SEGMENTATION OF IMAGES PAINTED ON PARAMETRIC MANIFOLDS (WedAmOR11)

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Abstract :

Active contours are a widely spread tool for the important task of image segmentation. An active contour evolves in time on an image, till it stops on the boundaries of the objects in it. The forces governing this evolution consist of internal geometric forces and external forces originating from the image data. We present the use of active contours for the segmentation of a more general type of images, i.e., images painted on parametric manifolds. Good representatives of this kind of images are face images, where the face manifold is a 2−dimensional manifold embeded in a Euclidean 3−dimensional space. Adding the manifold data can be most beneficial in various tasks including face recognition and enables also a better segmentation of face features such as eyes. We show that taking into account the geometry of the manifold boosts the performance of active contours. The inclusion of the manifold's geometry is done by evolving the contour on the manifold, instead of on a flat planar image. To keep the contour on the manifold the geodesic components of the driving forces are used. Appropriate numerical schemes enable the robust implementation of these active contours. Added efficiency is gained by evolving the active contours on the 2−dimensional cartesian parameterization plane and projecting the result back to the manifold.

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