

Capstone Project: Clustering Medical Centers in Puebla, Mexico

Business Problem Section

In 2017, the Mexican Association of Faculties and Schools of Medicine registered 38,600 applications for medical residences, of which only 21% obtained a place. There are many reasons because not all of the medical applicants get a place in a hospital, the most obviously is because there are not enough places. However, in some cases, the applicants get a place in the hospital but them don't want to take it because of the location of the hospital. In these cases, the doctors prefer to continue doing a social service in hospitals and wait one year more to apply to residences again. Generally, at each application, the doctors can established three hospitals in which, if they be accepted, they are assigned one of the three hospitals established before.

Considering it and using the Foursquare data location, in this work we are interested in clustering the medical assistance centers of the Puebla state in Mexico, taking into account the amenities that are around the medical centers, in order to doctors can choose similar medical centers as their three options.

Data Section

In order to achieve the goal of this work, that is clustering the medical assistance centers based in the amenities around them, we are going to use the dataset of Puebla, Mexico Locations of Municipal Buildings, Schools, Parks, Medical Assistance Centers, and Gardens. This dataset is provided by NYU ,Spatial Data Repository page and it contains the locations of the medical assistance centers, parks, schools, temples, municipal buildings and so on. Specifically, for this work we're interested in the locations of the medical assistance centers in Puebla, Mexico. The dataset contains 30340 instances and for each there are their latitude and longitude coordinates. An example of the dataset can see in Figure 1.

Moreover, in combination with the dataset describe before, we are going to use the foursquare data location, in order to obtain the amenities/venues around the each medical assistance center in Puebla, Mexico.

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|-----|------------------------------------|-----------|------------|
| 97 | Centro de Asistencia Médica | 19.050759 | -97.943619 |
| 98 | Instalación Deportiva o Recreativa | 19.054576 | -97.940450 |
| 99 | Templo | 19.047924 | -97.942135 |
| 100 | Centro de Asistencia Médica | 19.048078 | -97.942903 |
| 101 | Escuela | 19.060329 | -97.992656 |
| 102 | Pozo | 19.061705 | -97.994583 |
| 103 | Escuela | 19.059127 | -97.998996 |
| 104 | Centro de Asistencia Médica | 19.053554 | -97.995795 |
| 105 | Escuela | 19.058894 | -97.992663 |
| 106 | Palacio de Gobierno | 19.058332 | -97.993323 |
| 107 | Plaza | 19.058319 | -97.992836 |
| 108 | Escuela | 19.056706 | -97.990583 |
| 109 | Escuela | 19.056264 | -97.990718 |
| 110 | Templo | 19.058886 | -97.991904 |
| 111 | Instalación Deportiva o Recreativa | 19.063961 | -97.932066 |
| 112 | Palacio de Gobierno | 19.062316 | -97.932131 |
| 113 | Centro de Asistencia Médica | 19.061798 | -97.932346 |

Figure 1. Example of Dataset of locations of medical centers in Puebla, Mexico.