Cellular automata and attributed parallel array grammars

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ABSTRACT. The concept of n-dimensional parallel array grammars (e.g. see [1]) is a useful means for the formal syntactic description of n-dimensional cellular automata ([7]); for the two-dimensional case, a survey of possible applications of array automata like picture recognition is given in [5]. As n-dimensional parallel array grammars are a more general model than n-dimensional cellular automata, they also allow for simpler solutions of complex problems. Attributed parallel array grammars have been shown to be a useful tool for the formal description of the static and dynamic characteristics of neural networks; because of the underlying grid structure, Kohonen's model of self-organizing feature maps (e.g. see [6]) is especially well suited for being represented by n-dimensional parallel array grammars (e.g. see [3], [4]). Using the concept of different levels of scaling like in [2], even hierarchical networks can be modelled by attributed parallel array grammars.

References

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