

**Purpose:** The purpose of this study was to retrospectively evaluate dynamic contrast enhanced (DCE) breast magnetic resonance imaging (MRI) data. Texture analysis is applied to extract features from this data and test the feasibility of using these texture features for creating a computer aided diagnostic system (CAD).

**Methods:** Computation time for texture feature extraction for the entire 3D dataset precludes whole breast analysis. Reduction of data can be best accomplished through the generation of angiogenesis (parametric maps) based on contrast agent kinetics and the knowledge that malignancy exhibits rapid uptake and plateau or slow washout on the DCE curve. Breast image data that exhibits these high-risk characteristics can be segmented into volumes-of-interest (VOIs). These volumes-of-interest can be projected on high resolution post contrast (T1) images using direction cosines information stored in the image header. The corresponding projected VOI on the high resolution, post contrast MR image can undergo feature extraction. Total 35 VOIs were extracted (16 benign + 19 malignant).

In all 53 texture features such as grey level co-occurrence matrix (GLCM), second orientation pyramids (SOP), wavelets, gabor feature maps and 3 geometric features for each volume-of-interest was generated. Classification was performed using off the shelf classifiers and also with minimum enclosing ball (MEB) classifier designed by us. The efficacy of texture features to classify suspect VOIs as malignant or benign was evaluated.

**Results:** Classification using the first 14 Fisher ranked coefficients using MEB classifier produces the best results with sensitivity of 88%, specificity of 83%, and accuracy of 86%.

**Conclusions:** Machine classification of breast cancer detection from DCE MRI is encouraging. Clearly additional work in this area is required. The hypothesis that feature extraction and machine learning alone has produced good sensitivity and specificity can be proven with 95% significance level only by the study of larger datasets.