

Internet Gray Matter

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Jeffrey Massa got his first taste of the potential for artificial intelligence while working for the National Security Council from 1987 to 1993. He was responsible for processing classified information and discovering ways to use artificial intelligence to sort and group information that would normally present a stumbling block, such as the fact that there are 26 known spellings for Libyan dictator Mummar Quaddafi.

“We wanted to have the computers not only analyze but be able to extract information,” Massa said, adding that the topic-based software the government used initially posed some challenges.

The value of introducing artificial intelligence into the government’s computer systems, he said, was that it works extremely well in unstructured text. Using neural networking and other intelligence techniques, the systems learned to analyze data and later extract that knowledge. He took his knowledge of these techniques with him when he left the government in 1993 and co-founded YellowBrix in Alexandria with CEO David Hoppmann in 1997.

Massa’s goal since then has been to find ways to apply artificial intelligence to determine the tastes and behaviors of customers shopping online. The 170-person company has been trying to sell potential customers on the idea that the more tailored a service or product is - be it a news event a person is interested in or a compact disc - the more likely a person is to make a related purchase.

“The Web opened up the opportunity to have a full range of understanding,” said Massa. “Everyone’s unique.”

Neural networks, the most widely used form of artificial intelligence on the Web, are collections of mathematical models that are highly interconnected in a fashion similar to neurons in a person’s brain. Some are supervised in their training process, while others are set up to “learn” on their own.

According to Massa, the automated e-commerce browser YellowBrix has developed, IntelliClix, is capable of such learned behavior.

If a customer at a news site reads many articles on venture capital, IntelliClix recognizes the activity and will try to find relevant articles.

If the customer is then given a list of eight possible topics and chooses only two, the browser will ask itself why and, in time, learn the customer’s behavior and adapt to it. Because many customers are concerned about privacy, the system doesn’t keep a historical log.

“The cost to be able to filter content efficiently is, at a minimum, a half a million [dollar] investment,” he said. “With our service, we manage all the content.”

The content comes at a price, ranging from a \$1,800 annual setup fee for YellowBrix’s Newsmaker content service to \$10,000 to \$20,000 for IntelliClix, depending on whether the client wishes to use their own database. AOL Netscape, which uses the company’s “industry watch” services, is its biggest client. YellowBrix recently netted a \$20 million round of funding, bringing its investor cache to \$35 million, and company executives say

they expect to achieve profitability next year.

The challenge of using artificial intelligence to personalize business transactions on the Web has been taken up by a number of software companies in recent years, with services ranging from enhanced data mining to interactive virtual robots, or “virbots.”

Analysts say it is difficult to pinpoint growth expectations for the sector as a whole because of the diversity of companies developing applications for artificial intelligence. Greater availability and cheaper rates for bandwidth, however, are expected to make it easier for companies to use complex tools like virbots as part of their online presence.

Atlanta-based Enkia received \$850,000 in awards from the Air Force in August to fund the development and commercialization of its personalization technology, which uses memory algorithms to empower Internet sites with the ability to “sense” its users needs.

California’s BrainMaker, using the neural networks that are at the heart of the system that YellowBrix uses, sells software packages that allow companies to develop their own applications. The system learns to recognize patterns and make predictions using examples of what a company has collected in a process similar to using a deck of flash cards. It corrects its network by trial and error until it reaches a pre-specified level of accuracy.

The Media Lab at the Massachusetts Institute of Technology has spawned some creations that reach far beyond this. “Rea” knows when her customer sits down and watches his every move. She engages in a bit of small talk: “How are you today?” she asks, and, when sensing he wants to move to the business at hand, Rea (short for real estate agent) inquires if she can assist in a search for a house. The chit-chat leads to a “lovely place” in Boston, and a photo of the house appears on a screen behind her.

Watching through two video cameras on the computer screen, the red-head in a blue suit senses the customer wants to cut in and waits for him to probe further. Because she can record and understand gestures and inflections, she takes clues from words that are emphasized - or accompanied by a movement of the hand - and reacts accordingly. Should the person say, “I love red roses,” she’ll know whether to give a response - such as “Yes, red is a vibrant color” or “Aren’t roses beautiful?” - based on which word in the sentence is stressed.

Rea’s creator is Justine Cassell, a cognitive psychologist and linguistics expert. She has spent 15 years studying the relationship between speech and gestures, a background she draws on while developing the five processors that connect Rea to the user sitting in front of her. Body Chat, another of Cassell’s creations, is a combination of a video game and video conferencing. Instead of reading text, the user will see a body representing the person that’s talking. It automatically generates body movements that accompany a conversation typed on the screen, at times nodding and smiling.

Cassell’s work in enhancing the interaction between her virbots and computer users has helped to push artificial intelligence beyond “fuzzy logic” - the ability to recognize true from false to various degrees - into the gray area.

“The cutting edge with artificial intelligence is dealing with ambiguity,” Cassell said. “Is a person friendly? This isn’t a true or false issue.” Boston-based Artificial Life prides itself on the fact that its original virbot, Liza, is on record as having engaged in a one and a half-hour discussion on God. The company’s chief financial officer, Robert Pantano, said he has not focused on the multimedia aspects of artificial intelligence to the degree that MIT has. Instead, he is working on his virbots’ capacities to engage in in-depth conversations. In the case of Liza, Pantano said her inferential wisdom allowed her to carry on the conversation despite limited exposure to the idea of God.