

# Just the right face

By Jennifer Barr Kruger

Undaunted by major challenges, companies pursue face recognition technology

Face recognition technology, which would allow users to search the thousands of photos on their hard drives for pictures of a specific person, could make life so much easier for consumers. But this development has proven incredibly difficult for many technology companies, and some have abandoned it.

For things like driver's license photos and mug shots, taken straight on with even lighting, face recognition technology works fairly well. But because many real-life pictures aren't taken with the subject directly facing the camera – never mind changing hair colors and items worn in some pictures but not others, like glasses and hats – creating a reliable face

recognition search technology has proven extremely difficult.

Some companies are trying to harness face recognition potential. **Neven Vision**, a company working on such technology (which it provided quite successfully to the security industry), was acquired by **Google Inc.** in 2006. Google has yet to announce its plans for the face recognition arena. **Riya.com**, a company whose initial purpose was to allow consumers to search image databases for a particular face, has refocused its efforts into the new site **Like.com**, which applies the technology to online shopping (products are far easier to identify by feature than faces).

## Cautious optimism

**Bryan Calkins**, CEO of **CogniSign**, San Francisco, Calif. ([www.cognisign.com](http://www.cognisign.com)), is very familiar with trials and travails of face recognition. Its **xcavator** product uses image recognition technology to help consumers search images based on photo content. For example, clicking on a few points on a picture of a blue butterfly will bring up many other pictures similar to those points – mostly other blue butterflies.

But it doesn't work yet for face recognition. While **xcavator** is great at finding, for example, pictures of women with blond hair, it cannot discern one blond woman from another.

"People have very high standards for face recognition," Calkins says. "Market research has really borne this out. It's especially true for families, which also happens to be the most difficult group for this technology, because everybody tends to resemble [each other]. That creates the biggest challenge for face recognition."

The consumer market for face recognition technology is particularly difficult to serve, he notes. "Consumers need products that just work. No training, no finicky user interfaces," Calkins says. "Face recognition is a huge challenge because the bar is set really high – not only for consumers, but also for security and defense. If you're searching through 10 million photos for an image of a



Bryan Calkins, CEO of CogniSign, with niece Kathleen and nephew Bobby.

### Sony Cyber-shot DSC-G1 offers in-camera image search

At PMA 07, Sony Electronics Inc., San Diego, Calif. ([www.sony.com](http://www.sony.com)), introduced the 6-megapixel Cyber-shot DSC-G1 digital camera with a built-in auto image management system.

"Within it, you are able to search, label, and organize your images. You do that by working with the bundled software," explains **Yolanda Hunt-Boes**, senior public relations analyst, Digital Cameras & Camcorders. "You first have to input your metadata. By that, I mean you can come up with major events, like birthdays, weddings, and anniversaries. You can select images with you and your mom. You can select images where there is a lot of blue sky, for example, if you wanted to do a search around a color. You input that data into your camera one time, and then you are able to organize your images within the image management system accordingly."

In addition, Hunt-Boes says: "When you are looking for pictures, you can say, 'I want to find all the pictures that have this face in them,' or pictures with a similar composition, such as all the pictures with two people or every picture with a tree in it. It's a search and labeling function."

The G1 needs such a function because it has 2GB of internal memory.

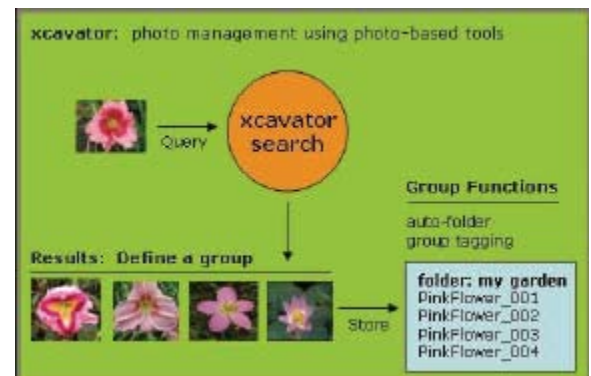
"For a 6-megapixel camera, that translates into 600 photos at 6 megapixels, or 7,500 VGA resolution photos. You don't need a media card at all," she notes, "but if you wanted to expand it, you could use up to an 8GB Memory Stick and have 10GB."

