



## PIZZA PLACE LOCATION RECOMMANDER

### Report

We intend to open a new pizza place in Mumbai. There are many areas in Mumbai, classified based on Pin Code. We intend to find the area which will be most suitable to opening a Pizza Place. The area should have relatively less completion and good number of customers.

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Applied Data Science Capstone

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## Introduction

- Mumbai (Old name Bombay) is a major city in India. It is the most populous city in India with an estimated population of 12.4 million as of 2011. It is the financial, commercial and entertainment capital of India. <https://en.wikipedia.org/wiki/Mumbai>
- Objective:  
We intend to open a new pizza place in Mumbai. There are many areas in Mumbai, classified on the basis of Pin Code. We intend to find the area which will be most suitable to opening a Pizza Place. The area should have relatively less completion and good amount of customers.
- Target Audience:  
Businessmen who is interested in starting a pizza shop in Mumbai. Analyst who want to understand the distribution on Pizza shops in Mumbai

## Data

Following data will be required for the research:

- List of Pin Codes in Mumbai: This data can be obtained from the website 'Maps of India'.  
url: <https://www.mapsofindia.com/pincode/india/maharashtra/mumbai>
- The geo coordinates (Latitude and Longitude) for these areas can be obtained from Google API. This data will help in plotting the areas on the map.
- From Foresquare API we will need information regarding
  - Pizza places in Mumbai based on area
  - Schools/Colleges/Universities in Mumbai based on area
  - Offices in Mumbai based on area
- Form the foresquare data we will have to extract
  - Venue
  - Venue Latitude
  - Venue Longitude
  - Venue Category

## Methodology

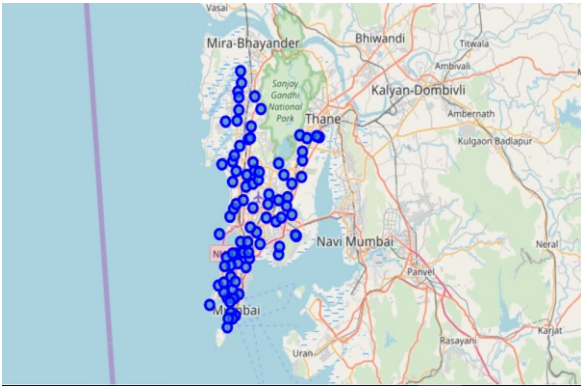
- Initially we will require a list of Pincodes for Mumbai. We will extract them from a website. We will have to remove any duplicates.  
-> *We have 89 Pincodes*
- Then we use google API to obtain Latitude and Longitude for these pincodes and then plot them on the map
- We then use Foresquare API to obtain following nearby venues for each pincode
  - Pizza places
  - Schools
  - Colleges/Universities
  - Offices
- We will design a metric called 'Pizza shop metric'. Each locality will have a value corresponding to this metric.
  - The number of each venue type in a area will be added.
  - This sum will be further multiplied with the multiplier
  - The addition of all such venue types will be the metric for the area.
    - Multipliers:
      - -1 : Pizza places in Mumbai based on area
      - +1 : Schools/Colleges/Universities in Mumbai based on area
      - +2 : Offices in Mumbai based on area

# Results

## Data frame of Pin codes with Latitude and Longitude and displayed on Map

Dataframe containg areas, Pin codes and coordinates  
(89, 4)

