

AbstractID: 1924 Title: Effect of Radiologists' Variability on Computer Performance in Classifying Malignant and Benign Microcalcifications in Mammograms

We developed a computer technique to classify clustered microcalcifications as malignant or benign based on the mammogram and a rectangular region of interest (ROI) containing calcifications, as indicated by a radiologist. The purpose of this study was to evaluate effect of variability in ROIs indicated by different radiologists on computer classification performance. We used 81 full-field digital mammograms (FFDM) of 49 patients (19 cancers). Four radiologists participated as observers in this study. The feature extraction algorithm and the artificial neural network (ANN) classifier used to calculate likelihood of malignancy (LM) of the calcifications were developed on a separate film-screen mammogram database. On average, overlap between all possible pairs of ROIs indicated by the 4 radiologists in each mammogram was 66%. The computer achieved image-based A_z values of 0.76, 0.78, 0.78 and 0.79 from ROIs indicated by the radiologists. The average standard deviation of the LMs was 0.13. Averaging the LMs calculated from each of the 4 ROIs in a given image increased the image-based A_z to 0.86 ($p = 0.03, 0.04, 0.14$ and 0.15 , respectively). The patient-based A_z also increased from 0.79 to 0.81. These preliminary results indicate that variation in ROIs indicated by radiologists can potentially be used to attain improved computer classification performance.