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The Performance of Some Implicit Region-Based ActiveContours in Segmenting and Restoring WeldingRadiographic Images

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Abstract: Several domains are based on image processing and analysis. One of them is the radiographicinspection which is used in Non Destructive Testing (NDT). Active contours, snakes ordeformable models are powerful techniques in image segmentation and restoration. According to theterm related to the input data (image to be treated) those functionals are ranked on two categories:edge-based models and region-based models. Previous studies point out the advantages of the regionbasedmodels over edge-based models. In this paper, we discuss and we summarize the strengths andweaknesses of four implicit region-based active contour models named: Piecewise Constant PC,Piecewise Smooth PS, Local Binary Fitting LBF and Global Local fitting energy GLF. After performingseveral experiments, we have concluded that all the models perform well with homogeneousimages. On the contrary when images are strongly inhomogeneous, the models based on global (PC)or local (LBF) statistic intensity fail to segment such images. The PS model with its great advantage inpreserving the contours has, as a drawback, the high CPU time consuming. The combination of localand global statistic image intensity gives to the GLF model the ability to better deal with such imagesin less CPU time.

Keywords : segmentation, radiographic images, Level set, region-based active contour, PC, PS, LBF, GLF