

An Image Enhancement Method Based on Curvelet Transform for CBCT-Images

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Abstract : Image denoising plays extremely important role in digital image processing. Enhancement of clinical image research based on Curvelet has been developed rapidly in recent years. In this paper, we present a method for image contrast enhancement for cone beam CT (CBCT) images based on fast discrete curvelet transforms (FDCT) that work through Unequally Spaced Fast Fourier Transform (USFFT). These transforms return a table of Curvelet transform coefficients indexed by a scale parameter, an orientation and a spatial location. Accordingly, the coefficients obtained from FDCT-USFFT can be modified in order to enhance contrast in an image. Our proposed method first uses a two-dimensional mathematical transform, namely the FDCT through unequal-space fast Fourier transform on input image and then applies thresholding on coefficients of Curvelet to enhance the CBCT images. Consequently, applying unequal-space fast Fourier Transform leads to an accurate reconstruction of the image with high resolution. The experimental results indicate the performance of the proposed method is superior to the existing ones in terms of Peak Signal to Noise Ratio (PSNR) and Effective Measure of Enhancement (EME).

Keywords : curvelet transform, CBCT, image enhancement, image denoising

Conference Title : ICPRCV 2017 : International Conference on Pattern Recognition and Computer Vision

Conference Location : Toronto, Canada

Conference Dates : June 15-16, 2017