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Using Similarity Search to Covid-19 on Northwest Brazilian

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Abstract The novel coronavirus (Covid-19) revealed several impacts on the world. In Brazil several problems emerged related the health and economic scenario. Understanding the problem thought big data analysis is a alternative to propose actions for future. We explored similarity search (spatial analysis) between 1794 municipalities in northeastern Brazil. Salvador city was chose as parameter feature. We compare different daily cases (April 01, May 27, and 30 June) to check the similarity. For obtain the results, we select appropriate spatial system. The results strong association in large municipalities, revealing a similar cluster close between adjacent municipalities analyzed. On the future, the result may help decision makers to planning public health policies.

Keywords: Similar search, Covid-19, Spatial analysis.

1 Introduction

A novel coronavirus diesase-2019 (Covid-19) affects entire the world. In Brazil, the situation is critical with more 100 thousand deaths since the firstly case confirmed. Also, there a biggest risk associated with vulnerable places. The injuries caused by Covid-19 include the economic and social impacts.

The virus spreads rapidly, and in Brazil the strategies were not efficiently to blocking transmission. However, similarity spatial analysis is a key for decision making under large data volume [1]. Spatial patterns is approach to finding ways to control the propagation of the virus [2], and establish planning to health public strategies. Then, spatial similarity of objects it is often used to analysis of spatial distributions and layouts of geographic phenomena [3].

Therefore, we present Similarity Search (Spatial approach) to identify similar municipalities situated in northeastern Brazil, considering the increase of Covid-19 cases. Also, we explore the populational data, to establish relationship with Covid-19 cases.

2 Methodology

The proposed methodology is divided into three stages (1) identifying the municipalities of study; (2) building spatial database with Covid-19 registers and demographic information; (3) apply similarity analysis with objects (municipalities).

We chose 1794 municipalities of Brazilian northeastern, composed by nine states (Maranhão, Piaui, Ceará. Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, and Bahia) [4]. Each state has municipalities and local capital. The most of region has environment semiarid, and one of the features is long drought period.

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The Covid-19 was obtained from database of Ministry of Health [5] and chosen the daily cases between Fev 02 and Jun 30. We do not apply death cases. Also, we selected population estimated (2019) for each municipality [4]. From the perspectives of public policies, the analysis is contribution to identify similar objects and associated with future health actions. To performance results, we employ the ArcGis environment [6].

3 Results and Discussion

Due to the recent discovery of Covid-19, several papers emerge about the issue. However, we explore knowledge approach the Similarity Search tool of ArcGis software. The objective is identifying which candidate features, chosen previous, are most similar to one or more input features [7]. The similarity is based on averages for each of the attributes of interest [3].

The Salvador city was chosen as feature match, the capital of Bahia state, due to most populous of entire northeastern (approximately 2,872,347 inhabitant). Then, we select three different days (April 01, May 27 and to performance Covid-19 similarity analysis. The others 1793 municipalities were compared with Salvador match chosen feature.

Firstly, we performance similarity search to population. The propose is ranked the objects related the Salvador city. The results categorized in five classes related the most similar (Class 1) and less similar (Class 5, and the other as intermediated. 360 municipalities were categorized as most similar to Salvador, and 359 as less similar.

Next, we explore the similar analysis to Covid-19 in three different days. In April 01, were registered 47 new cases entire northeastern, and there was similarity on municipalities adjacent. To May 27 were 5929 daily cases and cluster with same similarity decrease. Finally, 12882 daily cases were registered (June 30), and similarity was very close to Salvador city.

The results revealed, many clusters between municipalities that was compare Salvador city as parameter. Clusters are important to associate with social and economic variables, and therefore understand the reason between places with more cases. Thus, the present study makes use of a similarity analysis to explore Covid-19 related spatial patterns, associated with population on brazil region.

4 References

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