Digital surface regularization with guarantees

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Abstract

Voxel based modeling is a very attractive way to represent complex multi-material objects. Beside artistic choices of pixel/voxel arts, representing objects as voxels allows efficient and dynamic interactions with the scene. For geometry processing purposes, many applications in material sciences, medical imaging or numerical simulation rely on a regular partitioning of the space with labeled voxels. In this presentation, we consider a variational approach to reconstruct interfaces in multi-labeled digital images. This approach efficiently produces piecewise smooth quadrangulated surfaces with some theoretical stability guarantee. Non-manifold parts at intersecting interfaces are handled naturally by our model. We illustrate the strength of our tool for digital surface regularization, as well as voxel art regularization by transferring colorimetric information to regularized quads and computing isotropic geodesic on digital surfaces.

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