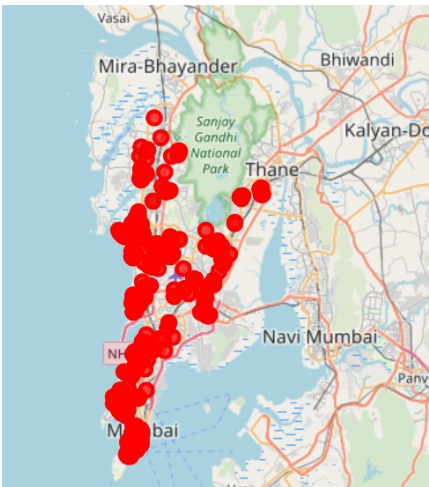
	Area	Pin Code	Latitude	Longitude
0	A I Staff Colony S.O	400029	48.525070	44.586426
1	Aareymilk Colony S.O	400065	19.166890	72.854364
2	Agripada S.O	400011	18.983293	72.826819
3	Ambewadi S.O (Mumbai)	400004	18.954329	72.821730
4	Andheri East S.O	400069	19.119432	72.851426



## Pizza venues data frame and plotted on map

Pizza venues containg areas, Pin codes and coordinates  
(437, 7)  
['Italian Restaurant' 'Fast Food Restaurant' 'Pizza Place' 'Ice Cream Shop'  
'Snack Place' 'Sandwich Place' 'Bakery' 'Mediterranean Restaurant'  
'Juice Bar' 'Pub' 'Diner' 'Shopping Mall' 'Café' 'Restaurant' 'Lounge'  
'Bagel Shop' 'Bar' 'Residential Building (Apartment / Condo)'  
'Indian Restaurant' 'Burger Joint' 'Gastropub' 'American Restaurant'  
'Breakfast Spot' 'Deli / Bodega' 'Hotel Bar' 'Mexican Restaurant'  
'Dessert Shop' 'Brewery' 'Falafel Restaurant' 'Coffee Shop'  
'Tex-Mex Restaurant' 'Performing Arts Venue']

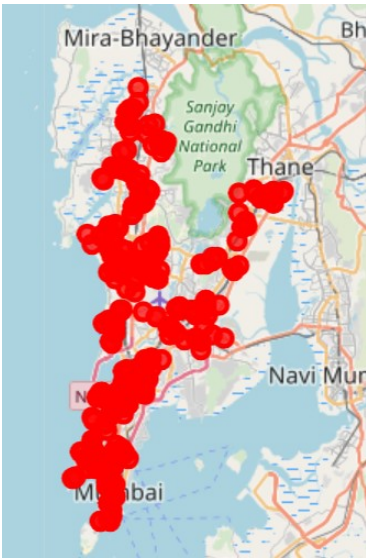
	Area	Area Latitude	Area Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Aareymilk Colony S.O	19.166890	72.854364	Prego	19.172650	72.860339	Italian Restaurant
1	Aareymilk Colony S.O	19.166890	72.854364	Taco Bell	19.173897	72.860184	Fast Food Restaurant
2	Aareymilk Colony S.O	19.166890	72.854364	Domino's Pizza	19.163121	72.845844	Pizza Place
3	Agripada S.O	18.983293	72.826819	The Tote	18.980391	72.820367	Italian Restaurant
4	Ambewadi S.O (Mumbai)	18.954329	72.821730	Bachelor's Ice Creams	18.954113	72.815396	Ice Cream Shop



Schools data frame and plotted on map

Academic venues - School containg areas, Pin codes and coordinates  
(342, 7)  
['High School' 'Nursery School' 'Religious School' 'Adult Education Center'  
'School' 'Preschool' 'Music School' 'Elementary School' 'Tattoo Parlor'  
'College Academic Building' 'Student Center' 'Private School' 'University'  
'Driving School' 'Church' 'Office' 'College Science Building'  
'Language School' 'General College & University' 'Flight School'  
'IT Services' 'Temple' 'Middle School' 'Monument / Landmark']

	Area	Area Latitude	Area Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	A I Staff Colony S.O	48.52507	44.586426	Школа #113	48.522261	44.584923	High School
1	A I Staff Colony S.O	48.52507	44.586426	МДОУ Детский сад #223 (территория садика)	48.523435	44.585895	Nursery School
2	Aareymilk Colony S.O	19.16689	72.854364	St Pius School	19.166435	72.855682	High School
3	Aareymilk Colony S.O	19.16689	72.854364	Pahadi Municipal school	19.166480	72.855106	High School
4	Aareymilk Colony S.O	19.16689	72.854364	ICIT College	19.163291	72.847749	High School

