

LOCATION-AWARE IMAGES

USING SMART-PHONE CAPABILITIES TO AUTOMATE RICH METADATA

AN INDUSTRY-WIDE ROUNDTABLE INTERVIEW



FUTURE IMAGE

MARKET ANALYSIS

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The 6Sight conference series focuses on the explosive global spread of connected imaging technology, and the exciting new opportunities it creates to improve people's lives in the personal, work, and community spheres. 6Sight brings together industry insiders, technologists, marketers, futurists, artists, educators, customers and members of the media to examine what happens when a billion people around the world are equipped with the tools of visual communication — image capture and display devices with always-on connections to a global network. How does it change the way we live our daily lives? Our culture? Our business opportunities, and more?

The program emphasizes innovative use cases, breakthrough technology demonstrations, and creativity. In addition to executives in the imaging, computing and telecommunications industries, it is aimed at large customers in government, education and business as well as media and analysts.

The 2006 session of 6Sight was held October 24 & 25 in Monterey, CA. The 2007 session is scheduled for November 8 & 9 in Monterey, CA. For more information please see www.6Sight.com

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LOCATION-AWARE IMAGING: SMART-PHONE CAPABILITIES TO AUTOMATE RICH METADATA

Executive Summary

Opening Thoughts

Comparative Roundtable interview

EXECUTIVE SUMMARY

The camera-phone has significant potential as an intelligent imaging device, one that leverages its smart capabilities — calendar, address book, GPS and more — to annotate the pictures and videos it takes with highly valuable metadata that makes these images more valuable, whether for personal or business purposes.

In his talk at Future Image's executive conference in 2003, LightSurf founder and camera-phone pioneer Philippe Kahn described a device that would know, for example, that he was at a baseball game — based on GPS, and either the schedule in his phone or by searching the Web automatically to find events, dates, and locations — and add the game information to each photo.

However, four years later, there is still no mainstream application on the market that, for example, lets a smart-phone user click a button to have all photos embedded with the data from that day's calendar event, or location.

Neither the photography nor the mobile communications industries have capitalized on the potential — or even done much to advance the state of the art.

What are the obstacles? Why hasn't this capability come to market in a consumer-friendly package? When might we see progress on this front?

For this report, we asked questions of executives at Adobe, ComVu, Ulocate, HP, Nokia, Sharpcast, Shozu, Verizon, and Microsoft.

What did we find?

In a nutshell: this is a powerful, convenient addition to consumer and industrial photography...

And it will hit the market in a big way... Someday.

That's right: just about everyone agrees automatic location and event metadata will be widely beneficial — but no one can say when it will be widely available.

The combined and condensed answers to our questions are summarized as follows:

1. Is this overall concept of "intelligent imaging" practical and desirable?

Yes: it will deliver definite benefits to end users, and help generate revenue for service providers.

2. What is the overall industry status for automatic image metadata today?

A large market opportunity is just opening, and the first location-aware services are just rolling out.

But the major carriers and device makers have yet to really enter the game.

3. Why hasn't it been widely implemented yet?

There have been more immediate needs / profit opportunities in mobile imaging.

There are cost issues such as GPS receivers and/or triangulation services.

There are control issues, such as carriers allowing other services and software to access a phone's location data.

There are disparate pieces — hardware, services, user behavior, monetization — that have to be put together,

But all these pieces are there today.

4. Are there other technical obstacles?

Not significantly.

There are only minor technological barriers such as getting the camera and calendar in a phone to be more aware of each other and interoperate.

5. Are standards — or lack thereof — in metadata formatting an issue?

Yes, but not a major one at all. New standards are unneeded, most likely.

Cross-company and cross-industry agreements are all that are needed for wider interoperability.

EXECUTIVE SUMMARY

6. Are there enough devices with GPS sensors, or does it matter if carrier triangulation is used instead?

GPS is just coming to the phone market as standard feature, and it will be many years before a sizeable share of the average user base has a phone with GPS.

Triangulation determines location based on proximity to multiple cell towers — and that provides enough usable data.

However, you need the operator's permission and assistance with triangulation data, whereas any user or service could work with GPS coordinates.

7. Are there significant differences in phone operating systems when it comes to delivering location-aware imaging?

No — but there are pros and cons to each.

