

# Improved cross pattern approach for steel surface defect recognition

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**Abstract:** In steel-making processes, different methods are used for online surface product monitoring. Such a control has become a necessity to avoid additional costs resulting from the poor quality of the final product. With the reported performance that varies from one application to another, all the applied methods have to meet a minimum of criteria as accuracy and speed. This effectiveness is assured thanks to a relevant image description and efficient defect classification algorithms. The Dual CrossPattern technique, successfully applied in face recognition, is a concept that relies on coding pixels to provide such a discriminating description of the image. Its principle can perfectly be used in industrial vision applications for surface defect recognition. In this study, the relevance of this method of describing defect images is evaluated, and improvements are proposed to increase its efficiency. The experimental study shows that the pixel coding that considers the variations of the intensity in several directions and captures the information from more than one pixel-neighborhood level makes it possible to better detect the variability in the defect image and helps to increase the defect recognition rate. The experiments are carried out with the use of the published Northeastern University (NEU) database for the comparison and with a new constructed database to better show the improvements brought by the proposed approach.

**Keywords :** Computer vision, Image description, Surface defect classification, Steel process