



Determine Locations for New Yoga Center in Bangalore

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Bangalore is the New Hub of Business

- Thanks to IT industry Bangalore has Grown exponentially in past decade.
- Rise in population has meant high demand for services
- Its now new hub of Start Up businesses
- Tech Savvy people looking for affordable fitness centres.
- Fitness focussing on Mind and body wellbeing are niche areas still under explored in Bangalore

Data Acquisition

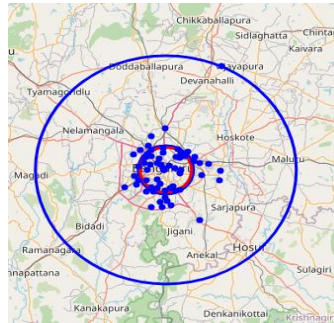
- Data on Bangalore Localities is picked from Wikipedia.
- Respective localities are plotted on map to arrive at nominal area to analyze
- Foursquare API used to determine location profile and key statistics
- OpenCage API for geocoding and reverse geocoding

Stages of Data Acquisition

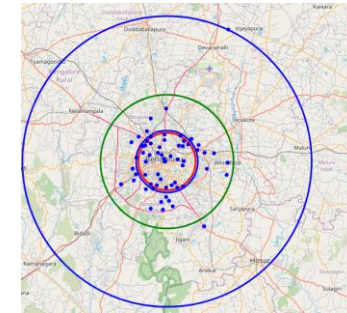
Get Spatial Coordinates of Each Location

	Name	Latitude	Longitude
0	Cantonment area	13.019567	77.509589
1	Domlur	12.962467	77.638196
2	Indiranagar	12.973291	77.640467
3	Jeevanbheemanagar	12.971940	77.593690
4	Malleswaram	13.016341	77.558664

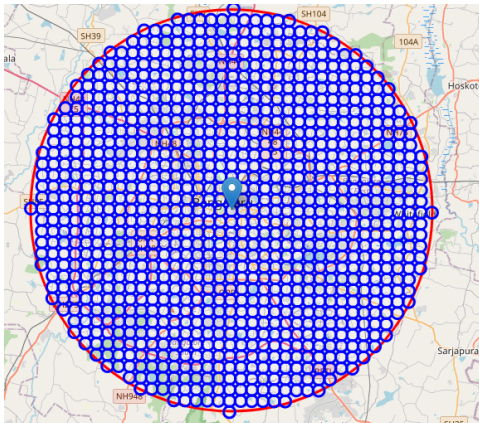
Plot Each Location and do comparative study to find Effective Radius



The effective Radius shown as Green Circle Denotes area of Analysis



Entire Area of Bangalore is Divided into Circular Cells of 500 M Radius



For each Cell the Spatial Coordinates and Cartesian Coordinates

	Address	Latitude	Longitude	X	Y	Distance from center
0	Bangalore Urban, Sakalavara - 560105, Karnataka	12.809804	77.596813	781902.49553	1.417520e+06	18000.000000
1	Byatarayanadoddi, Anekal	12.819288	77.550878	776902.49553	1.418520e+06	17720.045147
2	Byatarayanadoddi, Anekal	12.819199	77.560084	777902.49553	1.418520e+06	17464.249197
3	Gottigere, Bangalore South	12.819109	77.569289	778902.49553	1.418520e+06	17262.676502
4	Bannerughatta, Anekal	12.819019	77.578495	779902.49553	1.418520e+06	17117.242769

Data Refinement

	Address	Latitude	Longitude	X	Y	Distance from center
0	Bangalore Urban, Sakalavara - 560105, Karnataka	12.809804	77.596813	781902.49553	1.417520e+06	18000.000000
1	Byatarayanadoddi, Anekal	12.819288	77.550878	776902.49553	1.418520e+06	17720.045147
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	id	name	categories	lat	lng	distance	xs	ys
0	4bebb94561aca593885d8500	Toyota India Corporate Office	Office	12.971625	77.595967	287	781629.358542	1.435431e+06
1	4e54ceff1f6e7ab6b1b64441	TNT	Office	12.965733	77.603708	933	782476.361020	1.434787e+06
2	4f03d75c0e61e937ce874cd8	Madison Platinum Office	Office	12.981899	77.601903	1119	782262.170396	1.436574e+06
3	4dc14f03c65b268b41d82b86	ESPN Digital Media (India) Private Limited	Office	12.961511	77.599495	1217	782023.807946	1.434315e+06
4	4be13706c1732d7f33785b9a	Du Parc Trinity	Office	12.972480	77.618951	2219	784123.454505	1.435551e+06

