

## Segmentation of Microcalcifications with Weighted Inverse Wavelet Transform and Local Orientation

Segmentation of Microcalcifications is generally the first step to extract morphological features for Computer Aided Classification. There are several methods to segment microcalcifications based on the wavelet transform; however, many of them are based on the amplitude of the transformed coefficients, which can be regarded as the local contrast. In order to reduce the false positives and misclassify the breast tissue with similar local contrast, it is reasonable to apply both local contrast and shape analysis for segmentation purpose.

We segment microcalcifications by combining wavelet transform and local orientation measurement together, where local orientation is defined as the vector addition of the gradient angle of each point within a certain size window. The gradient angle can be directly calculated from the wavelet transform coefficients. This method is based on the breast model where the microcalcification is represented as a small closed area, and the breast tissue tends to have long linear structure. Thus the local orientation measurement is introduced to distinguish the wavelet transform coefficients that correspond to the microcalcification or breast tissue based on the difference of their shape.

The algorithm has been tested on 12 full field digital image of six patients and compared with other methods such as weighted wavelet transform or threshold based amplification of transform coefficients. The result is promising and the proposed method can segment the microcalcifications with less effect from other tissue with similar contrast.