A Review of “Chess Metaphors: Artificial Intelligence and the Human Mind”

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BOOK REVIEW


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In May of 1997, IBM’s “Deep Blue” defeated chess grandmaster Garry Kasparov in a six-game match. It was the first machine to beat a reigning world champion under standard chess tournament time regulations, a sure sign that artificial intelligence (AI) was well on its way to surpassing the cognitive abilities of human beings. Deep Blue had very specific advantages: It could reference a database of more than 4,000 opening positions and 700,000 grandmaster games, as well as a store of endgames involving up to six pieces. Although the average grandmaster searches up to five moves ahead, Deep Blue would search between six and eight moves ahead. In Chess Metaphors: Artificial Intelligence and the Human Mind, Diego Rasskin-Gutman describes Deep Blue as “the calculating monster with hundreds of parallel processors” and, given these advantages, it “would have seemed pathetic if it had not won the match” (156). Even though Deep Blue was not the self-aware form of AI that science fiction has imagined, it could certainly play chess.

In many respects, Chess Metaphors is a guidebook to understanding how the Kasparov/Deep Blue game—positioned at the convergence between cognitive science, computer programming, and artificial intelligence—came about. For the last 60 years or so, the game of chess has been an ideal laboratory for testing and exploring cognitive processes, largely because of how measurable it is. Chess is a zero-sum game, there are specified players, there are pieces with a limited range of movements, and specific rules must be obeyed. Chess is played not collectively but alone. These facets of chess put very specific restrictions on how one makes decisions about what move to make next. Rather than demonstrating all the ways that humans adapt to and cognize the world, playing chess cultivates highly specific strategies and methods of cognition that work within the given rules of chess.

As Diego Rasskin-Gutman discusses in Chess Metaphors, the conditions of playing chess make it the perfect “meeting place” for humans and AI. One of the philosophical questions that dances around the margins of this book is the difference between how humans and computer programs subjectively play chess. Rasskin-Gutman spends a considerable amount of time discussing the artistic aspects of chess: “real sacrifices . . . are intuitive. Calculation of variations is not important. Instead, the player knows, intuits, or feels that giving up the material is justified and that, sooner or later, it will force a victory” (97). If that is true, can a “calculating monster” like Deep Blue make a “real” sacrifice? “Chess is human communication. Each player, in each move, must understand the opponent’s message or soon fall into difficulties. In this way the creative act is united with the capacity to understand the opponent’s intentions, resulting in a fight of ideas, wills, and creative imagination” (96). Can chess be “creative” for programs that draw on a whole database’s chess strategy, or human–AI communication? Is chess the same game between people as between humans and programs? Chess began as an activity to pass some free time, but will it always remain a “human problem” (94)? Rasskin-Gutman’s work evokes these questions, although he does not deal with their theoretical implications.

In the first three chapters, Rasskin-Gutman summarizes scientific knowledge about the brain, the mind, and the history of computer science to frame a discussion of modern chess (chaps. 4 and 5). In chapter 1, “The Human Brain: Metaphor Maker,” Rasskin-Gutman summarizes how cognitive scientists understand the structure, function, and development of human brains, focusing on the
biological basis for human cognition. While this chapter does not discuss metaphor making explicitly, it certainly offers a variety of metaphors through which to understand the brain. These metaphors not only explain complicated brain processes to a lay audience, but also shape the relationship we develop with “our brains”: our brains are places of activity with “protagonists” (5), they are machines that are wired (8), they are archives that store information (5). Rasskin-Gutman describes the human mind and features of cognition in chapter 2, including many of the cognitive abilities used in the game of chess such as proprioception, perception, memory and learning, attention, thought, decision making, and problem solving.

In chapter 3 he briefly describes the development of computer science and artificial intelligence, with particular attention to the myths of Galatea, the Jewish golem, Frankenstein’s monster, and the film Metropolis as “four noteworthy myths that are part of this race to understand and dominate the life force—myths that are based on desire, necessity, curiosity, and power” (67). This leads him to a discussion of proto-AI and automatons such as “the Turk,” a chess-playing automaton, from the eighteenth century through the modern era, as humans developed and modeled computer programs based on their own “fabulous brains” (81). This crucial point shows how—before we thought of the brain as a computer—we thought of computers as potential brains, creations that we modeled after our own brains.

In the last two chapters, Rasskin-Gutman summarizes the history of chess, explores how chess has been used to study human cognition, and discusses the development of chess programs. He specifically focuses on cognitive studies of grandmasters and how they play chess at such a high level. Compared to novices, grandmasters of chess recognize familiar configurations of chess pieces on the board very quickly (“chunk theory”) and think about five moves ahead. Some experimenters have asked grandmasters to think out loud while they calculate their next move in a game to gain insight into their decision-making process. In such a case, chess can externalize the expert’s mind through the movements of thirty-six pieces, showing a choreography of decisions carefully calculated to win the game.

Although Chess Metaphors gives a great description of chess programming in chapter 5, the book misses an opportunity to explicitly discuss what metaphors do. Lakoff and Johnson’s groundbreaking study Metaphors We Live By (1980), or their other book concerning metaphors and cognitive science, Philosophy in the Flesh (1999), would be excellent to read alongside Chess Metaphors. Lakoff and Johnson argue that the metaphors we use in ordinary language structure our cognition, are grounded in human experiences, and often reflect cultural values. In his preface, Rasskin-Gutman makes a similar gesture toward chess: “Several cultural metaphors are embedded in chess—struggle as an echo of our animal nature (as the great Emmanuel Lasker put it), honesty, deceitfulness, bravery, fear, aggression, beauty, and creativity” (xv). Despite this discussion of what metaphors operate within chess, Rasskin-Gutman never mentions for what chess actually is a metaphor. This takes some time to parse out: At varying points Rasskin-Gutman writes that chess is a laboratory (xv), chess is a line of communication between two brains (xvii), and the behavior of a chess player is like the AI behavior (xiii). What should have been explicitly said is that chess is a metaphor for sapient life: Just as a player must make strategic decisions in chess, he, she, or it must also make logically informed decisions in their own life.

Rasskin-Gutman demonstrates a genuine enthusiasm for the game of chess with a particularly light narrative touch, and given its rich discussion of how chess programs have developed, Chess Metaphors should appeal to both chess enthusiasts and those interested in cognition and the mind.

REFERENCES