ABSTRACT

Objective image quality evaluation is of special interest in many image applications, for example for image compression, where it can be used to control the rate in order to keep a tradeoff between lost of data and image quality; another example is in the application of watermarks, i.e., introduction of descriptive information used to guarantee the authenticity of an image, that must be invisible to the observer who looks at the image. SSIM (*Structural SIMilarity*) index is a full-reference image quality assessment metric developed to evaluate gray images. This work investigates the application of SSIM in the evaluation of color images. Therefore, four different color spaces are tested – RGB, YCbCr, Lαβ e CIELAB. Initially SSIM is calculated individually for each one of color spaces channels. Then, inspired in (1), the results of the SSIM in the individual channels are combined in a unique result – the so called Composite SSIM. Finally, in order to improve the correlations between, calculated using CIELAB color space, together with SSIM. Three color image databases, LIVE, IVC and TID, were employed in the tests in order to confer solidity to the results. The evaluation of the results is made using VQEG (*Video Quality Experts Group*) methodology, developed for video quality evaluation with an adaptation regarding the time "dimension" that does not exist in the image domain. The conclusions from the work were that SSIM performs better in the evaluation of color images when applied to luminance channel of YCbCr, Lαβ and especially to CIELAB color spaces. It was also concluded that the use of just noticeable difference concept improve objective assessment results.

Keywords: Image quality assessment. SSIM. Just Noticeable Difference (JND). CIELAB.