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Modulare Neurale Systeme

Aufgabenstellung der Diplomarbeit

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Abstract

During the last years neural networks have been applied to a wide range of pattern recognition applications. The reasons for this rapid growth of interest for neural networks are the innovative capabilities of neural networks: Neural networks are universal and adaptive function approximators. They provide self organization as well as distributed representation of knowledge. Despite of these advantages, the solutions found, suffered by new problems like the enormous effort in computational power to train the networks, bad scaling properties and insufficient extendability. In this report it is stated, that the reason for these disadvantages can be found in the architecture of the used networks. It will be shown, that a single general purpose network will not fit optimally to any given problem. The report gives an introduction to a new approach to overcome the mentioned problems: Modularity. Starting with basic definitions like modular and hierarchical system, a detailed analysis of the advantages of modular architectures in comparison to large, single networks is presented. Using these definitions the principal structures, found in modular neural architectures, like parallelism (integrative and competitive), cascades and supervisor actor structures are described. Finally an outlook to the goals of the diploma theses and a definition of performance criteria for neural networks for optical character recognition are given.