

Copyright Protection using Video Watermarking based on Wavelet Transformation in Multiband

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ABSTRACT

This paper presents a novel technique to protect the copyright information by embedding a bit map image as watermark into the frames of videos in such a way in could be extract to proof the ownership from the video contents. The proposed scheme produce a robust video watermarking scheme into two bands therefore named as multiband with strength α_1 and α_2 respectively, which result from applying the discrete wavelet transform of every video frame. The watermark is embedded into LLLL band obtained by second level wavelet decomposition and into HH band obtained by single wavelet transformation. Various attacks, such as gaussian noise addition, cropping and rotation, have been applied in order to test the robustness of watermark. Experimental results shown in table 1 and table 2 clearly indicate that we have extracted the watermark successfully from various types of attacked video frames.

General Terms

Digital Video Watermarking, Information Security

Keywords

Discrete Wavelet Transform, Multiband, Human Visual System

1. INTRODUCTION

More and more types of video products are coming in the market that may be used in diversified fields like advertising, video conferencing, electronic media, video movies, training and workshop, video calling, video chatting, online video games and so on. DVD, PC Video Files, Web Video Files and Streaming Video are the major categories of product available in the market. These digital video data can be easily and perfectly copied and rapidly transferred from one system to other remote PC only by having internet connection. This leads to wide interest of information security and multimedia copyright protection [1]. This could be achieve by embedding the special bit pattern as copyright information known as digital watermark in the original contents with the conditions that perceptibility i.e. quality of video should not be degraded and it must maintain the robustness i.e. watermark could be recovered successfully even some manipulation or attack on the digital contents. Since watermark is being applying in digital video contents therefore this named as digital video watermarking. There are numerous application areas, other than of copyright protection, of digital video watermarking. Some of them are described as follows. *Copy control* ensures not to produce unauthorized or illegal copying of digital video data. Since each copy of digital video data provides exact reproduction of the original one, therefore some mechanism must be designed to prevent to replicate the original one. It [2] describes the copy control by using the ticket concept based on embedding signal.

Broadcast Monitoring [3] is another vital application area of digital video watermarking in which the broadcast video signals are monitored by active or passive monitoring. This type of monitoring may be use by the advertisement companies to verify that allotted air time is aired in accordance for which they paid. In a nutshell, we can summarize that images or video sequences on a public network always at risk of burglary and amendment therefore the researchers needs to implement a technique to protect the digital contents in a more robust manner.

In the literature survey, different digital video watermarking algorithms [4,5,6] have been proposed. Some techniques embed watermark in the spatial domain by modifying the pixel values directly in each frame but these methods are not robust to attacks and common signal distortions. In contrast, other techniques are more robust to distortions when they add the watermark in the frequency domain. In these types of schemes, the watermark is embedded by modifying the transform coefficients of the frames of the video sequence. The most commonly used transforms are the Discrete Fourier Transform (DFT), the Discrete Cosine Transform (DCT), and the Discrete Wavelet Transform (DWT).

The rest of the paper is organized as follows: Section 2 describe DWT based watermarking, section 3 presents the proposed watermarking scheme. Section 4 introduces the experimental results, section 5 compares the state of art with the proposed scheme and finally section 6 concludes the paper.

2. DWT BASED WATERMARKING

Since DWT has added widespread recognition in signal processing and image compression. Therefore several researchers rigorous are using DWT technique.

The DWT is computed by successive low pass and high pass filters. High pass filter produces coarse-scale DWT coefficients while low pass filter creates fine scale of DWT coefficients. It decompose a video frame, a static image of a video contents, into four non-overlapping multi-resolution sub-bands (LL, LH, HL and HH1) which can be rebuild to make the original frame without error. The sub-band LL represents the coarse-scale DWT coefficients or lower level resolution, LH represent coefficients of vertical edges, HL represent coefficients of horizontal edges and finally HH represent diagonal coefficients. The whole concept of DWT technique is elaborated in diagram 1(a) and 1(b).

There are numbers of advantages to choose DWT as our proposed research work. Some of the advantages are described below.

1. Due to its excellent spatial localization, -frequency spread and multi resolution characteristics, the DWT is very suitable to identify the areas in the host image where a watermark can be embedded effectively.