Compression Correction for Ultrasound Imaging

VANDERBILT UNIVERSITY
CTTC Center for Technology Transfer & Commercialization

Summary

Vanderbilt researchers have developed a system that corrects for compressional effects in ultrasound data during soft tissue imaging. The system uses tracking and digitization information to detect the pose of the ultrasound probe during imaging, and then couples this information with a biomechanical model of the tissue to correct compressional effects during intraoperative imaging.

Addressed Need

Existing ultrasound probes create inaccurate alignment and image distortion when pressed into soft tissue. As a result, intraoperative ultrasound images become incompatible with other intra- or preoperative imaging modalities leading to poor registration accuracy during image-guided therapies. The present technology overcomes these difficulties.

Technology Description

The technology can be integrated with existing surgical navigation systems to improve their imaging accuracy. The technology is also adaptable to all forms of soft tissue image-guided surgery. Using a biomechanical model, the technology predicts how the soft tissue is being manipulated during ultrasound imaging and uses this model prediction to correct the ultrasound data from a compressed to an uncompressed state. The technology can also enable real-time compensation, which is a capability that no other system on the market possesses.

Unique Features

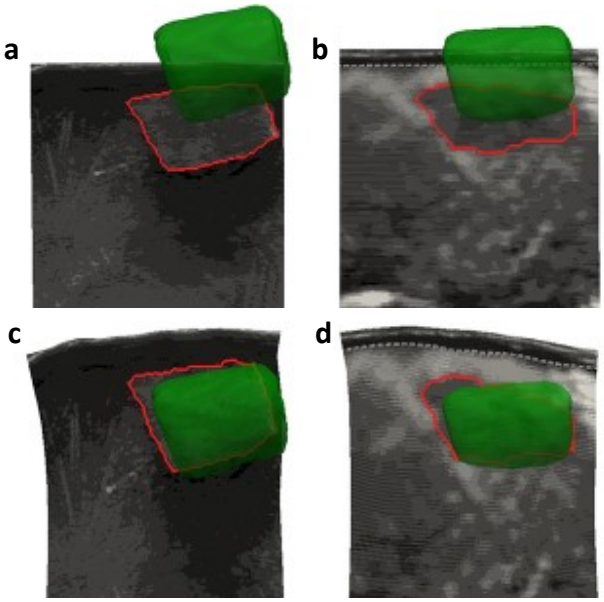
- Use of a biomechanical model to predict how soft tissue is being manipulated during ultrasound imaging
- Integration of the model prediction with imaging data, resulting in uncompressed ultrasound images
- Can be performed in real-time

Technology Development Status

The efficacy of the technology has been demonstrated, and further refinement of the algorithms is ongoing.

Intellectual Property Status

- A patent application has been filed



Examples of uncorrected B-mode (a) and strain image (b) contours showing the segmented tumor contour in *red* and the tomogram tumor volume in *green*. Alignment after applying the model-based correction is shown for B-mode (c) and strain image (d) contours.

CTTC CONTACT:
Ashok Choudhury, Ph.D.
(615) 322-2503
ashok.choudhury@vanderbilt.edu

INVENTORS:
Michael Miga, Ph.D.
Vanderbilt Biomedical Engineering
Biomedical Modeling Laboratory

VU REFERENCE: VU 15001

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