

Comparing two locations for locating
good residential area in a New
unknown City

The Problem to be solved

- ❖ IT professional, Transferred to Pune
- ❖ exploring suitable residential area
- ❖ Looking for an area in the city with great **modern amenities** around & also **closer to the office**
- ❖ Target Audience: Self, family members and other colleagues, who are also transferred to Pune
- ❖ Shortlisted two areas based on feedback from friends & reading on the web, fastest developed areas – **Aundh & Kothrud**
- ❖ Prefers to take decision comparing number and types of venues available in the locality

Data Acquisition and Visualization

Geopy.geocoders

- ❖ Location coordinates for all three localities (Hinjewadi, Aundh & Kothrud) were retrieved with geopy.geocoders
- ❖ These coordinates were used for ...
 1. calculating distance to office from Aundh and Kothrud
 2. as an input in API calls to Foursquare

```
address = 'Hinjawadi, Pune'

geolocator = Nominatim(user_agent="lionsuneel@gmail.com")
location = geolocator.geocode(address)
hin_latitude = location.latitude
hin_longitude = location.longitude
hin_coord = (hin_latitude, hin_longitude)
print('The geographical coordinate of Hinjawadi, Pune are {}, {}'.format(hin_latitude, hin_longitude))
```

The geographical coordinate of Hinjawadi, Pune are 18.59406345, 73.74204911007135.

```
address = 'Kothrud, Pune'

geolocator = Nominatim(user_agent="lionsuneel@gmail.com")
location = geolocator.geocode(address)
kot_latitude = location.latitude
kot_longitude = location.longitude
kot_coord = (kot_latitude, kot_longitude)
print('The geographical coordinate of Kothrud, Pune are {}, {}'.format(kot_latitude, kot_longitude))
```

The geographical coordinate of Kothrud, Pune are 18.5038889, 73.807673.

```
address = 'Aundh, Pune'

geolocator = Nominatim(user_agent="lionsuneel@gmail.com")
location = geolocator.geocode(address)
aun_latitude = location.latitude
aun_longitude = location.longitude
aun_coord = (aun_latitude, aun_longitude)
print('The geographical coordinate of Aundh, Pune are {}, {}'.format(aun_latitude, aun_longitude))
```

The geographical coordinate of Aundh, Pune are 18.5618834, 73.8101957.

Data Acquisition and Visualization

Foursquare

- ❖ A local search-and-discovery app
- ❖ Uses location-specific data
- ❖ to find the best restaurants, bars, shops, entertainment, parks and nightlife in any area
- ❖ **API calls** would be placed on 'Foursquare' to explore **venues within 4 kms** of desired locations
- ❖ This request **returns a list of recommended venues** near the current location

Data Acquisition and Visualization

Foursquare

- ❖ The API calls were placed in loop
- ❖ fetching **100 venues on each call** in order to fetch all the venues
- ❖ The 'json' files retrieved through calls were **normalized** first
- ❖ then **converted into dataframes**
- ❖ Only the desired features like name of the venue, categories and their lat-longs were fetched from the entire data

```
df.head()
```

	id	name	categories	lat	lng
0	0	Hidden Place - The Hangout	Pub	18.509107	73.812280
1	1	Cafe Coffee Day	Café	18.500140	73.814254
2	2	Barometer	Café	18.498824	73.819240
3	3	Endurance Fitness Club	Gym / Fitness Center	18.499235	73.821117
4	4	CCD	Café	18.507830	73.808498

Data Aquizition and Visualization

Foursquare

❖ The **number** and **types of categories** are used to compare the two localities

