



December 2008

## Incogna offers a new class of Internet image search engine

### A picture is worth a thousand meta-tags

Kris Woodbeck was walking through the corridors at the University of Ottawa early in 2007 when his eye caught a flyer pinned to a bulletin board extolling readers to enter a new business elevator pitch contest for a shot at \$1000. He thought, "Hey, I have an idea..." and signed up. At the time Woodbeck was wrapping up his Master's degree in Computer Science and had been doing his thesis on image recognition. He had seen how existing search engines such as Google and Yahoo had image search and felt that the work he was doing, which was significantly different, could form the basis of a new web service.

"I walked in and the room was full of business students," he says. "I was the only non-business student there." Woodbeck pitched his idea for Incogna and walked out with the \$1000 grand prize and thought 'Maybe this is something people really need!'

Woodbeck then connected with Renaud Arnaud, a member of the Ottawa Technology Transfer Network (OTTN). By providing funding, networking and critical advice to researchers, OTTN helps turn innovative ideas like Incogna into businesses that drive the economy and create jobs and wealth in Canada.

Arnaud immediately recognized Incogna's potential and stepped in to help Woodbeck take his idea "somewhere." Now, almost two years after the elevator pitch contest Woodbeck—who was named uOttawa Innovator of the Year in 2007 and was a finalist for OCRI's Student Researcher of the Year in early 2008—is the driving force behind Incogna Inc., a start-up company that launched its service publically available to users in November 2008—revolutionizing the way Internet image searches work in the process.

#### THE OPPORTUNITY

According to Nielsen/NetRatings more than 300 million image searches were completed in 2005. Within a year, that number had increased to more than 300 million searches per month and was increasing at twice the rate of text searches. In May 2008, R. J. Pittman (Director, Product Management at Google) said that "...image search is Google's second most popular offering"—despite the limitation of not looking at pixels in the images. Current technologies aren't actually image search engines at all. Instead they conduct text-based searches that look for the "meta-tags"—the short descriptions—used to label the objects on websites. An image of a catamaran-style sailboat such as you would find in an ad in a boat buying guide would be labeled with a string of appropriate meta-tags so that a search for "sailboat" or "catamaran" would hopefully turn it up.

According to Woodbeck, today's leading search engines are great at searching text, but are at a loss when it comes to images and visual data. They provide a "best attempt" at image search by ignoring image content, which forces users to sift through pages of irrelevant search results. The best image search engines today are still only image meta-crawlers, and just like text meta-crawlers in the 1990s, they don't do the job very well. "Google, Yahoo and the rest are image meta search engines," he says. "And this makes it hard to find good results. I wanted to be able to click on



Kris Woodbeck with the 2007 uOttawa Innovator of the Year Award

an image and get back a series of things that look like it. That's really a visual index and no one had done that on a large scale"

Simultaneously the processor market has become more and more generalized, with innovation and investment in the graphical processor unit (GPU) making significant strides forward. While the central processing unit (CPU) is the 'brain' of the computer, the GPU is the side-kick that's better suited for certain types of tasks, such as rendering characters in video games. The latest GPU processors from industry leaders have hundreds of cores which split processing tasks between them to complete tasks significantly faster than in the past.

"Most common tasks on the CPU don't easily run well in a parallel, multi-core environment. It boils down to the fact that the processor market is more aimed at a generalized processing like home and business PCs. But now that GPUs have become more and more generalized, they are now able to do much more than playing games. "I saw this from the start and saw the opportunity to design some algorithms that will recognize images and optimize the parallelization of the GPUs and did some initial work on it for my thesis."

#### THE TECHNOLOGY

The Incogna engine has a totally new approach and does not rely on meta-tags. "During my thesis, I was very interested in how the brain processes visual data and in how graphics processors could be sped up for more efficient image processing. I used data from neuroscience about how different classes of cells in the visual cortex process images and



**OTTN has helped Incogna  
create and refine its  
business model while we  
have developed the  
technology further”  
- Kris Woodbeck,  
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created a set of algorithms that mimic them and use parallel processor technology to index large quantities of visual data.”

