News

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FEATURED IN THIS ISSUE

Pervasive Computing Helps Fans Get into the Game

Maya Dollarhide

Being a sports fan used to be simple: buy a ticket, order a hot dog and beer, and watch your favorite players do what they do best. Today, pervasive computing devices give fans more control over their experience and more information about the games they love, even when they're miles away.

"Mobile devices have put sports into the pocket of the fan," says Aaron Watkins, vice president of Business Development at ipsh!, a wireless marketing agency that handles clients who use pervasive computing devices for sporting events. "Major sports teams all seem to have some mobile content and messaging deals in place, allowing consumers to access their sports when—and, more specifically, where—they want to."

PLAY BALL

Robert Harkins, vice president of Carousel Industries, has been working hands-on in the technology sector with the Boston Red Sox for six years, deploying various IP (Internet Protocol) and wireless solutions at Fenway Park. The technology at the stadium means fans never have to miss a play, even when buying a drink or ice cream cone. "We installed streamlined point-of-sale to the concessions stands so that fans could order straight from their seats without missing a pitch through the implementation of a wireless network that transmits orders from handheld devices used by the servers."

Moreover, baseball relies heavily on statistics—batting averages, RBIs, ERAs, and so forth can help predict a game. Pervasive technology can benefit fans and players alike by helping them get this information on demand.

Mobile content and messaging deals let consumers access their sports when and where they want to.

"In the luxury boxes, we've installed IP phones that give fans immediate access to weather, restaurants, and soon they'll be able to access all the player statistics available to them. We're installing a server and software-based application that will connect to a specific Web site. Then fans can use the IP phones as a connector to the site complete with browser functionality. Then we can choose what content to provide to them," says Harkins.

ON THE PUTTING GREEN

It's not just baseball fans that want instant scores and player information. This past May at the AT&T Classic Professional Golfers' Association event in Atlanta, Georgia, spectators used a new device called the Wireless Caddie.

The PGA permitted use of the Wireless Caddie, run on Cingular 8125 handsets, although normally cellular devices are not allowed on the tournament courses. The handsets had the ability to receive real-time scoring for all players; locate and follow players on any hole; create a personalized leader board for the fan's favorite players; get player bios, course data, and current stats; receive news flashes and crowd roar explanations; and even identify nearby concessions, restrooms, first aid stations, and shopping booths.

"I was at the tournament and the overall feedback was very good," says Todd Smith, a representative from AT&T, formerly Cingular Wireless. "I spoke with a tournament official and he was impressed with the amount of data that fans can receive to enrich their tournament experience. As he put it, fans can use this to find everything they could get from a guidebook and more."

Product deployment was a bit different than that of the previous technology used at tournaments, says Smith. Prior to the use of the Wireless Caddie, the application provider, myLeaderboard, would set up a Wi-Fi network around each course, which took between four and five days to set up. With the new devices, the existing network offers more ubiquitous coverage with less set-up time. Smith reports that the biggest challenge was not mechanical but simply making sure that the 500 devices given out were returned at the end of the games.

To date, AT&T has deployed the Wireless Caddie at several golf tournaments,

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in brief...

Barcodes Go Invisible

Meg Shannon

With information ever at a premium, the technology around barcodes has evolved over the past few years to include 2D barcode models that can hold nearly 2,000 bytes of data by some estimates. Now, companies such as Fujitsu and IBM have developed ways of printing these souped-up bar codes in invisible ink. The payoff? Since it's unobtrusive, the invisible code can take up more real estate than the 2D variety. That means you can store more data without sacrificing aesthetics, and users can glean additional content by pointing a mobile phone at an image, rather than at a black barcode.

