Spatial Databases Project

Analysis on the Schools and Hospitals in Mexico

Introduction:

I wanted to perform analysis on the schools and hospitals of any economically backward country because they are the two main building blocks for the development of any country. I have tried taking the data set of Nigeria, Republic of Sierra Leone which are the world's worst countries for health care but the datasets that were available were not that feasible ,accurate to perform analysis.

So I have taken one more economically developing country "**Mexico**" and performed analysis on the schools and hospitals of that country.

Mexico although beats majority of its peers in economic and quality life metrics, is still a developing country.

Spatial Data Used:

I have taken data set of Mexico which includes

- Mexico administrative boundaries shape file:

  The shape file is downloaded from arcgis website (https://www.arcgis.com/home/item.html?id=ac9041c51b5c49c683fbfec61dc03ba8)

- Mexico points of interest shape file:

  The shape file is downloaded from mapcruzin website

  (https://mapcruzin.com/free-mexico-country-city-place-gis-shapefiles.htm)

  This shape file contains all the points data of Mexico that includes schools,parks,places, hospitals etc of which I have filtered out schools and hospitals.

Tools used:

1. PgAdmin for running sql queries.
2. QGIS for visualizing data
3. Online tools(GeoLocator,OverPassTurbo)

Story of the Project:

Choropleth Maps:

As I wanted to do the analysis of schools and hospitals in Mexico, I had to create two choropleth maps using QGIS .One which contains the schools in Mexico and other which contains the hospitals in Mexico.

The screenshots of the maps generated are given below:

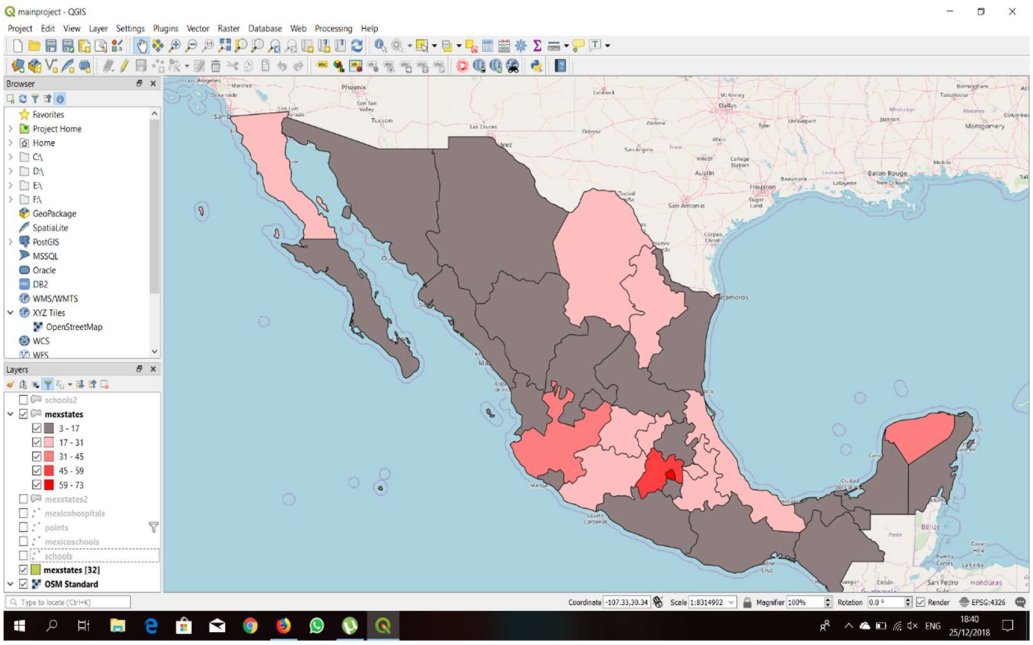

Fig a. Hospitals present in Mexico(Choropleth) classified based on the number of hospitals present in a state