Each index is built using multi-core processors which share many fundamental properties with the visual cortex. The engine then looks at each picture, analyzing the pixels of each image and its associated meta-tags to organize the pictures and places similar images together. “The engine effectively “sees” the images,” says Woodbeck. “This process lets us process images at an unprecedented scale and speed.”

#### THE BUSINESS CASE

Incogna’s primary value proposition is exactly the same as a regular text search engine. The free online search site intends to take a bite of the estimated \$45 billion (The Kelsey Group, Feb. 2008) global online advertising market.. Online text advertising is effective and typically returns a fee for every referral click, making them attractive compared to other forms of advertising.

The search engine will help users find images online quickly free of charge with targeted ads appearing alongside image search results as sponsored links. Growing this user community is critical as the more people who make the search engine a part of their regular online behaviors, who bookmark it and return will increase the impressions delivered to the advertisers making the ads more valuable. Incogna’s advantage is that its technology provides both a highly sophisticated visual search capability along with the visual processing necessary to make those ads relevant to the search.

Woodbeck is confident that Incogna will attract users and he has already signed up advertisers who agree. A second revenue stream may come from a customizable search appliance geared towards private image and video databases commonly found in the stock art/photography or surveillance industries. This tool provides the same power as the public search engine, but in a more convenient offering that can reside on user’s private networks.

#### OTTN SUPPORT CRITICAL

Now on the cusp of turning his idea into a business Woodbeck looks back at a rollercoaster two years and says that it would have been much more difficult, perhaps impossible, without the support of OTTN. The mission of OTTN is to facilitate and accelerate the commercialization of innovative ideas - to help new companies get started so they have the best chance to succeed. Funding comes from a number of government sponsors and the organization is strongly connected to a powerful network of research organizations on one

side and the business community on the other. Networking is critical ingredient and for some companies OTTN has helped introduce experienced executives who can help take a business from a fledgling to a fully functional company.

“Renaud was really enthusiastic about it,” Woodbeck says. “He brought me in to pitch to OTTN which really helped me solidify the business case. Until then it had been “this is cool technology and who cares how you make money?” But that process really helped formalize the value proposal and revenue stream.” Visualizing that revenue stream is something that has been rare in Ottawa, where even the high tech business community is much more comfortable with telecommunications, semiconductors and biotech than the newer business paradigms created by the Internet. “That’s one of the challenges with Ottawa...people are not as involved in the Web-based economy. I’ve had to explain Google’s business model so many times to so many people. The only people who do get it, I’ve been introduced to through OTTN.”

OTTN came on board in the summer of 2007 and started helping Woodbeck with sourcing additional funding, filing the patent application and arranging the creation of the company itself – critical elements that pure researchers traditionally have trouble with. “They’ve really taken care of the day-to-day stuff at and let me concentrate on refining the concept.” To date, Woodbeck has earned three grants from OTTN (and its sister organization the Innovation Alliance) that have gone to purchasing servers. The University of Ottawa has also provided hosting for Incogna’s servers in the School of Information Technology and Engineering.

These proof-of-principle grants have been vital to the fledgling enterprise and finding investors has been challenging. “Potential investors are really cautious supporting a business like this,” says Woodbeck, adding that as long as the superiority of the technology is supported and draws the attention of a large enough user base the company will be on a solid footing.

Incogna has moved the servers out of the University and is scouring the Internet cataloging and indexing millions of images to get the best results possible. With that hurdle overcome Woodbeck will quickly have another decision to make. Only this time it won’t be about entering an elevator pitch contest. He’ll have to decide whether to build the business up independently, partner with another company or even sell out. “That all depends on the users, for now Incogna needs to prove that it works and that we can generate revenues”, he says.

*To learn more visit [www.incogna.com](http://www.incogna.com)*

### About the Ottawa Technology Transfer Network (OTTN)

The Ottawa Technology Transfer Network (OTTN) is a collaboration among academic research institutions affiliated with the University of Ottawa whose goal is to enhance the economic impact of research commercialization through the sharing of best practices; enhanced market knowledge and proactive industrial interaction. OTTN members include the University of Ottawa, the Ottawa Health Research Institute (OHRI), the Children’s Hospital of Eastern Ontario (CHEO) and the University of Ottawa Heart Institute (UOHI)