CA	38355	37.779026	-122.419906
4	Boston, MA	37311	42.360253	-71.058291
5	Honolulu, HI	36339	21.304547	-157.855676
6	Minneapolis, Minnesota	35388	44.977300	-93.265469
7	Hartford, CT	34310	41.765558	-72.690613
8	Denver, CO	32399	5.342848	-72.395985
9	Portland, OR	31377	45.520247	-122.674195

Potential cities

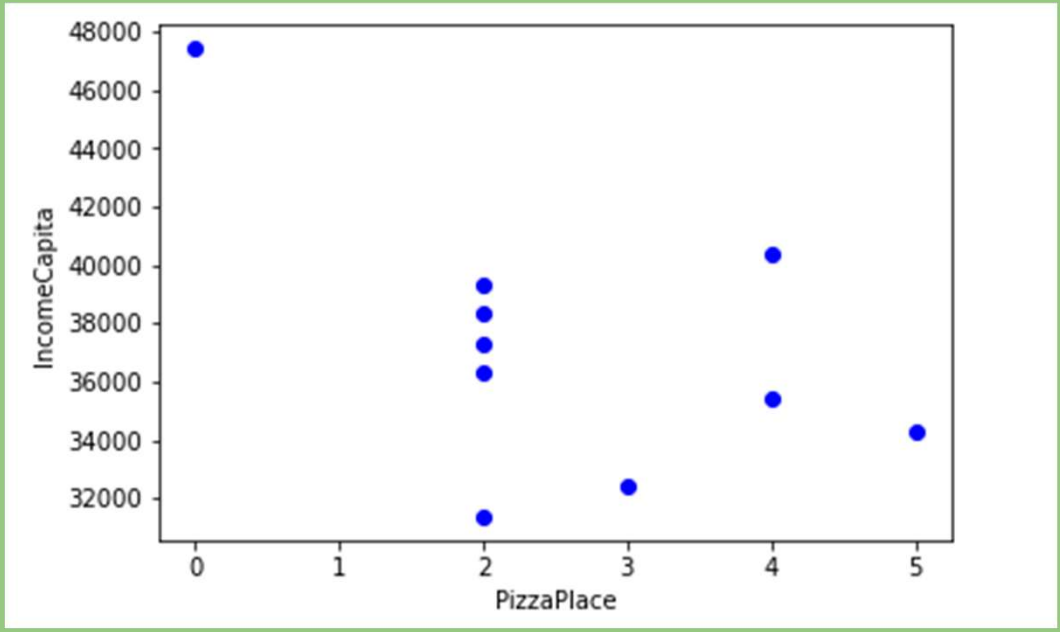
We collated the data on the top 10 US cities by per capita income.

We added lat long.

	City	Adult Boutique	American Restaurant	Antique Shop	Aquarium	Argentinian Restaurant	Art Gallery	M
0	Boston, MA	0	3	0	1	0	0	
1	Denver, CO	0	0	0	0	0	0	
2	Hartford, CT	0	8	0	0	0	1	
3	Honolulu, HI	0	1	0	0	0	0	
4	Minneapolis, Minnesota	0	2	1	0	0	2	
5	Portland, OR	0	1	0	0	1	0	
6	San Francisco, CA	1	0	0	0	0	0	
7	San Jose, CA	0	0	0	0	0	1	
8	Seattle, WA	0	0	0	0	0	0	
9	Washington, DC	0	4	0	0	0	0	

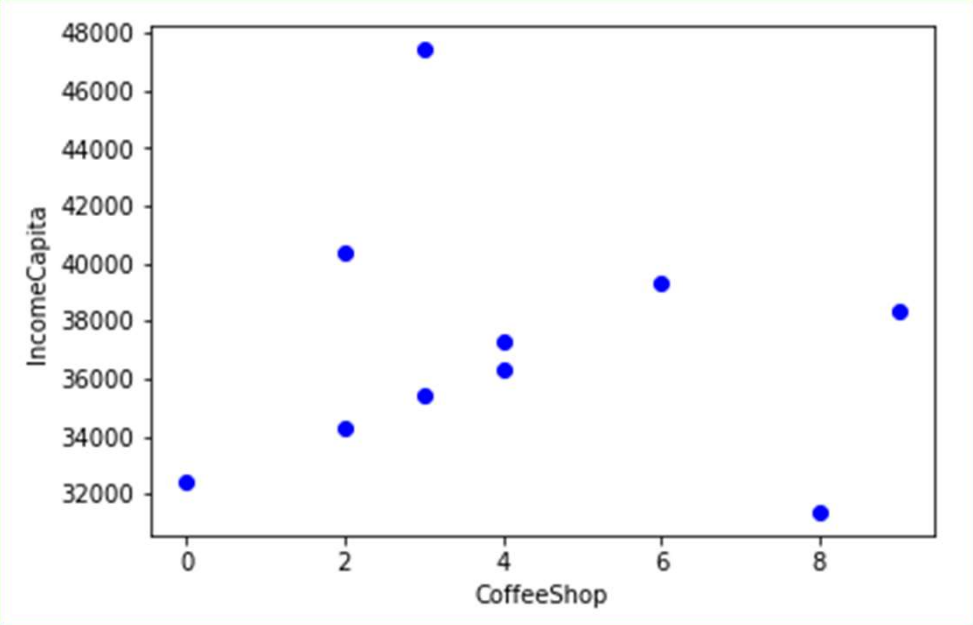
Data gathered and collated

We used the Foursquare API with the previous lat longs, to pull back data on venues in the city.



Visually assess pizza places

There may be a negative linear corelation between pizza places and income.