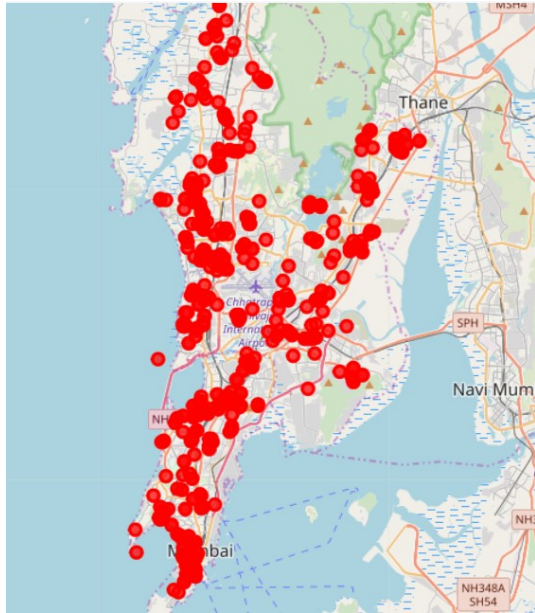


College/University data frame and plotted on map

Academic venues - College/University containg areas, Pin codes and coordinates  
(607, 7)  
['University' 'Trade School' 'College Academic Building' 'High School'  
'General College & University' 'College Administrative Building'  
'College & University' 'College Classroom' 'Medical School'  
'College Cafeteria' 'College Soccer Field' 'Student Center' 'Courthouse'  
'College Technology Building' 'College Engineering Building'  
'College Science Building' 'College Library' 'Fraternity House'  
'College Auditorium' 'College Quad' 'College Gym' 'Library' 'College Lab'  
'Law School' 'College Math Building' 'College Arts Building' 'Theater'  
'Community College' 'College Residence Hall' 'School' 'College Stadium'  
'College Rec Center' 'College Football Field' 'College Track'  
'Advertising Agency' 'Bookstore' 'College Communications Building'  
'College Bookstore' 'Sorority House' 'College Tennis Court'  
'Medical Center']

]:

	Area	Area Latitude	Area Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	A I Staff Colony S.O	48.52507	44.586426	ГУК МФЮА	48.523869	44.573490	University
1	A I Staff Colony S.O	48.52507	44.586426	ПУ 36	48.521264	44.584839	Trade School
2	Aareymilk Colony S.O	19.16689	72.854364	Femina Believe	19.167201	72.853217	College Academic Building
3	Aareymilk Colony S.O	19.16689	72.854364	St Pius School	19.166435	72.855682	High School
4	Aareymilk Colony S.O	19.16689	72.854364	St. Pius College	19.166498	72.858134	College Academic Building



