Researchers at the University of South Florida have developed a computerized analysis tool that may aid in the assessment of digital medical images such as mammograms, by incorporating methods of estimating breast cancer risk. Their technology has been patented at the USPTO, patent numbers 6,310,967 and 7,664,604.

Mammographic screening, for the identification of abnormalities and the pathological characterization of breast tissue, is normally a visual task that combines several aspects and X-ray findings, presented in various areas of the mammographic image, as well as external data available through each patient’s clinical history. Most current methods involve subjective opinions of the doctor or radiographer whose diagnosis may vary based on the radiographer’s experience. However, the exact task of tissue characterization and classification of a tumor as probable benign or probable malignant is extremely complex and includes advanced inference mechanisms. The mammographic workload is immense, while most images present without abnormalities or suspicions.

Our technology incorporates a data entry interface adapted to accept an array of risk factors associated with the patient including accepted breast cancer risk factors such as age and reproductive history to develop an automated risk assessment of the patient. Because radiographically dense breast tissue is a significant risk factor, the technology also incorporates tissue measurements from the mammogram in the risk assessment. This research aims to fuse risk analysis with the primary detection of breast abnormalities during routine screening and detect normal mammograms that do not require further attention. These procedures have the potential to greatly reduce the time spent in analyzing low-risk mammograms and increase the accuracy in evaluating mammograms. Early detection can dramatically drop the mortality rate as can be seen in the five-year mortality rate for women diagnosed with breast cancer.

Advantages:
- Early cancer detection in asymptomatic patients
- Detects abnormal or calcified tissue by multi-resolution model
- Quantitative risk assessment
- Inputs an array of clinical and genetic risk factors
- Low probability of false negatives

Figure: Digital mammogram image showing (a) suspicious calcification cluster, (b) labeled breast density and (c) the detection output that contains: (1) mostly normal tissue, (2) the detected biopsy proven cluster of calcifications and (3) a few other scattered suspicious regions.

Tech ID #01B079 & 97A007