

AbstractID: 2664 Title: Band-pass Filtering Vs. Multiscale Dyadic Wavelet Transform for Contrast Enhancement of Digital Mammograms

**Purpose:**

This paper discusses two methods for contrast enhancement of digital mammograms. One method is based on the Gaussian band-pass filter and the other is based on the dyadic wavelet transform and multiscale non-linear enhancement.

**Method:**

**Band-pass filter:** A logarithmic tone mapping operator with adaptive base is applied to an image to elevate the lower intensities which lie mainly in the skin-line zone. The mammogram is then filtered using a Gaussian band-pass filter to enhance the structure of breast while suppressing noise and the slowly varying high density structure.

**Dyadic wavelet enhancement:** Dyadic wavelet transform is applied to an image to decompose the image into horizontal detail and vertical detail subband images at different scales. Then, a non-linear weighting function is used to modify the wavelet coefficients of each subband image followed by synthesis to yield the final enhanced image. The final enhanced image is obtained by synthesis of the modified subband images.

**Results:**

We compared the enhancement performance between these two approaches. Band-pass filter does a better job of elevating the skin-line zone to the intensity level of the interior of the breast and also enhancing the contrast. However, there are some ringing artifacts which lead to saturation in a few regions near the top and the bottom part of the image. The local contrast can be improved to emphasize both salient and subtle features of mammograms. However, the contrast of the skin-line zone can not be enhanced well by the dyadic wavelet enhancement.

**Conclusion:**

Band-pass filter is fast and can obtain a good result on skin-line zone except for some ringing artifacts. Dyadic wavelet transform can enhance the unseen and barely seen features but is weak on skin-line. We tested the above methods on MIAS and Fischer Imaging databases.