

# Tropical cyclone or ISU Cyclone? Semantic science search engine knows that there is a difference

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(PhysOrg.com) -- Almost everyone who has used a major internet search engine has had the same experience: Search for "Dodge convertible" and 0.16 seconds later you have 4.3 million links to web pages on dodge ball, Dodge City and convertible debt instruments.

Noesis, a new semantic web search engine developed at The University of Alabama in Huntsville, won't help you find the perfect Charger ragtop, but it is helping scientists who study the environment retrieve the research data they need. It has the potential to help scientists and researchers in many other fields perform more focused and productive searches.

"This is the first semantic scientific search tool, the first time something like this has been used for science," said Dr. Rahul Ramachandran, a research scientist in UAHuntsville's Information Technology and Systems Center.

Noesis replaces the simple word-or-phrase matching search used by most search engines with a discipline-specific semantic "ontology," or knowledge base.

Using Noesis, for instance, an aquatic botanist searching for Mobile Bay sea grass might get a list of additional terms narrowing the search based on taxonomy, location or water type, while filtering out websites

offering sea grass mats, oils and lotions that leave your skin silky smooth.

Both the terminology and the structure of relationships between terms in the ontology help Noesis narrow a search to items related to the specific field of study. The algorithm might not understand the difference between tropical cyclone and Iowa State Cyclone, but it will recognize that there is a difference.

"Building an ontology is not an insignificant task," Ramachandran said. "Usually you get the experts together, then they argue and decide what concepts and information to include, and how it is organized. Then we encode it so our system can take it and use it."

While it narrows the search terms, Noesis also broadens the search by adding datasets and scientific publications not routinely included in web searches.

"There are some things you have to configure for a particular domain, such as the specific journals and major data catalogues," said Ramachandran. "It gets complicated fast."

Even in scientific circles, the semantic search has advantages: "In some datasets they might refer to one set of readings as temperature while another site might use sea surface temperature or SST. With a normal search engine you would never see one if you search for the other. What we have is the ontology that does all of that matching for you."

While the first three projects using the Noesis system are all related to meteorology or environmental science, Ramachandran says the system can be adapted to any branch of science or research.

"Everything is the same except the ontology," he said. "It can be

configured to different domains for different projects. The hope for the future is there will be a growth of these small ontologies."

Provided by University of Alabama in Huntsville

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