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Elastography based on X-Ray Ct and Sound Wave Integration

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BRIEF DESCRIPTION

Researchers at UCI have created an elastography technique, which combines X-ray computed tomography (CT) and sound wave integration. This adapted elastographic technique avoids the issues faced by ultrasound alone and permits medical imaging of deep tissue and measures the mechanical properties of materials.

FULL DESCRIPTION

Ultrasound imaging, which involves the measurement of wave velocity, has been used to assess mechanical properties of deep tissues inside human bodies. Ultrasound alone however, can be susceptible to image noise, low spatial resolution, and poor detection of tissue interfaces.

Inventors at UCI have modified an elastography technique with an X-ray CT capable of sound wave integration. This modified elastography imaging device eliminates the problems associated with. 3D structures of sample or tissues are obtained by X-ray CT scanning. With a 3D image model reconstructed, acoustic tests will be performed to assess the external pressure distribution. Mechanical properties can be determined after finite element modeling and analysis.

The value of this technology is that it only requires assessment of pressures on the outside of the sample or tissue in question to determine its mechanical properties. This technique will enhance accuracy of ultrasound measurements, improve categorizations of tissues, and expand ultrasound's use in clinical applications.

SUGGESTED USES

- » Medical imaging: to determine mechanical properties of deep tissues inside living organisms
- » Materials science: Measure mechanical properties of materials

FEATURES/BENEFITS

- » Does not require multiple types of data to be acquired. Typically, pressure data is sufficient.
- » System is easy to implement
- » Can accommodate materials of varying geometries
- » Does not involve complicated image processing

PATENT STATUS

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OTHER INFORMATION

KEYWORDS

Elastography, X-Ray, Computed Tomography, Sound Wave, Integration, Ultrasound, Imaging, 3D, Acoustic, Numerical Simulation

CATEGORIZED AS

- » **Imaging**
 - » 3D/Immersive
 - » Medical
- » **Medical**
 - » Imaging

RELATED CASES

2015-984-0

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STATE OF DEVELOPMENT

Numerical simulation and experimental sample data acquisition have been performed to validate this method.

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