Marvin Minsky

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Marvin Lee Minsky (born August 9, 1927) is an American cognitive scientist in the field of artificial intelligence (AI), co-founder of Massachusetts Institute of Technology's AI laboratory, and author of several texts on AI and philosophy.

Marvin Minsky	
 Marvin Minsky in 2008	
Born	Marvin Lee Minsky August 9, 1927 New York City, United States
Fields	Cognitive science
Institutions	MIT
Alma mater	Phillips Academy Harvard University Princeton University
Doctoral advisor	Albert W. Tucker
Doctoral students	Manuel Blum Daniel Bobrow Carl Hewitt Danny Hillis Joel Moses Bertram Raphael Gerald Jay Sussman Ivan Sutherland Terry Winograd Patrick Winston
Known for	Artificial intelligence
Notable awards	Turing Award (1969) Japan Prize (1990) IJCAI Award for Research Excellence

(1991)
Benjamin Franklin Medal (2001)

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Biography

Marvin Lee Minsky was born in New York City to a Jewish family,[1] where he attended The Fieldston School and the Bronx High School of Science. He later attended Phillips Academy in Andover, Massachusetts. He served in the US Navy from 1944 to 1945. He holds a BA in Mathematics from Harvard (1950) and a PhD in the same field from Princeton (1954).[2] He has been on the MIT faculty since 1958. In 1959[3] he and John McCarthy founded what is now known as the MIT Computer Science and Artificial Intelligence Laboratory. He is currently the Toshiba Professor of Media Arts and Sciences, and Professor of electrical engineering and computer science.
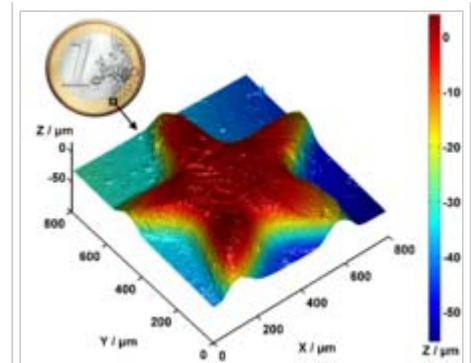
Minsky won the Turing Award in 1969, the Japan Prize in 1990, the IJCAI Award for Research Excellence in 1991, and the Benjamin Franklin Medal from the Franklin Institute in 2001.[4]

Isaac Asimov described Minsky as one of only two people he would admit were more intelligent than he was, the other being Carl Sagan.[5] Patrick Winston has also described Minsky as the smartest person he has ever met. Ray Kurzweil has referred to Minsky as his mentor.

Minsky's inventions include the first head-mounted graphical display (1963) and the confocal microscope[6] (1957, a predecessor to today's widely used

confocal laser scanning microscope). He developed, with Seymour Papert, the first Logo "turtle". Minsky also built, in 1951, the first randomly wired neural network learning machine, SNARC.

3D profile of a coin (partial) measured with a modern confocal white light microscope.

Minsky wrote the book *Perceptrons* (with Seymour Papert), which became the foundational work in the analysis of artificial neural networks. This book is the center of a controversy in the history of AI, as some claim it to have had great importance in driving research away from neural networks in the 1970s, and contributing to the so-called AI winter. That said, few of the mathematical proofs present in the book, which are still important and interesting to the study of perceptron networks, were ever countered. He also founded several other famous AI models. His book "A framework for representing knowledge" created a new paradigm in programming. While his "Perceptrons" now is more historical than practical book, the theory of frames is in wide use. Minsky was an adviser[7] on the movie *2001: A Space Odyssey* and is referred to in the movie and book.

> Probably no one would ever know this; it did not matter. In the 1980s, Minsky and Good had shown how neural networks could be generated automatically—self replicated—in accordance with any arbitrary learning program. Artificial brains could be grown by a process strikingly analogous to the development of a human brain. In any given case, the precise details would never be known, and even if they were, they would be millions of times too complex for human understanding.
> —Arthur C. Clarke, *2001: A Space Odyssey*[8]

In the early 1970s at the MIT Artificial Intelligence Lab, Minsky and Seymour Papert started developing what came to be called The Society of Mind theory. The theory attempts to explain how what we call intelligence could be a product of the interaction of non-intelligent parts. Minsky says that the biggest source of ideas about the theory came from his work in trying to create a machine that uses a robotic arm, a video camera, and a computer to build with children's blocks. In 1986, Minsky published *The Society of Mind*, a comprehensive book on the theory which, unlike most of

his previously published work, was written for a general audience.

In November 2006, Minsky published *The Emotion Machine*, a book that critiques many popular theories of how human minds work and suggests alternative theories, often replacing simple ideas with more complex ones. Recent drafts of the book are freely available from his webpage.[9]

Affiliations

Marvin Minsky is affiliated with the following organizations:

- United States National Academy of Engineering
- United States National Academy of Sciences
- Extropy Institute's Council of Advisors[10]
- Alcor Life Extension Foundation's Scientific Advisory Board[11]
- kynamatrix Research Network's Board of Directors[12]

Minsky is a critic of the Loebner Prize.[13][14]

Personal life

Minsky is an actor in an artificial intelligence koan (attributed to his student, Danny Hillis) from the Jargon file:

The Minskytron or "Three Position Display" running on the Computer History Museum's PDP-1, 2007

> In the days when Sussman was a novice, Minsky once came to him as he sat hacking at the PDP-6. "What are you doing?" asked Minsky.
> "I am training a randomly wired neural net to play Tic-tac-toe," Sussman replied.
> "Why is the net wired randomly?", asked Minsky.
> "I do not want it to have any preconceptions of how to play," Sussman said.
> Minsky then shut his eyes.
> "Why do you close your eyes?" Sussman asked his teacher.

