

Optimal Topological Cycles and Their Application in Cardiac Trabeculae Restoration

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Abstract

In cardiac image analysis, it is important yet challenging to reconstruct the trabeculae, namely, fine muscle columns whose ends are attached to the ventricular walls. To extract these fine structures, we propose a novel method to jointly detect salient topological handles and compute the optimal representations of them. The detected handles are considered hypothetical trabeculae structures. They are further screened using a classifier and are then included in the final segmentation. We show in experiments the significance of our contribution compared with previous standard segmentation methods without topological priors, as well as with previous topological method in which non-optimal representations of topological handles are used.

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