

Segmenting Apartment complexes in Bangalore

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1. Introduction

1.1 Background

Bangalore is a city in the southern part of India and is commonly known as Silicon Valley of India because of being a technology and start-up capital of India. The city has also seen a real estate boom on the onset of millennium due to an increase in the affordability of the middle class. There is a value in understanding the real estate packages on offer based on the size and location. This will allow us to understand what are the various price segments in which apartments are offered and is it actually providing enough value for the price.

1.2 Problem Statement

This analysis will be focusing on a hypothetical prospective customer named Mr. Omar Little who is moving to Bangalore with family for a long time and is looking for an apartment.

He has the following requirements:

- a. He is looking for a moderately sized 3 Bedroom apartment which is moderately (not premium) prized
- b. He is looking for the apartments which have schools and hospitals in the vicinity (within 2 Kms of the apartment)

1.3 Who is this for?

This analysis is for potential homebuyers in any big city across India who are home-hunting and are looking for apartments which meet their affordability criteria. This helps us in understanding how apartment offerings are packaged according to size and price in the metro cities in India such as Bangalore.

2. Description of the Data

2.1 Source of Data

The data was sourced from Kaggle ([here](#)) where a user has collected the real estate website data from a website. The data had was available as 2 CSV files:

- a. **apartment dataset:** *datasets_151373_358770_apartment_data.csv* – List of apartments in Bangalore with their longitude and latitude
- b. **apartment details dataset:** *datasets_151373_358770_blore_apartment_data.csv* – The size (number of rooms), area, price of the apartments ()

The foursquare API was then be used to get the neighbourhood venues(within 5000m radius) to these apartments.

The foursquare API was also used to fetch the hospitals and schools near this apartment by specific queries on category hospitals and schools.

2.2 Data Cleaning

2.2.1 Data Cleansing for apartments.csv:

- The apartment dataset has just 4 columns with the *apartment name*, *latitude* and *longitude* and *geometry*. The geometry column was dropped as it was a repeat of the coordinates again.
- The names column had city appended to each name of the column. The city name was parsed out of the *names* columns

2.2.2 Data Cleansing for apartment details.csv

- The apartment details csv had four columns namely *names*, *Price*, *Area*, *Unit type*.
- The *Price* column were coded as alphanumeric (e.g. 100000 as 1 L, 1000000 as 1C) and the lower and upper prices were coded in the same column. The column was split based on '-' and the amounts were converted to a numeric value.
- The *Unit Type* had BHK appended to it. To convert it to a numeric value, the BHK was split off.
- Some of the apartments had types such as 1 RK Studio Apartment, 1 RK Apartment, 1RK, Studio. These were coded as 0.5 BHK apartments.
- There were some properties which had an entry simply as a Plot. These entries were dropped.
- The Price and Area fields were converted to Float data types. The low and high price were made same if one of them was not available.
- The Mean price and Mean area per property was determined to standardize and cluster it later.

2.2.3 Merging

- The data frames created above were merged into a single final data set which was used for further processing.

2.2.4 Summary of pre-processing

Input file name	Input Columns	Columns Dropped	Columns Created	Output Data frame Name
<i>datasets_151373_358770_apartment_data.csv</i>	<i>names,lat,lon,geometry</i>	<i>geometry</i>	NA	<i>bang_apt</i>
<i>datasets_151373_358770_blore_apartment_data.csv</i>	<i>names,price,area,Unit type</i>	<i>price,area,Unit type</i>	Size(BHK),Area-L,Area-H,Price-L-num,Price-H-num	<i>bang_apt_details</i>

2.3 Four Square data fetch

2.3.1 Venues search

- The two dataframes (*bang_apt* and *bang_apt_details*) were merged and and final bangalore data set(*bang_fin*) was created.
- Since the interest is in 3BHK apartments, a new dataframe *df_surya* was created for 3BHKs with average price and areas averaged.
- The foursquare API was then called for each of these apartments to get the venue details(*df_venues*) which was then one-hot coded(*bg_onehot*) and clustered.
- This allowed clustering of the apartments based on their price and nearby venues and allowed us to select the cluster based on moderate pricing.

2.3.2 Hospital and Schools Data

- a. The cluster data which corresponded to the moderate pricing was moved to a new dataframe(*bg_cluster1*)
- b. The **query search** feature of Four Square was used to get hospitals(*df_hosps*) and schools(*df_schools*) in the 2Km radius of the apartments.
- c. This data was then grouped based on number of hospitals(*df_hosps_grouped*) and schools(*df_schools_grouped*) near the apartments and the mean distance of those hospitals and schools.
- d. The data was then merged to create a dataset(*bg_final_sel*) of apartments which had both hospitals and schools near the apartments which yielded 148 such apartments.
- e. This data was then sub-clustered again to understand the best deal possible which satisfies the requirements and cluster label was added.
- f. The top 20 venues near each of these apartments were added again to provide a holistic view of the apartments with all the venues and the average distance of hospitals and schools near them.