A research in cartographic labeling to predict the suitable amount of labeling in multi-resolution maps.

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Extended Abstract

There have been several works and efforts towards making the best computerized map generalization. An important part of the generalization process, axiomatically, for a map is to understand its components. Furthermore, since the labels are one of the main components of the map - through labeling the user can understand the map a lot easier and more accurate- several works for that purpose were done (Zoraster, 1997; Zhang and Harrie, 2006; Stadler, et al, 2006; Brewer, et al, 2013 ...etc). These works witness a lot of unnecessary data lost, and focus mostly on point labeling, therefore they are not dealing with real time mapping and focus more on a static hardcopy map production. Most of the previous works were focusing on the legibility problems discussed on the cartographic generalization process (amalgamation, displacement, etc.) alone, while our work address more than that ordinary processes. The study focuses more on the online multiresolution map products, also on the significant of the displayed feature at every level of detail, and the amount of displayed labels in every level of detail. Since the multi-resolution map user will be concerned in extracting the most required information from the map, their needs should differ in every level of detail, moreover, the road types which is going to be presented at that certain zoom level should be considered, also trying to make the amount of the displayed data sufficient enough without any shortage or excessive.

In this study, it is expected to develop a proposed methodology for better labelling with the use of intellectual hierarchy while also trying to compose an empirical formula to display the road labels. We started working in defining every road class to its appropriate level of detail, also we are expecting to make our own formula to predict the most suitable amount of labels for the road features to be displayed. We defined the suitable road types

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and classes that would give the map user better understanding at every zoom level. We analyzed the best multiresolution map services, such as Google Maps, Yandex Map, Open Street Map, Bing Map and others. Most if not all of the used popular online map services do not share their used algorithms or models, thus forced us to simulate their displaying system using the artificial neural network means and tools.

The used map services various in content and number at every level of detail, hence we decided to examine these products in several testing central cities around the world (Ankara, Istanbul, Johannesburg, Cambridge, Sydney, etc.) to compose our formula. Our formula is expected to display the best amount of labels along with the most important road features to be labeled at every level of detail. The elements will be used to insure that are (1) the artificial neural system principles means and tools (2) the actual number of road objects and actual number of the labels displayed at each level of detail extracted from the used map services, (3) the field of view (area) of the displaying screen. The composed formula will be expected to provide us the average amount of road labels considering the above mention elements at every level of detail. The composed formula will be compared with the radical law equation of Topfer and Pillewizer (1966) to predict the suitable number of features needed to be shown at the target scale. The formula is expected to be more accurate and suitable for the online multi-resolution map production.

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