With such an enormous amount of data, it was critical for Sony to provide a method of image management, Hunt-Boes says.

terrorist, even a 1 percent false positive is going to be a very large error rate."

Despite these significant hurdles, Calkins is excited about the prospects of face recognition; but he and his company are taking their time. "Face recognition requires more sophisticated algorithms that we will build on top of our core technology. Those algorithms will be based on facial features, like eyes, ears, lips, nose and hair color, as well as exact spatial relationships between those features, and exact skin complexion," he says.

"Naturally, they will be much more computationally intense than our current image recognition algorithms. We realize the longer we wait, the more powerful and cheaper computers will get. There will be a convergence at some point where both the technology and the home computer are powerful enough to run this stuff – but that's probably a year or two away."



CogniSign xcavator allows users to search image databases for certain elements in a selected image.

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## Not quite perfect, but good enough

**FotoNation Inc.**, Burlingame, Calif., ([www.fotonation.com](http://www.fotonation.com)), a company that makes technology embedded in cameraphones and digital cameras, is moving forward with a face recognition solution for the consumer market now – but CEO **Eran Steinberg** says it will never be foolproof technology.

Steinberg is careful to distinguish FotoNation face detection technology embedded in cameras, which helps the camera capture better images of faces, from its face recognition technology for the purpose of searching and organizing images. The two technologies are distinct, but symbiotic.

“Face classification is a very old science. It’s been used for many years, primarily for things like security. Most technologies were trying to solve problems like finding a terrorist in an airport,” Steinberg says. “But we feel consumers may be interested in something very different.”

In designing its technology, FotoNation considered the numbers of people consumers are likely to take pictures of and be interested in searching for.

*“The real question is whether face categorization reaches the stage of being more useful for the average consumer than a nuisance. Our opinion, unequivocally, is yes.”*

— Eran Steinberg  
FotoNation Inc.

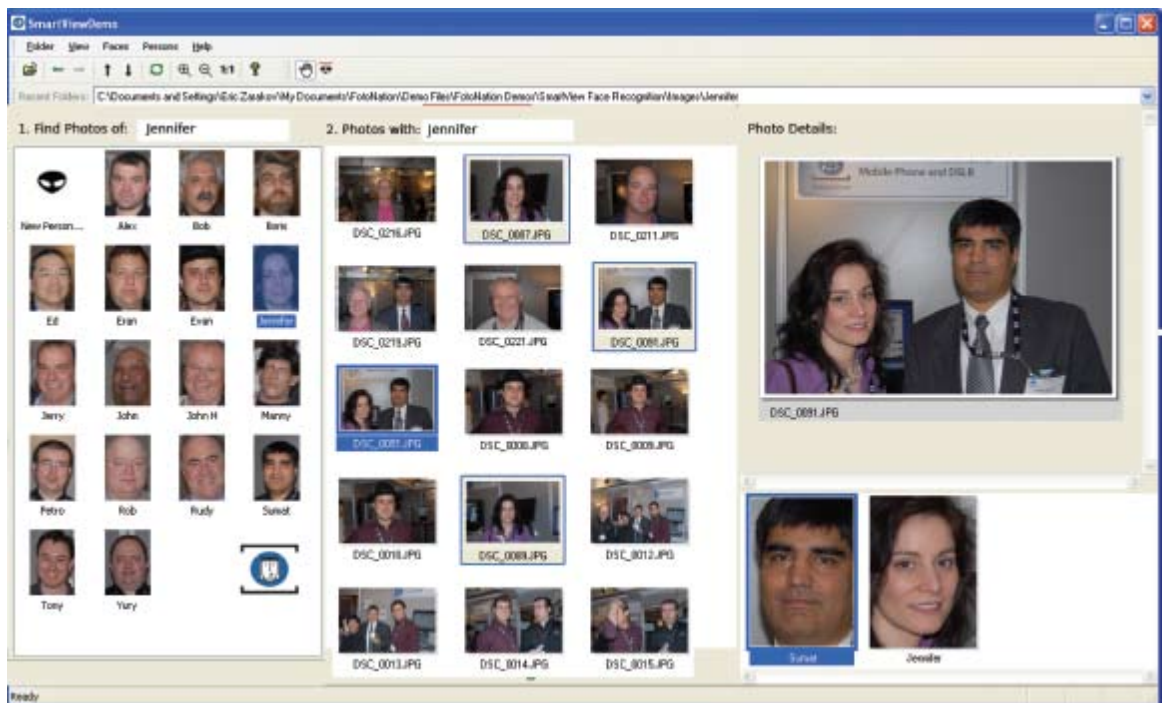
“Consumers don’t need to differentiate you from every person in New York,” he states. “They need to differentiate you from their other friends and family members. Our approach to face classification is more selective. We are looking for maybe two or three close circles – typically, direct family, extended family, and friends. You can have much better recognition if it is limited to a smaller group.”

