

图书基本信息

书名：<<细胞式神经网络的通用性与新兴计算UNIVERSALITY AND EMERGENT COMPUTATION IN CELLULAR NEURAL NETWORKS>>

13位ISBN编号：9789812381026

10位ISBN编号：9812381023

出版时间：2003-12

出版时间：Pengiun Group (USA)

作者：Dogaru, Radu

页数：246

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

内容概要

Cellular computing is a natural information processing paradigm, capable of modeling various biological, physical and social phenomena, as well as other kinds of complex adaptive systems. The programming of a cellular computer is in many respects similar to the genetic evolution in biology, the result being a proper cell design and a task-specific gene. How should one "program" the cell of a cellular computer such that a dynamic behavior with computational relevance will emerge? What are the "rules" for designing a computationally universal and efficient cell? The answers to those questions can be found in this book. It introduces the relatively new paradigm of the cellular neural network from an original perspective and provides the reader with the guidelines for understanding how such cellular computers can be "programmed" and designed optimally. The book contains numerous practical examples and software simulators, allowing readers to experiment with the various phases of designing cellular computers by themselves.

书籍目录

1. Introduction 1.1. Emergent computation as a universal phenomena 1.2. Emergence 1.3. Cellular computing systems 1.4. Universality 1.5. Designing for emergence, the essence of this book 1.6. Detecting the potential for emergence: the local activity theory

2. Cellular Paradigms: Theory and Simulation 2.1. Cellular systems 2.2. Major cellular systems paradigms The Cellular Neural Network (CNN) model The Generalized Cellular Automata Reaction-Diffusion Cellular Nonlinear Networks 2.3. Matlab simulation of generalized cellular automata Uncoupled GCAs Coupled GCAs Simulation of standard cellular neural networks 2.4. Simulation of Reaction-Diffusion Cellular Neural Networks 2.5. Concluding remarks

3. Universal Cells 3.1. Universality and cellular computation, basic ideas Boolean universal cells The simplicial cell - universality expanded to continuous states 3.2. Binary cells 3.2.1. What would be an "ideal" binary CNN cell? Universality Compactness Robustness Capability of evolution 3.2.2. Orientation s and Projection Tapes Local binary computation Projections Orientations Projection tapes Default orientations Valid and non-valid projection tapes Transitions and robust transitions Finding the optimal orientation Optimal orientations for totalistic and semi-totalistic Boolean functions 3.2.3. Universal cells with canonical discriminants 3.2.4. Compact universal cells with multi nested discriminants Bifurcation tree for multi-nested discriminant function Uniform multi-nested cell s and their bifurcation trees The uniform multi-nested discriminant as an analog-to-digital converter Uniform orientations and projection tapes Boolean realizations: an analytic approach Finding the genes for arbitrary Boolean functions Other random search methods 3.3. Continuous state cells 3.3.1. Overview 3.3.2. Some theoretical issues on simplicial neural cells Relationships with fuzzy logic Training and testing samples Quantization of gene's coefficients 3.3.3. Circuit implementation issues Considerations regarding the implementation of the local Boolean logic Software implementations 3.3.4. A general procedure for training the simplicial cell 3.3.5. Functional capabilities and applications Square scratch removal Median Filters Edge detection Pattern classification 3.3.6. Nonlinear expansion of the input space 3.3.7. Comparison with multi-layer perceptrons 3.4. Concluding remarks

4. Emergence in Continuous-Time Systems: Reaction-Diffusion Cellular Neural Networks 4.1. The theory of local activity as a tool for locating emergent behaviors 4.2. Narrowing the search, "Edge of chaos" domains 4.3. The methodology of finding "edge of chaos" domains 4.3.1. Four steps precluding the local activity testing 4.3.2. The concept of local activity 4.3.3. Testing for stable and unstable local activity Local activity test for one diffusion coefficient Local activity test for two diffusion coefficients 4.3.4. Unrestricted versus restricted local activity, the edge of chaos Unrestricted local activity and passivity The Edge of Chaos 4.3.5. Bifurcation diagrams One-diffusion coefficient case The two-diffusion case 4.3.6. Emergent behaviors near and within the "edge of chaos" Mapping the Edge of Chaos Static and dynamic patterns on the Edge of Chaos Homogeneous static patterns Turing-like patterns Spiral wave patterns Information computation patterns Periodic dynamic patterns.....

5 Emergence in Discrete-Time Systems:Generalized Cellular Automata

6 Unconventional Applications:Biometric Authentication

References

Index

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>