

WSU developing new Web technologies

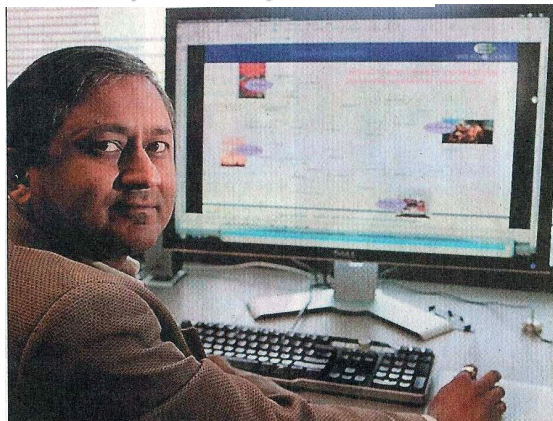
The Semantic Web will sort and analyze huge amounts of information, researchers say.

By Jim DeBrosse
Staff Writer
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With 16 million biomedical articles in the online database MEDLINE (medline.cos.com) and 3,000 new articles added each month, a researcher who wants to prove, say, that magnesium can help alleviate migraine headaches could spend hours, even days

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sorting through documents and trying to find the right documents to support that hypothesis.



But experimental software being developed at Wright State University could retrieve the relevant medical articles and display their relationships in a simple diagram almost instantly, with just a single query.

Finding ways to automate the grunt work of collecting and analyzing large amounts of data is one of the goals of The Kno.e.sis Center, an Internet technology research organization at Wright State University headed by Amit Sheth, who holds the position of LexisNexis Ohio

Eminent Scholar.

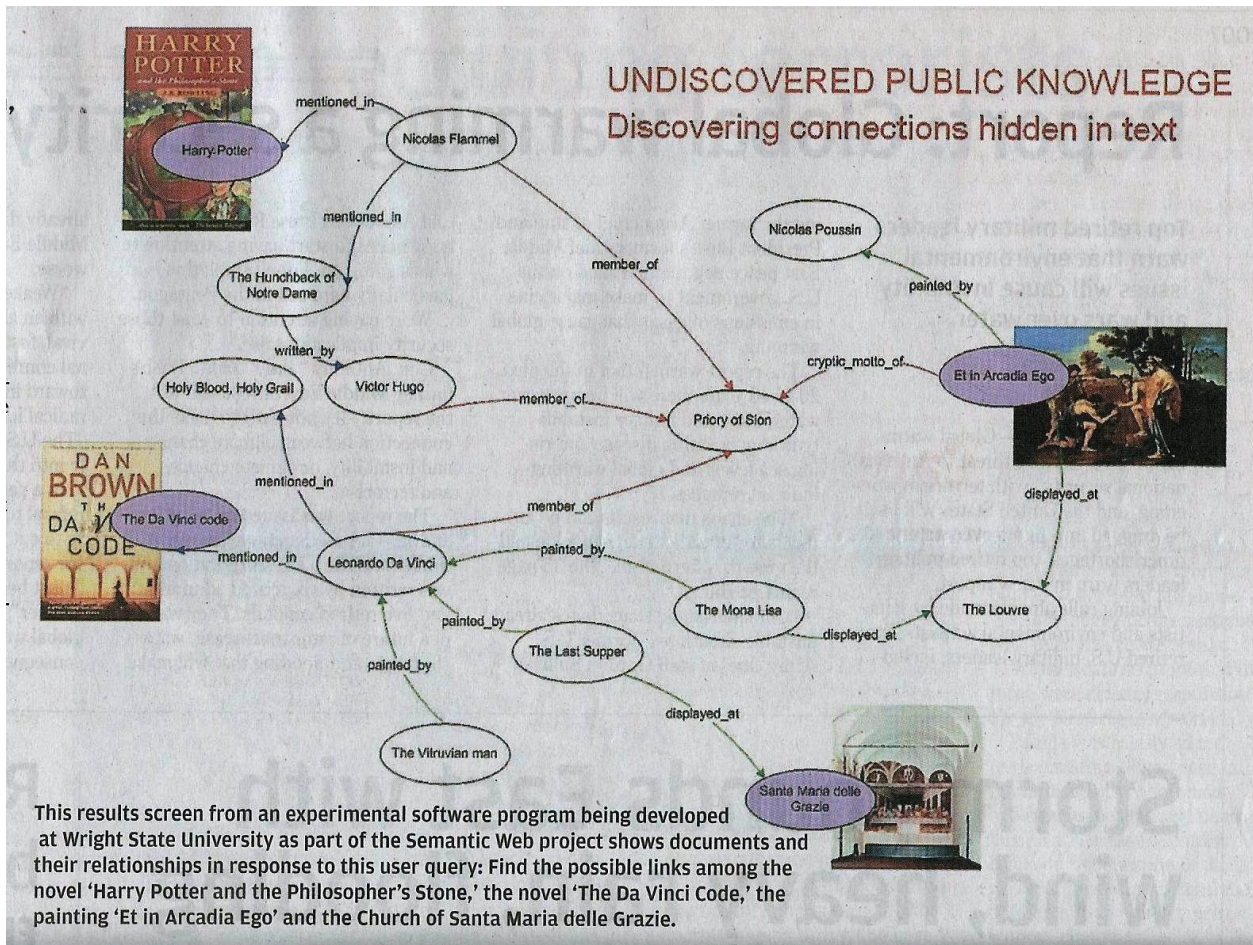
With the world's store of knowledge expected to double in just the next five years, "it's important to bring computers into the picture," Sheth said. "The human brain just can't keep up with the information overload that keeps getting bigger all the time."