Above Data is Combined to Arrive at following final data for Exploration

	Address	Latitude	Longitude	X	Y	Distance from center	Gyms	YogaCenters	Offices	Residential	Commercial	Colleges
0	Bangalore Urban, Sakalavara - 560105, Karnataka	12.809804	77.596813	781902.49553	1.417520e+06	18000.000000	0	0	0	0	0	1
1	Byatarayanadoddi, Anekal	12.819288	77.550878	776902.49553	1.418520e+06	17720.045147	0	0	0	0	0	0
2	Byatarayanadoddi, Anekal	12.819199	77.560084	777902.49553	1.418520e+06	17464.249197	0	0	0	0	0	0
3	Gottigere, Bangalore South	12.819109	77.569289	778902.49553	1.418520e+06	17262.676502	0	0	0	0	0	0
4	Bannerughatta, Anekal	12.819019	77.578495	779902.49553	1.418520e+06	17117.242769	0	0	0	0	0	0

Methodology

- Analyse the extracted data to determine Primary locations of interest.
- Do an exploratory analysis to determine Secondary Locations of Interest .
- Using Kmeans Clustering Algorithm identify Primary and Secondary Clusters of interest
- Use Reverse Geocoding to determine the addresses of the the clusters as the final result

Further Analysis of Data Collected in Previous Stage

We compute for each location distance to nearest Gym, Yoga Centre and Amenities

	Address	Latitude	Longitude	X	Y	Distance f	Gyms	YogaCentr	Offices	Residenti	Commerci	Colleges	Distance t	Distance t	Distance to Amenity
0	Bangalore	12.8098	77.59681	781902.5	1417520	18000	0	0	0	0	0	1	10415.09	5062.131	0
1	Byataraya	12.81929	77.55088	776902.5	1418520	17720.05	0	0	0	0	0	0	5496.633	4560.348	4000
2	Byataraya	12.8192	77.56008	777902.5	1418520	17464.25	0	0	0	0	0	0	6381.579	4922.196	3000
3	Gottigere,	12.81911	77.56929	778902.5	1418520	17262.68	0	0	0	0	0	0	7296.309	4467.825	2000
4	Bannerugl	12.81902	77.57849	779902.5	1418520	17117.24	0	0	0	0	0	0	8230.899	4107.108	1000
5	Bannerugl	12.81893	77.5877	780902.5	1418520	17029.39	0	0	0	0	0	1	9179.285	3971.803	0
6	Bangalore	12.81884	77.59691	781902.5	1418520	17000	0	0	0	0	0	1	9423.524	4084.373	0
7	Bangalore	12.81875	77.60611	782902.5	1418520	17029.39	0	0	0	0	0	0	9610.985	4391.658	1000
8	Bangalore	12.81866	77.61532	783902.5	1418520	17117.24	0	0	0	0	0	0	9896.427	4103.964	2000
9	Yarandaha	12.81856	77.62452	784902.5	1418520	17262.68	0	0	0	0	0	0	10271.68	3380.427	2236.068

Selecting Required Data

- Using Panda Sql we derive our Desired Primary and Secondary Locations

```
areas_of_interest = pd.DataFrame()
areas_of_interest = pysqldf("SELECT * FROM blr_locations WHERE YogaCenters = 0 and Gyms = 0 and (Offices > 0 or Residential > 0 or Commercial > 0 or Colleges > 0);")

print('Total number of Primary Areas:',len(areas_of_interest))
```

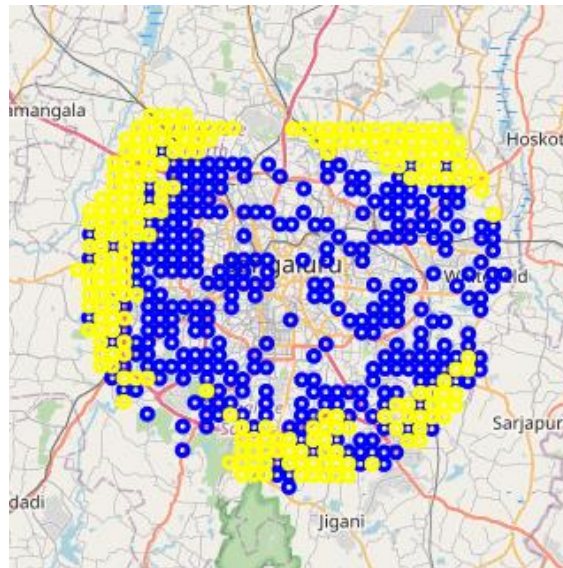
Total number of Primary Areas: 313

```
: secondary_areas = pysqldf("select * from blr_locations where YogaCenters = 0 and Gyms = 0 and Offices = 0 and Residential = 0 and Commercial = 0 and Colleges = 0 and [Distance to Amenity] > 0 and [Distance to Amenity] < 4000 and [Distance to Yoga Center] > 5000")
#pysqldf("SELECT * FROM blr_locations WHERE [Gyms in the Area]> 1 ").head()
print('Total Number of Secondary Area of Interest : ',len(secondary_areas))
```

