

Segmentation of Discrete Surfaces into Plane Segments Based on a Distance Map

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Context

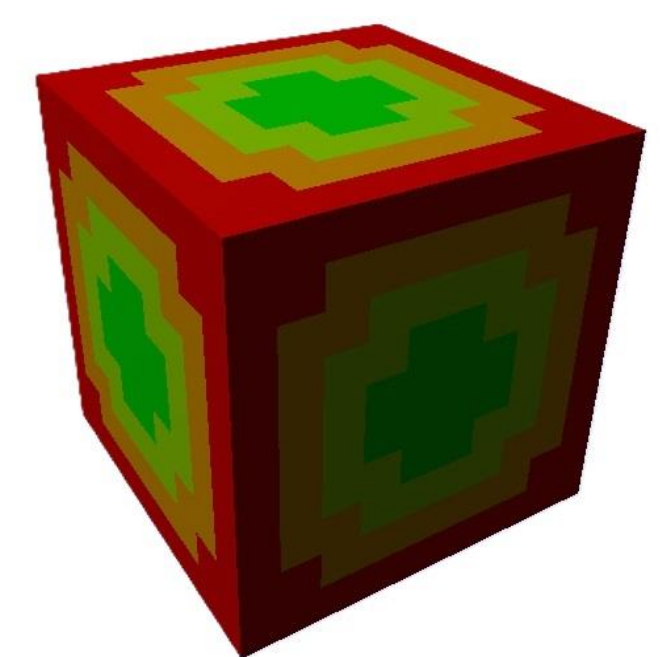
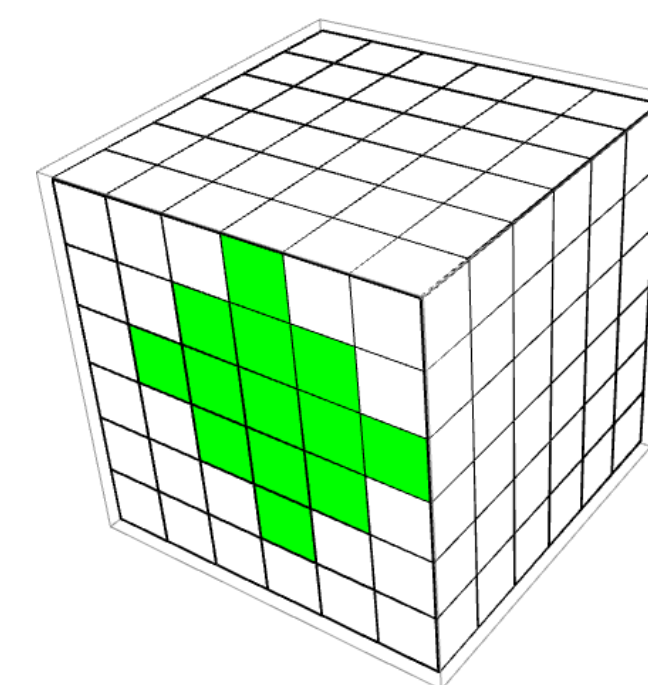
Segmentation is the first step to lead of a reversible reconstruction of a 3D digital shape. Cutting the surface into standard plane segments is a complex task, as the surface does not allow for efficient paths.

Contribution :

- A new Segmentation algorithms of a discrete surface into plane segments

Map distance on each surfels

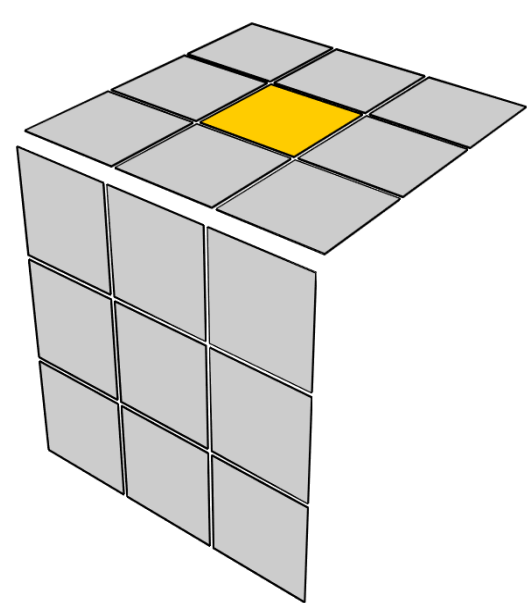
In each surfel, extension of a circle as long as the circle forms a plane segment.



