World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:8, No:11, 2014

A Novel Breast Cancer Detection Algorithm Using Point Region Growing Segmentation and Pseudo-Zernike Moments

Authors : Aileen F. Wang

Abstract : Mammography has been one of the most reliable methods for early detection and diagnosis of breast cancer. However, mammography misses about 17% and up to 30% of breast cancers due to the subtle and unstable appearances of breast cancer in their early stages. Recent computer-aided diagnosis (CADx) technology using Zernike moments has improved detection accuracy. However, it has several drawbacks: it uses manual segmentation, Zernike moments are not robust, and it still has a relatively high false negative rate (FNR)–17.6%. This project will focus on the development of a novel breast cancer detection algorithm to automatically segment the breast mass and further reduce FNR. The algorithm consists of automatic segmentation of a single breast mass using Point Region Growing Segmentation, reconstruction of the segmented breast mass using Pseudo-Zernike moments, and classification of the breast mass using the root mean square (RMS). A comparative study among the various algorithms on the segmentation and reconstruction of breast masses was performed on randomly selected mammographic images. The results demonstrated that the newly developed algorithm is the best in terms of accuracy and cost effectiveness. More importantly, the new classifier RMS has the lowest FNR–6%.

Keywords : computer aided diagnosis, mammography, point region growing segmentation, pseudo-zernike moments, root mean square
Conference Title : ICBC 2014 : International Conference on Breast Cancer
Conference Location : Venice, Italy
Conference Dates : November 13-14, 2014