COMPETITION OR COMPANIONSHIP BETWEEN STATISTICAL METHODS AND NEURAL NETWORKS

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Numerous researchers have made comparison between traditional statistical methods and artificial neural networks. Most of such researches involve a few data sets, and majority of them show that artificial neural networks perform better. These studies have spread a wrong attitude among some people who think that artificial neural networks can be a substitute for statistics, whereas this can not be true because most of artificial neural network methods are just extensions of statistical methods.

For example, feed-forward networks with no hidden layer are basically generalized linear models, probabilistic neural networks are identical to kernel discriminant analysis, Kohonen networks for adaptive vector quantization are very similar to K-means cluster analysis, Kohonen self-organizing maps are discrete approximations to principal component analysis, etc. However, there are some artificial neural network areas that appear to have no close relations to the existing statistical literature, such as reinforcement learning.

In this paper, we try to compare and contrast the fields of statistics and artificial neural networks in order to show that not only they are not competing methodologies for analyzing data, but also that there is considerable overlap between them. Better communication between these two fields can be useful and beneficial for both of them.