PROPOSAL   FOR

GOVERNMENT ZONAL HOSPITALS

- MUMBAI

BACKDROP…

- Medical care has become very expensive

- 80% of Indian Population can't afford corporate hospitals

- Government hospitals are very few

- Traffic in metropolitan cities like Delhi, Mumbai, Kolkata, Chennai and in major cities like Hyderabad, Bangalore etc. is becoming bad to worse

- There are many cases where a patient died on the way to an affordable hospital

- In this scenario, it's very important to have a government hospital or government aided hospitals in close vicinities

- Pin code(or postal code),very prevalent in India , is a means of grouping areas

- Each city has few to many pin codes, depending on the size of the city and its spread

- So, Pin code can be safe and strong base to cluster the areas in a city

PROPOSED SOLUTION

 The solution proposed here is to identify at least one hospital in each area (Pin Code) that government can take over or provide aid, so that it becomes economically affordable to all the people.

In case where there is no hospital in that area(Pin Code), a hospital in the cluster, where this Pin Code is grouped into, is selected.

If there is no hospital even in the cluster, then a proposal to build a government hospital in that cluster, is suggested.

DATA EXTRACT AND CLEANING

- The list of Pin codes with the names of the areas are extracted from https://worldpostalcode.com/india/maharashtra/mumbai/

- The Latitude and Longitude for these areas are found with the help of Nominatim.

- The Pin codes for which the latlong could not be found, will be dropped

- Foursqare API is used to get the list of all hospitals in that particular Pin codes (using latlong found from Nominatim)

- The Pin Codes are then grouped, on the basis of latitude and longitude.

- This grouping is done by Kmeans. An appropriate value of K is found by examining the "Sum_of_squared_distances" for each value of K, over a range of values.

- This data is then processed, to find the suggestion of a Hospital name in every area. Then government can aid this hospital to make it economically affordable to everyone.

PIN CODE AND AREA NAME EXTRACT

- The Pin Code and the area name is extracted from
https://worldpostalcode.com/india/maharashtra/mumbai/

- This raw data is then cleaned using "BeautifulSoup"

- A dataframe with Area name and Pin code is created, this is the starting data which will later be processed

size of the dataframe is : (128, 2)

	Area_name	PinCode
0	A I Staff Colony	400029
1	Agripada	400011
2	Airport	400099
3	Ambewadi	400004
4	Andheri East	400069

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shape before: (128, 4)
shape after: (89, 4)
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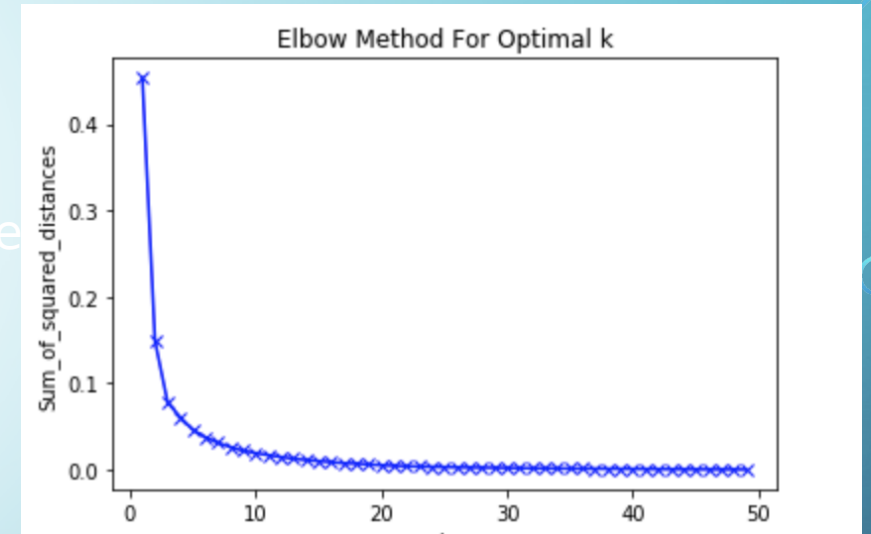|	Area_name	PinCode	Latitude	Longitude
0	Agripada	400011	18.975302	72.824898
1	Airport	400099	19.090201	72.863808
2	Ambewadi	400004	19.186776	72.859313
3	Andheri East	400069	19.115883	72.854202
4	Andheri H.o	400053	19.119125	72.847331

FOURSQUARE API

- Foursquare API is used to check if there is any hospital in the Pin Code (latlong) and if there is then the list of all hospitals is extracted and is added.

