**Panoramic cone beam computed tomography (CBCT) obtains full-scan CT images using only a half-scan rotation**

*Technology #2934*

State of the art cone beam computed tomography (CBCT) scanners used in image guided radiation therapy (IGRT) are cumbersome because the imaging source must rotate a full 360 degrees around the patient. Utilizing cone shaped x-ray beam sources, panoramic cone beam computed tomography (CBCT) is able to produce volumetric tissue density images obtained from a half scan rather than from the conventional full scan. The technology acquires multiple projection images over the half scan view and reconstructs the full scan image by stitching together the projection views using a direct image stitching method. In this way, panoramic CBCT reconstructs full scan image views by performing only a half scan of the target, improving the efficiency and functionality of conventional CBCT.

**CBCT reconstruction algorithm forms full-scan images by stitching panoramic projection images together**

This technology represents a method for reconstructing accurate images of anatomical structures and volumetric tissue densities from CBCT half-scans for use in IGRT. Data obtained from the half-scan is manipulated by the reconstruction algorithm to reconstruct tissue densities. Unlike existing techniques aimed at reducing scan rotations, this method does not sacrifice the ability to image large volumes or image accuracy. This technology can be deployed for use with existing CBCT systems. The panoramic CBCT technique has been validated using simulated cone-beam projection images of a human thorax.

**Lead Inventor:**

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**Applications:**

- Deployment at a reconstruction algorithm for CBCT imaging in IGRT (image guided radiation therapy).
- Reconstruction of CBCT images in dentistry.
- Application to nuclear imaging (PET and SPECT).
Advantages:

• Accurate image reconstruction from half-scan data without sacrificing image volume or accuracy.
• Fewer scan angles decrease the potential for the gantry to collide with the rest table.
• Fewer scan angle results in reduced radiation exposure from the CBCT scanner.
• Can be deployed with existing conventional scanners.

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Related Publications:

Further Information: Columbia | Technology Ventures Email: TechTransfer@columbia.edu

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