Towards a Next Generation of Swiss Maps

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Abstract:

The rapidly increasing use of mobile devices in the digital and mobile society has led to a wide variety of mobile map applications and a large number of map users (Bartling 2022). Nowadays, mobile map applications are ubiquitous. In particular, the map applications of the major players in this field have fundamentally influenced and changed user requirements. This inevitably leads to a rethinking and reorientation in official cartography to meet the changing user demands of a mobile society. There is an emerging trend worldwide that the focus of official cartography is increasingly set on the flexible and mobile presentation of data and accompanied by a shift away from the production of printed maps (Seifert 2021). Facing these challenges and based on internal studies, swisstopo has launched the project "NextGenerationMap" to provide maps optimized for mobile usage - in addition to the existing national map in digital and printed form. The design of mobile map applications aims at a positive user experience. To achieve this, the project focuses on developing a dynamic, interactive and context-oriented map representation as well as on improving the updating process of map content and the linking to additional information.

Dynamic map representation: One of the key elements of the project is the reinterpretation of a dynamic, national map-like visualization based on vector tiles. It has become more and more apparent in recent years that vector tiles are the future technology for digital map applications. Swisstopo follows the trend like other NMAs, which are also increasingly providing vector tiles. However, NextGenerationMap consistently follows the "mobile first" approach. The design deliberately abandons some of the principles of the classic national map design in favor of performance and legibility gains. While the national map is designed and optimized for different scales in its layout and generalization, the vector tile approach follows a design logic with fewer hard breaks between the individual zoom levels. The content density is significantly reduced and optimized for smaller map extents due to the display size of smartphones. The interactive user behavior of zooming in and out on maps compensates for the loss of content density and enables a more differentiated presentation of information. In favor of performance and storage reduction for the off-line usage, the integration of raster data is consistently avoided. As a result, terrain representations including shading, rock and scree representations are integrated in vector form and visualized dynamically across zoom levels.

Interactive map application and information linking: NextGenerationMap intends to generate geo-knowledge from geo-information. For this purpose, map applications shall become more interactive to bridge the gap between static information visualized in the map and a dynamic informational retrieval by the user. Points of interest are an essential component here. Points of interest data will be provided in staged steps in the coming years. In addition to swisstopo's own data, data from various sources will be combined and linked with additional information, such as real-time information or information from Wikipedia. Additional information is displayed to the user through interactive map elements. Special emphasis is placed on the design of the POI icons. They should be intuitively interpretable and follow existing standards. They are designed in a uniform design language while maintaining swissness and harmoniously complete the base map.

Update processes: The availability of up-to-date data is a major user need. This requires a change in the derivation chain to update map content as quickly as possible. While the classic national map is generalized via scale related cartographic models, vector tiles are derived directly from the source and automated generalization processes are integrated in the derivation pipeline. There is an increasing demand to manage the data flows and highly automated derivation processes to ensure fast updates and high data validity.

Context-oriented adaptivity: For an improved user support in a specific map usage situation, context-oriented adaptivity is considered in NextGenerationMap. In cooperation with the University of Zurich, two approaches will be implemented. On the one hand, temporal-spatial dependencies are particularly visualized under consideration of real-time data and a dynamic context change. This is intended to intuitively support the user under real-time conditions, in which time-critical information of features is emphasized. On the other hand, geographically significant features in terms of landmarks are appropriately symbolized and highlighted in the map for the mobile usage context to support the user in orientation and wayfinding.

References

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