Mumford-Shah-based elastic shape averaging

Benedikt Wirth[1] Martin Rumpf[2]

A method is presented to compute an average representation of a given number of shapes. The method is based on image registration via edge matching and uses a hyperelastic regularization. The corresponding model is stated in a variational form and implemented as a fixed point iteration of gradient descent steps, using finite element methods in a multilevel framework. Results are presented that show the model's applicability to finding e. g. the average shape of a human organ or even to produce simple anatomical template maps.

[1]University of Bonn, Institute for Numerical Simulation, Nussallee 15, 53113 Bonn, Germany, Benedikt.Wirth@ins.uni-bonn.de
[2]University of Bonn, Institute for Numerical Simulation, Nussallee 15, 53113 Bonn, Germany, Martin.Rumpf@ins.uni-bonn.de