

Evaluation of automated breast density segmentation software on segmenting digital mammograms acquired at Magee-Womens Hospital

Yogindra Raghav

Advisor: Dr. Shandong Wu

There are many risk factors impacting the likelihood of developing breast cancer. In our research we are investigating what radiological imaging-based information we can identify using computerized techniques from medical breast imaging (digital mammograms/magnetic resonance imaging). We hope to use this information to improve the assessment/prediction of breast cancer risk.

Mammographic breast density (MBD) has been established as an independent risk factor for breast cancer. Currently MBD is clinically assessed in terms of four qualitative categories. However, this qualitative assessment is coarse and subjective, with large inter- and intra-reader variability. Automated computerized methods have been emerging to segment dense breast tissue from digital mammograms.

The Laboratory for Individualized Breast Radiodensity Assessment (LIBRA), a software package developed by researchers at the University of Pennsylvania, has been recently published and publicly available for use to segment breast density. The LIBRA software was evaluated using digital mammograms acquired at the University of Pennsylvania Hospital System. Digital mammograms acquired at different medical centers may have different imaging parameters and characteristics. Therefore it is clinically important to test the generalizability of the LIBRA software. In this study, we aim to test the LIBRA software on processing digital mammograms acquired at Magee-Womens Hospital.

To accomplish this goal, we downloaded the LIBRA software and ran it in the Matlab environment to process 85 digital mammogram images (in DICOM format) acquired during 2013 at Magee-Womens Hospital. The 85 images included 42 from women with a cancer diagnosis and 53 from healthy women. Each woman has, on average, 4 images covering two breasts (left and right) in two different imaging views (CC and MLO). The LIBRA software was run automatically to process each of the 85

images, where the whole-breast region was delineated and then area of dense breast tissue within the whole-breast region was segmented. The segmentation was visualized by red (breast) and green contour (dense tissue) superimposed in the original digital mammogram images.

An expert reviewed all segmentation results and evaluated whether the segmentation is “acceptable” or not. Out of the 85 there were only 2 images (both from cancer patients) were evaluated as “not acceptable”. Therefore, this preliminary study showed that the LIBRA software can be used to process digital mammogram images acquired at Magee-Womens Hospital.