

## IDEAS

# Computers that work like brains: flawed account of neural networks

## COGNIZERS: NEURAL NETWORKS AND MACHINES THAT THINK

by R. Colin Johnson and Chappell Brown  
New York: John Wiley & Sons  
260 pp. \$22.95

By Simson L. Garfinkel

**N**EURAL networks have been billed as computers that think the way people do. After nearly 40 years of research, they are being applied today to problems as diverse as robot control, voice recognition, credit rating, and market research.

But neural networks are nothing more than hundreds of extremely simple computers, wired together in a manner similar to the way neurons are connected in the brain. What makes them powerful is the way the processors are connected and work together.

While there is a wealth of technical information available on the subject, there has been no definitive text on the networks for the general public. R. Colin Johnson, an editor of the trade magazine *Electronic Engineering Times*, and Chappell Brown, a free-lance science writer, set out to write one in "Cognizers."

Good science writing simplifies but does not distort. "Cognizers" fails this standard on both measures. It doesn't simplify, and it often distorts.

The first chapter of "Cognizers" gives a superficial history of the computer age, from Charles Babbage's steam-driven analytical engine to the Cray supercomputer. The second chapter does the same for the history of neurobiology. These chapter-size encapsulations of scientific thought present the material too fast for those unfamiliar with the subjects, yet too superficially for those who have some background and thirst for more details.

Then the historical style is discarded in favor of a random sampling of research findings from the neural network field. This shift is unfortunate, because the best way to describe what neural networks are today is to follow their historical development.

"Cognizers" could have presented the controversy between the fields of artificial intelligence (computer programs that model the human mind and symbolically manipulate facts, concepts, and goals) and neural networks (systems that model the way the brain works) for what it was

— a fight over research dollars. The authors could have followed the rebirth of neural network research in the past decade, looking at each major experiment and showing how today's well-publicized "breakthroughs" are the result of years of careful, deductive research.

Beyond flaws in presentation, "Cognizers" distorts many findings it alleges to report. Broad claims are made for research that the researchers themselves would never make. Brain researchers tend to be a cautious crowd; "Cognizers" throws caution to the winds.

Illustrations might have saved the book, but Lisa Metzger's drawings are inexact. The sketches of the brain and neurons look like the classroom notes of a first-year medical student.

Johnson and Brown write in a strong, opinionated style; they make no secret of their point of view. But to support it, they overstate the problems of conventional computers and artificial intelligence, while they speak of conjectures in the field of neural networks as if they were established scientific truths.

"Cognizers" shares this failing with many other popular reports of the field: "A lot of stuff on neural networks is

either wrong or unfounded hype," says Tomaso Poggio, a neural network researcher at MIT's department of brain and cognitive science. Dr. Poggio called the report of his research in "Cognizers" "either wrong, out of place, or worse."

Many sentences in the book are grammatically correct but meaningless. Others are missing critical parts of speech. Phrases that are frequently repeated, such as "one Japanese researcher" and "longtime admirer," jar the reader. The book has the feeling of a rush job.

Perhaps the most annoying aspect of the book is its title. Do not look for the word "cognizer" in any other book on neural network research: The word was coined by the authors for the new class of electronic brain their book pretends to describe, a synthetic neural network that cannot be created with today's computers.

By trying to pass off neural networks as something fundamentally different that theoretically cannot be modeled with conventional computers, the authors do a disservice to their readers and the neural network researchers themselves.

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## BOOKS

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from preceding page

ship coming in to harbour . . ."

To comfort and to warn: With touch sure and quick, McGuckian adds that her words to the erring child are



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