Geovisualization in Neogeography?

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Abstract - Recently, a new domain of GI Science has been emerged after the conceptualization of web 2.0. This domain is promoting use of geographic information (GI) by non-expert users. These are actively engaged in creating, visualizing and sometimes analyzing GI. This GI is user-generated content (UGC), more specifically User-Generated Geo-Content (UGGC) because it has been geotagging with locational information. It is the domain of neogeography. Principally, UGGC can be visualized via mash-ups of both spatial and non-spatial data (linked with spatial objects) from multiple sources. This on top of base maps offered by Google Maps, Bing Maps, or even Open Street Map which it self is UGGC. The visual products of mash-ups can be termed neogeography maps. Neogeography maps are easy, fast and cheap to create and to disseminate when compare to conventional maps. Consequently, neogeography can be seen as an alternative / additional source of GI (maps).

Now the question is if neogeography can be effectively used, because UGGC and derived neogeography maps are not without their problems. What about the credibility and quality of UGGC and the readability of the maps. Neogeography lacks the established methods applied in GI Science. Since non-experts are engaged in the process of neogeography, its data are termed as informal data. Formal data is created by experts following an established set of rules. As a consequence, neogeography maps are mostly disorganized and cluttered, making them difficult to interpret at a given scale. This problem is partly due to poor visualizations applied in neogeography maps. This article explores if a set of geovisualization methods can play a role to make these maps more easily to interpret and to get some meaningful insight from them.

The article will start discussing the terminology that surrounds the concept of UGGC, followed by applications where UGGC (neogeography maps) are used, and finally gives a description of several geovisualization tools developed for neogeography maps. The main contribution of this article will be to put the neogeography maps within the context of geovisualization. What are the problems with these maps? What is the nature of their users? Do those users need improved neogeography maps? What can be easily done to improve the maps by geovisualization? For what purposes can those improved maps be used? These and other questions have been answered by mirroring them onto several case studies.

A set of geovisualization methods are identified that offer a solution for cluttered neogeography maps. Those methods utilize both clustering techniques and cartographic approaches. Clustering techniques are used to group several point data into clusters. It helps to perceive the spatial distribution of features and relationships amongst them. Most importantly, the neogeography maps become easier to interpret due to less clutter. After applying clustering techniques, cartographic approaches are used to symbolize the spatial objects.

Spatiotemporal clustering techniques are applied to target neogeography maps. As a first case study, a neogeography map is created based on flickr shapefiles. Shapefiles containing multiples attributes are extracted using the Flickr API and displayed them on top of Google Map to create the neogeography map. Several spatial clustering techniques (K-means, DBSCAN, OPTICAL etc.) are reviewed in order to find the suitable one for the map. Then the intended clustering techniques are applied. The map is visualized through simple cartographic symbolization. As a second case study, spatiotemporal clustering is applied on neogeography map based on epidemiological data. This map has an additional time attribute. Several spatiotemporal clustering techniques are reviewed for selecting the technique to be applied on this neogeography map. After clustering, the map is symbolized using a set of specific cartographic symbols in different map representation.

The aim is to find geovisualization methods that keep the details of the neogeography efforts but do summarize these in the map such a way that the maps become more useful. This article contributes to include those methods not only for making neogeography maps less cluttered but also for making them suitable for well augmented decision making process. This study gives an idea if those geovisualization methods can be implemented in neogeography environment.