

Neural Networks for automated classification of HF radar returns

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The classification of HF radar returns from the ionospheric irregularities (sometimes called clutters) into those suitable, or not, for further analysis, is a time-consuming task that has typically required human intervention. We tested several different feedforward neural networks on this task, investigating the effects of network type (single-layer vs. multilayer) and number of hidden nodes upon performance. As expected, the multilayer feedforward networks (MLFNs) outperformed the single-layer networks. The MLFNs achieved performance levels of 100% correct on the training set and up to 98% correct on the testing set. Comparable figures for the single-layer networks were 94.5% and 92%, respectively. When measures of sensitivity, specificity, and proportion of variance accounted for by the model are considered, the superiority of the MLFNs over the single-layer networks is much more striking. Our results suggest that such neural networks could aid many HF radar operations such as frequency search etc.