About this Journal   Submit a Manuscript   Table of Contents

FDK Half-Scan with a Heuristic Weighting Scheme on a Flat Panel Detector-Based Cone Beam CT (FDKHSCW)

Dong Yang and Ruola Ning

Department of Imaging Sciences and Electrical & Computer Engineering, University of Rochester Medical Center, Rochester 14642, NY, USA

Abstract

A cone beam circular half-scan scheme is becoming an attractive imaging method in cone beam CT since it improves the temporal resolution. Traditionally, the redundant data in the circular half-scan range is weighted by a central scanning plane-dependent weighting function; FDK algorithm is then applied on the weighted projection data for reconstruction. However, this scheme still suffers the attenuation coefficient drop inherited with FDK when the cone angle becomes large. A new heuristic cone beam geometry-dependent weighting scheme is proposed based on the idea that there exists less redundancy for the projection data away from the central scanning plane. The performance of FDKHSCW scheme is evaluated by comparing it to the FDK full-scan (FDKFS) scheme and the traditional FDK half-scan scheme with Parker's fan beam weighting function (FDKHSFW). Computer simulation is employed and conducted on a 3D Shepp-Logan phantom. The result illustrates a correction of FDKHSCW to the attenuation coefficient drop in the off-scanning plane associated with FDKFS and FDKHSFW while maintaining the same spatial resolution.