The company is developing a server-based image archival solution that offers classification up to 100 faces.

“It’s not an automatic archival system. I believe it will always require user interaction; but as time goes by, the level of automation grows,” Steinberg says.

The system works when the user takes a picture of a person and tells the system who the person is. Then the user repeats the process with a second picture of the same person – in effect, the user trains the system to know what that person looks like. The more pictures of that person the user identifies to the system, the better the system can find that person in other images – but it doesn’t take very many lessons for the system to begin learning. Sometimes a single good picture is enough for it to recognize someone.

Steinberg describes it this way: “We take a picture of you, and we tell it, ‘This is Jennifer.’ Then we take another picture of you and we ask it, ‘Do you know who



FotoNation face classification technology offers classification up to 100 faces.

## CogniSign launches xcavator.net for visual search of stock photography

CogniSign, San Francisco, Calif., launched the beta release of its new xcavator.net ([www.xcavator.net](http://www.xcavator.net)) product, targeting the stock photography industry.

Providing natural and intuitive interactive photo search capabilities, xcavator.net allows buyers of stock photography to quickly browse photos based on visual content. The key to these capabilities is the product image recognition engine, powered by the CogniSign Intelligent Image Recognition Technology.

It can be interfaced to a stock photo company system using live data feeds of thumbnail image data and associated keyword and metadata. The underlying technology has unlimited scalability; it can be configured to search distributed photo databases across any number of servers. The company beta will launch with more than 300,000 images of stock photo inventory from **Photovault**, also based in San Francisco.



CogniSign xcavator.net will allow stock photography buyers to quickly browse photos based on visual content.

this is?’ It says, ‘It could be Jennifer, but it could also be Jane.’ Then we tell it, ‘No, that’s still Jennifer.’ By the third time, the system is much smarter. It learns more every time, but that learning is based on feedback. The more it learns, the more it can make matches. You may wear glasses one day, and another day you may not. You may comb your hair sometimes one way and sometimes another. But if you teach the system that, it gets smarter.”

As Steinberg notes, the system clearly requires effort on the part of the user; but he believes consumers are willing to make that effort – even considering the technology will probably never be 100 percent accurate.

“The real question is whether face categorization reaches the stage of being more useful for the average consumer than a nuisance. Our opinion, unequivocally, is yes,” he says. “If I open a roll of pictures

from my disc, and two of the 50 images are questionable, we think that’s OK.”

In fact, Steinberg sees some difficulties of face recognition as potential benefits. The fact some family members strongly resemble could turn into a fun software game.

“If I had this tool – *Who do you look more like, your mom or your dad?* – would you try it just for kicks? Maybe there is going to be some site that would match you to famous Hollywood stars,” he says.

But there are a million and one challenges. It’s a statistical problem. Face matching by definition is statistics, not mathematics; and there are lots of real-life issues that make it harder. But for good pictures, I believe the technology is there.”

Steinberg predicts there will be consumer products featuring FotoNation face classification technology on display by **PMA 08.** ■

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