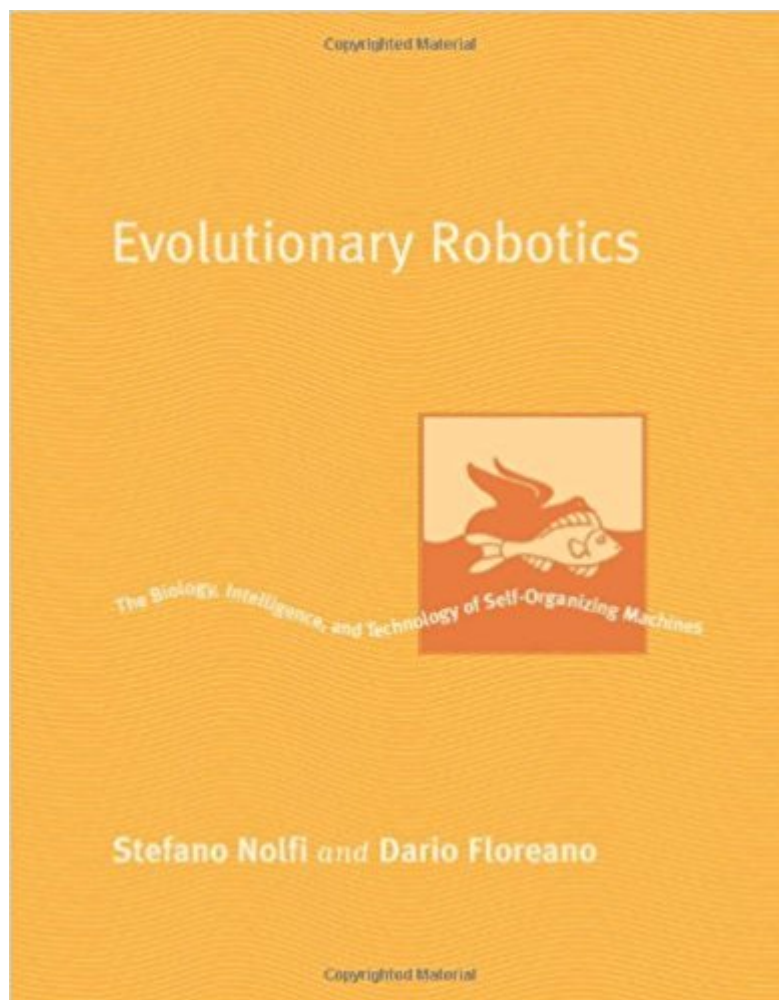




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Evolutionary Robotics: The Biology, Intelligence, And Technology Of Self-Organizing Machines (Intelligent Robotics And Autonomous Agents)



Synopsis

Evolutionary robotics is a new technique for the automatic creation of autonomous robots. Inspired by the Darwinian principle of selective reproduction of the fittest, it views robots as autonomous artificial organisms that develop their own skills in close interaction with the environment and without human intervention. Drawing heavily on biology and ethology, it uses the tools of neural networks, genetic algorithms, dynamic systems, and biomorphic engineering. The resulting robots share with simple biological systems the characteristics of robustness, simplicity, small size, flexibility, and modularity. In evolutionary robotics, an initial population of artificial chromosomes, each encoding the control system of a robot, is randomly created and put into the environment. Each robot is then free to act (move, look around, manipulate) according to its genetically specified controller while its performance on various tasks is automatically evaluated. The fittest robots then "reproduce" by swapping parts of their genetic material with small random mutations. The process is repeated until the "birth" of a robot that satisfies the performance criteria. This book describes the basic concepts and methodologies of evolutionary robotics and the results achieved so far. An important feature is the clear presentation of a set of empirical experiments of increasing complexity. Software with a graphic interface, freely available on a Web page, will allow the reader to replicate and vary (in simulation and on real robots) most of the experiments.

Book Information

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Customer Reviews

"Highly recommended for all involved in the field of evolutionary robotics. It will be an important reference for experimental and theoretical studies in evolutionary robotics for quite some time." - Horatiu Voicu, AI Magazine; "An informative and inspiring book that provides a thorough examination of the subject." - Industrial Robot: An International Journal"

Dario Floreano is Director of the Laboratory of Intelligent Systems at the Swiss Federal Institute of Technology in Lausanne (EPFL). He is the coauthor of *Evolutionary Robotics: The Biology, Intelligence, and Technology of Self-Organizing Machines* (MIT Press, 2000).

The behavior of passive robots depend upon the choice of its designer and it can hardly be said to be autonomous. In contrast, evolutionary robotics largely rely on self organization and many of the evolved robots exploit active interaction with the environment. In artificial evolution of robots, importance is usually given to autonomous interaction with the physical environment. In addition, learning can enhance the adaptive power of evolution. One way to avoid the problem of time is to evolve robots in simulation and then run the most successful individuals on the physical robot. However, in order to generate identical behaviors in the real environment, the robot-environment interactions should be accurately modeled in the simulator. With illustrations by experiments, this book provides a useful introduction to evolutionary robotics. It presents how to evolve robots and explore competitive co-evolution and evolvable hardware.

It is what I need. The book is fantastic to study and understand the evolutionary robotics background. The authors show not only the theoretical background but the practice example too. Very valuable position.

This is a not too technical book, introducing you to evolutionary robotics. It covers a lot of interesting work done in the field over the last few years. Using genetic algorithms it is possible to construct the brain of a robot (Neural network), and even (though harder) the hardware itself. The book gives an introduction to genetic algorthims & artificial neural networks, but the reader should still be somewhat familiar with these concepts before buying this book. After reading this book, I did one of the experiments mentioned in the book. While I only did this with a freeware Kephara robot simulator, it was still fun.

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Excellent transaction. Very fast delivery and the book is in a really good condition! Thanks very much

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