Abstract

Since steel is an essential industry raw material and its surface quality is an important evaluation indicator, this paper proposes a quality inspection method for detecting and characterizing defects on steel surfaces. The objective is to detect and classify the defects in the steel products using Scanning Electron Microscopy (SEM) images. In order to obtain better classification accuracy, Discrete Wavelet Transform (DWT) based laws mask method is proposed. Initially, wavelet transform is applied to the input training images and the resultant sub-images are applied with different laws masks like ripple, wave, level, edge and spot. Texture features like mean, entropy, standard deviation, kurtosis and skewness are extracted.
The test images are applied with different laws masks and feature values are calculated. These feature values obtained for test and training images are considered for the accuracy assessment which is done based on the minimum distance obtained by taking Sum of Squared Distance (SSD). The accuracy of proposed method is compared with the performance of classical methods namely Tamura features, Gray Level Co-occurrence Matrix (GLCM) and Laws Masks. The overall accuracy of proposed method is 82.5%. The results obtained indicate that better classification of defects is possible by proposed method of applying DWT based laws masks.

References

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