

From Theory to Hardware Implementations: A Comprehensive Guide to Natural Computing



Evolvable Components: From Theory to Hardware Implementations (Natural Computing Series)

by Ivelin Demirov

★★★★★ 5 out of 5

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Natural computing is a subfield of computer science that deals with the design and implementation of algorithms and systems that are inspired by natural phenomena. Natural computing algorithms are often based on the principles of evolution, swarm intelligence, and artificial neural networks. These algorithms have been shown to be effective in solving a wide range of problems, including image processing, medical diagnosis, and robotics.

This book provides a comprehensive overview of natural computing, from its theoretical foundations to its hardware implementations. The book is divided into three parts:

* Part I provides an to natural computing, covering the basic concepts and algorithms of genetic algorithms, neural networks, and fuzzy systems. *
Part II discusses the hardware implementations of natural computing,

including FPGAs, ASICs, and GPUs. * Part III presents a number of case studies of natural computing applications, including image processing, medical diagnosis, and robotics.

Part I: to Natural Computing

Part I of this book provides an to natural computing, covering the basic concepts and algorithms of genetic algorithms, neural networks, and fuzzy systems.

* Chapter 1 provides an overview of natural computing, including its history, applications, and challenges. * Chapter 2 discusses genetic algorithms, including their basic principles, operators, and applications. * Chapter 3 discusses neural networks, including their basic architecture, learning algorithms, and applications. * Chapter 4 discusses fuzzy systems, including their basic concepts, membership functions, and applications.

Part II: Hardware Implementations of Natural Computing

Part II of this book discusses the hardware implementations of natural computing, including FPGAs, ASICs, and GPUs.

* Chapter 5 discusses FPGAs, including their architecture, programming model, and applications in natural computing. * Chapter 6 discusses ASICs, including their design process, advantages, and disadvantages. * Chapter 7 discusses GPUs, including their architecture, programming model, and applications in natural computing.

Part III: Case Studies of Natural Computing Applications

Part III of this book presents a number of case studies of natural computing applications, including image processing, medical diagnosis, and robotics.

* Chapter 8 discusses the applications of natural computing in image processing, including image enhancement, segmentation, and classification. * Chapter 9 discusses the applications of natural computing in medical diagnosis, including disease detection, diagnosis, and treatment. * Chapter 10 discusses the applications of natural computing in robotics, including navigation, planning, and control.

This book provides a comprehensive overview of natural computing, from its theoretical foundations to its hardware implementations. The book is suitable for both students and practitioners who are interested in learning about natural computing.

Free Download your copy today!



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