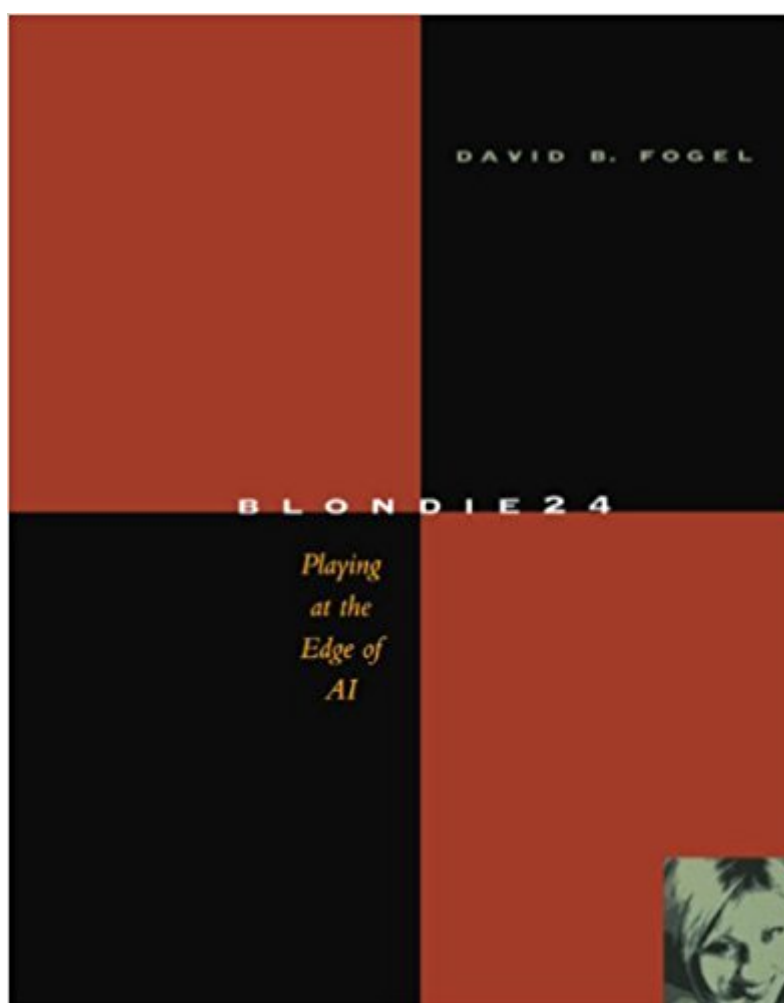


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# Blondie24: Playing At The Edge Of AI (The Morgan Kaufmann Series In Artificial Intelligence)



## Synopsis

Blondie24 tells the story of a computer that taught itself to play checkers far better than its creators ever could by using a program that emulated the basic principles of Darwinian evolution--random variation and natural selection-- to discover on its own how to excel at the game. Unlike Deep Blue, the celebrated chess machine that beat Garry Kasparov, the former world champion chess player, this evolutionary program didn't have access to strategies employed by human grand masters, or to databases of moves for the endgame moves, or to other human expertise about the game of checkers. With only the most rudimentary information programmed into its "brain," Blondie24 (the program's Internet username) created its own means of evaluating the complex, changing patterns of pieces that make up a checkers game by evolving artificial neural networks---mathematical models that loosely describe how a brain works. It's fitting that Blondie24 should appear in 2001, the year when we remember Arthur C. Clarke's prediction that one day we would succeed in creating a thinking machine. In this compelling narrative, David Fogel, author and co-creator of Blondie24, describes in convincing detail how evolutionary computation may help to bring us closer to Clarke's vision of HAL. Along the way, he gives readers an inside look into the fascinating history of AI and poses provocative questions about its future. Brings one of the most exciting areas of AI research to life by following the story of Blondie24's development in the lab through her evolution into an expert-rated checkers player, based on her impressive success in Internet competition. Explains the foundations of evolutionary computation, simply and clearly. Presents complex material in an engaging style for readers with no background in computer science or artificial intelligence. Examines foundational issues surrounding the creation of a thinking machine. Debates whether the famous Turing Test really tests for intelligence. Challenges deeply entrenched myths about the successes and implication of some well-known AI experiments. Shows Blondie's moves with checkerboard diagrams that readers can easily follow.

## Book Information

Series: The Morgan Kaufmann Series in Artificial Intelligence

Paperback: 406 pages

Publisher: Morgan Kaufmann; 1 edition (October 10, 2001)

Language: English

ISBN-10: 1558607838

ISBN-13: 978-1558607835

Product Dimensions: 5.5 x 1 x 7 inches

Shipping Weight: 1.2 pounds (View shipping rates and policies)

Average Customer Review: 4.4 out of 5 stars 41 customer reviews

Best Sellers Rank: #189,261 in Books (See Top 100 in Books) #58 in Books > Textbooks > Computer Science > Artificial Intelligence #157 in Books > Computers & Technology > Computer Science > AI & Machine Learning > Intelligence & Semantics #8019 in Books > Textbooks > Science & Mathematics

## Customer Reviews

What must it do to the human male ego to find out that the young woman who just handily won an online game of checkers is actually a sleek piece of software with no real understanding of the game's rules? Evolutionary programmers David B. Fogel and Kumar Chellapilla learned this and many other lessons in their quest to build a problem-solver divorced from human expertise. Fogel's book *Blondie24: Playing at the Edge of AI* captures their spirit of good-natured questioning of the received wisdom of traditional checkers playing and AI research. The writing is surprisingly engaging, coming from a software researcher; even readers with little interest in checkers will follow Fogel's many game analyses with rising interest as his neural networks increase in prowess. Ever the scientist, he includes a laundry list of fairly harsh critiques of his work--with rebuttals--as an appendix. Devotees of cutting-edge AI, online psychology, or tournament-level checkers will find plenty of interest in the exploits of *Blondie24*. --Rob Lightner