LESS IS MORE

The "if a tree falls in a forest and no one hears it, does it make a sound?" quandary rings true for invisible ink. How will users know to point a phone at an ad to get additional information if they can't see that the additional information exists? Two components to the technology—layout and extraction—aid users in knowing the code exists, according to Noboru Kamijo, manager of technology innovation services in the Tokyo Research Laboratory at IBM Japan. Layout selects the most optimum space on the material to print the 2D barcode. The best site is determined by simulating successful decoding rates, he says. Until invisible barcoding is common, a caption or symbol will appear alerting the user that the material contains invisible bar codes, he adds.

Extraction relies on an image-processing technique that can pull out information and decode the barcodes, regardless of whether the image containing the data overlaps with the original content of the advertisement or material, says Kamijo.

According to IBM, when this system is in place, you could use any mobile device with a blacklight-LED-enabled camera as the reader. The blacklight LED illuminates the invisible ink, making it visible to the reading device. The device translates that information into additional content—for instance, offering the reader a Web site. IBM says it's evaluating other applications that would prove useful to mobile users, such as providing tourist information, stock prices, weather information, news updates, recipes, news for kids, product information, coupons, ticketing information, music and film reviews, video previews, and sports clips. IBM has prototyped a blacklight-LED-enabled cell phone and Web camera to illustrate proof-of-concept and is now working with several media and press companies to commercialize the system.

"What we are providing to clients is the business concept with our core extraction software (algorithm), barcode layout tool for a desktop publishing system based on the same algorithm, and the reference design of the cell phone," Kamijo says. "We will help publishers and cell phone carriers to commercialize the whole system including invisible barcode and the reader design."

Last fall, Fujitsu debuted its own invisible barcode using a technique dubbed FP (Fine Picture) code and aims to have commercial applications by the end of 2007. FP uses faint yellow lines (the least discernable color by the human eye) to depict its code. This code can be superimposed atop a photograph without being noticed, says Toshimitsu Kurosawa, manager in the Global Solution Business Division at Fujitsu.

When launched, users could download software from Fujitsu to enable a camera-equipped phone to capture and translate the images of the invisible code. Once a phone points to the code, the image is translated into numbers and sent to a server. The server would respond with whatever information was requested from that content provider—be it, again, a Web site providing more information, a telephone number, or an email address, says Kurosawa.

According to Kurosawa, you can use FP code to make any kind of user-friendly information such as product details, pricing, and ordering available because the data is stored on content servers. FP code is in use today for

including the US National Pro-Am tournament at Pebble Beach. "The fans have access to the same stat updates as PGA officials and media, in real time, and that helps them get access to players they love while keeping up with the rest of the field," says Smith.

CHECKMATE, NO CHEATING

Brana Malobabic Giancristofaro says her experience as a chess player in the 2002 Canadian Open led her to create MonRoi, a company in Quebec, that creates devices for player, judge, and fan use during chess matches.

regional revitalization in some Japanese cities, he adds. At the city of Gifu, for example, there was an experiment to set up FP code at various sites such as a park, a temple, and a castle. By having their device read the FP code at those sites, tourists could obtain both text and audio accompaniment. In another application, FP code contained in a hotel's pamphlet leads users to the URL of the hotel's Web site with more detailed information available. The technology is used for entertainment as well. By scanning the FP code in a sports magazine, for instance, a reader could be linked to a Web page that broadcasts a live message from that sports fan's favorite player.

DIVISIBLE OVER INVISIBLE

Invisible ink brings more flexibility and applications to the table than its 2D predecessors. A business that prints up advertisements with black-ink 2D codes will have no use for those advertisements if the corresponding information to that code is rendered obsolete. But printing up the advertisement, then superimposing the invisible ink code over the content will allow the business more flexibility. As for applications, since the invisible ink makes it possible to place barcodes on images or products without disrupting the packaging design, the coding can be printed in multiple places on consumer literature, promotions, and posters. A movie poster, for instance, might superimpose the invisible code so consumers could receive movie times and theater locations, or even entice users with a coupon to purchase tickets outright. Other applications specific to invisible code include gaming or the identification and tracking of objects and people. And while watermarking—which carries only some 128 bits of data and is used mainly for images on a document—has uses for authenticating documents or papers, experts say using invisible ink would let you store more data and wouldn't be as detectable to counterfeiters. Wine companies, for instance, could use invisible ink on the label to reassure their buyers that a bottle is from the vineyard it promises to be.

