BREAST CANCER DIAGNOSYS SYSTEM ON MAMMOGRAM DATA USING WAVELET ANALYSIS AND MODIFIED NEURAL NETWORK

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ABSTRACT

In this study, the diagnosis system of early-stage breast cancer is constructed using wavelet analysis and modified neural network on mammogram data. Wavelet analysis is used to extract mammograms features and modification of neural network is used for classifying features of mammogram data. Data input is a mammogram image which is a gray image. First, Input image is processed using thresholding and histogram equalization to improve the quality of the image. The next process is to obtain the vector features using wavelet analysis. Wavelet analysis consists of five stages, which are the wavelet decomposition, coefficient extraction, normalization, energy computation and features reduction. The vectors features are used for classification process. The classification is divided into three categories, normal and abnormal, mass and microcalcification, benign and malignant. The coefficients of energy in the experiment used, are energy coefficients of 100, 500, 1000 and 5000.

The experiment shows that the masses can be well recognized by the energy coefficient of 100 and microcalcifications can be well recognized by the energy coefficient of 5000. Network training for microcalcifications using image data as much as 16 microcalcifications, and the iterations stop at the the 666th epoch with an error of 0.00096204 for the masses while using the data as many as 24 mass images, the iterations stop at the 117th epoch with an error of 0.00092874. From the test results using 6 benign masses and 6 malignant masses, the system obtained an accuracy of 70% for benign massess and 83.3% for malignant masses. From test results using 4 benign microcalcifications and 4 malignant microcalcifications, the system obtained an accuracy of 100% for benign microcalcifications and 75% for malignant microcalcifications.

Key word: breast cancer, neural network, mass, microcalcification.