



RoCaSCA: A contour tracing grid-based algorithm to identify similarity regions and clusters in spatial geographical data

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Over the last decades the amount of spatial geographic data obtained from satellite and radar remote sensing, geographical and other types of spatial information has increased tremendously, making it impossible for a user to examine all in detail. Therefore, a considerable amount of research has focused on smart and efficient solutions to segment a spatial image into its dominant regions, extracting most essential information.

The current research presents a new spatial image cluster identification method. The delineation of clusters is performed in two separate steps. First, we identify a regions outer contour using the properties of a rotating carpenter square. Secondly, we define all inner pixels belonging to a cluster based on the same principle, excluding inner contour regions if necessary. As such, a cluster identification method will be presented which has considerable similarity to some of the tracing type and connected component image segmentation algorithms developed in the literature during the last decade. However, since the characteristic shape of a carpenter square can easily be extended, the algorithm presented here does not strictly label neighboring pixels to the same component only. On the contrary, our algorithm is able to connect non-neighboring pixels for varying pixel distances as well. In addition, since our algorithm takes a continuous grid as input, it is possible to define transition pixels, that connect pixels that belong to a given cluster. Therefore, this newly developed algorithm presents a link between the traditional image segmentation methods implemented on binary grids and the partitional density and grid-based cluster identification methods that use continuous datasets.

We will demonstrate the impact of this new cluster identification method for a number of typical geophysical cases ranging from global drought identification to weather radar based precipitation cell delineation.