

Content Rights Management and Protection Using Digital Watermarking

-Towards smooth content distribution-



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STRL is a leader in research and development of digital watermarking technology for rights protection and management of digital content.

Recently, it has become very popular to distribute digital content, such as video and audio data, over the Internet or by using a recording medium such as an optical disk. While digital content is easy to distribute and store, it also makes it simple to perform illegal activities such as the duplication or retransmission of data without the authorization of the rights holder. This risk increases the importance of technologies related to rights management and protection. This is especially essential in the case of digital content distribution over the Internet, where any number of people have access. For that purpose, digital watermarking is effective to prevent illegal use of digital content.

Digital watermarking is a technology that embeds rights information into the video or audio signal itself, like the "watermark" on a paper bill. The information is embedded by slightly altering the content data, to an extent that is imperceptible to the human eye or ear.

Digital watermarking of video for broadcasting requires the following:

- (1) Adequate picture quality after embedding digital watermarking.
- (2) The ability to retrieve embedded rights information after video processing, such as video compression and partial cropping.
- (3) The ability to accurately retrieve embedded information even from analog-copied video images or images re-shot with consumer video cameras.

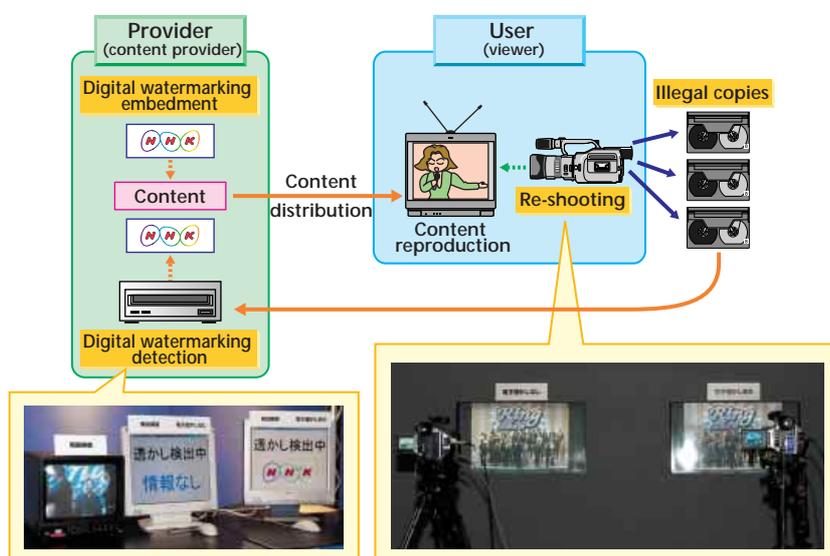
STRL has constructed various

digital watermarking technologies in the past. One of these is a technology to embed digital watermarks in a video image by using multiple schemes, allowing different pieces of embedded data to be extracted individually. Using separate digital watermarking schemes allows us to embed various rights-related information (copyright holder name, distribution date, number of authorized replays) into a single piece of video. Our technology is designed so that none of the schemes interfere with each other, thereby preventing corruption of the embedded data.

We also fabricated a digital watermarking embedding/detection hardware system for motion pictures. This system is capable of real-time embedding and detection of digital watermarks in HDTV signals.

Another new digital watermarking technology enables the detection of embedded information in video content that has been re-shot from a TV monitor with a consumer video camera (refer to figure below). The illegal distribution of re-shot video images can be thus be prevented with this scheme, which embeds rights related information into the contents of an HDTV broadcast.

Our goal is to facilitate secure, smooth content distribution, and our future work will include a technology for constructing digital watermarks for the highly compressed images distributed over the Internet and a digital watermark technology to identify unauthorized use.



Digital watermarking detection in re-shot video