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Discontinuities detection in welded joints based on inverse surface thresholding

Abstract

Automated detection of welding defects in radiographic images becomes nontrivial when uneven illumination, contrast and noise are present. In this paper, a new approach using surface thresholding method is proposed to detect defects in radiographic images of welding joints. In the first stage, several image processing techniques namely fuzzy c means clustering, region filling, mean filtering, edge detection, Otsu thresholding, and morphological operations method are utilized to locate the area where defects might exist. This is followed by the construction of the inverse thresholding surface and its implementation to locate defects in the identified area. The proposed method was tested on 60 radiographic images and it obtained 94.6% sensitivity. Its performance is compared to that of the watershed segmentation, which obtained 69.6%.

Keywords — Fuzzy c means clustering, inverse surface thresholding, non-destructive testing, welded joints.