Current challenges in cartographic generalization

Date and place: 01.04.2015.
Faculty of Geography and Regional Studies, Warsaw University, room 102.

Time: 15 :00 - 17:20 Seminar
17:20 -18:00 Wrap-up discussion

Program:

15:00 – 15:10 *Methodology of the BDOT10K generalization for the purpose of topographic maps production*
T. Berezowski, W. Ostrowski, I. Karsznia, J. Żolnierz

15:15 – 15:25 *Implementation of the concept of the new topographic map series in Poland*
J. Zieliński, A. Radomyska, A. Wiosna, T. Berezowski

15:30 – 15:40 *Implementation of the methodology of generalization BDOT10K to BDOO*
J. Zieliński, A. Radomyska, A. Wiosna

15:45 – 15:55 *Enabling Context-Aware settlements selection for the purpose of small-scale mapping with the usage of Data Enrichment and Machine Learning techniques*
I. Karsznia, R. Weibel, W. Ostrowski

15 min break

16:10 – 16:20 *DEM generalization using the 3D Douglas - Peucker algorithm.*
M. Leszczuk

16:25 – 16:35 *Conceptual and geometric generalization as the method for visual communication applied in www.mapy.zabytek.gov.pl map portal*
A. Kołodziej

16:40 – 16:50 *How to control generalization process – the role of reducts*
A. Fiedukowicz

16:55 – 17:05 *Spatial generalization of individual time series models*
J. Gąsiorowski

15 min break

17:20 – 18:00 Wrap-up discussion on:

Current challenges in cartographic generalization.

Panelists: R.Weibel, J.Zieliński, R.Olszewski, W.Ostrowski, T. Berezowski, A. Wiosna.

Short presentation description:

Methodology of the BDOT10K generalization for the purpose of topographic maps production

T. Berezowski*, W. Ostrowski**, I. Karsznia**, J. Żolnierz*
*Wroclaw Institute of Spatial Information and Artificial Intelligence
** Univeristy of Warsaw, Faculty of Geography and Regional Studies, Department of Geoinformatics, Cartography and Remote Sensing

The presentation will cover the novel methodology of the BDOT10K database generalization which has been developed for the purpose of new topographic map series production at the detail levels of 1:25 000, 1:50 000 and 1:100 000.
The scope of the presentation encompasses both overall generalization methodology concept as well as the cartographic knowledge base built for the purpose of the generalization process, together with examples of problems that have arisen during the conceptual works. The project has been initiated by the Head Office of Geodesy and Cartography in Poland. The conceptual works have been developed in the cooperation between Wroclaw Institute of Spatial Information and Artificial Intelligence and Warsaw University, while the generalization process implementation has been undertaken by geoinformation company OPEGIEKA Sp. z o.o. The uniqueness of the project lies in the fact that for several decades there has been the gap in topographic map production line at the detail levels of 1:25 000 and 1: 100 000 in Poland.

Implementation of the concept of the new topographic map series in Poland

J. Zieliński*, A. Radomyska*, A. Wiosna**, T. Berezowski***
*Head Office of Geodesy and Cartography, Department of Geodesy, Cartography and Geographic Information Systems
**OPEGIEKA Sp. z o.o.
***Wroclaw Institute of Spatial Information and Artificial Intelligence

Within the scope of the task to develop a new generation of topographic map series, the first test sheets of civilian topographic maps at the scales of 1:25 000, 1:50 000 and 1: 100 000 have been prepared. The basis for this task were the requirements laid down in the "Regulation of the Ministry of the Interior from 17 of November 2011 on the topographic objects database and general objects database as well as standard cartographic products". Two variants of maps have been developed – one in standard version and another in enhanced version enriched with shading. The experience gathered within this work constitutes the basis for the future new generation of topographic map production lines development.

