Abstract

Now-a-days, almost all areas of medical diagnosis are impacted by the digital image processing. When an image is processed for visual interpretation, the human eye is the judge of how well a particular method works. Clinical application demanding Radiotherapy plan, for instance, often benefits from the complementary information in images of different modalities. For medical diagnosis, Computed Tomography (CT) provides the best information on denser tissue with less distortion. Magnetic Resonance Image (MRI) provides better information on soft tissue with more distortion. With more available multimodality medical images in clinical applications, the idea of combining images from different modalities become very important and
medical image fusion has emerged as a new promising research field. Wavelet transform fusion is more formally defined by considering the wavelet transforms of the two registered input images together with the fusion rule. Then, the inverse wavelet transform is computed, and the fused image is reconstructed. The wavelets used in image fusion can be classified into three categories: Orthogonal, Bi-orthogonal and A’trous’ wavelet. Although these wavelets share some common properties, each wavelet has a unique image decompression and reconstruction characteristics that lead to different fusion results. A Novel multi-resolution fusion algorithm is proposed in this paper, which combines aspects of region and pixel based fusion. Normally, when a wavelet transformation alone is applied, the results are not so useful for analysis. However, if a wavelet transform and a traditional transform such as Principal Component Analysis (PCA) transform is integrated, better fusion results may be achieved. Hence, a new novel approach is introduced in this work to improve the fusion method by integrating with PCA transforms. In this paper, the fusion results are compared visually and statistically to show that wavelet integrated method can improve the fusion result, reduce the ringing or aliasing effects and make image smoother.

References


Index Terms

Computer Science

Emerging Trends in
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Computed Tomography (CT)  Magnetic Resonance Image (MRI)  Fusion  Wavelets
PCA Transform