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ON THE EXPEDIENT USE OF NEURAL NETWORKS. Tony Martinez. Computer Science Dept., 230 TMCB, Brigham Young University, Provo, Utah 84602 USA

Computational machines do deterministic mappings of inputs to outputs. Current implemented and proposed machines include the von Neumann computer, calculators, special purpose logic devices, neural networks, etc. Each differs in its mechanism, efficiency, and utility in mapping input states to output states for the myriad of potential computing applications. Neural network features include parallel execution, adaptive learning, generalization, etc. Neural networks are potentially powerful devices for many classes of applications, but not all. Many times much time and emotional backing is given to a model which can already be implemented in a much more efficient way with an alternate technology. For example, arbitrary mappings of boolean input and output vectors, where the majority of input states are defined and important, coupled with a guarantied high speed learning mechanism, can be efficiently accomplished with a normal RAM chip. This talk seeks to delineate the classes and features of applications which may truly require the special features of neural network models, and which are not efficiently fulfilled by current alternate technologies. Applications are dichotomized by specific features into classes which lend themselves to efficient implementation with varied computing machines. The application classes which fall into the expedient domain for neural network models is detailed. Features of this domain include sparse input/output domains, types of generalization, adaptation, parallelism, spontaneous versus supervised learning, and symbolic aspects. Different proposed models which efficiently implement the subclasses of the neural network application domain are summarized.