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Tomgsynthesis imaging configuration optimization based on computer simulation

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Abstract

Digital tomosynthesis is a novel imaging technology to provide three-dimensional reconstruction with fast image acquisition. Tomosynthesis imaging configuration optimization is essential to improve image quality with limited dosage. Currently, both parallel imaging and partial isocentric imaging configurations exist in breast tomosynthesis imaging field. With the development of carbon nanotube based multi-beam X-ray sources by scientists Zhou *et al*., it is possible to distribute X-ray sources with various spatial configurations. To investigate the effects of flexible beam distributions, tomosynthesis datasets of several spatial distributions including parallel imaging and rectangular imaging were simulated. Iterative reconstruction algorithms were developed to reconstruct the simulated objects. Preliminary results showed that two dimensional rectangular configurations outperformed parallel alignment by providing better depth resolution, enhanced image contrast, and reduced out-of-plane artifacts.

Biography

Dr. Ying Chen is an Associate Professor in the Department of Electrical and Computer Engineering and Biomedical Engineering Graduate Program at Southern Illinois University Carbondale. Her research interests include medical imaging, image reconstruction, digital tomosynthesis, image processing and image quality analysis.