

## AbstractID: 4703 Title: Comparison of image segmentation algorithms on digitized mammograms and FFDM images for CAD

**Purpose:** To investigate lesion tumor segmentation methods for both digitized screen-film mammograms (DSF) and full-field digital mammography (FFDM).

**Method and Materials:** Breast lesion segmentation methods are important in the overall image analysis for computer-aided diagnosis. Our initial development was performed on DSF, and we are currently evaluating our methods for use with FFDM. Three of our lesion segmentation methods were investigated using a database of 84 DSF and 287 FFDM cases including malignant and benign lesions. A region growing method utilizes the size and shape of the evolving lesion contour to determine the lesion margin. A radial gradient index (RGI) segmentation method uses a Gaussian constraint function to suppress the influence of distant pixels. Then for a series of contours returned by grey level thresholding, the contour with maximum RGI is chosen as the one that best delineates the lesion. A two-stage, region-based active contour method minimizes an energy function based on the homogeneities inside and outside of the evolving contour. The minimization algorithm solves the Euler-Lagrange equation describing the contour evolution. Prior to the application of the active contour model, RGI segmentation is applied to delineate an initial contour closer to the lesion margin and estimate the effective background. The methods were compared to radiologist-delineated margins on both DSF and FFDM images using an area similarity metric.

**Results:** At an overlap threshold of 0.3, the region growing, RGI, and two-stage methods correctly segmented 84%, 86% and 94% of the digitized screen-film lesions, and 81%, 83% and 88% of lesions on FFDM, respectively.

**Conclusion:** Our results indicate that the two-stage method yields improved segmentation for both DSF and FFDM, and also that methods developed with DSF can be efficiently converted for use with FFDM.

**Conflict of Interest (only if applicable):** MLG is a shareholder in R2 Technology, Inc.