# Fast Learning in Multi-Resolution Hierarchies

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Abstract: A class of fast, supervised learning algorithms is presented. They use lo(cid:173)cal representations, hashing, atld multiple scales of resolution to approximate functions which are piece-wise continuous. Inspired by Albus's CMAC model, the algorithms learn orders of magnitude more rapidly than typical imple(cid:173) mentations of back propagation, while often achieving comparable qualities of generalization. Furthermore, unlike most traditional function approximation methods, the algorithms are well suited for use in real time adaptive signal processing. Unlike simpler adaptive systems, such as linear predictive cod(cid:173) ing, the adaptive linear combiner, and the Kalman filter, the new algorithms are capable of efficiently capturing the structure of complicated non-linear systems. As an illustration, the algorithm is applied to the prediction of a chaotic timeseries.