While the technology has seen some progress in Japan, there hasn't been much demand for invisible ink barcodes in the United States—at least from enterprise customers, says Chris Brock, senior director of advanced development at Motorola's enterprise mobility business. And while the industry is seeing readers for imaging applications catch on—such as police or retailers wanting to scan in customer identification, such as drivers' licenses—obstacles lie ahead for invisible ink technology.

Two reasons for the lack of interest are low awareness among customers and high cost. Invisible ink is currently five to 10 times more expensive than visible ink, says Kamijo, although he adds that as the technology is accepted and mass produced, the cost discrepancy will disappear.

Another challenge awaiting invisible ink is a technical one. The reading device, such as a cell phone, must scan the invisible ink code and translate it quickly because customers won't want to wait for information. For this to happen, devices must effectively, correctly, and quickly extract the barcode and its information, send it to the server, and return the information, which can be challenging, says Kamijo. Additionally, Fujitsu's Kurosawa says that porting the technology to other manufacturers' cell phones is an obstacle. Fujitsu's technology can currently only be used with Fujitsu phones.

However, if such hurdles are cleared, invisible barcodes could become as ubiquitous as traditional ones—we just wouldn't notice. Consumer support could go a long way to making this a reality.

"I can easily imagine the consumer application really driving it home," Brock says of invisible ink technology. "Once it becomes prevalent, you can imagine it spreading onto other places."

MonRoi uses its parent company's (InnDe) wireless sensor network. The networks consist of numerous small sensor nodes and one or more base stations, which process the data received from the sensor nodes and take necessary control actions. InnDe's technology provides MonRoi products with fault tolerance as well as scalability, hardware features, efficient power consumption, and extended wireless range.

One of MonRoi's most popular devices, the Personal Chess Manager, uses pictorial symbol recording. It lets play-

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ers record chess games, review games instantly, and upload and download chess games from a computer. The Personal Chess Manager is an electronic scoring device that chess players can use during games. It can also be used to broadcast games live over the Internet, so family and friends can log on and follow the games in real time.

Retailing at US$359.00, the Personal Chess Manager records every move a player makes, so judges and other players can be certain of each move and game. While in the recording mode, MonRoi's Personal Chess Manager disables any programs that could help a chess player during the game. It also disables access to information from outside sources.

The personal chess manager works symbiotically with the MonRoi tournament manager device through wireless communication, which permits games to then be sent directly to the MonRoi World Databank of Chess (www.monroi.com/wdc), where they're stored for viewing and analysis. This also gives fans full access to the games in real time. MonRoi currently broadcasts over 10,000 games a year on three continents. The products have received mixed reviews from chess fans.

TeamAwear (Team Sports Awareness Wearable Display) is a clothing line that offers an electronically augmented sports jersey. Created by Mitchell Page, a recent graduate in design computing at the University of Sydney, and his supervisor Andrew Vande Moere, the jersey can indicate game-related information in real time via a small microelectronic board that controls a series of LED panels. Currently, the jerseys are research prototypes that have only been tested by semiprofessional basketball players in Australia.

If electronic clothing can present player information with lightning-fast results, those who watch sports for high stakes (that is, gambling) might have even more reason to bet on their favorite players. But one aspect of pervasive computing that might not come into play anytime soon is electronic gambling through mobile carriers and wireless systems connected to sports arenas and courts. It's currently prohibited, but despite efforts on the part of the carriers to prohibit it, there has been talk in the industry about how to age-monitor various forms of mobile content, potentially making off-track betting stands a thing of the past.