

عنوان مقاله:

A Novel Approach for Reducing of Partial Volume Averaging Artifact in CT Scanner

محل انتشار:

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خلاصه مقاله:

Partial volume averaging is one of the most prevalent artifacts in computed tomography (CT) that threatens the diagnostic interpretation by giving the misleading density of a voxel. This paper proposes a novel approach for reducing of partial volume averaging artifact in CT called dual scan method. The idea behind this work is to acquire two sinograms of the object while detector is slightly shifted in x-axis. Then a computer program simultaneously processes the two sinograms and extracts a new sinogram with double spatial resolution and less partial volume artifact. To evaluate this method, a model based on an actual CT scanner was simulated in GATE Monte Carlo code. An exclusive phantom was designed for investigation of partial volume averaging artifact. The phantom consisted of two materials with densities of 1.2 and 1.6 g/cm³. Because of partial volume averaging artifact the reconstructed image of the phantom revealed the density of 1.4 g/cm³ and also the spatial resolution of the system obtained 0.4 mm. After applying the dual scan method to the CT scanner, not only did the spatial resolution of the system improved to 0.2 mm but also the partial volume averaging artifact decreased up to 50% and density of each materials of the phantom was detected exactly.

کلمات کلیدی:

Partial volume averaging artifact; Computed tomography; Monte Carlo simulation

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