

## CyberSquash: Internet Access Platform using Digital Watermarks—Enables Users to Access Related Information Easily by Reading Printed Images

NTT has developed CyberSquash, an Internet access platform that uses digital watermarks<sup>\*1</sup> developed by NTT Cyber Solutions Laboratories. In the past, watermarks have mainly been used for copyright management. CyberSquash is a platform that automatically guides users to specified Web pages by reading digital watermarks, which are embedded into printed images. We have developed two types of software for reading the watermarks: “Squash Reader: Active-X version” reads watermarks automatically when you simply point the Web camera of a PC at the target image and “Squash Reader: i-appli<sup>\*2</sup> version” reads them when you use a cellular phone equipped with a digital camera. The platform thus supports Internet access from both PCs and cellular phones.

As corporate Internet applications become increasingly advanced—for example, with sales promotion campaigns tied into e-commerce and Web pages—we expect this platform to be used in a broad range of fields such as entertainment and as an effective means of guiding users to Web pages.

The CyberSquash platform will be provided for approximately six months, starting from July 8, via our “Cyber Trial” [1] service site (<http://www.cybertrial.com/> (in Japanese)).

By gathering comments from users who try the trial service, NTT hopes to verify the effectiveness and reliability of this technology in actual usage environments and feed these comments back into the research and development that will form the foundations of new services.

### Background to CyberSquash development

These days, URLs can be found in many printed materials, including posters, pamphlets, magazines, and company profiles. They can provide more detailed information via the Internet, including updated or related information that could not be included in the printed material. However, there are a

number of problems with this approach. For example, it is troublesome to have to manually type in a URL while reading something, and often only the URL for the company’s home page is given for several items on the same printed page, so specific 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 capturing the image. It is also possible to obtain related information from a poster or billboard some distance away by photographing the image using a cellular phone equipped with a digital camera (Fig. 1).

### Key technologies

- (1) Reading digital watermarks using PCs with Web cameras

Because digital watermarks are used as security techniques for copyright management and similar applications, it has always been considered a security risk to give ordinary users the capability to read watermarks. NTT has divided the digital watermark reading and processing software into two parts and located the critical elements at a technical center. This lets us safely distribute user interface programs for operating the system on regular terminals. We have also developed the program for terminals in ActiveX Control<sup>\*3</sup> for-

\*1 Digital watermark: Additional information embedded 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 cellular 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 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.

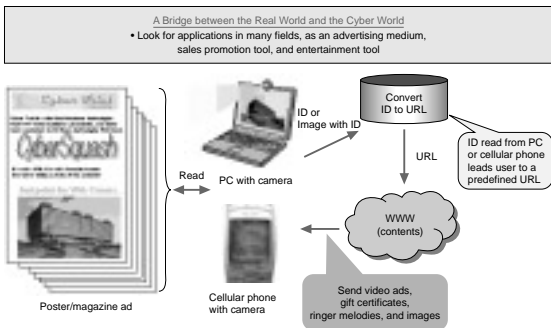


Fig. 1. Typical application of digital watermark reading technologies.

mat, so that users can read digital watermarks using only a Web browser without having to install any special programs.

- (2) Reading digital watermarks using cellular phones with digital cameras

There have been many problems with attempting to provide camera-equipped cellular phones with functions for reading digital watermarks because of the limited processing and memory capacities. On the other hand, methods in which photos taken using cellular phones are sent to a server one at a time to have the watermarks read by the server, also have problems with the camera functions or the photographic conditions and watermarks often cannot be read correctly. We have developed an application that makes it possible to use commercial camera-type cellular phones as digital watermark readers, by modifying the watermark embedding and reading methods for camera-type cellular phones, but with a limited scope of application.

#### How to use the "CyberTrial"

Anybody can use "Cyber Trial" by accessing the Web page and registering as a user. For details of 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> (in Japanese).

#### Future plans

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 lay the foundations for services that will offer more fun and convenience for users. We will work with the various companies in the NTT Group to achieve new ASP<sup>\*4</sup> services that incorporate these technologies.

#### Reference

- [1] "KiriBanWeb: a Tool for Easily Constructing Personal Portals—Trial Service Begins at "Cyber Trial" Site," NTT Technical Review, Vol. 1, No. 4, pp. 69-70, 2003.

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\*4 ASP (Application Service Provider): A service provider that offers applications via the Internet.