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Classified Image Enhancement Method Based on Histogram Characteristics in YCbCr Color Space

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Color image enhancement in YCbCr space is an important task since most of the color image signals captured from the embedded camera or the professional video device are YCbCr image signals. Prior classical color image enhancement methods like linear transforms such as binarization, piecewise-line transform, and gray-level slicing, or non-linear transforms such as logarithm transform, index transform, and power-law transform did not consider possible histogram characteristics, and thus their enhancement performance on different image types would be degraded in some cases. In this paper, a novel classified image enhancement method based on CbCr and Y histograms is proposed to address the aforementioned problem. First, captured images are divided into two types, document image and scene image, according to the normalized chrominance histogram characteristic. For the document image, a filter is applied in space domain to get a better foreground and background. For the scene image, three different types are divided by the normalized luminance histogram characteristics. Then, three different processing schemes are applied to the three types of scene images respectively. Experimental results on different images with a variety of variations verify the effectiveness and robustness of the proposed method.

Keywords: Image processing, Image enhancement, Characteristic classification, YCbCr color space, Normalized Histogram

Modelling and simulation of CNTs- and GNRs-based nanocomposites for nanosensor devices

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The main objective of the current study is to demonstrate the implementation of advanced simulation models providing a proper description of the electronic properties, electrical conductivity, electromagnetic and electromechanical phenomena of functionalized CNT- and GNR-based nanostructures of different morphologies and their interconnects for nanosensor and nanomemory systems. The sensitivity of the local electronic density of states to external influences (mechanical, chemical, magnetic, etc) on the fundamental electromagnetic properties of CNTs, GNRs and their metal interconnects have been analyzed from the point of view of nanosensor applications. Nanoporous systems are considered as complicated ensembles of basic nanocarbon interconnected elements (e.g., CNTs or GNRs with possible defects and dangling boundary bonds) within the effective media type environment. The model of nanocomposite materials based on carbon nanocluster suspension (CNTs and GNRs) in dielectric polymer environments (e.g., epoxy resins) is regarded as a disordered system of fragments of nanocarbon inclusions with different morphologies (chirality and geometry) in relation to a high electrical conductivity in a continuous dielectric environment. The electrical conductivity of a nanocomposite material depends on the concentration of nanocarbon inclusions (in fact, carbon macromolecules). Various nanocomposite morphologies are considered and computer simulation results are discussed.