Abstract

This work presents a new approach for classifying masses in breast ultrasound images. Detection and classification of masses in ultrasound images still remains a challenge because most of the ultrasound images contain speckle noise and fuzzy boundaries. Ultrasound (US) is an important adjunct to mammography in breast cancer detection as it increases the rate of detection in dense breasts. Ultrasound also does dynamic analysis of moving structures in breast thus it is used to analyze the functional behavior of breast. In the proposed method, ultrasound images are preprocessed using Gaussian smoothing to remove additive noise and anisotropic diffusion filters to remove multiplicative noise (speckle noise). Active contour method has been used to extract a closed contour of filtered image which is the boundary of the spiculated mass. Spiculations which make breast mass unstructured or irregular are marked by measuring the angle of curvature of each pixel at the boundary of mass. To classify the breast mass as malignant or benign we have used: the structure of mass in accordance with spiculations, elliptical shape of the mass and acoustic shadowing feature which is an important functional feature. We have used receiver operating characteristic curve (ROC) to evaluate the performance. We have validated the proposed algorithm on 100 sub images (40 spiculated and
Classification of Mass in Breast Ultrasound Images using Image Processing Techniques

60 non spiculated) and results shows 92.7% of sensitivity with 0.88 Area Under Curve. Proposed techniques were compared and contrasted with the existing methods and result demonstrates that proposed algorithm has successfully detected and classified mass ROI candidates in breast ultrasound images.

References

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Classification of Mass in Breast Ultrasound Images using Image Processing Techniques


Index Terms

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Keywords
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