Prediction of next alphabets and words of four sentences by Adaptive Junction

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Abstract

It seems that feedback-type neural networks are effective methods to realize sequential processing. We have studied Adaptive Junction which is one of feedback-type neural networks recognizing spatio-temporal patterns. Our past research suggests that Adaptive Junction networks have two major internal representations, the chain reaction and the piling, and that Adaptive Junction learning rule can learn the chain reaction with 1-degree feature patterns for any spatio-temporal pattern. Since the chain reaction with 1-degree feature patterns can decide neurons activating for next spatial patterns, the chain reaction must perform prediction. This paper demonstrates that Adaptive Junction networks performing the chain reaction with 1-degree feature patterns can behave prediction of next alphabets or words of four sentence, "A MAN CRIES", "A BABY CRIES", "A DOG BARKS" and "A CAT MEWS". These results indicate that the chain reaction must play an important role for such cognitive behavior as prediction.

Temporal Pattern Identification in a Self-Organizing Neural Network with an Application to Data Compression

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Abstract

A neural network system is presented that seeks to find the optimal structure embedded in a temporal sequence. This structure is manifested by the existence of a finite number of subsequences that comprise the temporal sequence. The measure for optimality is the information rate and it is precisely defined and utilized in the network. The network consists of three levels of processing units; the first level grows a tree based on the inputs, the second selects groups of nodes in the tree to form set of subsequences that completely cover the input, and the last calculates the information rate and indicates which set is the most optimal. Experimental simulations reveal various attributes of this system. The application to data compression is described.