Sheth's team of three faculty members and 10 graduate students is part of the W3C World Wide Web Consortium that sets international standards for the Internet. Last May, three research articles by the group were nominated for best papers at the annual Web conference in Edinburgh, Scotland.

Sheth has received more than \$10 million in funding for his work from the National Science Foundation, the U.S. Department of Defense, the National Institutes of Health and private industry. Sheth came to Wright State in January from the University of Georgia, bringing most of his team with him.

Some of the areas being explored by Sheth's team include:

- Developing electronic record-keeping systems that will give doctors instant advice on how to avoid harmful drug interactions and find the best match between diagnosis and treatment.



- Improving the automation of biology experiments and providing better analyses of their data to understand such things as the role of complex carbohydrates in cancer.
- Helping banks minimize the risks of money laundering, fraud and terrorist financing by exploring and analyzing links among customers and organizations on watch lists.
- Integrating sensor data from spy satellites and other sources with known databases and profiles to provide troops and commanders in the field with the latest information on enemy numbers, movement and firepower.

"The Semantic Web is alive and well in Ohio, and has been for a long time," said Don Loritz, a consulting research scientist for LexisNexis in Springboro. For many years after its founding in the early 1970s, LexisNexis had a larger database of documents than could be found on the entire Internet.

LexisNexis has been improving and tweaking its search engines ever since for customers seeking legal and news documents, and is busy developing its own semantic-based software, Loritz said. The company will soon partner with Sheth.

An international pioneer in the move toward a Semantic Web is just up Interstate 70 in Columbus, where Eric Miller's consulting company, Zepheira, helps businesses link fragmented databases into searchable wholes. In a March 1 article this year, MIT Technology Review magazine credited Miller, an Ohio State University graduate, with leading a diverse group of researchers who, five years ago, began laying the foundation for the Semantic Web.

Miller essentially took what he had learned while he worked as a research scientist at the Online Computer Library Center — the now-worldwide library network and card catalog that began in Ohio — and applied a similar approach to the World Wide Web. Miller believes the transition to a Semantic Web will be evolutionary, not revolutionary, with "huge steps" already beginning to appear.

"What we're doing is weaving a very powerful data architecture into the Web architecture that already exists, making it easier to find the information we need," Miller said.

The ability to integrate databases and share new information more easily also can be a powerful tool for matching businesses and promoting regional economic growth, he said. "Ohio companies and universities that are partnering in the ground floor of the Semantic Web are making a smart move for the entire region," he said.

Editor's Note: Both LexisNexis and OCLC are partners of daytaOhio, the Ohio Wright Center for Data.

How quickly today's Web can be transformed into a far more powerful Semantic Web depends on how quickly the massive amount of information on the Internet can be labeled and categorized in ways that computers can read and understand.

If the Internet is an information highway, today's search engines gather signposts along the way, but computer users have to interpret them to arrive at the data they want. The Semantic Web will have signage that the computers will be able to read, while the user sits back and enjoys the ride.

The task of annotating the Web and, even more vital, of developing software that can do that labeling automatically, is occurring all over the world.

A more challenging goal for Sheth's team has been developing software that can reason and find relationships among data. One of its experimental programs connects relationships among drugs, drug interactions, dosage, diagnosis and treatment — a great tool for doctors.

Another Kno.e.sis program under development is aimed at distinguishing among persons, places and things and arriving at an accurate perception of when two or more people are located "near" one another at the same time — a useful tool in tracking the movements of potential terrorists, Sheth said.

What seems like common sense to humans can be a major task for a computer.

"People would know that Wright State is near Dayton, but a computer can't make that determination as easily," Sheth said.

Sheth said he hopes to expand his team by the end of next year to include five or six full-time faculty members and as many as 20 graduate students.

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