Statistical Imaging Reconstruction Is Faster, Cuts Noise

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WARF: P130341US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a technique for reconstructing medical images using a framework that accounts for statistical noise.

Overview

In recent years, statistical imaging reconstruction has been introduced in clinics by different computed tomography (CT) manufacturers as a means to reduce radiation dose levels. Essentially, the method achieves low dose CT imaging by searching for the highest quality image with the lowest noise level.

One major drawback is slow reconstruction speed, often on the order of hours. This primarily is due to the tradeoff between convergence speed and parallelizability (i.e., when one feature is high the other is low).

Clearly needed is a new approach that leverages the benefits of statistical reconstruction but avoids such a tradeoff.

The Invention

A UW–Madison researchers has developed an iterative reconstruction method that simultaneously achieves high convergence speed and high parallelizability. The method can work with various medical imaging systems, including CT, magnetic resonance imaging (MRI), X-ray angiography and positron emission tomography (PET).

In general, a nonlinear reconstruction problem is decomposed into separate linear sub-problems that can be solved more efficiently. The statistical image reconstruction process is decomposed into a statistically weighted algebraic reconstruction update sequence. After this step, the image is de-noised using a regularization function.

Applications

- Statistical image reconstruction software
- Suitable for imaging systems such as time-resolved CT, cone-beam CT, cardiac imaging CT, contrast-enhanced CT, X-ray angiography, MRI, PET, single photon emission CT (SPECT) and optical coherence tomography (OCT)

Key Benefits

- Fast and highly parallelizable
- Reduced noise

Additional Information

For More Information About the Inventors

- Guang-Hong Chen

Related Technologies
- WARF reference number P100275US01 describes a universal signal-to-noise ratio enhancement using "PICCS" image reconstruction.

Tech Fields
- Information Technology : Image processing
- Medical Imaging : CT
- Medical Imaging : Other diagnostic imaging

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