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Soft Tissue Elasticity Imaging Method to Assess Pathology (20140062, Dr. Bojan Guzina)

Technology No. 20140062

Acoustic radiation force (ARF) ultrasound

This invention uses ultrasound to measure the nonlinear mechanical properties of an object including those of biological tissues. This information can be used to detect abnormalities in tissues. The technique combines the advantages of using acoustic radiation force (ARF) ultrasound for local tissue characterization and the capability of assessing the nonlinear tissue elasticity as an additional new modality for differential cancer diagnosis.

Local tissue characterization

At present, no techniques are capable of assessing nonlinear tissue elasticity locally via acoustic radiation force (ARF) ultrasound. ARF generated by modulated ultrasound is already used in a number of medical diagnostic techniques: Vibroacoustography, Shear Wave Elasticity Imaging (SWEI), Supersonic Imaging, and Acoustic Radiation Force Impulse Imaging (ARFI). However, these techniques only diagnose the tissue locally by assessing its linear elastic parameters. Estimating a tissue’s nonlinear elastic parameters may elevate the differential diagnosis of cancerous lesions. This localization is especially important when imaging highly heterogeneous tissues as it allows the user to distinguish, in terms of linear and nonlinear tissue, between neighboring regions with high spatial resolution.

Phase of Development

- Proof of concept

Benefits

- New modality for differential cancer diagnosis

- Potential a tool for non-invasive biopsies

Features

- Local tissue characterization (restricted to the size of the focal region)
- Generates a shear wave through tissue using acoustic radiation force (ARF)
- Distinguishes between neighboring regions with high spatial resolution

Applications

- Cancer diagnosis (e.g., breast and prostate)
- Potential for non-invasive biopsies
- Estimating nonlinear elastic parameters of tissues

Researchers

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Publications

Application of topological sensitivity toward soft-tissue characterization from vibroacoustography measurements
J. Comput. Nonlinear Dynam, 8(3), 034503 (Mar 21, 2013)

Interested in Licensing?

The University relies on industry partners to further develop and ultimately commercialize this technology. The license is for the sale, manufacture or use of products claimed by the patents. Please contact us to share your business needs and licensing and technical interests in this technology.