

Improved cross pattern approach for steel surface defect recognition

Zoheir MENTOURI, Hakim DOGHMANE, Abdelkrim Moussaoui, Hocine Bourouba

Abstract: In steel-making processes, different methods are used for online surface product monitoring. Such a control has become anecessity to avoid additional costs resulting from the poor quality of the final product. With the reported performance that variesfrom one application to another, all the applied methods have to meet a minimum of criteria as accuracy and speed. Thiseffectiveness 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 discriminatingdescription 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 itsefficiency. The experimental study shows that the pixel coding that considers the variations of the intensity in several directionsand captures the information from more than one pixel-neighborhood level makes it possible to better detect the variability in thedefect image and helps to increase the defect recognition rate. The experiments are carried out with the use of the publishedNortheastern University (NEU) database for the comparison and with a new constructed database to better show the improvementsbrought by the proposed approach.

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