A New Approach to model Complex Systems: Cellular Neural Networks

F.Conti¹, P.Andriani²,
¹Dipartimento di Ingegneria Elettrica, Elettronica e dei Sistemi, Università degli Studi di Catania, Viale A. Doria 6, 95125 Catania, Italy,
²Durham Business School, Durham University, Mill Hill Lane, Durham City DH1 3LB, United Kingdom

Abstract

Cellular Neural Networks (CNNs) are an evolution of Cellular Automata and Neural Networks and have been traditionally used for pattern recognition. CNNs represent an exciting dimension of complexity in action, whereby the principles of local action, micro-diversity, and massive parallelism have been implemented in a new computing logic and related hardware. This paper introduces the basic features of CNNs and shows that Cellular Neural Networks (CNNs) constitute a powerful new paradigm for modeling complex systems. We follow the principles of good science by “docking” previous Cellular Automata results with the CNN approach. In particular we show that Duncan Watt’s CA model of diffusion of innovation can be replicated by using CNNs. We also show that the CNN approach can be generalized to model more complex problems.