8. Are current smart-phones intelligent enough location-aware imaging?

Yes, but there are too few on the market. That is changing as they become more standard, mass-market devices.

9. Does location-aware imaging require more consumer demand?

Consumer demand is an issue — but that is likely because customers are not aware of the potential.

10. Are customers concerned about personal privacy?

It is not a major issue, but well could be. Carriers and service providers are working to be "exceptionally prudent" in regards to individual location information.

11. What should be done now to advance location-enhanced imaging?

The carriers' pricing models for location data have to be based more on mass adoption rather than early adopters.

Otherwise the pieces are here today, and companies are coming out with solutions.

This is an area of huge potential on which the industry needs to align.

WHEN WILL METADATA BE AUTOMATIC? UNITING FORM AND FUNCTION

The technology is here to make photography more useful and enjoyable — but the industry has yet to deliver the complete package.

The camera-phone has significant potential as an intelligent imaging device, one that adds essential data to photographs — data that can make consumer and corporate photography more useful and enjoyable.

However, after many years neither the photography or mobile communications industries have capitalized on this potential.

What are the obstacles? Why hasn't this capability come to market in a consumer-friendly package? When might we see progress on this front?

PICTURE POTENTIAL

To enjoy and use a photo, you have to be able to find it.

That was hard enough when one had a shoebox with a few hundred pictures. But digital photography has brought with it an explosion in the number of photos: people who once took a few dozen shots a year now take hundreds each month. With thousands of shots on a PC hard drive, each with a generic name, no one who is not meticulously organized can find a photo they want to see.

However, digital photos are computer files, and those files can contain more information than just the ones and zeroes that describe the image. This other information is called metadata. Most cameras write into each photo such metadata as the date, the camera model, and picture exposure. Unfortunately, apart from the date, very little of this information is of use to the average person — and that date is more often than not incorrect, as most users don't set the camera accurately.

JPEG image files can also have location data in the EXIF header — but because no mainstream cameras find their own GPS positions, getting this data into a picture is a troublesome, kludgy process:

With applications such as Adobe's Elements consumer image editing program or the Flickr website, users can drag and drop a tag onto a file of folders taken at one location, for example, or drag the photos onto a spot on the map. Users can later find and share the photos by searching for a location name or address, or looking at a map.

Another option now coming to market is to use along with the camera a separate GPS device that notes which shots were taken where: the data and photos are synchronized and integrated on a PC later.

What's missing from that picture? Only the most numerous cameras: there are more camera-phones in peoples purses and pockets than actual stand-alone digital or film cameras.

These phones are actually computers: all mobile phones — not just the "smart-phones" with expandable operating systems — have processing capabilities better than the average desktop PC of 20 years ago.

And all that together means that the camera most people have with them — their phone — is something brand new: an intelligent camera, a smart photographic device.

It can do things with photos that ordinary cameras can not — and we don't just mean transmitting the picture via a cellular network.

Phones know who you are, where you are with GPS accuracy, and, by accessing your calendar, what you are doing and who you are seeing.

The "smart camera" can automatically add that information to every photograph's metadata.

At the very least, they can put your name and if desired your contact info into a copyright header on every shot — unlike most digital cameras.

Location and event metadata would make photos much more searchable, shareable, and useable.

Images can be automatically sorted, whether actually filed in appropriate folders, or 'virtually' organized based on the data and a search query.

Photos can be easily accessed and searched by the picture-taker and by others as well: one family member could instantly find all the photos of gathering at a certain date and location from within another's otherwise unsorted collection of photos, for example.

On the business side, a field agent could take photos — with the smart camera stepping him through the procedure to get the necessary shots and angles, perhaps — and those photos — tagged with the shooter's name, location, assignment, etc. — would be sent, as he took them, to the other people in the company who needed to see them, and appended to the right documents, and filed in the right places.

All without intervention.

This is not an original idea; it's been around for at least five years.

LightSurf founder Philippe Kahn discussed it at a Future Image summit in 2002: the camera-phone pioneer described a device that would know for example that he was at a baseball game — based on GPS, and either the schedule in his phone or by searching the Web automatically to find events, dates, and locations — and add the

SMART-PHONES AND INTELLIGENT IMAGING

game information to each photo.

Since that time, GPS chipset prices have fallen drastically, and the FCC's E-911 mandate ensures that US wireless phone carriers be able to determine the location of a cell phone to within 50 meters.