	Area_name	PinCode	Latitude	Longitude	IsHospital	Hospital_list
0	Agripada	400011	18.975302	72.824898	1	[Wockhardt Hospital, Nair Hospital, B Y L Nair...
1	Airport	400099	19.090201	72.863808	0	[]
2	Ambewadi	400004	19.186776	72.859313	1	[st marys hospital]
3	Andheri East	400069	19.115883	72.854202	1	[criticare hospital]
4	Andheri H.o	400053	19.119125	72.847331	1	[Sanjeevani Hospital, BSES Hospital, Brahmakum...

CLUSTERING

- Multiple times clustering, resulted in a different shape cluster each time, but there was no affect after that

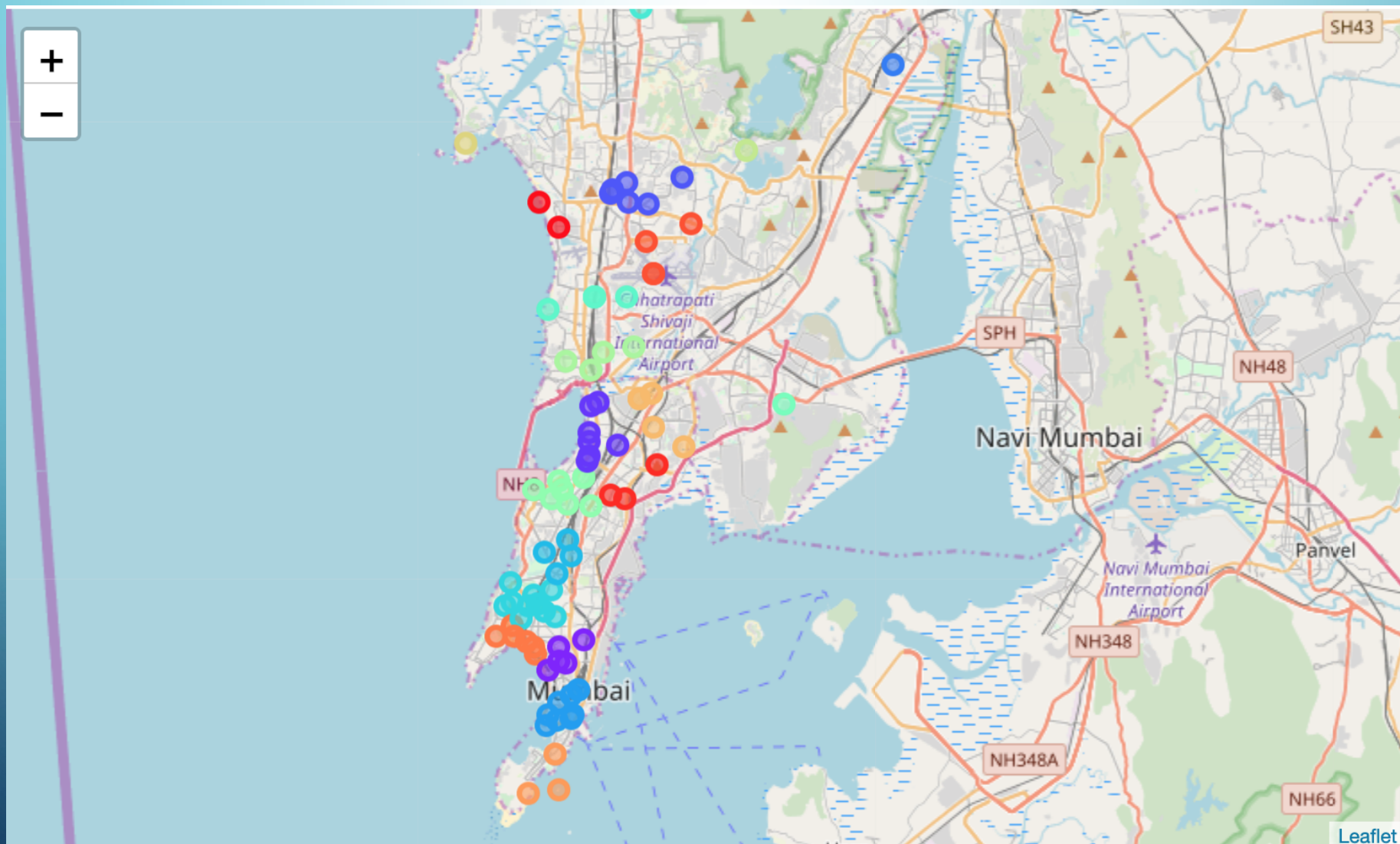- The City is clustered on latlong, using Kmeans.

