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NTT Develops "CyberSquash"
Internet Access Platform using Electronic Watermarks

Enables users to access related information easily
by reading printed images

Nippon Telegraph and Telephone Corp. (NTT; Head Office: Chiyoda-ku, Tokyo; President: Norio Wada) has developed "CyberSquash," an Internet Access Platform that uses electronic watermark technologies[*1] developed by NTT Cyber Solutions Laboratories (NTT-SL).

The recently developed "CyberSquash" is a new service platform that makes use of watermark technologies, which in the past have mainly been used in the field of copyright management. In this system, watermarks indicating the URL for the desired homepage are embedded in a printed image, enabling the user to automatically navigate to the specified homepage simply by reading that image with a Web camera or a mobile phone with an i-appli[*2] digital camera. Two types of software have been developed for reading the watermarks: "Squash Reader: Active-X version," which allows watermarks to be read automatically simply by pointing the Web camera on a PC at the target image, and "Squash Reader: i-appli version," which allows the user to read watermarks by taking a picture of the target image using a mobile phone equipped with a digital camera. The platform thus supports Internet access from both PCs and mobile phones with camera functions.

As corporate Internet applications become increasingly advanced -- for example, with sales promotion campaigns tied into e-commerce and homepages -- this platform is expected to see applications in a broad range of fields, for example in entertainment and as an effective means of leading users to homepages via advertising media and various types of sales promotion tools.

The CyberSquash platform will be provided for a period of approximately six months, starting from July 8, via NTT-SL's "Cyber Trial[*3]" service site (http://www.cyber-trial.com/). In this trial, watermarks have been embedded in images on the site, and users can access CyberSquash functions simply by pointing a web camera at a printout of the image, or by taking a picture using a mobile phone with a digital camera function. The first 1,000 users will receive a free "SquashCard" (PDF file) -- a name card featuring a watermark (see attachment 1).

Through this trial, by gathering comments from users that try the service, NTT hopes to verify the effectiveness and the reliability of this technology in actual usage environments, and at the same time to reflect these comments in research and development that will form the foundations of new services.

1. Background to development of "CyberSquash"

Recently, URLs can be found in many media, including posters, pamphlets, magazines, and company profiles. These URLs make it possible to provide more detailed information via the Internet, including updated or related information that could not be included in the print media. There are a number of problems with this approach, however. For example, it is troublesome to have to input the URL while reading the printed media, and in many cases, only the URL for the top page is given when various pieces of information are shown in the same media, so that information is difficult to locate on the Web.

"CyberSquash" enables the user to link directly to the targeted information from a variety of images on a printed page, arriving at the desired information easily just by reading the image. It is also possible to pick up related information from a poster or sign some distance away by photographing the image using a mobile phone equipped with a digital camera (see attachment 2).

2. Keys to related technologies

(1)Technology for reading electronic watermarks using PCs with Web cameras

Electronic watermark technologies are used as security technologies for copyright management and similar applications, so there has always been a problem with security when providing general users with software for reading such watermarks. NTT has divided the electronic watermark reading and processing programs into two parts, and located the key elements at the Technical Center to ensure resistance to attacks. In this way, we have made it possible to distribute user interface programs for operating the system on regular terminals. We have also developed the program in the terminals in ActiveX Control[*4] format, so that users can read electronic watermarks using only a Web browser without having to install any special programs.

(2)Technology for reading electronic watermarks using mobile phones with digital cameras

There have been many problems with attempting to equip camera-type mobile phones with functions for reading electronic watermarks, as a result of limitations in processing capacity and memory volume. Conversely, when using methods in which photos taken using mobile phones are sent to a server one at a time to have the watermarks read by the server, in most cases problems with the camera functions or the photographic conditions prevented the watermarks from being read correctly. We have developed an i-application that makes it possible to use commercial camera-type mobile phones as electronic watermark readers, by modifying watermark embedding and reading methods for camera-type mobile phones, but with a limited scope of application.

3. How to use "CyberTrial"

Anybody can use "Cyber Trial" by accessing the top page and registering as a user. For details on procedures and the system environment required to use CyberSquash, please refer to the CyberSquash manual on the trial site:
[http://squash.cyber-trial.com/howto.html]

4. Outline of "SquashCard" present

The first 1,000 visitors to the "CyberSquash" site who wish to do so can obtain a "SquashCard" (pdf file) name card containing a watermark. If the user prints out the SquashCard and distributes it to friends, those friends can register on a homepage by taking a picture of the SquashCard using a camera-type mobile phone with a "Squash Reader" installed, and can then read a message hidden on the web site. This message can be changed at any time on a PC, enabling a wide range of information to be shared.

5. Future Developments

NTT will continue its research and development activities with a view toward full-scale provision of CyberSquash. By creating a bridge between the real world and the cyber world using cameras with digital camera functions, which are becoming increasingly popular, we will promote research and development that will form the foundations for services that will offer more fun and convenience for users, and work with the various companies in the NTT Group to achieve new ASP[*5] services that incorporate these technologies.

Glossary

([*1]) Electronic watermark technology
A technology for embedding additional information in an image, video, or other contents, with virtually no effect on the image quality.

([*2]) i-appli
An application service that can be accessed using NTT DoCoMo's i-mode mobile phones. Compatible phones are equipped with program execution environments created in Java language, and can download and execute application software written in that language.

([*3]) Cyber Trial
Announced on May 7, 2003. Please refer to the Press Release entitled: "NTT Develops 'KiriBariWeb' tool for easy construction of personal portals -- Begins Tests via Trial Service Site 'Cyber Trial'-- "
(http://www.ntt.co.jp/news/news03e/0305/030507.html)

([*4]) ActiveX control
A software component technology developed by Microsoft. ActiveX controls are downloaded from Web servers via the Internet, and used as additional functions in Microsoft's Internet Explorer browser.

([*5]) ASP (Application Service Provider)
A service provider that offers applications via the Internet.

- Attachment 1:Outline of "CyberSquash"

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