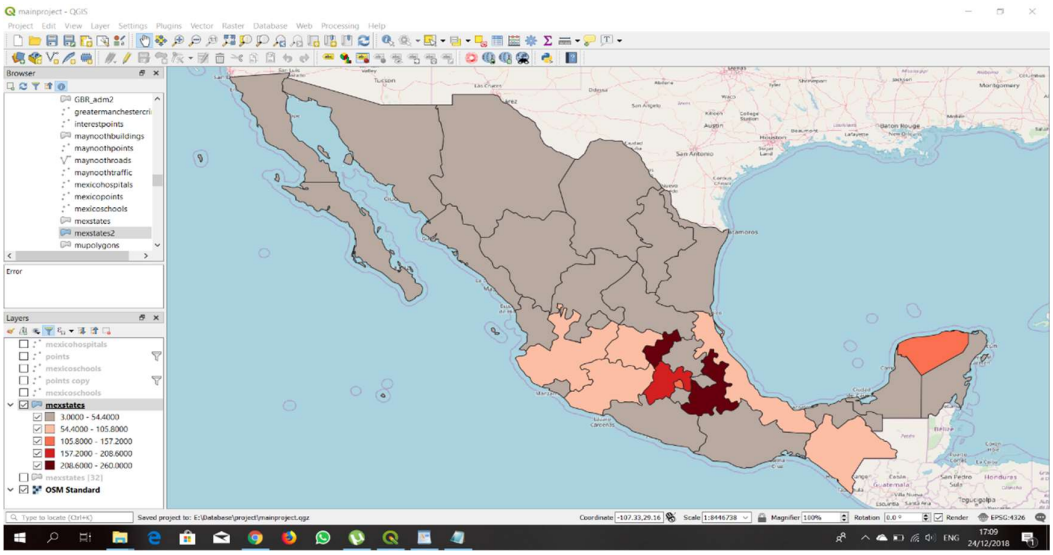

Fig b.Schools present in Mexico(Choropleth) classified based on the number of schools present in a state

It is observed that the northern part of Mexico has a smaller number of schools and hospitals compared to the central or southern part. The query is provided in the sql file submitted.First in postgis, the spatial join is created with a new column that gives the count of schools and hospitals in each Mexican state and then it is visualized in qgis.

The query is provided in the sql file submitted.

Web Mapping:

As a part of the project , the web based maps of the schools and hospitals present in the Mexico are generated which are as follows:

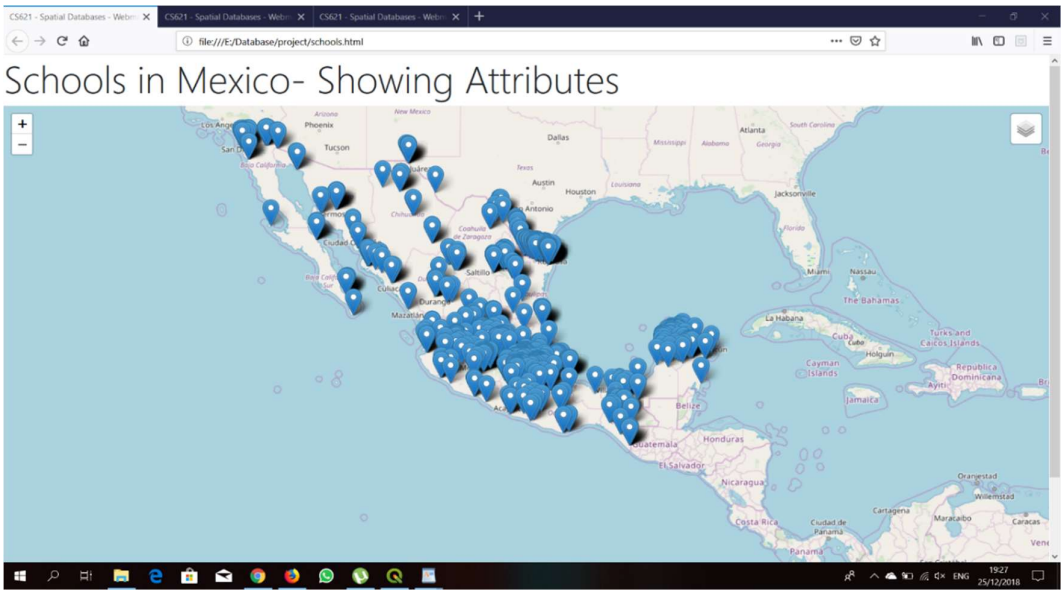

Fig c.WebMap showing the schools in Mexico and their attributes when clicked

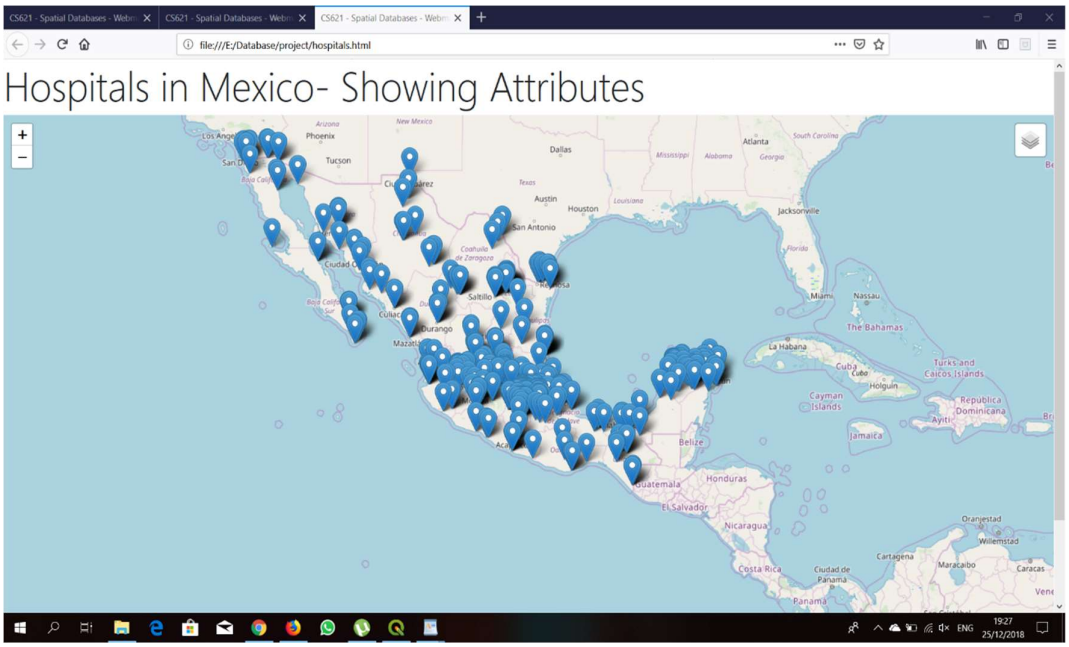

Fig d.WebMap showing hospitals in Mexico and their attributes when clicked

One more choropleth map is generated using the html file of schools .It is as follows:

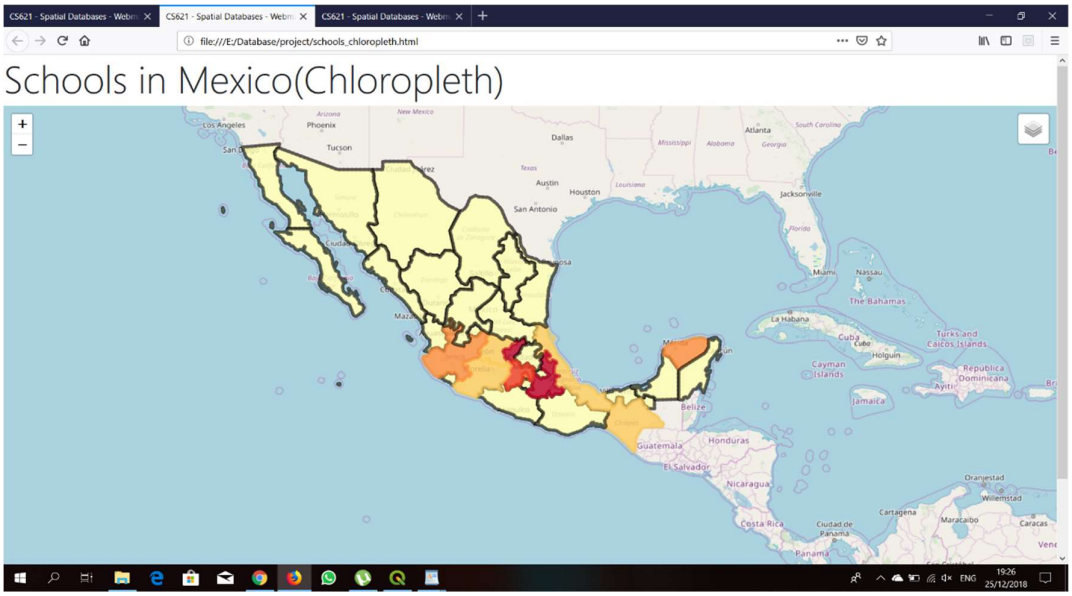

Fig e.web based choropleth map showing number of schools in each state of Mexico(graduated).

