Cone-Beam Filtered Backprojection Image Reconstruction Method for Short Trajectories

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Inventors: Guang-Hong Chen

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for accurately reconstructing images from divergent beams of acquired image data.

Overview

In computed tomography (CT) imaging, divergent beam data acquisition modes have the potential to speed up data acquisition and shorten scan time. However, image reconstruction from divergent-beam projections poses a challenge.

The Invention

A UW-Madison researcher has developed a method for accurately reconstructing images from divergent beams of acquired image data. In this new cone-beam filtered back projection (FBP) reconstruction method, a shift-invariant FBP algorithm is applied to the arc scaning path. The algorithm filters the pre-weighted and differentiated cone-beam projection data along some image voxel-dependent eigen-directions, providing better image quality than the conventional Feldkamp algorithm. Another advantage is that this algorithm works in super-short scanning mode—the normal angular range of projections is not necessary to satisfy the so-called short scan condition.

Applications

- CT imaging, particularly with a C-arm X-ray system
- Reconstruction of both fan-beam and cone-beam CT images
- May be used to reconstruct an image for other clinical applications, such as radiation therapy, where an X-ray source and a flat-panel imager slowly rotates around a patient

Key Benefits

- Accurately reconstructs images from divergent beams of acquired image data
- Scanning path may be a full scan, short scan or super-short scan.
- Allows the use of fast Fourier transform (FFT) to accelerate the image reconstruction process
- Applicable to a system with a curved detector and circular source trajectory

Additional Information

For More Information About the Inventors

- Guang-Hong Chen

Tech Fields

- Medical Imaging : CT

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846