Total 100 venues fetched within a total radius of 4.0 Km from Aundh Location

Total 24 venues fetched within a total radius of 4.0 Km from Aundh Location

Total 124 venues fetched in Aundh

❖ **Aundh**

Total 96 venues fetched within a total radius of 4.0 Km for Kothrud Location

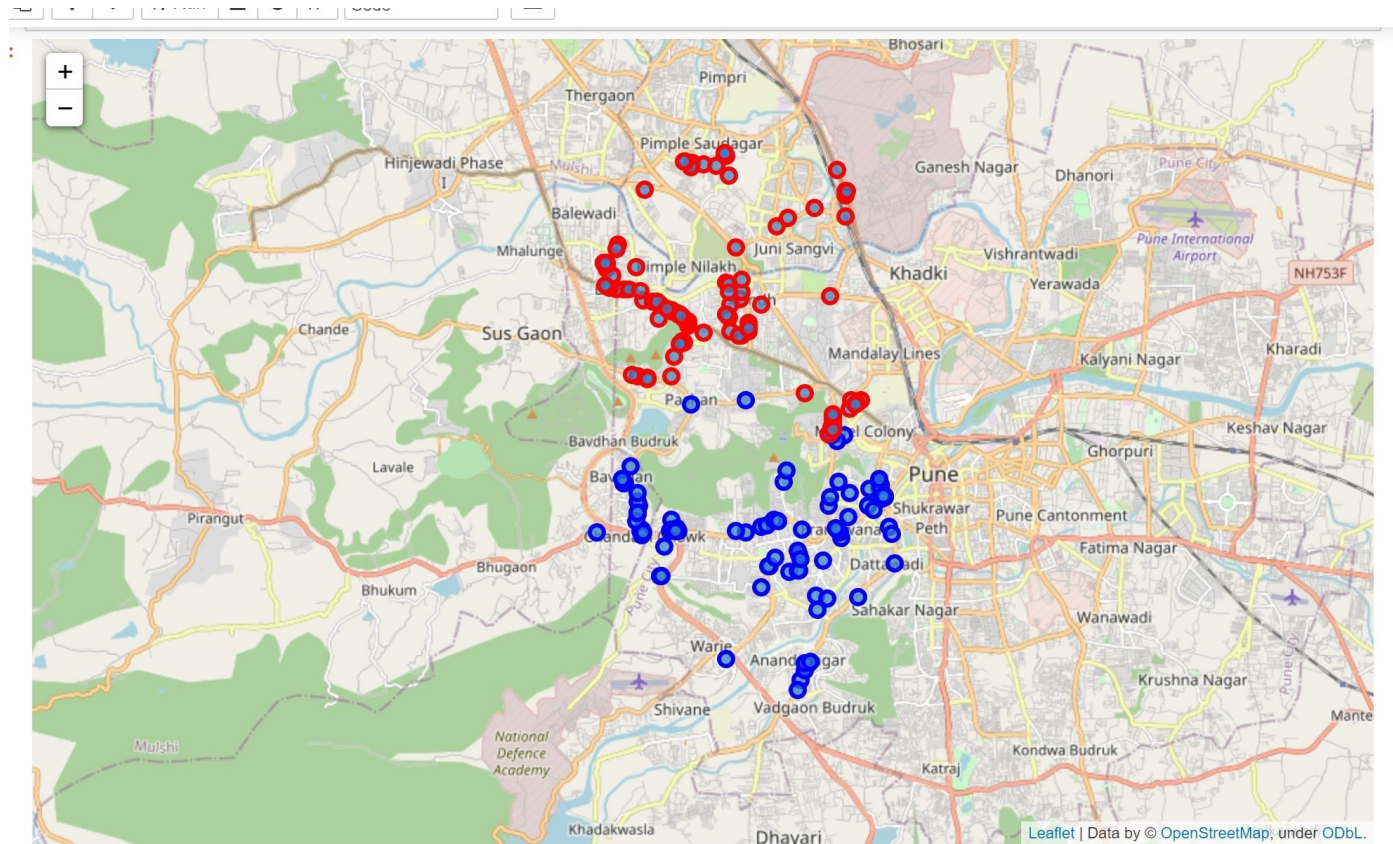
Total 96 venues fetched in Kothrud

❖ **Kothrud**

Data Acquisition and Visualization

folium

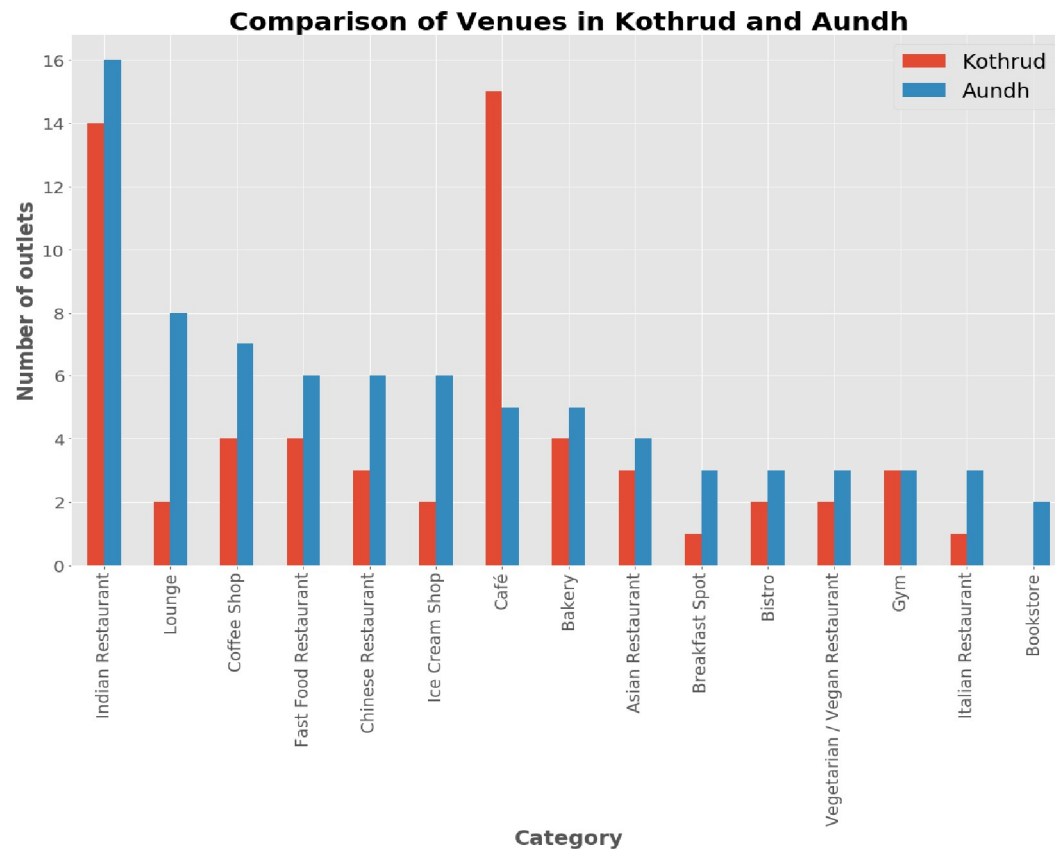
- ❖ The fetched venues were then plotted on a map
- ❖ to visualize the distribution and population of venues in the two localities



Data Acquisition and Visualization

matplotlib

- ❖ Top-15 types of venues are visualized for their numbers in each category



Data Aquizition and Visualization

Geopy.distance

- ❖ Used to calculate **geodesic distance** between two location coordinates
- ❖ The geodesic distance is the shortest distance on the surface of an ellipsoidal model of the earth
- ❖ Another method, '**Great-circle distance**' uses a spherical model of the earth, using the mean earth radius. However this method results in an **error of up to about 0.5%.**

```
Distance from Hinjawadi to Kothrud: 12.149941753959334 km  
AND  
Distance from Hinjawadi to Aundh: 8.02677846599389 km
```

Results

- ❖ From the plot on the map, it is evident that the venues are **more densely packed around Aundh** than those around Kothrud
- ❖ Also it is observed from map that the **Aundh Location is nearer to Hinjewadi** compared to Kothrud Location
- ❖ Total number of venues fetched in **Aundh** within a radius of 4 kms are more in numbers **(124 venues)** in comparison with those fetched in **Kothrud (96 venues)**
- ❖ The bar graph for top-15 venues also show that most of the **types of venues** are **more in numbers in Aundh** than those in Kothrud.
- ❖ The geodesic distance from the office to **Aundh** is lesser **(8.0 kms)** in comparison to **Kothrud (12.1 kms)**

Conclusion

‘Aundh’ area is the preferred choice over ‘Kothrud’ area because –

- ❖ **More number of densely placed Venues**
- ❖ **Most of the categories of venues are more in number than those in Kothrud area**
- ❖ **The travel distance to the office would be shorter leading to shorter travel time and lesser fuel consumption**