Evolutionary Computation: Toward a New Philosophy of Machine Intelligence, 3rd Edition
David B. Fogel

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**DESCRIPTION**

This Third Edition provides the latest tools and techniques that enable computers to learn

The Third Edition of this internationally acclaimed publication provides the latest theory and techniques for using simulated evolution to achieve machine intelligence. As a leading advocate for evolutionary computation, the author has successfully challenged the traditional notion of artificial intelligence, which essentially programs human knowledge fact by fact, but does not have the capacity to learn or adapt as evolutionary computation does.

Readers gain an understanding of the history of evolutionary computation, which provides a foundation for the author's thorough presentation of the latest theories shaping current research. Balancing theory with practice, the author provides readers with the skills they need to apply evolutionary algorithms that can solve many of today's intransigent problems by adapting to new challenges and learning from experience. Several examples are provided that demonstrate how these evolutionary algorithms learn to solve problems. In particular, the author provides a detailed example of how an algorithm is used to evolve strategies for playing chess and checkers.

As readers progress through the publication, they gain an increasing appreciation and understanding of the relationship between learning and intelligence. Readers familiar with the previous editions will discover much new and revised material that brings the publication thoroughly up to date with the latest research, including the latest theories and empirical properties of evolutionary computation.
The Third Edition also features new knowledge-building aids. Readers will find a host of new and revised examples. New questions at the end of each chapter enable readers to test their knowledge. Intriguing assignments that prepare readers to manage challenges in industry and research have been added to the end of each chapter as well.

This is a must-have reference for professionals in computer and electrical engineering; it provides them with the very latest techniques and applications in machine intelligence. With its question sets and assignments, the publication is also recommended as a graduate-level textbook.

ABOUT THE AUTHOR

David B. Fogel is chief executive officer of Natural Selection, Inc. in La Jolla, CA—a small business focused on solving difficult problems in industry, medicine, and defense using evolutionary computation, neural networks, fuzzy systems, and other methods of computational intelligence. Dr. Fogel's experience in evolutionary computation spans 20 years and includes applications in pharmaceutical design, computer-assisted mammography, data mining, factory scheduling, financial forecasting, traffic flow optimization, agent-based adaptive combat systems, and many other areas. Prior to cofounding Natural Selection, Inc. in 1993, Dr. Fogel was a systems analyst at Titan Systems, Inc. (1984–1988), and a senior principal engineer at ORINCON Corporation (1988–1993).

Dr. Fogel received his Ph.D. degree in engineering sciences (systems science) from the University of California at San Diego (UCSD) in 1992. He earned an M.S. degree in engineering sciences (systems science) from UCSD in 1990, and a B.S. in mathematical sciences (probability and statistics) from the University of California at Santa Barbara in 1985. He has taught university courses at the graduate and undergraduate level in stochastic processes, probability and statistics, and evolutionary computation. Dr. Fogel is a prolific author in evolutionary computation, having published over 50 journal papers, as well as 100 conference publications, 20 contributions in book chapters, two videos, four computer games, and six books—most recently, Blondie24: Playing at the Edge of AI (Morgan Kaufmann, 2002). In addition, Dr. Fogel is coeditor in chief of the Handbook of Evolutionary Computation (Oxford, 1997) and was the founding editor-in-chief of the IEEE Transactions on Evolutionary Computation (1996–2002). He serves as editor-in-chief for the journal BioSystems and is a member of the editorial board of several other international technical journals.

Dr. Fogel served as a Visiting Fellow of the Australian Defence Force Academy in November 1997, and is a member of many professional societies including the American Association for the Advancement of Science, the American Association for Artificial Intelligence, Sigma Xi, and the New York Academy of Sciences. He was the founding president of the Evolutionary Programming Society in 1991 and is a Fellow of the IEEE, as well as an associate member of the Center for the Study of Evolution and the Origin of Life (CSEOL) at the University of California at Los Angeles. Dr. Fogel is a frequently invited lecturer at international
conferences and a guest for television and radio broadcasts. His honors and awards include the 2001 Sigma Xi Southwest Region Young Investigator Award, the 2003 Sigma Xi San Diego Section Distinguished Scientist Award, the 2003 SPIE Computational Intelligence Pioneer Award, and the 2004 IEEE Kiyo Tomiyasu Technical Field Award.

NEW TO EDITION

- Doubled the quantity of examples in the Intelligent Behavior chapter.
- Latest theories and empirical properties of evolutionary computation added to Chapter 4.
- A new chapter on the hybridization of evolutionary computation techniques with those of others such as neural networks and fuzzy systems.
- End of chapter questions and assignments have been added to the end of each chapter. Answers appear at the end of the book.

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