

Segmentation and Clustering of Medical Facilities in the Greater Accra Region of Ghana

Edward Deladem Kobla Lampoh

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1. INTRODUCTION

1.1 Background:

The Greater Accra region of Ghana in spite of having the smallest land mass among the other 16 regions in this West African country, is the 2nd most densely populated region in the country[1]. The most populated region being the Ashanti Region. It is no surprise that the statistics are this way since this rather small region is also the largest commercial region of the country and home to the capital city, Accra. It is worth noting that in the wake of recent developments in the continent of Africa, Ghana has been elected the commercial capital at the center of the Africa Continental Free Trade Agreement.

1.2 Problem:

More commercial activity would mean more offices and more people engaging this commercial terrain. This presents the challenge of increasing the already high traffic congestion across the region. High traffic congestion in cities stresses the populace as they spend longer time on the road commuting from one location to the other. Proximity to vital locations such as medical facilities need to be looked at, so that traffic situations do not delay access to such facilities in case of emergencies. It's also worth noting that the people's choice of medical facility to visit when the need arises is not only influenced by proximity. This project seeks to explore and provide insight about the distribution of medical facilities across the region showing the areas that need medical facilities and the kind that the people will find most useful.

1.3 Interest:

The Ministry of Health, the Metropolitan Assemblies as well as Real Estate developers will find this insight useful and inform their decision in addressing the medical needs of the people in the Greater Accra. Entrepreneurs who want to set private hospitals in the region would be better informed as the best locations to set up their facilities which would meet the needs of the people.

2. DATA ACQUISITION AND CLEANING

2.1 Data sources

The list of the various districts and their capitals within the Greater Accra Region were obtained from [here](#). The list of hospitals and medical facilities that can be found within a 500 meter radius along with their location data and user rating stats were obtained using Foursquare API.

2.2 Data Cleaning

The data on the medical facilities were obtained in json format using the API. There was very little challenge with the data that was obtained as desired features were readily available except for the opening hours of these facilities. The other issue that had to be dealt with was the fact that some of the data obtained from the api were not medical facilities, that is outliers which do not belong to the target of the call I made to the api, however these were very few and were dropped from the data. I defined a function that made a count of the total number of hospitals found within 500 meters radius of each district capital and assigned the total number to each respective district. It became apparent that the distribution of medical facilities was uneven which is exploratory data analysis session. It is worth noting that though the data source for the list of districts and their capitals also included the coordinates of each district capital which could be scrapped, it was easier and more direct to pull that information using the API.

A total number of 29 district capitals exist across the greater Accra region with a total number of 517 medical facilities.

Th tables below are samples of the data collected:

District	Capital	Number of Medical Facilities
Ablekuma Central Municipal	Lartebiokorshie	20
Ablekuma North Municipal	Darkuman	20
Ablekuma West Municipal	Dansoman	20
Accra Metropolitan	ACCRA	20
Ada East	Ada-Foah	20
Ada West	Sege	3
Adentan Municipal	Adenta	20
Ashaiman Municipal	Ashaiman	20

NAME OF HOSPITAL	RATING	TOTAL RATINGS	LATITUDE	LONGITUDE
Barnor Hospital	3.8	21	5.549374	-0.240991
Holy Care Specialist Hospital	4.4	9	5.549925	-0.244662
Loving Life Chinese Clinic	4.2	6	5.548236	-0.232870
Beth's Clinic	4	1	5.550399	-0.233826
Robert Medical Centre	4.7	6	5.547638	-0.233553
D-Health Enterprise	3.5	2	5.541845	-0.239605