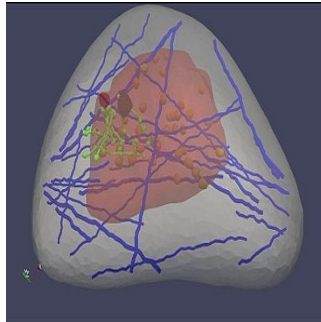

'Virtual Breast' Could Improve Cancer Detection



Researchers from Michigan Technological University (MI, USA) have developed a virtual breast — a 3D, computer-generated “phantom” — that would help medical professionals practice in the safety of the laboratory, according to a news release from the university. Clinicians can practice looking for cancer by applying virtual ultrasound elastography to the virtual breast and then evaluating the resulting images.

Like a simulator used to train fledgling surgeons, the virtual breast was developed using data from the Visible Human Project, which gathered thousands of cross-sectional photos from a female cadaver. Thus, it mimics the intricacy of the real thing, incorporating a variety of tissue types and anatomical structures, such as ligaments and milk ducts, said the research team led by Jingfeng Jiang, a biomedical engineer at Michigan Tech.

Next to lung cancer, breast cancer is the leading cause of cancer death in women, according to the American Cancer Society. Physicians encourage women to get mammograms, even though the tests are imperfect at best. Data show that only a minority of suspicious mammograms actually leads to a cancer diagnosis. That results in lots of needless worry for women and their families — not to mention the time, discomfort and costs of additional tests, including ultrasounds and biopsies.

Recently, another type of test, ultrasound elastography, has been used to pinpoint possible tumours throughout the body, including in the breast. “It uses imaging to measure the stiffness of tissue, and cancer tissues are stiff,” Jiang pointed out. Those images can be breathtakingly clear — i.e., in an elastogram the tumour could be seen as different from normal breast tissue as a yolk is from the white in a fried egg. However, not all images are that precise, Jiang said.

“Depending on who does the reading, the accuracy can vary from 95 percent to 40 percent,” he explained. “Forty percent is very bad—you get 50 percent when you toss a coin. In part, the problem is that ultrasound elastography is a new modality, and people don’t know much about it.”

Ultrasound elastography could be an excellent screening tool for women who have suspicious mammograms, but only if the results are properly interpreted. Jiang, who helped develop ultrasound elastography when he was a postdoctoral researcher at the University of Wisconsin–Madison, reasoned that clinicians might improve their accuracy if they could practice more. This prompted Jiang and his colleagues to develop a virtual breast.

Jiang’s team, including graduate student Yu Wang and undergraduate Emily Helminen, both of Michigan Tech, presented a poster on their work, “A Virtual Breast Elastography Phantom Lab Using Open Source Software,” at the IEEE Ultrasonics Symposium held in Chicago last month.

Their research project is supported by a \$452,780 grant from the National Institutes of Health through the National Cancer Institute. Jiang’s hope is that eventually the lab software will be available to anyone who needs the training.

Source: Michigan Technological University
Image Credit: Michigan Technological University

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