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Neural network and multi-fractal dimension features for breast cancer classification from ultrasound images☆

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Abstract

Breast cancer is considered to be one of the most threatening issues in clinical practice. However, existing breast cancer diagnosis methods face questions of complexity, cost, human-dependency, and inaccuracy. Recently, many computerized and interdisciplinary systems have been developed to avoid human errors in both quantification and diagnosis. A computerized system can be further improved to optimize the efficiency of breast tumour identification. The current paper presents an effort to automate characterization of breast cancer from ultrasound images using multi-fractal dimensions and backpropagation neural networks. In this study, a total of 184 breast ultrasound images (72 abnormal (tumour cases) and 112 normal cases) were examined. Various setups were employed to achieve a decent balance between positive and negative rates of the diagnosed cases. The obtained results manifested in high rates of precision (82.04%), sensitivity (79.39%), and specificity (84.75%).

Keyword: Breast cancerMulti-fractal dimensionNeural network approachBreast cancer classificationUltrasound images