Implementation of the methodology of generalization BDOT10K to BDOO

J. Zieliński*, A. Radomyska*, A. Wiosna**
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Within the scope of the task of the General Geographic Objects Database (BDOO) development, there have been developed both the technological line together with appropriate tools supporting the main database BDOT10k generalization to BDOO. The assumption was

to achieve the highest automate level during this process. Thus the pre-selection process of the source data, namely BDOT10k has been based on the criteria described in “Regulation of the Ministry of the Interior from 17 of November 2011 on the topographic objects database and general objects database as well as standard cartographic products”. The data has been further generalized by applying appropriate generalization operations like simplification. The end result of this process is a set of transformation algorithms developed in FME software and generalized data written into the target database structures.

Enabling Context-Aware settlements selection for the purpose of small-scale mapping with the usage of Data Enrichment and Machine Learning techniques

I. Karsznia***, R. Weibel**, W. Ostrowski*
*Univeristy of Warsaw, Faculty of Geography and Regional Studies, Department of Geoinformatics, Cartography and Remote Sensing
**Zurich University, Department of Geography, GIS Unit

The presentation focuses on the automated settlements selection for the purpose of small-scale mapping. The scope covers context-dependant, automatic settlements selection within the scale range from 1:250 000 to 1:500 000.
The first necessary step is the Database Enrichment for the purpose of effective spatial data generalization. It has been found that the current rule set used at the National Mapping Agencies, especially the Head Office of Geodesy and Cartography does not completely describe the situation that is actually found on the official Polish maps. While that is fine as long as trained cartographers are producing the maps it becomes a problem when the same should be done automatically. Thus it has been proposed to use Machine Learning techniques to train additional rules from the existing maps, significantly improving the completeness of the cartographic rule set.

DEM generalization using the 3D Douglas - Peucker algorithm.

M. Leszczuk
Wroclaw University of Environmental and Life Sciences, Faculty of Environmental Engineering and Geodesy, Institut of Geodesy and Geoinformatics

This presentation reviews generalization of DEM. Along with the development of Internet and popularization of mobile devices this process is particularly important in order to more efficiently process the elevation data.
The generalization process was based on the 3D Douglas – Peucker algorithm, developed by L. Fei i J. He (2009). The algorithm is the transformation result of the well-known and widely used Douglas – Peucker algorithm in three-dimensional space.
The study area consist of the digital elevation model of 1 m spatial resolution, built for the part of Eastern Sudetes.

Conceptual and geometric generalization as the method for visual communication applied in www.mapy.zabytek.gov.pl map portal

A. Kołodziej
Warsaw University of Technology, Faculty of Geodesy and Cartography, Department of Cartography

National Heritage Board of Poland is a state agency that gathers and disseminates information on Polish cultural heritage. The Board conducts works on implementing, updating and developing spatial data infrastructure within INSPIRE data theme "protected sites", which covers both immovable and archaeological monuments. The author will present the methodology of conceptual and geometric datasets generalization as the method of efficient visual communication between end-user and map portal. The proposed data generalization and visualization concept overrides the standard methods for data presentation described in "Data Specification on Protected Sites – Technical Guidelines, ver.3.2"

How to control generalization process – the role of reducts

A. Fiedukowicz
Warsaw University of Technology, Faculty of Geodesy and Cartography, Department of Cartography

The generalization process, if automatized, must be controlled by some decision system. The system usually makes a decision based on the set of attributes describing data being generalized. The challenge of selecting the right attributes to control generalization process may be as important as creation of decision system using those attributes. The proposed solution uses the reducts from rough set theory (and their further extensions) to choose attributes suitable for certain decisions in generalization process. This process of data enrichment by reduct calculation can be treated as a first step in creation of knowledge base controlling generalization process.

Spatial generalization of individual time series models

J. Gąsiorowski
Institute of Geodesy and Cartography

The presentation introduces the implementation of spatially generalized time series, which aim is to forecast a temporal trend of a phenomenon in any place of a given area on the basis of a set of irregularly distributed time series. The idea of the research is to determine the trend component for each time series and, with the use of Kriging method, to develop a general, spatially continuous trend model.