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Nota di contenuto	Computational Models of Evolution and Development -- Analysis of Gene Regulatory Networks -- Evolutionary Synthesis of Gene Regulatory Dynamics -- Evolution of Morphological Development -- Evolution of Neural Development -- Computational Brain-Body Co-Evolution -- Evolutionary Morphogenetic Self-Organization of Swarm Robots -- Towards Evolutionary Developmental Systems.
Sommario/riassunto	This book provides a basic yet unified overview of theory and methodologies for evolutionary developmental systems. Based on the author’s extensive research into the synergies between various approaches to artificial intelligence including evolutionary computation, artificial neural networks, and systems biology, it also examines the inherent links between biological intelligence and artificial intelligence. The book begins with an introduction to computational algorithms used to understand and simulate biological evolution and development, including evolutionary algorithms, gene regulatory network models, multi-cellular models for neural and morphological development, and computational models of neural plasticity. Chap. 2 discusses important properties of biological gene regulatory systems, including network motifs, network connectivity, robustness and evolvability. Going a step

further, Chap. 3 presents methods for synthesizing regulatory motifs from scratch and creating more complex regulatory dynamics by combining basic regulatory motifs using evolutionary algorithms. Multi-cellular growth models, which can be used to simulate either neural or morphological development, are presented in Chapters 4 and 5. Chap. 6 examines the synergies and coupling between neural and morphological evolution and development. In turn, Chap. 7 provides preliminary yet promising examples of how evolutionary developmental systems can help in self-organized pattern generation, referred to as morphogenetic self-organization, highlighting the great potentials of evolutionary developmental systems. Finally, Chap. 8 rounds out the book, stressing the importance and promise of the evolutionary developmental approach to artificial intelligence. Featuring a wealth of diagrams, graphs and charts to aid in comprehension, this book offers a valuable asset for graduate students, researchers and practitioners who are interested in pursuing a different approach to artificial intelligence.