"So that the room will be empty."
At that moment, Sussman was enlightened.

What I actually said was, "If you wire it randomly, it will still have preconceptions of how to play. But you just won't know what those preconceptions are." --Marvin Minsky

Minsky has three children: Henry Minsky, Julie Minsky and Margaret Minsky, who is herself a Doctor of Philosophy from MIT, with a special interest in Haptic technology.[15] He also has four grandchildren: Gigi Minsky, Harry Minsky, Charlotte Minsky and Miles Steele.

Selected works

- *Neural Nets and the Brain Model Problem*, Ph.D. dissertation, Princeton University, 1954. The first publication of theories and theorems about learning in neural networks, secondary reinforcement, circulating dynamic storage and synaptic modifications.
- *Computation: Finite and Infinite Machines*, Prentice-Hall, 1967. A standard text in computer science. Out of print now, but soon to reappear.
- *Semantic Information Processing*, MIT Press, 1968. This collection had a strong influence on modern computational linguistics.
- *Perceptrons*, with Seymour Papert, MIT Press, 1969 (Enlarged edition, 1988).
- *Artificial Intelligence*, with Seymour Papert, Univ. of Oregon Press, 1972. Out of print.
- Communication with Alien Intelligence, 1985
- *Robotics*, Doubleday, 1986. Edited collection of essays about robotics, with Introduction and Postscript by Minsky.
- *The Society of Mind*, Simon and Schuster, 1987. The first comprehensive description of the Society of Mind theory of intellectual structure and development. See also *The Society of Mind (CD-ROM version)*, Voyager, 1996.
- *The Turing Option*, with Harry Harrison, Warner Books, New York, 1992. Science fiction thriller about the construction of a superintelligent robot in the year 2023.
- *The Emotion Machine*[16] Simon and Schuster, November 2006. ISBN 0-7432-7663-9 (book available online on his MIT home page; see below)

See also

- Gerry Sussman
- John McCarthy
- Terry Winograd
- Transhumanism
- Russian cosmism
- N. F. Fyodorov
- Claude Shannon
- Triadex Muse

References

1. ^ Science in the contemporary world: an encyclopedia
2. ^ Hillis, Danny; John McCarthy; Tom M. Mitchell; Erik T. Mueller; Doug Riecken; Aaron Sloman; Patrick Henry Winston (2007). "In Honor of Marvin Minsky's Contributions on his 80th Birthday". *AI Magazine* (Association for the Advancement of Artificial Intelligence) **28** (4): 103–110. http://www.aaai.org/ojs/index.php/aimagazine/article/view/2064/2058. Retrieved 2010-11-24.
3. ^ Horgan, John (November 1993). "Profile: Marvin L. Minsky: The Mastermind of Artificial Intelligence". *Scientific American* **269** (5): 14–15.
4. ^ Marvin Minsky - The Franklin Institute Awards - Laureate Database. Franklin Institute. Retrieved on March 25, 2008.
5. ^ Isaac Asimov (1980). *In Joy Still Felt: The Autobiography of Isaac Asimov, 1954-1978*. Doubleday/Avon. p. 217,302. ISBN 0-380-53025-2.
6. ^ The patent for Minsky's Microscopy Apparatus was applied for in 1957, and subsequently granted US Patent Number 3,013,467 in 1961. According to his published biography on the MIT Media Lab webpage, "In 1956, when a Junior Fellow at Harvard, Minsky invented and built the first Confocal Scanning Microscope, an optical instrument with unprecedented resolution and image quality".
7. ^ For more, see this interview, http://mitpress.mit.edu/e-books/Hal/chap2/two3.html
8. ^ Clarke, Arthur C.: "2001: A Space Odyssey"
9. ^ Marvin Minsky's Home Page
10. ^ Extropy Institute Directors & Advisors
11. ^ Alcor: Scientific Advisory Board
12. ^ Minsky joins kynamatrix board of directors
13. ^ Minsky -thread.html
14. ^ Salon.com Technology | Artificial stupidity
15. ^ Margaret Minksy's website
16. ^ Simon & Schuster: The Emotion Machine: Commonsense Thinking, Artificial Intelligence, and the Future of the Human Mind (Hardcover)

External links

- Marvin Minsky's home page
- Oral history interview with Marvin Minsky at Charles Babbage Institute, University of Minnesota, Minneapolis. Minsky describes artificial intelligence (AI) research at the Massachusetts Institute of Technology (MIT). Topics include: the work of John McCarthy; changes in the MIT research laboratories with the advent of Project MAC; research in the areas of expert systems, graphics, word processing, and time-sharing; variations in the Advanced Research Projects Agency (ARPA) attitude toward AI.
- Oral history interview with Terry Winograd at Charles Babbage Institute, University of Minnesota, Minneapolis. Winograd describes his work in computer science, linguistics, and artificial intelligence at the Massachusetts Institute of Technology (MIT), discussing the work of Marvin Minsky and others.
- Scientist on the Set: An Interview with Marvin Minsky
- Marvin Minsky Playlist Appearance on WMBR's *Dinnertime Sampler* radio show November 26, 2003
- Consciousness Is A Big Suitcase: A talk with Marvin Minsky
- Video of Minsky speaking at the International Conference on Complex Systems, hosted by the New England Complex Systems Institute (NECSI)
- "The Emotion Universe": Video with Marvin Minsky
- Marvin Minsky at the Mathematics Genealogy Project
- Radio interview on Philosophy Talk
- Marvin Minsky's thoughts on the Fermi Paradox at the Transvisions 2007 conference
- "Health, population and the human mind": Marvin Minsky talk at the TED conference

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