Abstract

Digital imaging in medicine is improving the medical standards since last few decades. The images acquired by various imaging modalities suffer from various kinds of noise in the acquisition phase. The noise in the image decrease the contrast of the image and it becomes difficult to locate the tumours, lesions etc from these corrupted images. So the removal of noise from these images is very important. In this paper we developed the algorithms for the removal of Poisson noise in X-Ray Images and Rician noise in Magnetic Resonance Images. The noise in these modalities won’t follow the Gaussian distribution. The Poisson noise in X-ray images will follow the Poisson distribution and the noise in MR images is modeled as Rician noise. In this work we developed the algorithms using Discrete wavelet transform, Undecimated wavelet transform, Dual tree Complex wavelet transform, Double Density discrete wavelet transform and Double density dual tree complex wavelet transforms to decompose the image into multiple resolution levels along with the variance stabilisation transforms to convert the Poisson noise and Rician noise into approximate gaussian noise. The performance of the algorithms were evaluated using PSNR (Peak signal to noise ratio), UQI (Universal quality index) and SSIM (Structural similarity index) etc. The results show that the double density dual tree complex wavelet transform is performing well than the other transforms.
References


Denoising of Poisson and Rician Noise from Medical Images using Variance Stabilization and Multiscale Transformations


Index Terms

Computer Science
Signal Processing

Keywords
Discrete Wavelet Transform  Dual tree complex wavelet transform  Double density wavelet transform

Wavelet shrinkage

Variance Stabilization. ifx