

UWB imaging for breast cancer detection using neural network.

ABSTRACT

This paper presents a simple feed-forward back-propagation Neural Network (NN) model to detect and locate early breast cancer/tumor efficiently through the investigation of Electromagnetic (EM) waves. A spherical tumor of radius 0.25 cm was created and placed at arbitrary locations in a breast model using an EM simulator. Directional antennas were used to transmit and receive Ultra-Wide Band (UWB) signals in 4 to 8 GHz frequency range. Small training and validation sets were constructed to train and test the NN. The received signals were fed into the trained NN model to find the presence and location of tumor. Very optimistic results (about 100% and 94.4% presence and location detection rate of tumor respectively) have been observed for early received signal components with the NN model. Hence, the proposed model is very potential for early tumor detection to save human lives in the future.

Keyword: Ultra-Wide Band; Neural Network; Breast cancer; Tumor detection.