Segmentation of Unevenly Illuminated Line Scanned Images

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Abstract

Though many segmentation methods have been published, few of them are developed especially for line scanned images. An ill illuminated line scanned (IILS) image tends to have a uniform intensity distribution in column direction while non-uniform intensity distribution in row direction. So, it is improper to segment IILS images by using either a fixed threshold or a threshold surface. In view of that, the objective of the paper is to develop a suitable segmentation method for segmenting IILS images. To achieve the objective, we took illumination variation across column of a line scanned image into account and developed a segmentation method on the basis of a threshold line. The developed threshold-line-based segmentation method was compared with Otsu's fixed threshold segmentation method and Niblack's threshold-surface-based segmentation methods. The results show that the proposed threshold-line-based segmentation method outperforms others. The merit of the proposed method is that the slant of the line light source is now allowed. In other words, even if a line-scan image is not evenly illuminated, the proposed method is still able to successfully detect desired flaws.

Keyword：Line Scanned Image, Flaw Detection, Threshold line, Threshold surface