

A robust algorithm for 3D Mesh Watermarking using NBR technique

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Abstract

With the rapid development and wide use of Internet, information transmission faces a big challenge of security. People need a safe and secured way to transmit information. Digital watermarking is a technique of data hiding, which provide security of data. This paper presents a watermarking technique which least significant bits (LSB) NBR and Mesh watermarking, its steps and its process with matlab images.

Keywords

watermarking ,LSB, NBR, Mesh.

1. Introduction

Watermarking is a technique used to hide data or identifying information within digital multimedia. Our discussion will focus primarily on the watermarking of digital images, though digital video, audio, and documents are also routinely watermarked. Digital watermarking is becoming popular, especially for adding undetectable identifying marks, such as author or copyright information. The digital watermarking process embeds a signal into the media without significantly degrading its visual quality. Digital watermarking is a process to embed some information called watermark into different kinds of media called Cover Work [10,2]. Digital watermarking is used to hide the information inside a signal, which cannot be easily extracted by the third party. Its widely used application is copyright protection of digital information. It is different from the encryption in the sense that it allows the user to access, view and interpret the signal but protect the ownership of the content. Digital watermarking involves embedding a structure in a host signal to “mark” its ownership [12]. Digital watermarks are inside the information so that ownership of the information cannot be claimed by third party [8]. While some watermarks are visible [5], most watermarks are invisible. [11].

2. Classification of Watermarking

Digital Watermarking techniques can be classified as:

- Text Watermarking
- Image Watermarking
- Audio Watermarking

- Video Watermarking

In other way, the digital watermarks can be divided into three different types as follows:

- I. Visible watermark
- II. Invisible-Robust watermark
- III. Invisible-Fragile watermark

3. Techniques of Watermarking

A. Frequency Domain Watermarking:

These methods are similar to spatial domain watermarking in that the values of selected frequencies can be altered. Because high frequencies will be lost by compression or scaling, the watermark signal is applied to lower frequencies, or better yet, applied adaptively to frequencies containing important elements of the original picture.[4]

B. Spread Spectrum:

This technique can be used for both spatial domain and frequency domain. The spread spectrum method has the advantage that the watermark extraction is possible without using the original unmarked image [1].

C. Spatial Domain Techniques:

Techniques in spatial domain class generally share the following characteristics:

The watermark is applied in the pixel domain.

No transforms are applied to the host signal during watermark embedding.

Combination with the host signal is based on simple operations, in the pixel domain.

The watermark can be detected by correlating the expected pattern with the received signal.

Spatial domain watermarking is performed by modifying values of pixel color samples of a video frame. Let us denote a

picture to be watermarked by P and values of its pixel color samples by P_i , a watermarked version of picture P by P^* and values of its pixel color samples by P^*_i . Let us have as many elements of watermark W with values W_i as number of pixels in picture P . Watermark W hereby covers the whole picture P . Further, it is possible to increase the watermark strength by multiplying watermark

logo image instead of a pseudo-random Gaussian sequence. Such watermarks are considered as binary image watermarks or grey scale watermarks. Such watermarks are used for original data detection. Based on the type of watermark embedded, an appropriate decoder has to be used to detect the existent of watermark.

6. Image Watermarking Embedding Domain

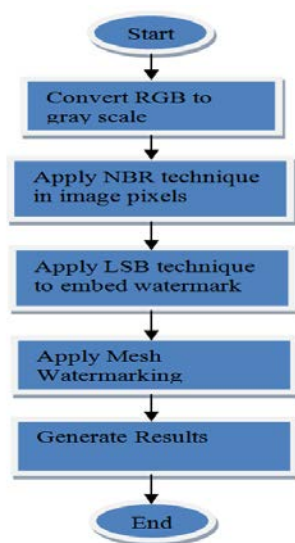
Based on domain used for watermark embedding process, the watermarking techniques can be classified into the following types:

1) Spatial watermarking

Spatial watermarking can also be applied using colour partition such that the watermark appears in only one of the colour bands. However, the watermark appears when the colours are separated for printing. Spatial domain process involves addition of fixed amplitude pseudo-noise into the image. These approaches modify the least significant bits of original contents. The watermark can be hidden into the data to assume that the LSB data are visually irrelevant.