Total Number of Secondary Area of Interest : 220

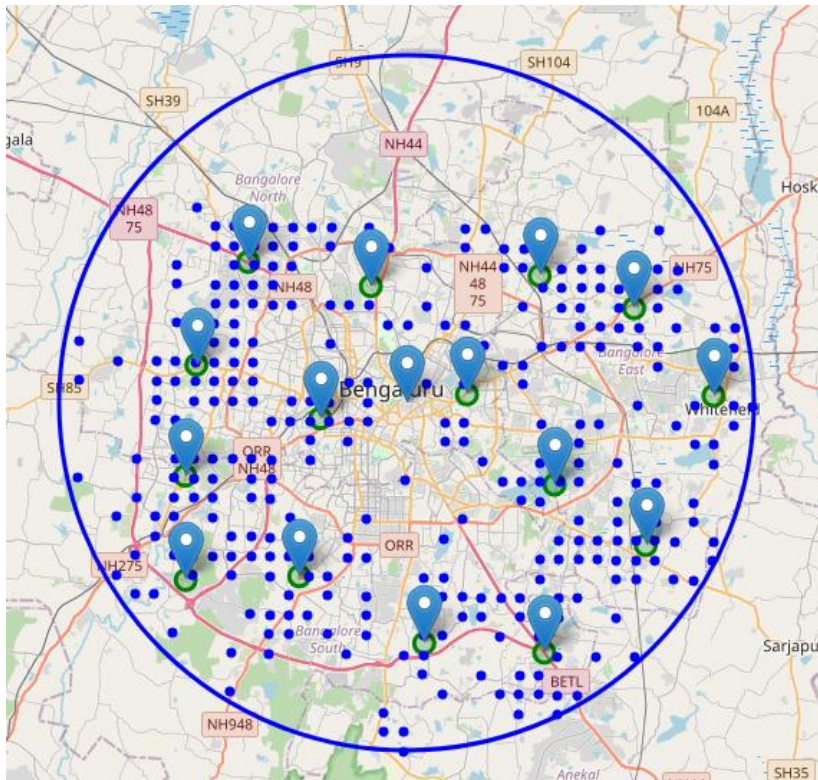
Plotting on Map to Show Areas of Interest

- Areas marked in Blue are Primary Locations
- Areas marked in Yellow are the Secondary Locations

