Intelligent, Real-Time Tracking Method to Enhance Ultrasound-Based Strain and Elasticity Imaging

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method to produce high quality strain and elastic modulus images for diagnostic use.

OVERVIEW

Ultrasound-based elasticity imaging is used in medicine for non-invasive analysis of tissue movement and displacement. These types of techniques determine how tissue moves in response to pressure, much like the pressing of tissue by a physician to feel differences in elasticity in the underlying structures. Because tumors often are stiffer than surrounding tissue, elasticity measurements can be used to help diagnose breast, liver or prostate cancer.

In ultrasound strain imaging, two images obtained with an ultrasound probe are analyzed to deduce the amount of displacement in the material at a number of corresponding regions. The displacement between corresponding regions is determined by identifying a multi-point region, known as a reference kernel, in the material before it is compressed. Then the reference kernel is compared to a target kernel in the material after compression.

Calculation of the displacement vectors depends on “seeds,” or original points obtained by an algorithm, and the kernels associated with these points. In areas of substantial tissue displacement, an error known as “peak hopping” occurs when these seed vectors and the associated kernels are falsely matched to target kernels.

THE INVENTION

UW–Madison researchers have developed a new process that combines a regularized speckle tracking algorithm and a quality-based seeding strategy. The method improves the identification of high quality seed displacement vectors by evaluating similarity and correlation of seed kernel displacement calculations as well as local continuity. This combined approach greatly reduces the risk of the selected seed kernels having peak hopping errors while preserving the benefits of a quality-based seeding strategy.

The method improves image quality and reduces image reconstruction time by using an

THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.

algorithm that chooses the highest quality seeds possible with the highest probability of accuracy. Seed quality is improved by factoring in specific organs and types of transducers. As a result, noise in the reconstructed image is reduced.

APPLICATIONS

- Three- or four-dimensional strain imaging
- Image reconstruction software used in ultrasound imaging

KEY BENEFITS

- Ensures high quality seeds are given priority in image construction
- Reduces image noise
- Performs ten times faster than multi-grid approach alone
- Reduces required computational power significantly

ADDITIONAL INFORMATION

Related Technologies

For more information about high precision ultrasound elasticity imaging, see WARF reference number P07059US.

Tech Fields

Medical Imaging - Ultrasound

CONTACT INFORMATION

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