Roger Schank's thinking computer

The Cognitive Computer, by Roger Schank with Peter G. Childers; Addison-Wesley, 268 pp., $17.95.

In tomorrow's world computers will converse in natural languages. They will do our work, offer legal and banking advice. They will teach our children, govern our nations. We will have unlimited information available at our fingertips; mundane jobs will be outlawed. "Intelligent computers should also have some concept of morality." For Roger Schank, computers are everything. His new book, The Cognitive Computer, advocates computerizing every area of our lives. Schank's writing (assisted by Peter G. Childers, a recent Yale graduate) is fluent and enthusiastic. But beneath its surface lies a core not of science, but of dogma, of dreaming of a computer world that is his vision. The assumption of the book is that our lives will be improved by "technical progress." That our lives could be diminished by an encroaching technology does not seem to concern Roger Schank.

Schank sets up every question so that its answer necessarily lies in the domain of the computer. His writing on natural language rests on unshakable specifications, while his brief tour of "world problems" provides problem definitions narrow enough to preclude victory for a non-computer option. Dark questions such as the dehumanization of society are glibly skated over with statements to the effect that "people don't brainwash people. People brainwash computers." The reputation of Roger Schank, head of the Computer Science Department at Yale University, is staked on his work on natural language, and the need for computers to enter discourse in our language forms the main thrust of the book.

"Programming languages allow only one way to say things, with a specified syntax and a very limited vocabulary, allowing no ambiguity. Programming languages enable the computer to understand instructions for moving various symbols around, and to decide the order in which such commands should be executed. It is not possible in a programming language to discuss something, voice an opinion or elaborate a point. The representation of abstract ideas and of concrete events is the province of natural languages alone." Schank is quick to concede that there are certain concepts a computer could never understand, "distinctly human things or ideas, such as 'justice,' 'virtue,' 'democracy,' 'beauty' and so on... No human really understands what any other human means when he uses words such as 'low,' or 'truth,' or 'beauty,' so it indeed would be surprising if a computer could exhibit the level of understanding." But, "Schank points out, "you don't have to understand what 'truth' or 'beauty' are to ask a traffic cop how to get on the highway. But you do have to have a basic ability to understand the cop's language." Schank agrees that "language understanding is a highly individual process. We understand by relating the meaning of a sentence to our own knowledge and experience. An understanding of concepts, Schank says, is essential to comprehension of a sentence, and "if we are to understand what the prospects for intelligent computers truly are, and how these computers will affect our lives, we have to look at ourselves, not computers." Schank then begins to delimit a series of assumptions upon which, as he shall see, his claims necessarily rest. Most important is his three-way typology of understanding since "understanding is really a spectrum of relative degrees and levels. The computer, he states, cannot emulate "complete empathy," "Complete empathy," which comes about through shared experiences between people "might approach COMPLETE EMPATHY if the experiences of the individuals involved had caused very similar memory structures to have been created. The two individuals would understand each other in terms of their own memory structures. Given a similar set of goals and beliefs, individuals might process new episodes in much the same way... The more completely goals, prior beliefs, prior experience, and memory structures are shared, the better the understanding between two people can be." Schank defines "the opposite end of the spectrum" as "making sense," which "requires simple recognition of the terms used and the actions performed. It doesn't involve the kind of analysis and identification required for COMPLETE EMPATHY. If a friend came over to your house and suddenly burst into tears, you could MAKE SENSE of the situation by determining that he was sad and questioning him as to why he was sad. You would understand why he was crying at the level of MAKING SENSE, but you would have COMPLETE EMPATHY for him only if you could relate what he told you to very similar memories and experiences of your own. You would have to put yourself in his place by analyzing your experiences relative to his and by allowing your memory structures to change as a result of the new experiences."

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