$500,000 grant from the Alfred P. Sloan Foundation awarded to Program in Cognitive Science

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What is intelligence? Do computers think, or can they be made to think? Do thinking processes differ among humans, animals and machines? How do humans acquire intelligence?

These are among the questions currently under investigation by a group of psychologists, anthropologists, philosophers, linguists, sociologists and neuroscientists in the Program in Cognitive Science at the University of California, San Diego.

The program, under the direction of Dr. Donald A. Norman, professor of psychology and director of the Center for Human Information Processing, has recently received a three-year, $500,000 grant from the Alfred P. Sloan Foundation to launch a training program for graduate and post-doctoral students.

"For the past two years," said Norman, "we have been trying to examine ways of looking at cognition, whether human or artificial. We have been doing a broad scale investigation of what it means to be intelligent."

The first two years of the program were funded by a $250,000 grant from the Sloan Foundation.

"We have brought in outside experts and staged a series of small conferences and workshops," continued Norman. "These are people from different disciplines-sociology, neuroscience, anthropology, psychology-- all studying some aspect of cognition. It's very rare to get them together."

Norman, the former chairman of the UC San Diego psychology department, said that the first two years of the program were aimed at a broad examination of the topic, not at producing specific research findings.

"We don't expect any results for at least five years," he said. "After all, we're studying the most complex thing there is--the human brain."

The new grant will be used to promote more in-depth study of certain areas of human cognition.

"We will use the money to bring in people who are experts in certain areas-such as language, computer vision (programming a computer to 'see'), and consciousness and the control of our actions," said Norman.

"Some of the money will go toward the purchase of more sophisticated computers than we presently have, and some will go toward financing the first international conference on cognitive science which will be held this August at UC San Diego."

Although research into intelligence is going on at other universities around the country, Norman stressed a unique aspect of the UC San Diego effort.

"Most places in the country are concerned with studying some aspect of language as a cognitive process," he said. "Here we are concerned with the psychological processes of cognition. And we study these by bringing outside people from a wide variety of fields to contribute ideas and do research."

For the next three years the goal of the program will be to train doctoral students and post-doctoral students, which may include faculty members as well as individuals from off campus such as industry representatives who have an interest in the subject.

"What we are doing is already related to what's going on in the computer industry," Norman noted.

"We want to understand how people think, or how machines think. We're looking in general at the problems of cognition, which is learning, and thinking, and language, and acting. It's very important to look at more than just people. We want to look at how we might build a machine which could do these things as well.

"By learning how to build machines we improve not only our capability to do intelligent things with machines, but our general understanding of intelligence."

How close are machines to thinking?

"It depends what you mean by thinking," Norman replies. "What generally happens is that somebody says 'I won't believe a machine can think until it can write music, play chess, or paint a picture.' But machines can already do all of those things, so you have to change your definition of 'thinking.'

"Machines don't work the same way as the human brain," Norman continued, "and our brains definitely don't work the same way machines do. When a machine does intelligent things today, it usually does them with mechanisms quite different from a human.

"Machines can beat people at chess, they can even play Class A-level chess, but they're not playing the same way a chess master does. I want to understand the difference. I want to understand the human mind."

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