



Simultaneous Image Reconstruction and Artifact Reduction

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a medical imaging technique that accounts for data inconsistencies.

Overview

With conventional image reconstruction, a single image is produced from a corresponding set of data. For example, an image can be reconstructed from a single CT sonogram or one MRI data set. Such direct correspondence between data and image is based on the assumption that data are consistent with each other.

Routinely, this assumption is false. Inconsistencies can be caused by motion, metal objects, scattering, undersampling and contrast agents traveling through a subject's vasculature. These inconsistencies manifest as artifacts.

To enable more faithful imaging, a system must account for levels of data inconsistency.

The Invention

A UW-Madison researcher has developed a system for reconstructing images with different levels of artifacts. In this way, a 'target image' with the lowest level of problems will be produced simultaneously with an 'artifact image' that depicts primarily artifacts.

The method works by automatically and iteratively producing multiple images from one set of data, with the multiple images corresponding to different data consistency levels.

Once a subject is scanned, an image matrix is initialized having columns that correspond to different images. At least one image then is reconstructed by minimizing a matrix rank. The ranking is constrained according to a consistency condition that promotes the forward projection of each column to be consistent with a different subset of the acquired data.

Applications

- Time-resolved CT
- Cone-beam and contrast-enhanced CT
- Cardiac imaging
- X-ray angiography
- MRI

Key Benefits

- Enables motion-consistent images
- Can generate several consistent time frames from one short scan
- Helps clinicians compare quality images with artifact images

Additional Information

For More Information About the Inventors

- [Guang-Hong Chen](#)

Related Technologies

- [For more information about PICCS, a method for reconstructing high-quality images from undersampled data, see WARF reference number P08127US.](#)
- [For more information about a method to reconstruct images from time-resolved cardiac CT image data, see WARF reference number P08250US.](#)

Tech Fields

- [Information Technology : Image processing](#)
- [Medical Imaging : CT](#)

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