And yet today there is not a mainstream application that, for example, lets a Windows Mobile user click a button to have all photos embedded with the data from that day's calendar event.

WHY NOT NOW?

The real question is, why hasn't this happened yet? Why can't the average camera-phone owner use what is now in hand, without added services or fees, to simply add information to photos taken with that camera?

In a nutshell, the problem is that the various parts of a camera-phone may be integrated in one device, but that is matter of form only, not function. There is a phone, a camera, and a computer in there, but they hardly work together easily. Yes, one can take a picture, and then use the computer to send via the phone an email with a picture attached a photo — but that is hardly all the device should be capable of. And yes, there are now applications that automatically send every photo to one's blog or webpage, but there is little else in the way of true functional integration.

What are the reasons for this lack of progress: consumer desire, industry reluctance, technical obstructions?

We spoke with executives at Adobe, ComVu, Ulocate, HP, Nokia, Sharpcast, Shozu, Verizon, and, via email, Microsoft. And we received a variety of answers.

Our report combines all the interviews in a round table style to contrast and compare the responses to such questions as:

What would make this a practical solution?

What are the distinctions in phone operating systems?

What are the immediate obstacles?

What are the intermediate steps the industry should be taking?

ROUNDTABLE COMPARATIVE INTERVIEW

Participating in the interview here are:
uLocate Communications, Walt Doyle, CEO.
ShoZu, Jennifer Grenz, senior marketing director.
Nokia, Andrew Elliott, director of experiences,
Multimedia Business Group.
David Burmester, associate director, Advanced
MMS Services of Verizon Wireless.
Gunar Penikis, senior product manager for Adobe
Bridge and XMP.
HP, Aaron Weiss, general manager, HP Snapfish
Mobile Imaging.
HP, Leo Blume, manager and senior architect, HP
Snapfish Mobile Engineering.
HP: Evan Smouse, CTO of digital photography and
entertainment.
Microsoft, Mike Calligaro, senior development
lead.
ComVu Media, William Mutual, CEO.

OPENING THOUGHTS

What are your thoughts on the overall practicality of what we are calling “intelligent imaging?”

uLocate: Camera-phones are prevalent everywhere. You leave your house with a few things: your keys, your wallet, your phone — and you have a pretty good camera on that phone.

So all these digital images are getting created, but the problem is that nobody was ever able to monetize them, largely because the minute that the image leaves the phone — and in most cases if it does leave the phone it goes online — there’s no metadata associated with the image. Meaning that there’s no context to it.

And if there’s no metadata, you can’t search it. And online, if you can’t search it, basically, you can’t monetize it, right? You can’t sell contextual advertising against it.

When you look at a lot of these online photo sites, you see that people will go back and apply metadata to them, or tag their photos — but that’s a fairly laborious process to go and do that. It’s even more so if you try to tag an image from the handset — manually triple-tap some annotation to an image before you send it.

ShoZu: We absolutely think that this kind of metadata is going to be helpful for people. Not only to organize and find their photos — but because it’s interesting and fun for them.

For example, Flickr has a mapping feature, which is really cool and people are excited about it. Say I’m going to Spain next week, and my family has my

Flickr account. Well, as I can geotag all the photos I send, they can literally track on a map where I go throughout Europe. And my parents get a big kick out of that. I think it’s going to be a really appealing consumer feature.



*Walt Doyle,
CEO of uLocate Communications*

Nokia: The idea you put forth here is very pertinent, given that you’ve got this collection of different capabilities in the device now.

I myself am using a beta service that lets me take a very good picture at a travel location. If I want to share that with friends and family, it would be geotagged and uploaded to my blog, and the actual location of where that picture was taken is now pictured on a little map. If you put the mouse and hover it, people who have access to my Vox blog can go see that I’m taking a boat ride on the Seine river in Paris: they can see my picture, or some video I may have taken, through that blog.

There are companies looking to bring these types of solutions together already, so I don’t think this is out of the realm of possibility. The question is, why aren’t more people using this kind of capability today?

Adobe: The ability for the phones to just capture more “environmental information” and put that into the metadata is really exciting.

I think it’s a great idea. It’s sort of been happening, trickling in here and there.

The approach you’re taking from the mobile phone is interesting. Some of the workflows remind me of the promise of what the “semantic web” idea