2) Transformation based watermarking There are many techniques proposed based on transformation based watermarking. Watermarking can be applied in the transform domain; including such transforms are discrete Fourier, discrete cosine, and wavelet. In this first the host or main data is transformed and then modifications are applied to transformed coefficients. Watermark is embedded in DFT, DCT and DWT domain coefficients.

7. Proposed Work



Flow Chart of proposed Work

8. Results

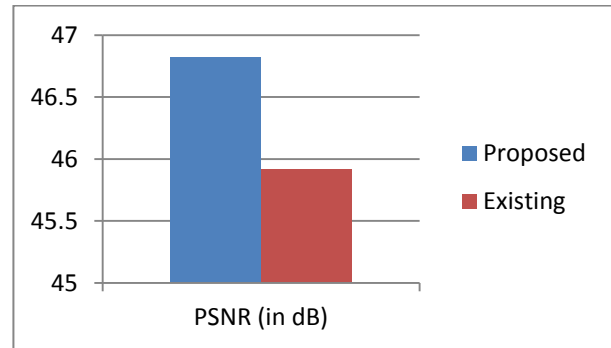


Fig 4: PSNR value

Fig 4 described about the PSNR value of image after the embedding of watermark. It has shown that the psnr value in proposed is better than that of existing approach.

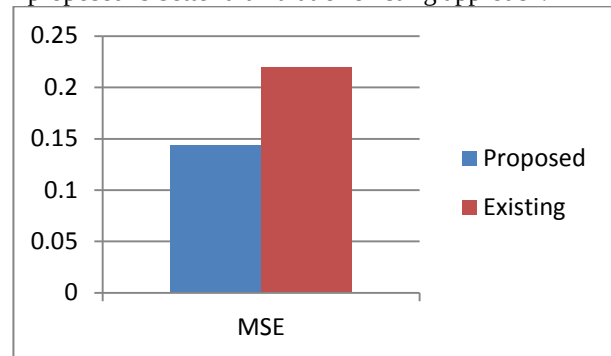


Fig 5: MSE

Fig 5 described about the MSE value of image after the embedding of watermark. It has shown that the mse value in proposed is better than that of existing approach.

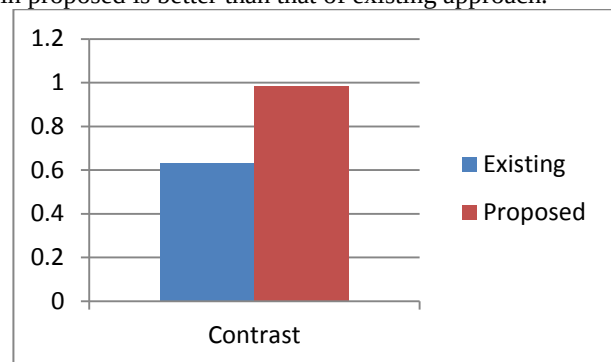


Fig 6: Contrast

Fig 6 described about the contrast value of image after the embedding of watermark. It has shown that the contrast value in proposed is better than that of existing approach.

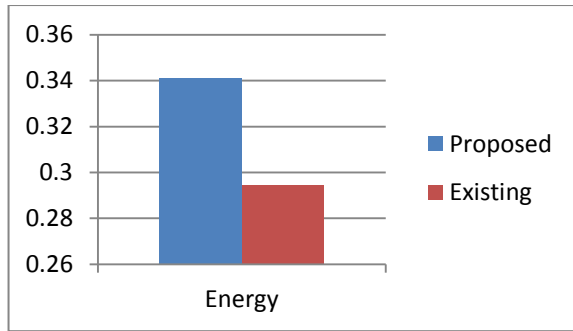


Fig 7: Energy of an image

Fig 7 described about the energy of image after the embedding of watermark. It has shown that the energy in proposed is better than that of existing approach.

9. conclusion

In this paper we survey the current literature on digital image watermarking,. We classified watermarking algorithms based on the transform domain in which the watermark is embedded. Also, study the watermarking properties, applications and techniques used. This paper proposed the robust techniques and generate results which can prevent attack on the watermark using LSB, NBR technique.

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