

Tool combination for the description of steel surface image and defect classification

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Abstract : In industry, the automatic recognition of surface defects of flat steel products still represents a real challenge. Indeed, in addition to constraints such as the image noise or blur, there is neither an agreed standard of these defects nor a standard method that can ensure the defect identification, whatever are their size, shape, orientation and location. Thus, the complexity of the algorithm that deals with this matter always depends on specific needs of the application. In this paper, we give details on an approach that combines Gabor wavelets (GW) and the local phase quantization technique (LPQ), to describe the steel surface images, and uses the histogram to extract their characteristics. The defect classification is carried out by means of two classifiers, namely the nearest neighbors and the support vector machine. The method assessment is based on testing different parameter values of the used tools. The approach shows a good performance in terms of recognition rates and feature vector length, which impacts the computing time. Also, the study reveals its suitability for an online steel surface defect recognition application.

Keywords : Quality control, Computer vision, metal surface imaging, Filter bank application, pattern analysis and recognition