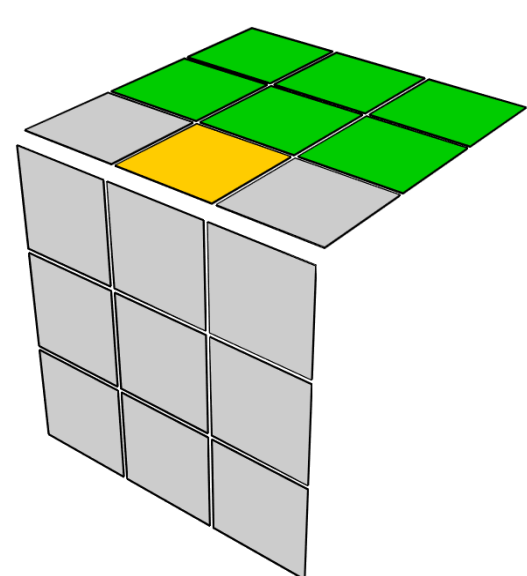
Vertex labeling according to circle size

Different segmentation configurations

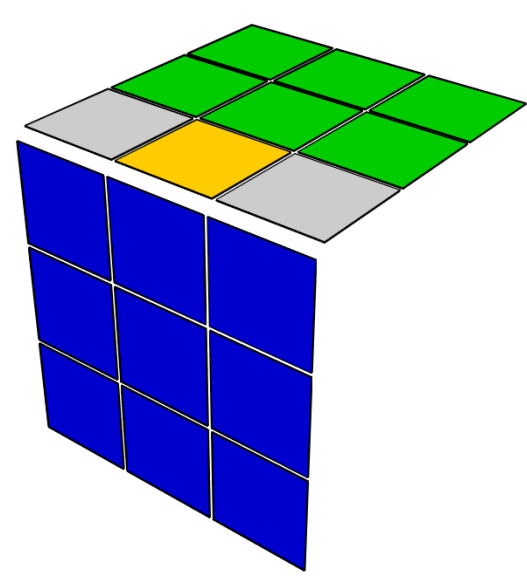
Surfel processing according to label value.
Configuration according to neighbors already processed, and their availability



0 neighbors available
Create a new plan segment



1 neighbors available
Add surfel to neighboring segment



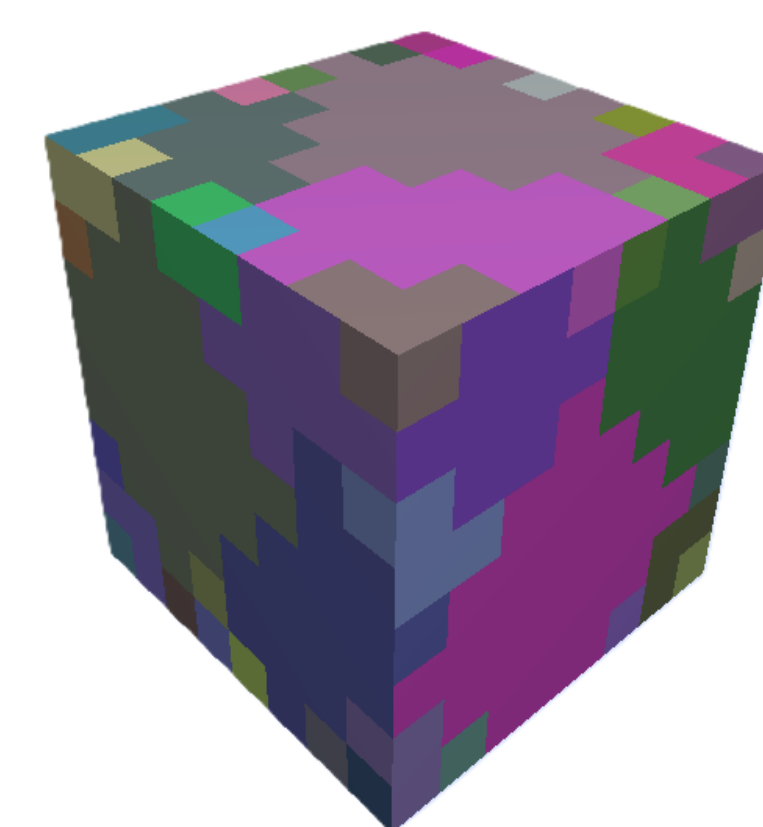
2+ neighbors available
Comparison of two neighbors by modifying normal before and after addition