- Finding Optimum K

- The cluster numbers added

Elbow Method For Optimal k

shape: (89, 7)

	Area_name	PinCode	Latitude	Longitude	IsHospital	Hospital_list	clusters
0	Agripada	400011	18.975302	72.824898	1	[Wockhardt Hospital, Nair Hospital, B Y L Nair...	7
1	Airport	400099	19.090201	72.863808	0	[]	18
2	Ambewadi	400004	19.186776	72.859313	1	[st marys hospital]	8
3	Andheri East	400069	19.115883	72.854202	1	[criticare hospital]	3
4	Andheri H.o	400053	19.119125	72.847331	1	[Sanjeevani Hospital, BSES Hospital, Brahmakum...	3

FOLIUM MAP FOR CLUSTERS

HOSPITAL AT CLUSTER

- For all the Pin Codes that doesn't have a hospital, check is perfomed to find a hospital in the cluster. If present then that hospital is added.

- If not present, "No hospital Present" is written

	Area_name	PinCode	Latitude	Longitude	IsHospital	Hospital_list	clusters	cluster_Is_H	cluster_H_list
0	Agripada	400011	18.975302	72.824898	1	[Wockhardt Hospital, Nair Hospital, B Y L Nair...	7	0	[]
1	Airport	400099	19.090201	72.863808	0	[]	18	1	Medicare hospital
2	Ambewadi	400004	19.186776	72.859313	1	[st marys hospital]	8	0	[]
3	Andheri East	400069	19.115883	72.854202	1	[criticare hospital]	3	0	[]
4	Andheri H.o	400053	19.119125	72.847331	1	[Sanjeevani Hospital, BSES Hospital, Brahmakum...	3	0	[]

FINAL RESULT

- Finally one more column added, which suggests the name of the hospital either from the hospitals in the Pin Code or from the hospitals in the Cluster(for cases where there is no hospital in the Pin Code.
- The suggested name of the hospital is selected randomly.
- The best bet would be to include the ratings of a hospital, in the selection process.

	Area_name	PinCode	Latitude	Longitude	IsHospital	Hospital_list	clusters	cluster_Is_H	cluster_H_list	Govt_Hospit
0	Agripada	400011	18.975302	72.824898	1	[Wockhardt Hospital, Nair Hospital, B Y L Nair...	7	0	[]	Wockhardt Hospital
1	Airport	400099	19.090201	72.863808	0	[]	18	1	Medicare hospital	Medicare hospital
2	Ambewadi	400004	19.186776	72.859313	1	[st marys hospital]	8	0	[]	st marys hospital
3	Andheri East	400069	19.115883	72.854202	1	[criticare hospital]	3	0	[]	criticare hospital
4	Andheri H.o	400053	19.119125	72.847331	1	[Sanjeevani Hospital, BSES Hospital, Brahmakum...	3	0	[]	Sanjeevani Hospital

CONCLUSION AND SUGGESTIONS

- The suggestion would be to pick the suggested hospital and provide aid, so that medical care in that hospital will be affordable.

- According to the observations during the process, there are at least 3 or 4 Pin Code that does not have hospital either in the Pin Code or at the cluster level.

- This is a depressing fact.

- May be a new hospital in each of this cluster should be built.