## Venue count and venue metric dataframe

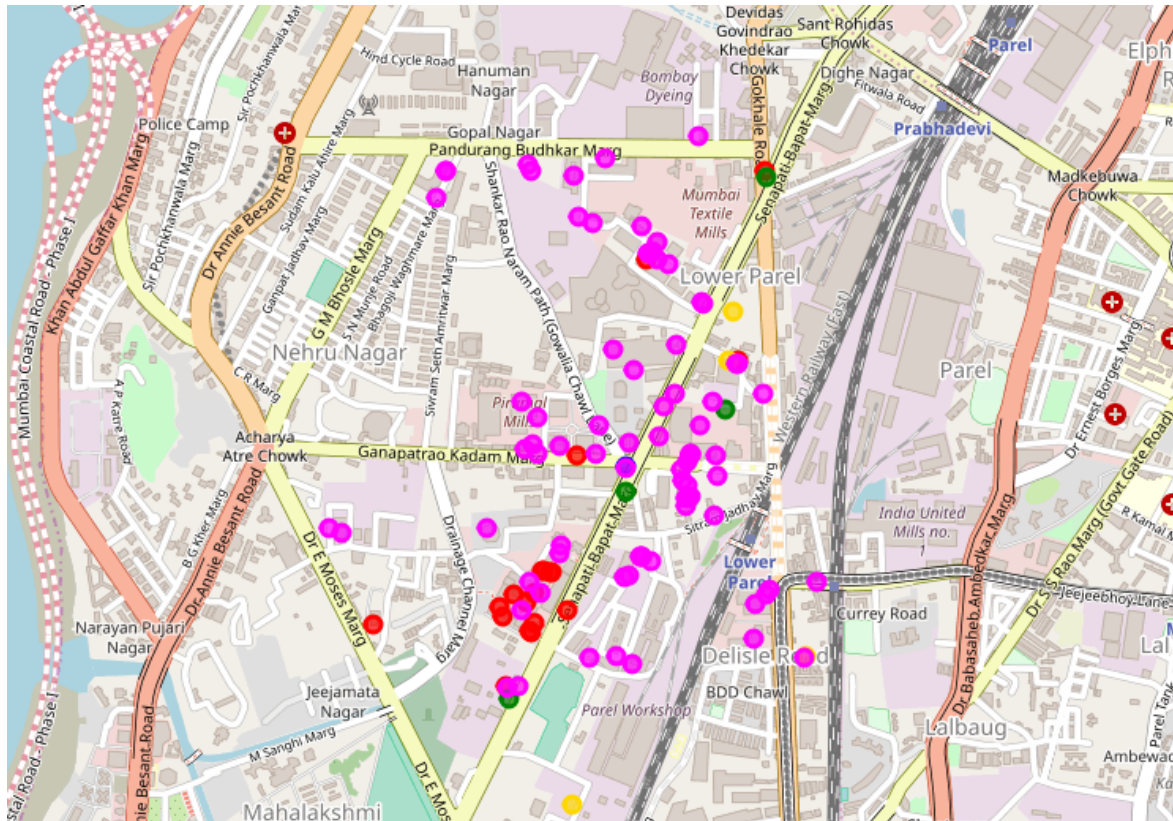
Dataframe containg count of venues  
(89, 8)

	Area	Pin Code	Latitude	Longitude	PizzaPlace	School	College	Office
0	A I Staff Colony S.O	400029	48.525070	44.586426	0.0	2.0	2.0	6.0
1	Aareymilk Colony S.O	400065	19.166890	72.854364	3.0	6.0	7.0	27.0
2	Agripada S.O	400011	18.983293	72.826819	1.0	1.0	4.0	28.0
3	Ambewadi S.O (Mumbai)	400004	18.954329	72.821730	9.0	5.0	4.0	17.0
4	Andheri East S.O	400069	19.119432	72.851426	4.0	6.0	8.0	42.0

	Area	Metric
17	BARC S.O	200.0
59	Delisle Road S.O	147.0
153	New Prabhadevi Road S.O	131.0
34	Century Mill S.O	128.0
81	High Court Building S.O (Mumbai)	126.0



Map of one of the recommendation - Delisle Road S.O





## Discussion

- Foresuqre API is robust and can be used. However, there were some issues with the Google API.
- As seen for the venue map of the recommended location, we could see that there is potential to set up a Pizza shop in that locality.
- The comments on the nearby shops and the demographic of the locality can also add value to the analysis.
- More factors such as average rating of Pizza shops in that locality can be used to enhance the study.
- Overall, there is potential to use this project as a recommender to identify location to set up a Pizza place in Mumbai.

## Conclusion

- Our analysis helped us build a recommender tool to identify an ideal location for setting up a pizza shop in Mumbai.
- The field of Data Science has huge potential in helping analyze problems and find solution to them in a systematic and scientific way.