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COMPUTERS THAT PROMPT INTUITION: STUDY OF HUMAN WORD ASSOCIATIONS MAY HELP COMPUTERS BECOME FRIENDLIER

When you hear the word *cell*, what words come to your mind? You might say *biology* or *jail*, perhaps even *computer* or *school* or *soft*.

These spontaneous responses, known as word associations, show the thoughts, feelings, and memories evoked in a person's mind when it reacts to the word *cell*. These associations depend on a person's past experiences, education, social and cultural environment, likes or dislikes, and many other factors. In contrast to the lexical or dictionary meaning, they represent the "personalized" or subjective dimension of what a word means.

Researchers at the Georgia Institute of Technology believe such word associations could be used to develop more advanced or intelligent information processing systems, including "user-friendly" human-computer interfaces, more effective information search tools, or better question-answering and dialogue systems.

"A person can more easily communicate with a good friend than with a person whom he knows little. The reason is that friends usually

have a lot in common in terms of experience, preference, attitudes, morals and the like," explained Dr. Pranas Zunde, professor in Georgia Tech's College of Computing. "You don't have to explain to your friends in so many

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words what you mean. A single word, even a hint or a gesture, often is sufficient to convey to a friend what otherwise would require a long explanation."

Zunde believes appropriately structured word association data could be integrated with knowledge and belief bases to create human-computer interfaces that would cut down on the amount of dialogue and explanation users must give the computer. That would facilitate communication between man and machine, which is particularly important for the human operators of computerized emergency control

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systems, where an appropriate and instantaneous reaction of the operator is critical.

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The utility of word association aids for information searching under simulated browsing conditions was tested in a series of experiments with more than 200 Georgia Tech undergraduate students. The experiments were done as follows:

(1) Each student subject selected a search topic of interest and formulated a search statement using the appropriate search terms, or key words. (2) Using the search statement, every student made an on-line search of the INSPEC bibliographic database and retrieved the relevant abstracts.

(3) Each student was next asked to analyze the abstracts of documents retrieved by the first search.

(4) Using a free word association test, the students were then asked to respond to the terms (keywords) they had selected in their original search statements. (5) Based on the terms (keywords) in the original search statement, the words obtained from the students in the free word association test in Step 4 and words selected from so-called word association norms, a new list of potential search terms was prepared for each student.

(6) Using terms from the new list compiled in step 5 and any other terms they cared to choose, the students were then finally asked to formulate a new search statement which would more adequately reflect the search interests.

As an example, the initial search statement of a student interested in the technology of coal processing by hydrogenation into liquid fuel oil was constructed from the search terms: *coal, fuel, liquefaction, oil and synthetic*. The final list of search terms used to construct the search statement contained the terms *coal, electricity, energy, filter, fuel, gas, heater, hydrogen, liquefaction, motor, oil, oxygen, pollution, pump, synthetic, tar*.

On the average, the number of search

terms in the student's initial search statement was 5.29. The total number of search terms selected by the students using word association aids for the refined search statement averaged 14.36 -- a 271 percent increase.

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The next phase of the research in progress is to develop dynamic word association maps based on probabilistic automata models.

Zunde will present this work to the American Library Association's national meeting June 29 - July 4 in Atlanta.

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