

Gorman, R.P.; Sejnowski, T.J.;
Allied-Signal Aerosp. Technol. Center, Columbia, MD

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Abstract

Massively parallel learning networks are applied to the classification of sonar returns from two undersea targets and the ability of networks to correctly classify both training and testing examples is studied. Networks with an intermediate layer of hidden processing units achieved a classification accuracy as high as 100% on a training set of 104 returns. These networks correctly classified a test set of 104 returns not contained in the training set with an accuracy of up to 90.4%. Networks without an intermediate layer of processing units achieved only 73.1% correct on the same test set. Performance improved and the variability due to the initial conditions for training decreased with the number of hidden units. The effect of training set design on test set performance was also examined. The performance of a three-layered network was better than trained human listeners and the network generalized better than a nearest-neighbor classifier