International Cartographic Association
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Effective visualization of the AI-based road selection results for small scale maps design

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Keywords: generalization, road selection, visualization, GeoAI

Abstract:

Selection of relevant features for map representation is a crucial aspect of cartographic generalization. While previously, maps were the result of manual efforts and subjective decisions of cartographers, automated generalization has gained influence over the last years. Automated methods have emerged for both large-scale and small-scale maps. Among these, the road network constitutes a significant thematic layer in general maps that delineates transportation routes within urban areas and beyond. Recent advancements, particularly those including deep learning models such as graph convolutional networks (GCN), constitute promising approaches in road selection.

While the established methodologies demonstrate effectiveness, an important concern persists regarding the visual assessment of the outcomes. The objective of AI applications in cartography is to improve and make more efficient the demanding aspects of the generalization and their evaluation processes. Consequently, there exists a necessity for the development of robust methods of evaluation of both the statistical and visual results.

Our research focuses on exploring classical machine learning and deep learning models for the selection of road networks at small-scale maps. A challenge we have encountered, concerns the need of proposing more advanced methods, measures and techniques of presenting results to a broader audience. Our objective is to effectively show the differences and similarities between the applied models as well as facilitate meaningful comparisons between the source and target (smaller scales) road network data.

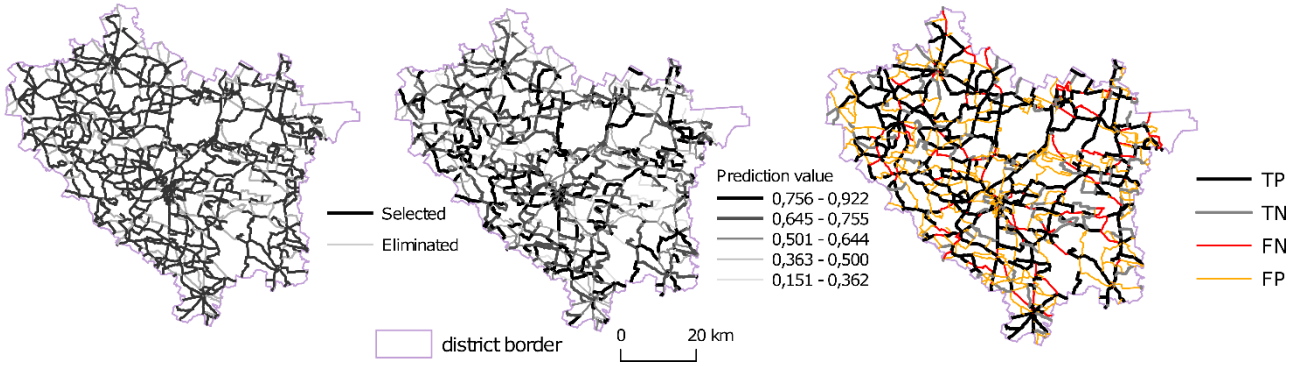

Figure 1. Three approaches to visualization of road network selection. Result achieved by GCN model.

To explore potential solutions, we propose three different visualizations based on the same datasets (figure 1), presenting road networks selected by GCN and other machine learning models (including decision trees, random forest, support vector machines and neural networks) on the example of selected groups of districts in Poland. We would like to engage workshop participants in a discussion to identify strengths, weaknesses and opportunities to improve the presented visualizations.

Acknowledgements

This research was funded by the National Science Centre, Poland, grant number UMO-2020/37/B/HS4/02605, "Improving Settlement and Road Network Design for Maps of Small Scales Using Artificial Intelligence and Graph Theory."