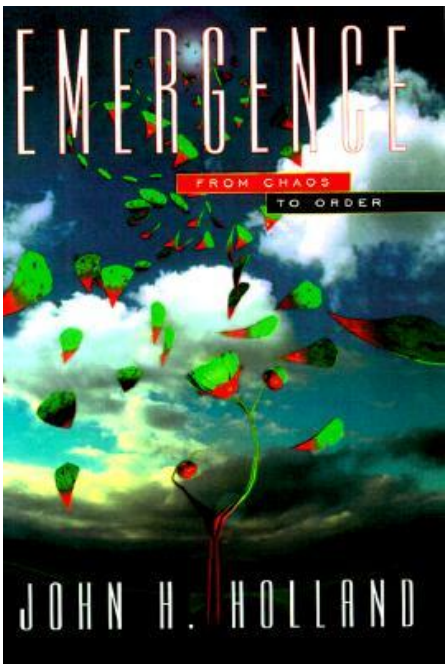

Emergence: From Chaos To Order

John H. Holland

Download now

Read Online

Emergence: From Chaos To Order

John H. Holland

Emergence: From Chaos To Order John H. Holland
In this important book, John H. Holland dramatically shows us that the “emergence” of order from disorder has much to teach us about life, mind and organizations. Creative activities in both the arts and the sciences depend upon an ability to model the world. The most creative of those models exhibits *emergent* properties, so that “what comes out is more than what goes in.” From the ingenious checkers-playing computer that started beating its creator in game after game, to the emotive creations of the poet, *Emergence* shows that Holland’s theory successfully predicts many complex behaviors in art and science.

Emergence: From Chaos To Order Details

Date	:	Published April 23rd 1999 by Basic Books (first published 1998)
ISBN	:	9780738201429
Author	:	John H. Holland
Format	:	Paperback 272 pages
Genre	:	Science, Nonfiction, Mathematics, Physics

Download Emergence: From Chaos To Order ...pdf

Read Online Emergence: From Chaos To Order ...pdf

Download and Read Free Online Emergence: From Chaos To Order John H. Holland

From Reader Review Emergence: From Chaos To Order for online ebook

Frederick says

We never quite got to the order part except an imaginary one based on leaps of imagination, flights of fancy, and a slavish devotion to any scientific sounding theory that supported the author's thesis. The whole is greater than the sum of its parts, but you don't need this kind of leaping to conclusions, to call anything that suits a manifestation of emergence and to simply ignore anything that doesn't support the theory seems to be a bit intellectually dishonest. Although, in this case I would just suspect the author actually believes that his theory can predict outcomes for complicated relationships, one would guess from supply chains to military actions. But, I am no more convinced than I was when I began. Don't waste your time.

Peter says

Good book for AI and software agents: This is a good book for people interested in Artificial Intelligence and Software agents (especially reactive agents). The book gives examples of emergent behaviours in the world. An interesting read.

Walter says

John H. Holland is a major researcher in the field of artificial intelligence and the father of one of AI's most popular methodologies, the genetic algorithm. In this book, Holland explores the concept of emergence in complex systems. Complex systems are those systems that have multiple components, and as those components interact with each other they create exponentially increasing numbers of possible states of the system. So how does the researcher model a system such as this? Holland explains that studying the emergence, or the process by which the individual components meld into the complex system, is critical to understanding any complex system.

So how does one study emergence? This is as complicated an issue as the study of complex systems themselves. Holland discusses several methods. He goes through traditional stochastic models such as the random walk and the biased random walk model. He explores the mathematical models used to study such systems, such as difference and differential equations. But the most powerful discussion in this book is the discussion on artificial intelligence techniques. These are interative processes that mimic biological processes, such as the neural network and the genetic algorithm. These processes develop a "memory", which allows the process not only find the right answer but to remember what it did to find the right answer so that it can use the same method the next time. Such systems do not need to understand the mathematics behind a process, just the results. That is the allure of artificial intelligence.

Holland uses complicated mathematical models and concepts so this really is not appropriate for the novice. But Holland's writing style is good and he makes the topics interesting, drawing on metaphors and analogies to explain complicated subjects. He brings in discussions from physics and biology, and spends a considerable amount of time discussing games like checkers and chess. He even draws examples from literature and poetry. At the end of this discussion, the reader really feels comfortable with the breadth of the applicability of these theories.

I would recommend this work for anyone who is interested in the dynamics of complex systems or in artificial intelligence.

Bart says

Typically excellent work from Holland. Here are a few general excerpts:

We only know that having a familiarity with several "nearby" disciplines, when the target does not fit well within an established discipline, will enhance the possibility of a source --> target transfer. The perception of what's "nearby" is a part of that still mysterious trait we call insight. (p. 213)

At a deeper level, our abysmal ignorance of most aspects of cognition presents a serious deterrent to the understanding of emergence. (p. 233)

The largest question Holland wants to answer goes like this: "How does the central nervous system select relevant pieces from the never-ending, perpetually novel torrent of sensory information it receives?"

We're only millimeters closer to answering that question than we've ever been. Once we're a few meters closer, we can start working on consciousness.

Jon says

John Holland is pretty much the dude that invented the genetic algorithm, and has done a bunch of groundbreaking AI work using bottom-up learning techniques. This book discusses a lot of these things, and how a small number of rules can create emergent higher-level behavior. In particular, I found his discussion of his 'classifier system' quite interesting. This is just a bunch of agents that can read/write strings from/to a common bulletin board. Each agent reads something, does something to it and posts it back, but the system keeps track of history. When an agent can produce a "correct" result in the form of a string, it's payed off, and every agent that contributed to building the final string is also payed -- strengthening these agents. When a new type of final result is needed, there are already strong agents that are good at making building blocks, so the system adapts much faster than a top-down design. Anyway, if you're interested in genetic algorithms, bottom-up learning, AI, or emergence, you should read this book. However, it is kinda dry in places, obviously written by an academic.

Catherine says

Not a light or easy read, even if you choose to ignore the maths in the boxes, but worth the effort. By sticking to a few of the many possible examples and explaining them in detail, Holland shows how complex behaviours can emerge from the repeated application of a few simple rules and how this behaviour can appear directed when constrained. I'm sure field has moved on since this was written, and perhaps some of the ideas in here are out of date or have led to dead ends, but that he doesn't claim to have all the answers is something that makes the book a refreshing change from the gee-whiz popular science books that I seem to pick up more often. I don't usually need to make use of a pencil and paper when reading these days, but didn't resent having to do so in this case.

Sam Rose says

Critical learning for anyone involved in modeling dynamic/evolutionary systems

Franck Chauvel says

J. Holland explains here "emergence": how patterns persist in complex adaptive systems (CAS). He starts with a general discussion about models, follows with a model of the checker board game, and gradually introduces neural networks. He then presents generative constraint procedures (GCP), a way to describe these CAS, which while being formal, remain accessible—at least I followed. After a discussion reductionism, he concludes with the current status and future of research on the topic.

I find this book much broader than Hidden Order: How Adaptation Builds Complexity. I found the presentation of the checker game and of the neural network very clear, and yet deep. I also appreciate the very nuanced discussion about reduction and levels. I think this a very good reference on CAS: I found this text much more accessible than others such as Complex Adaptive Systems: An Introduction to Computational Models of Social Life for instance. I recommend it, definitely.