

Model of Dynamic Labelling of Populated Places in Slovakia

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Extended Abstract

Text on maps has an irreplaceable function. It increases information value and completes appearance of maps. To communicate spatial information effectively, map features need to be labelled.

The effectiveness and functionality of a map, as a communication medium, undoubtedly depends on how it is labelled. Clarity and legibility are two main objectives which a cartographer strives to achieve and which have direct influence on the perceptual and cognitive process used by map readers to search a certain name on the map and to determine its meaning.

A term dynamic labelling refers such labelling, the characteristics of which are adapted to the creation of labelling in dynamic maps. They are characterized by allowing for continuous zoom and pan. Change of zoom level results in change of scale and also in change of size of the displayed territory. Pan results in change of region of interest. The aim of dynamic map labelling is filtering, selection and placement of labels on the map.

This paper is focused on populated place labelling for multi-scale mapping for the new state map series of the Slovak Republic (SR). The new state map series will be created from data of Basic Database for GIS (BDGIS). Part of BDGIS consists of point layer of geographical names (GN). This point layer should serve for placement of populated place labels. All GN records contain name and coordinate location attributes. Unfortunately, this point layer contains no information about categorization of populated places.

If we construe the map as a tool for transferring information between the cartographer and the map reader, then correctly designed categories of populated places and defined rules of labels placement have direct impact on obtaining information from the map.

We defined new categorization of populated places as well as font parameters such as colour, height, width and spacing of letters. New categorization is based on number of inhabitants. Towns and villages are divided into unique categories on the basis of last census. We designed four new categories for towns and three categories for villages. Additionally, town and village parts with different names as is the name of the town or village have their own category. In comparison with previous categorization for the state map series we reduced number of categories. Furthermore we applied rules of the digital typography for designing font parameters for each category and scale. The proposed font has to meet requirements for simplicity and good readability in different sizes depended on digital environment. Three font types were tested on the same territory of interest. We decided to use font Arial and smallest size 8 pt. Labels in each category has to be different in size at least for 2 points to ensure clarity. Proposed colour is 80 % of grey scale.

For purpose of populated place labels placement is an important task to correctly define hierarchies, priorities and weights. Majority of cartographic conflicts were caused either by overlapping labels, crossing labels with line objects or crossing labels with areal objects. Numerous cartographic conflicts can be solved by determining correct label placement rules. Line objects must not be overlapped thus we set highest weights to roads and rivers while roads have higher priority. The hierarchy is set on the basis of categorization in meaning populated places with more inhabitants are higher in hierarchy ranking. Model of dynamic labelling of populated places was created in ArcGIS v.10.2.2 and its extension Maplex. This extension provides a special set of tools that allows improving label placement quality.

GN features are all identified by a single XY coordinate. This causes problem when labels for larger towns are placed. We want to ensure that labels occur even when the GN definition point is on a different map sheet. Also in scale 1:25 000 we can obtain better results when positions of labels are calculated for areal features of towns.

The goal in a feature work is to solve problem caused by point character of GN features. We want to define a new relational linkage of names of towns stored in GN database with polygons, which represent their area. Areal features may provide better placement results in populated place labelling. Next step is to define new category for town parts of two largest Slovakia cities (Bratislava and Košice). Bratislava has seventeen town parts while Košice twenty-two. These have individual administrative meaning, which must be reflected in their labelling. Our effort is also to make tests of the labelling model based on eye-tracking technology to obtain feedback from map readers and improve our dynamic labelling model of populated places.