Team Name: IKSHA

Topic: Health Care Centers Map

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**Procedure:**

1. It was decided to locate various health centers and hospitals spread over 16 Mandals of the Hyderabad district (not city) of Telangana State.
2. The “Mandal Boundary” of the Hyderabad District was downloaded from <https://data.telangana.gov.in/>, which is an open source datasets portal of Government Of Telangana.
3. There was no direct data pertaining to the coordinates of various hospitals available in any open source websites I have checked. Few datasets were made available by some insurance companies, but as the mapathon rules of using only ISRO data, the datasets were neglected.
4. I added the Mandal Boundary layer on to Bhuvan 2D([ISRO's Geoportal | Gateway to Indian Earth Observation | 2D Viewer (nrsc.gov.in)](https://bhuvan-app1.nrsc.gov.in/bhuvan2d/bhuvan/bhuvan2d.php)),(Tools>Add Layer),and using its Proximity Analysis, I got the locations of health centers and hospitals under the “ Health and Wellness” category. Now the challenge was to extract the data.
5. Initially I thought to pointout locations of hospitals one by one on Bhuvan 2D, using the Point feature from“Draw Tool”, from Tools option . Like this I would get the coordinates of every hospital. But for each hospital I had to make 2 mouse clicks and pointing out each hospital in Hyderabad would take a very very long time.
6. I had to think of another way to solve the problem. I then used the Line feature by pointing the hospitals and thought of extracting coordinated of hospitals.(Line feature saved my time a lot, compared to the Point feature from “Draw tool”). So I made a small trial and found out that I was able to make points out of the vertices of the line I make in QGIS. The procedure I followed in QGIS: Added Mandal Boundary layer>Added the Line Layer made from Bhuvan 2D> Toggle Editing> Vertex Tool. Thus, I was able to get the coordinates of the vertices in a Table in the “Vertex Editor” dialogue box. I copied the columns in to an excel document. The data was copied into one cell, later had to divide it into columns to have Longitude and Latitude in each cell. I continued this for 3 to 4 mandals. But somehow this method was stopped working, as I was unable to copy the table contents of the Vertex Editor. I had to find yet another way.
7. I came across this option “Vectors>Geometry Tools>Extract Vertices”. With this I extracted the the locations but in polar coordinate system. After many trials I came across this, “Processing> Toolbox> Vector Table> Add X/Y fields to layer” option via which I was able to get the coordinates of the hospital locations. This feature was saved and from its “.dbf” I extracted the coordinates and copied to another CSV document. The above method was used for all the remaining mandals. Therefore I finally had all the coordinates of the hospitals, with its Longitudes and Latitudes categorized by their Mandals. Nearly 7000 hospitals/health centers were indicated including dental clinics, eye clinics, veterinary clinics, homeopathy clinics, hospitals etc.
8. The metro rail data was taken from Hyderabad Metro Rail Limited ([Open data - Hyderabad Metro Rail (hmrl.co.in)](https://hmrl.co.in/open-data.html)). The station locations as points were added as layer and joined using line tool to represent the track. The three main tracks are indicated in the Map as followed by the Hyderabad Metro Rail.
9. I have also shown two large water bodies Hussain Sagar and Mir Alam Tank using the Polygon feature from Draw tool of Bhuvan 2D.

**Complexities faced:**

As I am a complete beginner to the subject and having no idea how to use QGIS, I faced few complexities and was very happy that I understood and solved them on my own. I could have just located the hospitals and just made a layer for each mandal. By doing so, the shapefile of my map won’t have any useful data in the attribute table in case, in the future any analysis was to be followed. Just blind dots on the map would not bring much meaning to the work. But, I was dedicated to have a formally sound data, and tried my best to extract the coordinates of the hospital locations. The usage of Line feature in Bhuvan 2d, its coordinate extraction was a challenging part for me to find out how.It took me lot of time to know how get to where I want. And after a lot of trials and research I thus made my map with details fine enough for a beginner. I learnt all the possibilities of Bhuvan, especially Bhuvan 2D and QGIS to achieve my simple idea.

**Potential Applications:**

I started with the idea that knowing locations of Hospitals would be helpful to reduce the time wasted in travelling/ambulance etc. Therefore I thought of analyzing areas of low hospital density with respect to the population. But Hyderabad district is not one having less hospitals. And one could potentially reach good hospitals in case of emergencies in terms of number and distance. One of the reasons why patients die in ambulances/ hospitals is not because hospitals are too far, but the ambulances/facilities fail to reach the patients/hospitals in time. Its too late before one can be saved. The main problem being traffic of Hyderabad. The issue can be attributed to its huge population too. Therefore I think the map would be helpful to trace out /construct specialized paths for ambulances to travel on road. Also in the future Metro Rail can be used to deliver Medicines/Organs/Blood etc in case of emergencies, between hospitals safely. A new infrastructure can be planned to built using the map and rail tracks can be extended to various parts of the district. A separate compartment with specialized equipment can be made available. This would reduce the wastage of time, improve the chances of life of a patient by efficient deliveries of Blood/organs etc and improve the communication between hospitals over the whole city/district.

These are some of the indirect potential applications of the map.