

# Order-Independent Sequential Thinning on Two-Dimensional Binary Images

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The aim of skeletonization is to extract a region-based shape feature, the medial curve of binary objects. Blum illustratively interpreted this process as the fire front propagation [1]. Thinning is a frequently used strategy for this purpose. Thinning algorithms iteratively peel off points from the boundary of the objects which satisfy some geometrical and topological conditions [2]. Although the fire front propagation is parallel by nature, several sequential thinning algorithms were proposed, as well [3]. The motivation behind the use of the latter methods is that topology preservation can be easily guaranteed when only one non-skeleton point is removed at a time. However, sequential thinning algorithms have also a major weakness: they may produce various medial curves for different visiting orders of border points.

Earlier we published an order-independent sequential algorithm which is based on a classification of border points [4]. In the beginning of an iteration the algorithm labels these special border points, and later it takes advantage of this additional information to decide whether a point is deletable or not.

Because of the use of extra labels one may say that such an algorithm cannot be considered as "sequential" in a strict sense. This motivated us to define another thinning scheme, which considers tricolor input images in which background points, boundary object points, and non-boundary object points are indicated by different colors, and no additional labeling is allowed during the process. In this work, we propose a template-based order-independent sequential thinning algorithm that is based on this scheme.

## References

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