"Meet Blondie. She's a 24-year old graduate student in mathematics at the University of California at San Diego. She skis and surfs, and is an ace at math. But her real claim to fame is her amazing ability to play checkers. She's really good--not good enough to defeat a grand master, but she did earn a spot in the top 500 of an international checkers tournament. Considering that she taught herself how to play without reading books, taking classes, or getting tips from experienced players--that's impressive. And considering that *Blondie* is only a computer program, and the rest of her persona is just a product of my imagination, you might say that's really impressive!"-from the Introduction

In this book the author gives a detailed story of his involvement in the development of the "*Blondie24*" checkers program, and the story is a very interesting one. The reader not familiar with certain research topics in artificial intelligence such as neural networks and evolutionary programming, will still be able to read the book since the author gives a good intuitive discussion of

these topics. If the book inspires a young person to enter the field of artificial intelligence, it has served a noble purpose, even if the author did not intend this as the primary purpose of the book. The author's main thesis is the value of using concepts of evolutionary programming to bring about the rise of intelligent machines. The author clearly believes that before "HAL-like" machines can be built, researchers must construct computer programs that can teach themselves how to solve problems without any help. Intelligent machines must be creative, and learn and adapt to new circumstances. Traditional research in artificial intelligence has been geared towards building machines that emulate human intelligence, and this will not do in the author's view. The research did not address the true definition and meaning of intelligence, but instead made the goal of creating machines that think and act like humans, whence the famous "Turing test" for machine intelligence. The author completely rejects this test and holds it responsible for bringing about the "AI winter" where no substantive progress was made. "The key to creating truly creative computers", he says, "lies in mimicking nature's process of evolution." The author though was not comfortable with merely refuting arguments about the Turing test or other strategies for designing intelligent machines. He knows that such argument-counterargument activity will not result in sound approaches to artificial intelligence. Therefore, he sought to construct a working, viable alternative, which produces results that can be checked. Intelligence for the author is based on decision making, such as how to obtain resources, and how to respond to environmental changes by prioritizing goals. "Intelligence is the property that allows living organisms to sense, react to, and learn from their environment in order to adapt their behavior to better promote their survival", he says. Hence, the author brings in the evolutionary paradigm to artificial intelligence, and to give credence to his view, he attempts to create a program that will learn the game of checkers and then play it well, at least from the standpoint of the checkers game rating system. The book is a very detailed overview of how he and his collaborators went about doing this, the most interesting strategy being the use of neural networks, the topology of which is not set beforehand, but is evolved according to a "survival of the fittest" process. The author, through diagrams, gives the reader a taste of the moves that were made as the program dealt with online checkers games. The author even gives a dose of the criticism he received from referees when his results were submitted to professional journals, and this gives the book greater appeal from the standpoint of intellectual honesty. Certainly the author and those he worked with have achieved a great deal in the context of building intelligent machines. It remains to be seen whether evolutionary programming can be extended to situations that require even more creativity, such as that of generating new and interesting results in pure mathematics. This is the ultimate test in my view of machine intelligence. It is not immediately obvious how this is

to be done in the evolutionary programming or indeed of any other paradigm in artificial intelligence.

I was already interested in neural networks, and have read several other books on the subject, all for information on how to design and build neural networks to do various tasks, so I was primed to like this book, but I had no idea how compelling it would be. Fogel does give most of the details necessary to recreate Blondie, but some of the specifics for the later modifications are missing and can be found, I believe, in his and his partner's scientific articles referenced in the book. The first half is quite good, giving very basic background information on neural networks and machine learning algorithms as well as a brief history of the two best known checkers programs, Samuels' machine learning checkers player and Chinook, the best ever player (so far). It's the second half of the book, however, that kicks the story into overdrive. Fogel begins describing how he and his partner, Kumar Chellapilla, made their design decisions, evolved a neural net, then began playing it against humans over the internet. Even if you aren't all that interested in checkers (I am not) the games as they are described by Fogel become at least as interesting as any close sporting event, especially in those cases where the neural net set up traps for its opponents that neither Fogel nor the other player could foresee. There were times that I couldn't stop reading. I'd get off the bus to work, get in the office, and continue until I could pull myself away. The second half of this book is as much a page turner as the best novels I've read. An absolute must read for anyone interested in where AI needs to go.

I started reading David Fogel's "Blondie24: Playing at the Edge of AI" on a recent flight more or less to better my professional knowledge. I also had a 'fun' book. However, once I started reading Blondie24 I could not put it down. It is a true technology adventure that describes the development of an innovative program that teaches itself to play checkers. And it did this with no expert input or help. Rather it just plays a second version of itself. The two versions independently 'evolve' to determine winning positions and strategies. As Fogel describes, in short order the program can easily beat its creator. And not long there after 99% of the people participating on a checkers playing website. That's amazing. And I do this sort of stuff for a living. David Fogel is a world renowned expert and innovator in the development of evolutionary learning techniques described in Blondie24. His work is the state of the art, well known and respected by all in the field. The program and its implications are not only fascinating but extremely important and I believe a real look into the future for the development of 'intelligent' systems. I highly recommend Blondie24 to anyone even mildly interested in current AI technologies and the future of computing and intelligent systems. It's a

great book.

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