Heat Map:

Kernal Density Estimation of the schools in Mexico is also generated using Heat Map which is as follows:

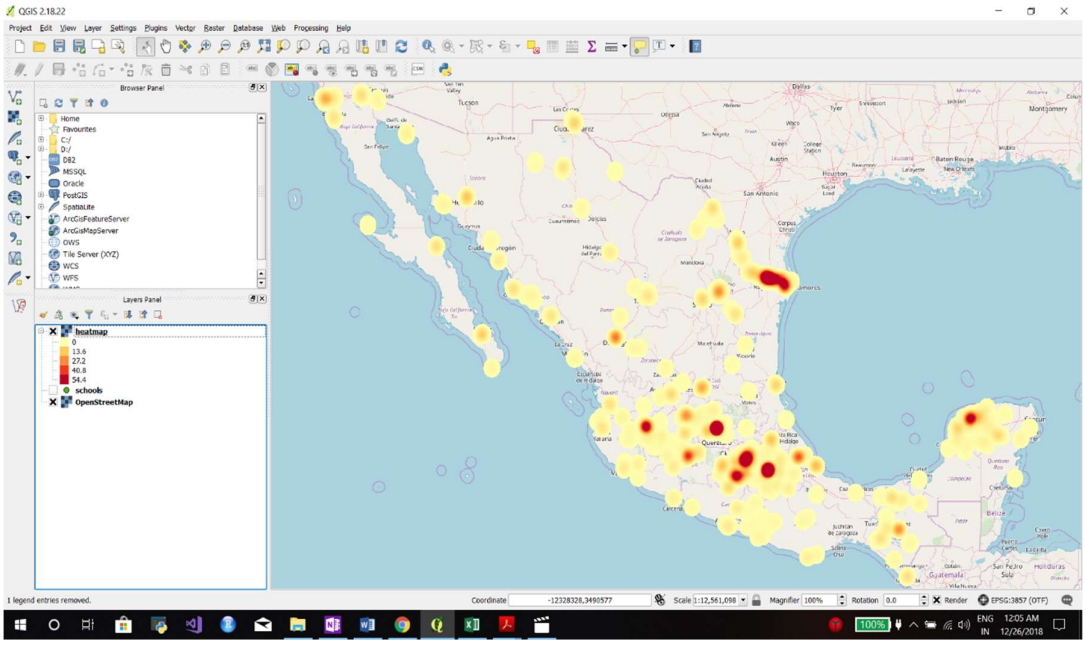

Fig f.Heat Map of schools in Mexico

KDE is a time taking process and the QGIS crashed many times loading the data so I have used another system with higher specification to generate the Heat Map.

QGIS is used to visualize the datasets such as schools , hospitals in Mexico in a meaningful way i.e choropleth map which lets us understand the distribution of number of schools and hospitals in Mexico.

Different maps generated lead to the same point i.e there are more number of schools and hospitals in the central part of Mexico.

PostGIS is used while creating the choropleth maps i.e to apply a spatial join between the boundaries of Mexico and schools , hospitals of Mexico respectively and then they are graduated based on the count of schools ,count of hospitals in each Mexican state respectively.

Summary :

The analysis done says that only fewer parts of Mexico are rich in number of schools present,number of hospitals present and particularly the northern most parts of Mexico which touches USA has less number of schools ,hospitals .

Maybe because of this reason , there has been a large number of illegal immigrants coming to USA from Mexico because there is a lack of facilities such as basic primary education and basic health care and they can not afford to migrate to different countries because there is also a problem of poverty in Mexico.

And also there have been initiations made to build a border wall between USA and Mexico , it won't be a solution to stop the illegal immigrants as long as the basic facilities and the quality of education , health care is improved .

In the project , QGIS and PostGIS tools are used and different kinds of maps are generated to perform this analysis and draw the conclusions about the schools and hospitals in Mexico.

QGIS and PostGIS both being opensource,crash most of the times while loading data sets of bigger size and this is the main problem with the tools.

All the corresponding files of the project are included in the zipped folder submitted.

References:

1)All the lecture slides uploaded in the moodle.

2)GeoFabrik website for downloading and analysing the datasets of different countries.

(http://download.geofabrik.de/)

3)Country of Mexico(https://en.wikipedia.org/wiki/Mexico)

4)GeoLocator(http://www.cs.nuim.ie/~pmooney/locator/)