

> **BREAKING NEWS**

Federal appeals court rules former Ohio State running back Maur ineligible for NFL draft. Details soon.

SEARCH

The Web CNN.com

Search

Enhance

- Home Page
- World
- U.S.
- Weather
- Business
- Sports
- Politics
- Law
- Technology**
- Science & Space
- Health
- Entertainment
- Travel
- Education
- Special Reports

TECHNOLOGY

Researchers develop 3-D search engine

Friday, April 16, 2004 Posted: 10:11 AM EDT (1411 GMT)

NEW YORK (AP) -- The mind-boggling speed and reach of Internet search engines mask a severe limitation: They are powered by words alone.

What a humdrum existence. The world is so much brighter and more varied, full of objects and patterns that defy searchable descriptions.

In hopes of wrapping their arms around more of that stuff, computing researchers have developed new search engines that can mine catalogs of three-dimensional objects, like airplane parts or architectural features.

All the users have to do is sketch what they're thinking of, and the search engines can produce comparable objects.

"The idea of information and knowledge, and retrieval of knowledge, has been something I've been intrigued with for a long time. This gives it a more solidified meaning," said Karthik Ramani, a Purdue University professor who created a system that can find computer-designed industrial parts.

Ramani expects his search engine will serve huge industrial companies whose engineers often waste time and energy designing a specialized part when someone else has already created, used or rejected something similar.

Rick Jeffs, senior engineering specialist at a Caterpillar Inc. engine center in



An image provided by Purdue University shows the results of a search engine that uses patterns and shapes instead of words to locate objects.

Story Tools

- [SAVE THIS](#) [EMAIL THIS](#)
- [PRINT THIS](#) [MOST POPULAR](#)

RELATED

[Microsoft to enter search engine market](#)



- [Going deeper than Google](#)
- CNN/Money: [Amazon enters the Web search fray](#)
- [Princeton engine](#)

YOUR E-MAIL ALERTS

Technology (general)

Search Jo
 Enter Keyw
 Enter City

RI
 click the
 This messag
 America Pre

Lafayette, Indiana, believes Ramani's technology could help the company simplify its inventory. Jeffs' center alone has tens of thousands of different parts.

"If you've got to design a new elbow for an oil line, more often than not, we have a plethora of elbows," Jeffs said. But even though many parts are created with computer-aided design (CAD) software, they are catalogued such that each has to be examined separately, a tedious task "that isn't even performed that often, because it isn't feasible or practical."

- Online
- Purdue University
- Princeton University

or [CREATE YOUR OWN](#)

[Manage alerts](#) | [What is this?](#)

With the Purdue search engine, designers could sketch the part they need and instantly see dozens in inventory that might fit the bill.

If an item seems close, but not quite right, designers can see a "skeleton" of the part and manipulate it on their computer screens -- make it longer or shorter or curved, for example -- and then query the database again.

"It seems like there's ever-greater demands for speed in product development, and it's those kinds of breakthroughs that are needed to keep up," Jeffs said. "This would really just add to the efficiency."

Mainstream search engines, meanwhile, are still trying to master 2-D images. For example, Google Inc.'s picture search program delivers pretty good results but can't actually examine the images it serves up. It mines the text surrounding the photos, and hopes for success.

However, 3-D search engines have begun to emerge as improvements in computing power and interactive modeling software have deepened the pool of designs available to query -- not only in industrial settings but also in highly detailed online virtual worlds. Boeing Co. engineers invented their own 3-D search engine a few years ago as part of an effort to reuse more parts.

Princeton University professor Thomas Funkhouser and colleagues have put a 3-D search engine on the Web that lets anyone sketch an object using a computer mouse, add a textual description, then search for similar models in design databases.

The results can be startling. Draw a big potato, and the system responds with a bunch of, well, potato-looking objects -- and a few urns. Those seem wrong until you rotate your potato, orienting it vertically instead of horizontally, and see your sketch actually does resemble an urn, narrow on top and bottom and bulging in the middle.

Certainly this makes old-fashioned keyword searches seem a blunt instrument.

Then again, text can be far more precise than a sketch. If you're searching for information about baseball Hall of Famers, there's little chance a computer will misunderstand a query for "Willie Mays."

So how can computer programs look for objects? The breakthrough is the voxel.

Digital camera owners are familiar with pixels -- the basic element of a digital image. Each pixel is a tiny grain of color.

Similarly, a voxel is the basic element of a three-dimensional object that is represented in a computer. Each voxel represents the volume of the object at any given point.

In Ramani's program, for example, stored CAD designs and entries sketched by users are converted into voxels. Then voxel patterns are compared for similarities. Because the voxels represent volume rather than just shape, the program can sniff out, say, a coffee cup, which is mostly hollow but might have a solid handle.

Princeton's Funkhouser believes 3-D searching should get even smarter. He believes the systems ought to learn from their users' queries and eventually recognize common patterns. A computer could eventually recognize that several different images all show a human, even if the people are in different poses.

For the foreseeable future, 3-D searching is likely to see only specialized business uses. However, Peter Norvig, Google's director of search quality, calls the technology "interesting" and adds, "If it starts to take off, we'll look more seriously at it."

Ramani is still fine-tuning the interface of his 3-D search engine, which is to be licensed by Imaginestics LLC, where he is chief scientist. But he is already excited about the improvements in productivity that could result when objects, not just words, are accessible through computers.

"I think this," he said, "is the beginning of the information age."

Copyright 2004 The [Associated Press](#). All rights reserved. This material may not be published, broadcast, rewritten, or redistributed.

Story Tools

-  [SAVE THIS](#)  [EMAIL THIS](#)
-  [PRINT THIS](#)  [MOST POPULAR](#)

advertisement

[Click Here to try 4 Free Trial Issues of Time!](#)



TECHNOLOGY

TECHNOLOGY NEWS ▾

[Hackers hit supercomputing giants](#)



- [Chipping away at privacy with radio waves](#)
- [EarthLink fights data-stealing Web sites](#)
- [Flurry of 'critical' patches for Windows](#)

TOP STORIES

CNN.com HOME PAGE ▾

[Fallujah talks result in cease-fire commitment](#)



- [CNN/Money: Report: Saudis to cut oil prices to help Bush](#)
- [Woodward: Tenet said WMD case a 'slam dunk'](#)
- [CNN/Money: McDonald's CEO dies at 60](#)

[International Edition](#)

Languages

[CNN TV](#)

[CNN International](#)

[Headline News](#)

[Transcripts](#)

[Preferences](#)

SEARCH

[The Web](#)



[CNN.com](#)



Search

ENHANCED

© 2004 Cable News Network LP, LLLP.
 A Time Warner Company. All Rights Reserved.
[Terms](#) under which this service is provided to you.
 Read our [privacy guidelines](#). [Contact us](#).

-  All external sites will open in a new window. CNN.com does not endorse external sites.
-  Denotes premium content.