AbstractID: 9411 Title: Breast Tissue Classification in Digital Breast Tomosynthesis Images using Texture Features

Purpose: Breast density is a known breast cancer risk factor. Digital breast tomosynthesis (DBT) is a tomographic x-ray breast imaging modality with superior breast tissue visualization in comparison to mammography. The goal of our on-going study is to evaluate the performance of DBT texture features in distinguishing between dense and fatty breast tissue regions. Our hypothesis is that DBT texture analysis could result in more discriminative features to characterize breast density in comparison to mammography, and ultimately yield more accurate measures of risk. **Method and Materials:** DBT images and digital mammograms (DM) from 39 women were analyzed. DBT and DM acquisition was performed with a GE Senographe 2000D FFDM system modified to allow positioning of the x-ray tube at 9 locations by varying the angle from -25^{o} to $+25^{o}$ in increments of 6.25^{o}. Filtered-backprojection was used to reconstruct DBT tomographic planes in 1 mm increments. The dense tissue area was delineated within each breast image using a widely validated thresholding technique (*Cumulus* Ver. 4.0, University of Toronto). Two regions of interest (ROIs) were manually selected in each breast image: one within the dense tissue region and another within the fatty region. Texture features of skewness, coarseness, contrast, fractal dimension, energy and homogeneity were computed from all available ROIs. Two-tailed paired Student's t-test was applied to compare the means of the texture feature distributions from the dense versus the fatty ROIs. **Results:** Coarseness, contrast, energy and homogeneity were statistically significantly different ($p \leq 0.001$) between dense and fatty ROIs. Dense ROIs have lower coarseness, higher contrast, higher energy and lower homogeneity. **Conclusions:** X-ray image texture differs between dense and fatty breast tissue regions. Further work is underway to fully compare the relative performance of texture features in classifying dense versus fatty tissue regions using DM, DBT source projections, and reconstructed DBT images.