Edit Delete

Advanced enhancement techniques for breast cancer classification in mammographic images

[HTML] from openbiomedicalengineeringjournal.com

Authors Sara EL Mohamed, Wael A Mohamed, Mohamed B Abdelhalim, Khaled EL Ahmed

Publication date 2022/12/1

Journal The Open Biomedical Engineering Journal

Volume 16

Issue 1

Description Background:

Breast cancer is one of the most significant health problems in the world. Early diagnosis of breast cancer is very important for treatment. Image enhancement techniques have been used to improve the captured images for quick and accurate diagnosis. These techniques include median filtering, edge enhancement, dilation, erosion, and contrast-limited adaptive histogram equalization. Although these techniques have been used in many studies, their results have not reached optimum values based on image properties and the methods used for feature extraction and classification.

Methods:

In this study, enhancement techniques were implemented to guarantee the best image enhancement. They were applied to 319 images collected from the Mammographic Image Analysis Society (MIAS) database. The Gabor filter and local binary pattern were used as feature extraction methods together with support vector machine (SVM), linear discriminant analysis (LDA), and nearest neighbor (KNN) classifiers.

Results:

The experimental work indicates that by merging the features of the Gabor filter and local binary pattern, the results were 97.8%, 100%, and 94.6% for normal/abnormal and 85.1%, 88.7%, and 81.9% for benign/malignant using the SVM, LDA, and KNN classifiers, respectively.

Conclusion:

The best results were obtained by combining the features of the two tested strategies and using LDA as a classifier.