International Journal of Biomedical Imaging

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An Approximate Cone Beam Reconstruction Algorithm for Gantry-Tilted CT Using Tangential Filtering

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Abstract

FDK algorithm is a well-known 3D (three-dimensional) approximate algorithm for CT (computed tomography) image reconstruction and is also known to suffer from considerable artifacts when the scanning cone angle is large. Recently, it has been improved by performing the ramp filtering along the tangential direction of the X-ray source helix for dealing with the large cone angle problem. In this paper, we present an FDK-type approximate reconstruction algorithm for gantry-tilted CT imaging. The proposed method improves the image reconstruction by filtering the projection data along a proper direction which is determined by CT parameters and gantry-tilted angle. As a result, the proposed algorithm for gantry-tilted CT reconstruction can provide more scanning flexibilities in clinical CT scanning and is efficient in computation. The performance of the proposed algorithm is evaluated with turbell clock phantom and thorax phantom and compared with FDK algorithm and a popular 2D (two-dimensional) approximate algorithm. The results show that the proposed algorithm can achieve better image quality for gantry-tilted CT image reconstruction.

Abstract

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