

DWT-SATS Based Detection of Image Region Cloning

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Abstract : A duplicated image region may be subjected to a number of attacks such as noise addition, compression, reflection, rotation, and scaling with the intention of either merely mating it to its targeted neighborhood or preventing its detection. In this paper, we present an effective and robust method of detecting duplicated regions inclusive of those affected by the various attacks. In order to reduce the dimension of the image, the proposed algorithm firstly performs discrete wavelet transform, DWT, of a suspicious image. However, unlike most existing copy move image forgery (CMIF) detection algorithms operating in the DWT domain which extract only the low frequency sub-band of the DWT of the suspicious image thereby leaving valuable information in the other three sub-bands, the proposed algorithm simultaneously extracts features from all the four sub-bands. The extracted features are not only more accurate representation of image regions but also robust to additive noise, JPEG compression, and affine transformation. Furthermore, principal component analysis-eigenvalue decomposition, PCA-EVD, is applied to reduce the dimension of the features. The extracted features are then sorted using the more computationally efficient Radix Sort algorithm. Finally, same affine transformation selection, SATS, a duplication verification method, is applied to detect duplicated regions. The proposed algorithm is not only fast but also more robust to attacks compared to the related CMIF detection algorithms. The experimental results show high detection rates.

Keywords : affine transformation, discrete wavelet transform, radix sort, SATS

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020