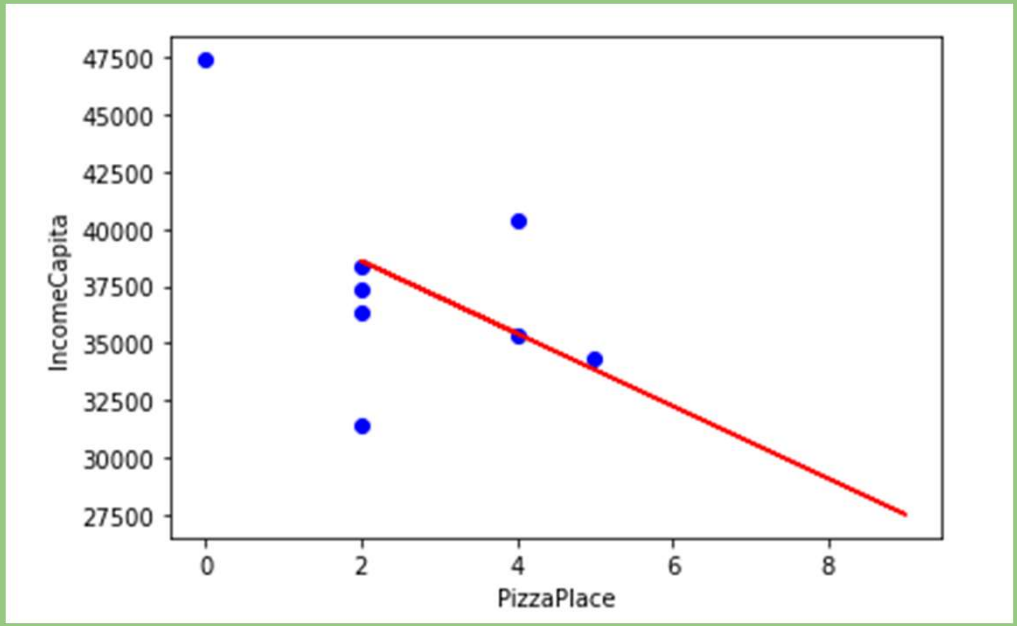
Visually assess coffee shops

There may be a polynomial relationship.

Gyms & wine bars

- There was not enough data returned on gyms and wine bars to do an assessment, with the 100 location API limit.

- These have been excluded from the analysis.

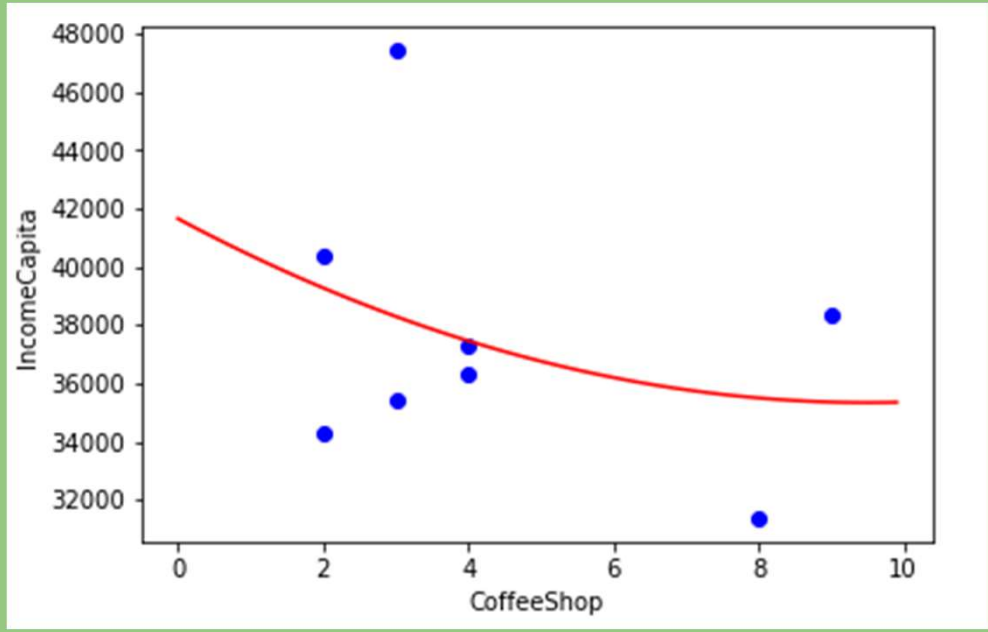


Regression model

A linear model was fitted.

The variance score was 9% - only 9% of the relationship is explained by number of pizza places.

This is a weak relationship.



Regression model

A polynomial model was fitted.

The r squared score was negative.

This implies no relationship between coffee shops and income.

FINDINGS

Results

- Both models are **quite bad predictors** of per capita income.
- The model predicts income decreases as pizza places increase. Pizza places only explain 9% of the variance in capita income. **This means there is a weak relationship between pizza places and income.**
- The model has fitted to coffee shops but the R Squared is negative, meaning there is **no correlation between coffee shops and income**.
- There are **not enough data points** on gyms and wine bars to perform the analysis.

CONCLUSIONS:

Conclusions

- We have fitted one model with some skill, which predicts lower number of pizza places gives higher capita income.
- ABC company should target cities with low number of pizza places.

- **Of course correlation does not imply causation!**

- **The analysis is very limited** by the 100 limit on the foursquare API, which does not give enough results for each venue type to build a good model.
- Recommend ABC company to pay for the developer level API so that they can get better results :)

- Of the cities analysed, **Washington, DC** has the lowest pizza places, and would be the recommended location for the new ABC office.