Map generalization today – Problem solved or not?

Mathias Gröbe, mathias.groebe@tu-dresden.de, TU Dresden, Institute of Cartography, Dresden

Generalization is always an actual topic in map production. After many years of research needs more attention than ever to connect theory and application. There is a big gap between recent map generalization possibilities and the weaknesses of current map products.

In map production, generalization is always an essential topic. There are many publications, for example, for line simplification algorithms, such as Douglas–Peucker[1], Visvalingam–Whyatt[2], Reumann–Witkam[3], Wang–Müller[4], and Li–Openshaw[5], to name a few. Often, only the Douglas–Peucker implementation is provided natively in software, rendering it the de-facto standard and neglecting alternatives that might offer better results. With such narrow default implementations, alternative solutions get lost in the discourse. For example, for simplifying buildings, a special case of line simplification, there is a less known solution[6] from the 70s, which is not available but would allow the creation of better maps easily with today's possibilities.

The current observation seems that only a few well-known generalization tools are readily implemented in software already. There is much space to use and combine other algorithms for better generalization results. Consequently, today's map production is suboptimal compared to what could be feasible given today's knowledge and computation power. Another point is that map production has changed – users expect up-to-date maps at any point time, which drives the need for fast and not complex solutions for generalization.

How to improve the situation? A good starting point could be the exploration and evaluation of today's knowledge, for instance, in workshops to connect people to explore solutions that may exist outside of science. Another perspective is to build connections between communities such as scientific cartography, software developers, and map makers. It would facilitate the implementation and application of the knowledge, which could result in collecting and publishing the knowledge in a reusable way.

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[2] Visvalingam, Maheswari, and James Duncan Whyatt. Line Generalisation by Repeated Elimination of the Smallest Area, 1992. https://hull-repository.worktribe.com/output/459275.

[3] Reumann and Witkam. "Optimizing Curve Segmentation in Computer Graphics." Amsterdam, 1974.

[4] Wang, Zeshen, and Jean-Claude Müller. "Line Generalization Based on Analysis of Shape Characteristics." Cartography and Geographic Information Systems 25, no. 1 (January 1998): 3–15. https://doi.org/10.1559/152304098782441750.

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[6] Staufenbiel, Wilfried. Zur Automation Der Generalisierung Topographischer Karten mit besonderer Berücksichtigung großmaßstäbiger Gebäudedarstellungen.; Hannover, 1973.