Future works

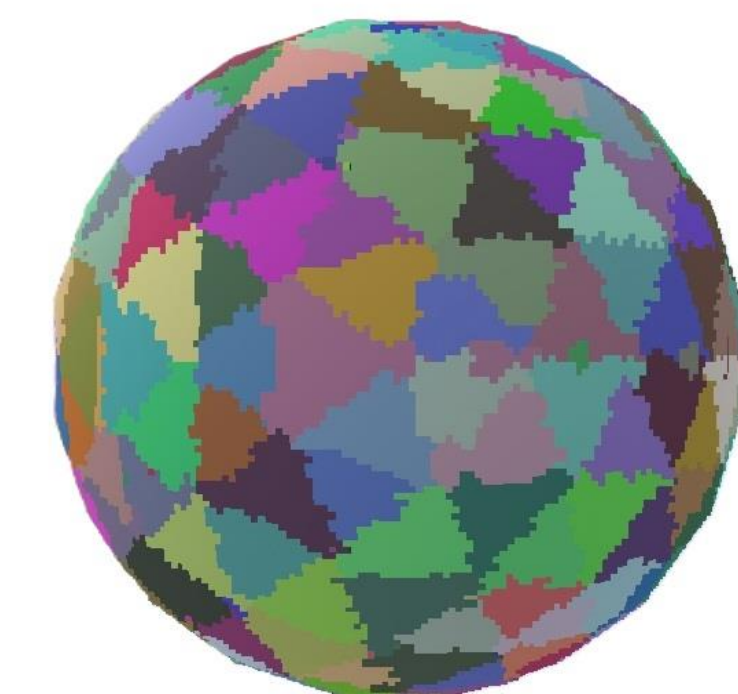
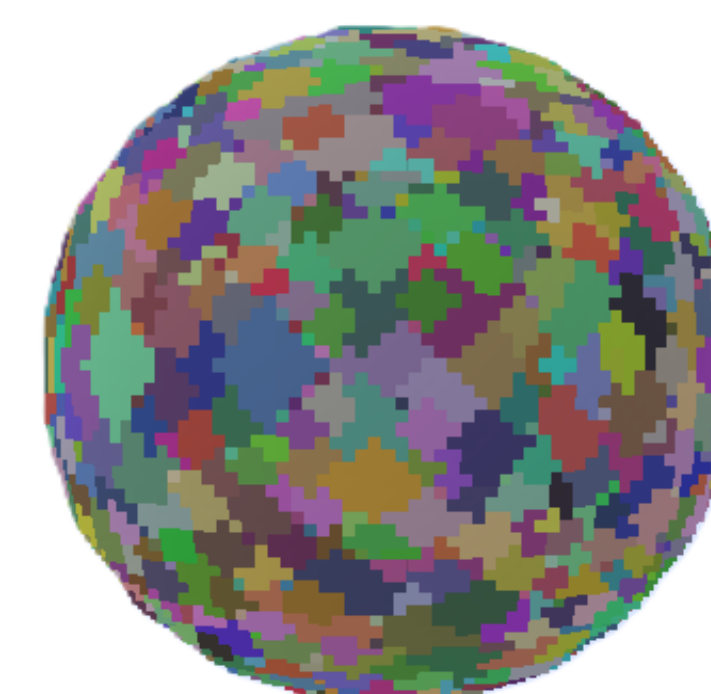
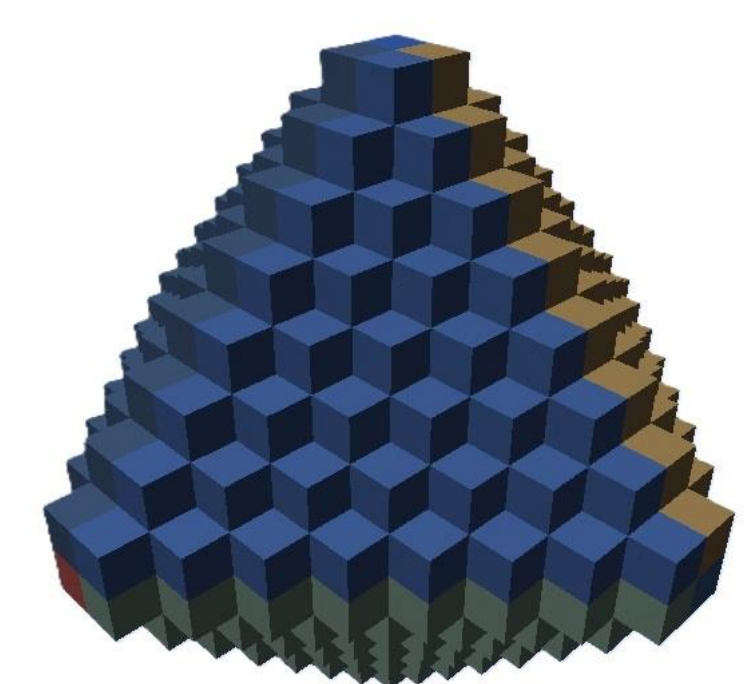
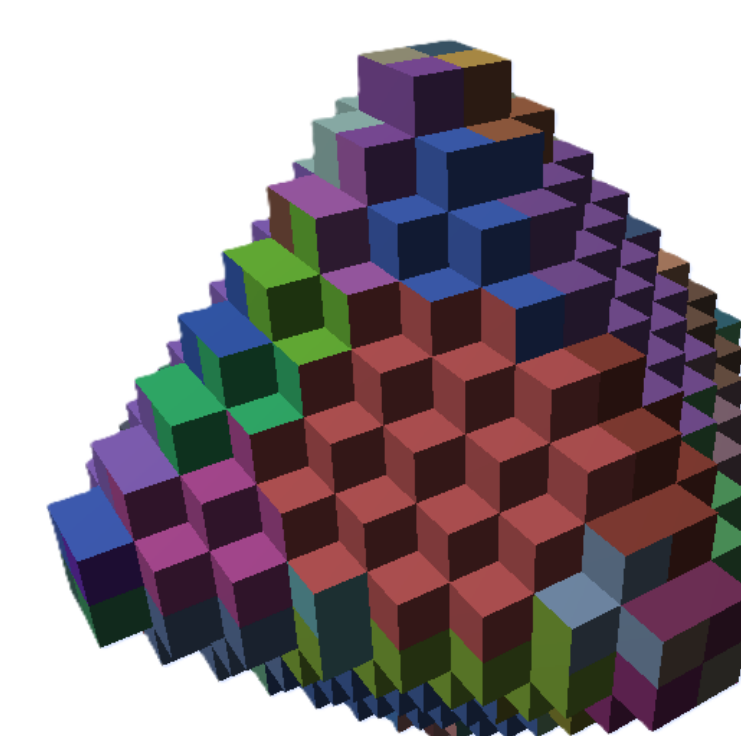
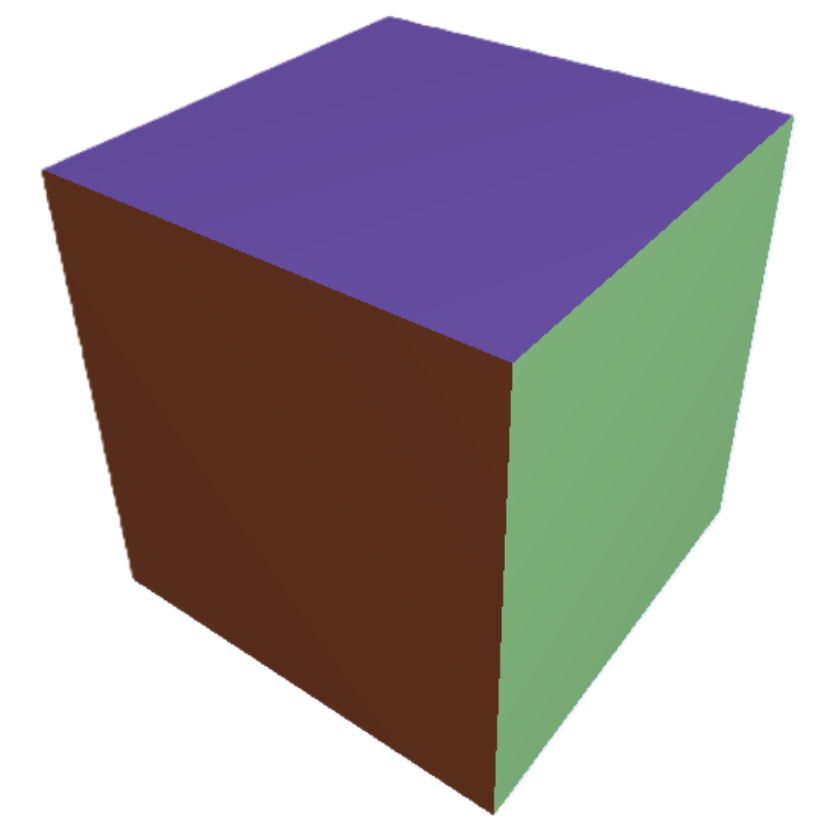
- G-Map creation by faces' adjacency.
- Refining after configuration recognition.
- Constraint resolution.
- Mesh reconstruction.

Results

DGtal Segmentation



Our Segmentation



Right-hand segmentation includes fewer plane segments. Respects the faces of the original mesh.