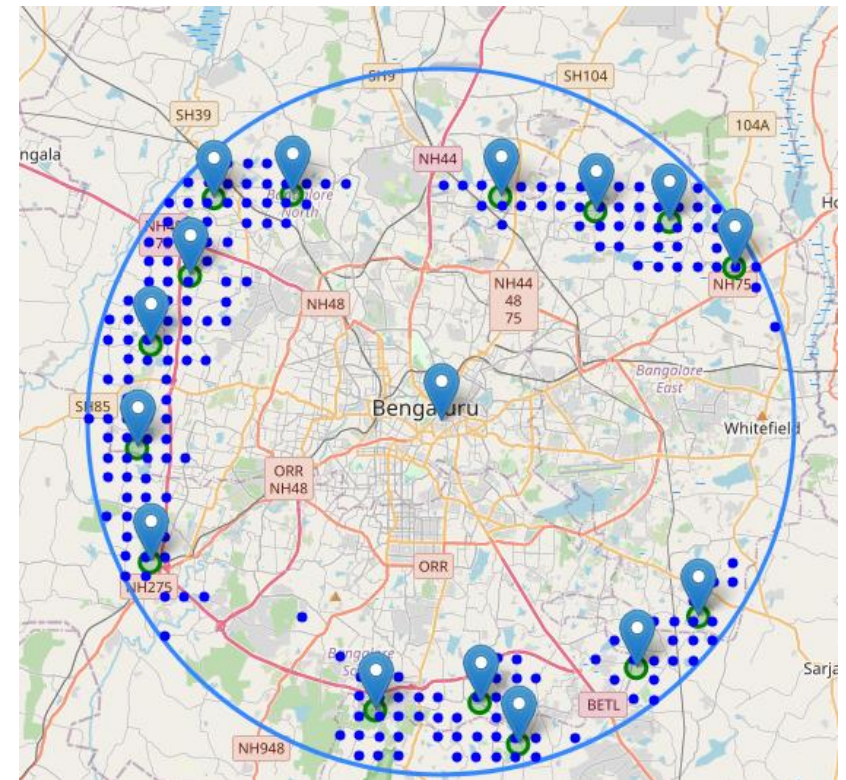


Clustering the Locations

Using K-means Clustering Algorithm we create 15 clusters of Primary and Secondary Locations



Cluster of Primary Locations



Cluster of Secondary Locations

Final Result of Probable Locations

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Addresses of Primary Locations recommended for further analysis
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Rayapuram Ward, Bengaluru - 560026, Karnataka	=> 4.6km from Bangalore Center
K R Puram, Bengaluru - 560 036, Karnataka	=> 12.8km from Bangalore Center
Begur, Bengaluru - 560076, Karnataka	=> 12.4km from Bangalore Center
4th Cross Road, Ganga Nagar Ward, Bengaluru - 560094, Karnataka	=> 6.3km from Bangalore Center
BWSSB Pipeline Track, Herohalli, Bengaluru - 560091, Karnataka	=> 11.1km from Bangalore Center
Kengeri Main Road, Jnana Bharathi, Bengaluru - 560074, Karnataka	=> 12.1km from Bangalore Center
Jogupalya, Bengaluru - 560007, Karnataka	=> 3.2km from Bangalore Center
India International School, Gunjur Varthur Main Road, Varthuru, Bengaluru - 560087, Karnataka	=> 14.4km from Bangalore Center
Krishna Leela Park, Pipeline Road, Vasanthapura, Bengaluru - 560082, Karnataka	=> 10.5km from Bangalore Center
1st Cross Road, Horamavu, Bengaluru - 560 077, Karnataka	=> 9.5km from Bangalore Center
Bellandur Lake, 7th Cross Road, Bellanduru, Bengaluru - 560017, Karnataka	=> 8.8km from Bangalore Center
Bangalore Elevated Tollways Limited, Begur, Bengaluru - 560 100, Karnataka	=> 14.7km from Bangalore Center
Umiya Woods, Ecumenical Christian Center Road, Hagadur, Bengaluru - 560066, Karnataka	=> 15.9km from Bangalore Center
HMT Ward, Bengaluru - 560057, Karnataka	=> 11.0km from Bangalore Center
Hemmigeppura, Bengaluru - 560074, Karnataka	=> 14.7km from Bangalore Center

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Addresses of Secondary Locations recommended for further analysis
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Thanisandra, Bengaluru - 56077, Karnataka	=> 11.8km from Bangalore Center
Gottigere, - 560083, Karnataka	=> 15.0km from Bangalore Center
Bangalore Urban, Machohalli - 560018, Karnataka	=> 15.3km from Bangalore Center
Bangalore Urban, Kodati - 560035, Karnataka	=> 16.5km from Bangalore Center
Bangalore Urban, Avalahalli - 560049, Karnataka	=> 16.9km from Bangalore Center
Anchepalya, Chikka Banavara - 560090, Karnataka	=> 16.2km from Bangalore Center
Challaghatta, Kommaghatta - 560074, Karnataka	=> 16.5km from Bangalore Center
Hudi, Bengaluru - 56077, Karnataka	=> 13.3km from Bangalore Center
Yarandahalli, Hulimangala - 560100, Karnataka	=> 16.8km from Bangalore Center
Begur-Koppa Road, Begur, Bengaluru - 560105, Karnataka	=> 14.4km from Bangalore Center
Dodda Bidarakallu, Bengaluru - 560073, Karnataka	=> 14.8km from Bangalore Center
Ullalu Upanagara, Kannalli - 560110, Karnataka	=> 15.6km from Bangalore Center
Begur, Bengaluru - 560 100, Karnataka	=> 16.0km from Bangalore Center
K. Channasandra, Bidarahalli - 560049, Karnataka	=> 15.5km from Bangalore Center
Shettihalli, Bengaluru - 560090, Karnataka	=> 13.8km from Bangalore Center

Conclusion

- The addresses are mere Starting Points for further exploration by stake holders
- Additional information like Real Estate rates, Population demographics of the area would aid in further refinement.