Enhancing breast cancer detection

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Straightforward imaging with an infrared, thermal, camera for detecting breast cancer early without the discomfort or inconvenience of mammography or biomolecular tests, according to a study to be published in the *International Journal of Innovative Computing and Applications*.

Tiago Borchartt of the Federal Fluminense University in Brazil and colleagues explain how breast thermography has up to now achieved an average sensitivity and specificity or approximately 90 percent for the detection of malignant tissue. The advantages of the technique are that it is painless, requires no contact between patient and instrumentation and is entirely non-invasive. However, a 90 percent accuracy rate implies that there is a lot of room for improvement before such a technique could become a mainstream clinical diagnostic for the early stages of breast cancer.

The team has developed new software that allows them to acquire thermal images into a computer database and so be used to help with diagnosis after the automatic extraction of the regions of interest. The same tool combines storage with feature extraction and recognition. The approach can detect the presence of problems using symmetric analysis and numerical simulations using finite element analyses allows it to analyze the relationships between internal temperature and the temperature on the breast surface during image acquisition.

So far, the researchers have tested their approach on a limited number of thermal images from 28 patients: four healthy patients, eight with cysts,

eleven patients with fibroadenoma and five with carcinoma. They were able to improve the accuracy of breast thermography using their approach to 96%. The next step will be to test this in larger group of at least 2000 patients. That future project has already been approved by the ethical committee of the University Hospital of UFF.

More information: "Combining approaches for early diagnosis of breast diseases using thermal imaging" in *Int. J. Innovative Computing and Applications*, 2012, 4, 163-183

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