ASPECTS OF WATERMARKING TECHNOLOGIES APPLIED TO DIGITAL TV BROADCAST OBJECTS

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ABSTRACT

The objective of the presented paper is to give a short overview about watermarking approaches for audio visual objects (AV-objects). Since the market of handling digital media within digital TV stations is strong developing in this paper aspects of innovation-related activities of watermarking applications as well as current research and investigation streams are pointed out. Furthermore an approach for watermarking of AV-objects considering DCT, Wavelet and PLT transforms is discussed.

INTRODUCTION

Watermarking is the process by which additional data (WM) are embedded into AV-objects such as images, movies or audio objects. The WM itself is not noticeable and detectable by “human eyes and ears”, but special software detectors can easily recognize this hidden information. These so called digital watermarks are currently used for a variety of different applications. The widespread application of these watermarks is as a unique content identifier that remains constant throughout a variety of manipulations like editing, compression, encryption, and broadcast without affecting the quality of the content. But this is not solely the type of application of watermarking technology. Especially in this discussed approach it can also be used for monitoring and tracking of content in broadcast and internet distribution furthermore for transmitting metadata information.

Existing standard methods are quite good for applications like copyright and content protection with respect to DRM (Digital Rights Management). But for such applications like metadata tagging, where the content information of the image or video is embedded, the current methods are not suitable due to the reduced amount of the included and embedded additional data.

Therefore in this paper the investigation of an approach based on the piecewise linear transform is presented.

ASPECTS OF INNOVATION-RELATED ACTIVITIES OF WATERMARKING APPLICATIONS

The monitoring of the exploitation of Broadcast or Distributed Images concerns the evaluation of broadcast audience of a program in a legal context, as well as the tracking of illegal exploitation (piracy). To overcome this problem several approaches are provided like “Fingerprinting”. In order to complete the tracing of AV content exploitation on a distribution media, a different mark is inserted in each distributed copy of an AV-object before delivery by its legal distributor. This identifies a transaction or a sold item.

A further aspect is “Document Integrity Checking” a type of "Fragile" Watermarking: the mark permits to detect eventual changes in an AV-object due to some attacks and their locations. Then, it is expected to be partly alterable.

Authentication and Identification of an AV-object: a user which receives an AV-object may need to identify the source of a document or the document itself with a high degree of certainty, in order to validate this document for a specific use.

Usage Control: the reception of some distributed AV-objects by some digital equipment in a distribution network, may be controlled in using watermarks inserted in these AV-objects, and only enabled on equipment, whose owner has paid for some access rights. A first example of it is provided by Copy Protection on DVD & CDROM for the Consumer Market: a mark is embedded in DVD video disks in order to prevent copy of DVD, in co-operation with playback and recording devices manufacturers.