

Scattering performance verification based on UWB imaging and neural network

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ABSTRACT

Breast cancer cases are increasing year by year and second leading reasons for the women's death worldwide. Early detection is very important and will help to save thousands of peoples' lives. The available systems such as Mammogram, MRI and ultrasound are invasive, expensive and need expert to operate. This paper presents a low cost and non-invasive breast cancer detection system for early detection. This system consisted hardware which consist a pair of home-made antenna and Ultra wide-band (UWB) and software which consist of a Neural Network (NN) module. Antenna will transmit the signal while another will receive. Both forward scattering and backward scattering performance are analyzed. The received signals are fed into NN module for further processing. Breast phantom is placed in the center and a pair of home-made antennas was placed diagonally opposite side of the breast phantom. K-fold cross validation based feed forward NN is used to train, validate and test the features. The system can screen the breast cancer with average detection performance of 87.55% using backward scattering signals while 84.17% using forward scattering signal. The proposed breast cancer detection system will be very useful for home user to check breast health regularly.

KEYWORDS

Breast cancer detection; UWB; Forward scattered signal; Backward scattered signal; Neural network

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