
Image Quality Assessment Using Directional Anisotropy Structure Measurement

Abstract:

Image quality assessment models prefer an effective visual feature to perceive image quality. Structure-based image quality metrics have verified that a measure of structural information change can provide a good approximation to perceived image distortion. Furthermore, psychological studies have suggested that human beings awareness on image structures is perception-driven and the human visual system (HVS) is more sensitive to the distortion on dominant structures rather than on minor textures. Accordingly, the image distortion can be perceived well by measuring the information loss of the dominant structures. Considering two conclusive psychovisual observations-anisotropy and local directionality-this paper takes a more comprehensive analysis on the behavior of structures and textures, and introduces a directional anisotropic structure measurement (DASM) to represent the dominant structures that are visually important. The proposed DASM can well identify dominant structures, to which the HVS is highly sensitive, from minor textures. Using the DASM as a visual feature, we assess image quality by measuring its degradations. The proposed method was tested on the six benchmark databases and the experimental results demonstrate that our method obtains good performance and correlates well with the human perception.