Artificial Neural Networks Technology

1.0 Introduction and Purpose

This report is intended to help the reader understand what Artificial Neural Networks are, how to use them, and where they are currently being used.

Artificial Neural Networks are being touted as the wave of the future in computing. They are indeed self learning mechanisms which don't require the traditional skills of a programmer. But unfortunately, misconceptions have arisen. Writers have hyped that these neuron-inspired processors can do almost anything. These exaggerations have created disappointments for some potential users who have tried, and failed, to solve their problems with neural networks. These application builders have often come to the conclusion that neural nets are complicated and confusing. Unfortunately, that confusion has come from the industry itself. An avalanche of articles have appeared touting a large assortment of different neural networks, all with unique claims and specific examples. Currently, only a few of these neuron-based structures, paradigms actually, are being used commercially. One particular structure, the feedforward, back-propagation network, is by far and away the most popular. Most of the other neural network structures represent models for "thinking" that are still being evolved in the laboratories. Yet, all of these networks are simply tools and as such the only real demand they make is that they require the network architect to learn how to use them.

This report is intended to help that process by explaining these structures, right down to the rules on how to tweak the "nuts and bolts." Also this report discusses what types of applications are currently utilizing the different structures and how some structures lend themselves to specific solutions.

In reading this report, a reader who wants a general understanding of neural networks should read sections 2, 3, 6, 7 and 8. These sections provide an understanding of neural networks (section 2), their history (section 3), how they are currently being applied (section 6), the tools to apply them plus the probable future of neural processing (section 7), and a summary of what it all means (section 8). A more serious reader is invited to delve into the inner working of neural networks (section 4) and the various ways neural networks can be structured (section 5).

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