عنوان مقاله:

A New Method for Detection of Backscattered Signals from Breast Cancer Tumors: Hypothesis Testing Using an Adaptive Entropy-Based Decision Function

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خلاصه مقاله:

Introduction In recent years methods based on radio frequency waves have been used for detecting breast cancer. Using theses waves leads to better results in early detection of breast cancer comparing with conventional mammography which has been used during several years. Materials and Methods In this paper, a new method is introduced for detection of backscattered signals which are received by microwave breast radar. In this method, a decision function is constructed based on noise and signal cross-entropy, using hypothesis testing concept. Then noise and signal are separated using the calculated value for the decision function in each time frame. To estimate value of the decision function, discrete wavelet transform and discrete S transform are used. Results Performance of the proposed method was evaluated in two different scenarios, in which the breast was considered homogenous and heterogeneous, respectively. The obtained results showed that the proposed method detected breast backscattered signals 55% and 49% better than existing methods in two above scenarios. Conclusion Performance of S transform was 21% better than discrete wavelet transform in detection of weak backscattered signals. So it can be concluded that hypothesis testing method which uses S coefficients of received wave for construction of its decision function may be a suitable choice for detection of backscattered signals in breast radar.

کلمات کلیدی:

Breast Cancer, Heterogeneous Breast Lesions, Hypothesis Testing, S Transform

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