**Medical Image Fusion via an Effective Wavelet-Based Approach**

**ABSTRACT**

A novel wavelet-based approach for medical image fusion is presented, which is developed by taking into not only account the characteristics of human visual system (HVS) but also the physical meaning of the wavelet coefficients. After the medical images to be fused are decomposed by the wavelet transform, different-fusion schemes for combining the coefficients are proposed: coefficients in low-frequency band are selected with a visibility-based scheme, and coefficients in high-frequency bands are selected with a variance based method. To overcome the presence of noise and guarantee the homogeneity of the fused image, all the coefficients are subsequently performed by a window-based consistency verification process. The fused image is finally constructed by the inverse wavelet transform with all composite coefficients. To quantitatively evaluate and prove the performance of the proposed method, series of experiments and comparisons with some existing fusion methods are carried out in the paper. Experimental results on simulated and real medical images indicate that the proposed method is effective and can get satisfactory fusion results.