Elman Recurrent Neural Network Application in Adaptive Beamforming of Smart Antenna System

Abstract

In this paper an artificial Elman Recurrent Neural Network (ERNN) is used for smart antenna adaptive beamforming. Neural network is used to calculate the optimum weights of uniform linear array antenna that steer the radiation pattern of the antenna by directing multiple narrow beams toward the desired users and make nulling in the direction of unwanted users. Two different supervised training algorithms are used to train the ERNN, they are Levenberg Marquardt (LM) algorithm and Resilient Backpropagation (Rprop) algorithm. Uniform linear array is used with five element and the spacing between element equal to half wavelength. The results of ERNN training using LM and Rprop showed that the performance of Neural Network (NN) trained by LM training algorithm is better than Rprop training algorithm, since it considers the fastest backpropagation training algorithm but it requires more memory than other algorithms.

References


Index Terms

Computer Science Wireless

Keywords

Smart Antenna, Conventional and Adaptive Beamforming, Elman Recurrent Neural Network.