

AbstractID: 7672 Title: Investigation of similarity measures for selection of similar images for breast lesions on mammograms

**Purpose:** Similar known images may be helpful for radiologists in the diagnosis of breast lesions on mammograms. However, selected images may not be really similar if a similarity measure is not properly determined. We determined the radiologists' subjective similarity ratings for pairs of lesions and investigated the objective measures that would agree with the radiologists' ratings.

**Material and Methods:** We selected 300 pairs of masses and 300 pairs of clustered microcalcifications for determination of subjective ratings to establish a "gold standard." These ratings would be useful for determination and evaluation of objective similarity measures. The 300 pairs were randomly grouped into two groups; one group was used as a training set, whereas the other group was used as a test set. This process was repeated for three times. The objective measures based on the distance in the feature space and by use of an artificial neural network (ANN) were compared by a cross validation method.

**Results:** For distance-based objective measure, the correlations between the subjective ratings and objective measures were 0.50, 0.53, and 0.51 for the mass pairs. When the radiologists' ratings were used as teacher in training of the ANN, the similarity measures were improved, and the correlations were improved to 0.66, 0.70, and 0.67.

**Conclusion:** The results indicate that similar images selected by the ANN-based similarity measure may be more useful than the images selected by the distance-based similarity measure in feature space.