

Diabologic: Artificial Intelligence

by Frank Dolinar

"When an old person dies, it's like a library burning down."

I don't know who said it, or when, but it couldn't be more true. The knowledge that we acquire during our lifetimes is lost when we die. There is, as yet, no way around it. Soon, however, the set of tools that constitute Artificial Intelligence (AI) and Expert System (ES) technology may provide a solution.

What is AI? There are many answers, but they usually resemble a statement like: "Behavior by a computer and its attendant software that would usually constitute intelligence in a human being." Related to this, an Expert System is a limited AI, developed to address a single kind of problem (i.e. a domain).

If asked, most people would tell you that they don't know anything about AI and they have never seen or used anything like it. They would be wrong, especially if they use computers on a daily basis or play computer-based games -- currently a hotbed of AI development.

For many people, the concept of an artificial intelligence brings to mind the spectre of Frankenstein, Mary Shelley's quintessential horror story. Her 1816 novel was inspired by a dream, but its premises were drawn from the work of some of the premier scientists and thinkers of Europe.

In the mid-twentieth century, Isaac Asimov's robot stories and his famous "Three Laws of Robotics" provided ample opportunity to explore the concept of what it means to be human and how to tell a human from an "intelligent" machine -- or more correctly, whether making the distinction was actually possible.

The question is not whether artificial intelligence systems can exist, but how good they're going to become. Will they exhibit "self-awareness" and "thinking"? How soon is that going to happen? How fast will they evolve? What will it mean for humans? This last question will depend in large part on whether the AI decides it needs the slow, sloppy, but occasionally brilliant thinking of the humans. It's a topic dealt with in James Hogan's science fiction novel *Two Faces of Tomorrow*. Hogan examines the social, economic, and political implications in considerably more detail in his non-fiction book *Mind Matters*.

Ray Kurzweil, in his book *The Age of Spiritual Machines*, suggests that computers are evolving so fast that by 2019 a \$1000 computer will have a computational ability comparable to a human brain.

Which brings us back to the problem of the burning library.

Such computers may make it possible to capture a person's knowledge into an Expert System for organizations or other individuals to use. There would be several steps:

- 1) capture the knowledge that applies to a specific application domain into an expert system;
- 2) surveys to elicit knowledge for capture should be carefully tailored to the relevant domain and should address its topics from multiple directions to allow the responses to be rich enough to be useful;
- 3) translate the gathered information about the knowledge into a "knowledge-base", a fundamental component of an expert system, and its associated "rule-base", used to define the decision processing;
- 4) use the expert system to determine what's missing -- which leads back to a revised step 2.

Developing an expert system will take time. As organizational processes evolve, the expert system's knowledge-base and rule-base will need to be updated, perhaps repeatedly. Once available, a working expert system can be used to help make decisions within an organization more consistent over time and across the organization, and to train new employees in the organization's decision-making processes.

Finally, I am reminded of an old editorial by Stanley Schmidt in Analog Science Fiction magazine on the science and technology necessary to create the HAL 9000 computer system in the film *2001: A Space Odyssey*. Schmidt's tag line on the editorial was: "The road to HAL is paved with good inventions."

For more information on the history and current state of Artificial Intelligence, visit the website of the American Association for Artificial Intelligence (<http://www.aaai.org>); the Stanford University Computer Science Department's "What is AI?" website (<http://www-formal.stanford.edu/jmc/whatisai/whatisai.html>); and the Wikipedia article on Artificial Intelligence (http://en.wikipedia.org/wiki/Artificial_intelligence).

There's an interesting article on knowledge capture at <http://www.knowfarm.com/bottom.html>