

Adaptive B-Spline Model Based Probabilistic Active Contour for Weld Defect Detection in Radiographic Imaging

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Abstract: This paper describes a probabilistic region-based deformable model using a new adaptive scheme for B-spline representation. The idea is to adapt the number of spline control points which are necessary to describe an object with complex shape. For this purpose, the curve segment length (CSL) is used as criterion. The proposed split and merge strategy on the spline model consists in: adding a new control point when CSL is greater than a certain splitting threshold so that the contour tracks all the concavities and, removing a control point when CSL is less to a certain merging threshold so that the contour aspect maintains its smoothness. Noise on synthetic and real weld radiographic images is assumed following Gaussian or Rayleigh distribution. The experiments carried out confirm the adequacy of this approach, especially in tracking pronounced concavities contained in images.

Keywords : weld defect, Active contour, adaptive B-spline, split and merge operations