

大阪電気通信大学 情報学研究所

講演会のご案内

講演題目 Introduction to Cellular Automata

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Abstract

Cellular automata (CAs) are models of physical systems, where space and time are discrete and interactions are local. Furthermore, CAs are exceptional ubiquitous structures since they are mathematical models of computation and computer models of natural systems. To this end, CAs research spans from theoretical concepts to computational structures and from complex systems thorough analysis to practical and applied implementation of powerful and novel models. In this lecture, we will insightfully examine both the theoretical confrontation of CAs as well as their practical aspects through the modeling implementation for various physical, biological and chemical phenomena and processes. Detailed paradigms, analytical models and thorough implementations of 1-D and 2-D CAs presented in this lecture will allow us to pursue information processing, respecting the link between the analysis and the perspective modeling of each under study phenomenon-process and the physical and chemical properties of its embodiment. Namely, we will present several physical, chemical, ecological and biological CAs based models for specific phenomena and processes, we will comment on the resulting computational complexity and how we manage it using very simple rules of dynamical transitions, we will continue with the presentation of how CAs can enrich their already rich and powerful behavior during modeling aspects with other well-known computational tools found in literature, like Genetic Algorithms, Fuzzy Theory, Game Theory, etc. and we will discuss extensively the corresponding hardware-massively parallel computing circuits, architectures and systems for the targeted applications. In such a sense, it is expected the potential of the numerous advantages of the CAs usage will become quite apparent also indicating that is really hard to find a field of natural and technical sciences, where CAs cannot be used.

講演対象 大学院生並びに学部生

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場所 大阪電気通信大学 寝屋川キャンパス J号館 J413 教室
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