# PEPNet: Parallel Evolutionary Artificial Neural Networks

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## Abstract

Artificial Neural Networks (ANNs) provide an important classification tool for Knowledge Discovery in Databases (KDD). Feed-forward fully-connected neural networks using a back propagation algorithm for weight adjustment are a common approach to building ANNs. Unfortunately such ANNs require considerable time to train, particularly when large datasets are involved. Training time is also adversely affected when the characteristics of the dataset are not consistent with the structure of the ANN. In developing ANNs there are no hard and fast rules for determining the structure of the network.

Evolutionary Artificial Neural Networks (EANNs) take advantage of evolutionary search techniques to address some of the problems associated with developing optimal ANNs. EANNs dynamically modify the structure of the ANNs on the basis of performance. EPNet (Yao and Liu 1996) is a serial algorithm which adopts these ideas to produce efficient ANNs. Such techniques produce greater accuracy in the networks, however at the expense of extra computational and storage requirements.

Our work focuses on PEANNs, Parallel Evolutionary Artificial Neural Networks. PEANNs have the potential to produce accurate networks in significantly less time than serial EANNs using larger datasets. A parallel implementation of EPNet, called PEPNet, is being developed to explore this hypothesis. The research is being performed within the Data Mining In The Large (DMITL) project of the Advanced Computational Systems (ACSys) CRC, a joint venture between the Australian National University (ANU), the CSIRO Division of Information Technology (DIT), Digital Equipment Corporation, Fujitsu Australia Limited and Sun Microsystems Australia.