Abstract

Earlier cosine transform are used in image quality assessments. But it resulted in fundamental problems. An application of neural networks in the field of objective measurement method designed to automatically assess the perceived quality of digital videos. This challenging issue aims to emulate human judgment and to replace very complex and time consuming subjective quality assessment. Several metrics have been proposed in literature to tackle this issue. They are based on a general framework that combines different stages, each of them addressing complex problems. but a linear correlation criteria, between objective and subjective scoring, up to 0.92 has been obtained on a set of typical TV videos. Reduced-reference (RR) image quality assessment (IQA) has been recognized as an effective and efficient way to predict the visual quality of distorted images. wavelet transforms are optimal greedy approximations to extract singularity structures, so they fail to explicitly extract the image geometric information, e.
g., lines and curves. Finally, wavelet coefficients are dense for smooth image edge contours. In this paper, to target the aforementioned problems in IQA, we develop a novel framework for IQA to mimic the human visual system (HVS) by incorporating the merits from multiscale geometric analysis (MGA), contrast sensitivity function (CSF), and the Weber’s law of just noticeable difference (JND). In the proposed framework, MGA is utilized to decompose images and then extract features to mimic the multichannel structure of HVS. Additionally, MGA offers a series of transforms including wavelet, curvelet, bandelet, contourlet, wavelet-based contourlet transform (WBCT), and hybrid wavelets and directional filter banks (HWD), and different transforms capture different types of image geometric information. CSF is applied to weight coefficients obtained by MGA to simulate the appearance of images to observers by taking into account many of the nonlinearities inherent in HVS. JND is finally introduced to produce a noticeable variation in sensory experience.

References


**Index Terms**

Computer Science  
Emerging Trends in Technology

**Keywords**

Image Quality Assessment Performance  
Image Quality Study  
Subjective Quality Assessment  
contrast Sensitivity Function (csf)  
Human Visual System (hvs)  
Image Quality Assessment (iqa)  
Just Noticeable Difference (jnd)  
Multiscale Geometric Analysis (mga)