

Upgrade of existing algorithms for creating contour lines on topographic maps of the karst surface

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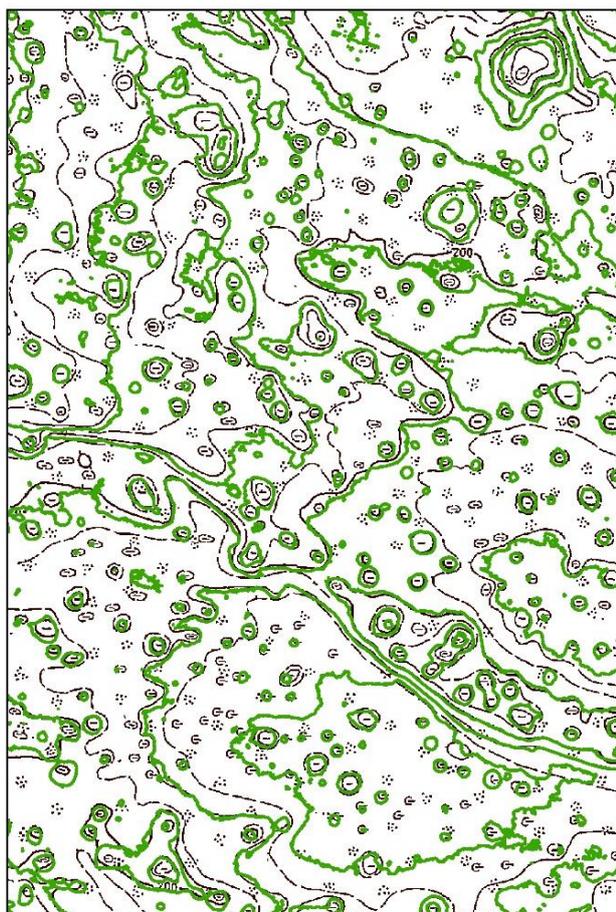
Keywords: contour lines, karst relief, national topographic map

Abstract:

Today, many software tools enable the production of contour lines from relief models, but the results of modelling complex karst relief are often inadequate. Reasons for this may be limited quality and resolution of relief models, limitations of algorithms for calculating contours, or limitations of algorithms for smoothing and displaying additional symbols that further describe relief, such as slope lines, steep slopes and smaller objects that cannot be effectively displayed with contours, etc.

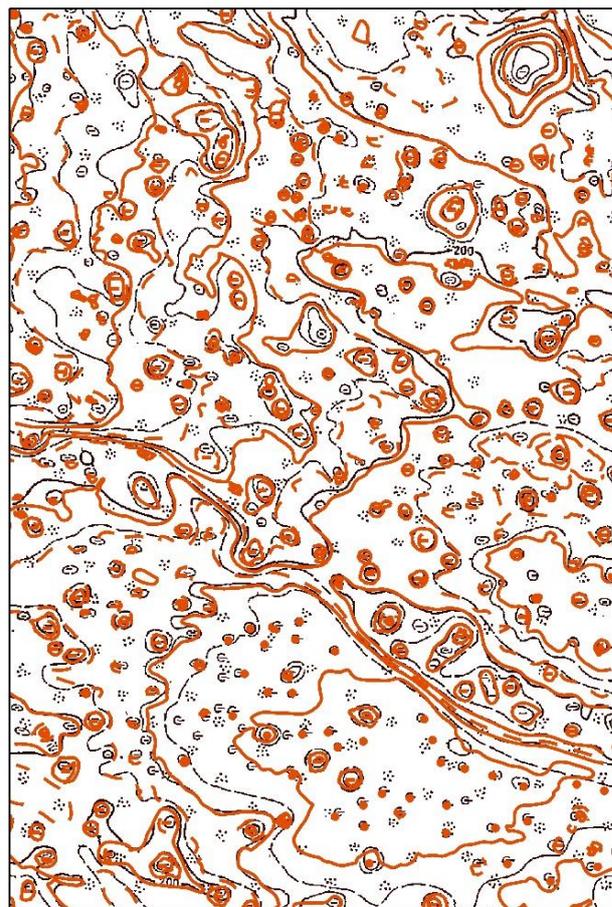
We will present research in the field of improving existing algorithms in rugged karst terrain. As a target result, the presentation of relief on the existing national topographic maps in Slovenia, which were made by manual photogrammetric survey of aerial photos stereo pairs, were used. Slovenian elevation model DMR1 (1 m density) is used as a source for the creation of contour lines in various commercial software packages, and by comparing the results with a relief presentation on a topographic map, we selected the most appropriate basic algorithm. This one is further upgraded mainly by enabling automatic selection of auxiliary contour lines in the area, presentation of individual smaller relief objects with appropriate point or linear symbols, addition of slope lines on contours and indications in the middle of depressions and displacement of contour lines in order to better depict the terrain morphology.

The results were tested in four different areas in Slovenia. Figure 1 shows the contour lines for a testing area near village Opatje Selo near Slovenia-Italy border, which were made by the best commercial software. The results of the algorithm are shown in Figure 2. The comparison between the results of the algorithm and the national topographic maps in the chosen scale gave promising results. In future work, we are planning to extend the algorithm so that it will be able to provide modelling of different terrains in the region.



0 250 500 1.000 Meters

Figure 1. Contour lines made by the best commercial software.



0 250 500 1.000 Meters

Figure 2. The results of the algorithm.