GRAPHICAL ANALYSIS OF LSB BASED ALGORITHM

Er.Shefali Manchanda, Er.Ravinder Bisht, Deepika Chaudhary

Abstract— **Digital Image watermarking is the process of hiding the digital data in the Image. It is used to protect the content of image by insertion of digital mark into the image. This paper presents digital watermarking algorithm using least significant bit (LSB). LSB is used because of its little effect on the image. In this paper an invisible watermarking technique (least significant bit) and a visible watermarking algorithm is discussed depending on the length of the watermark. The proposed work is explained using algorithm and graphical results. Various attacks are performed namely Gaussian noise, Poisson noise, Salt & Pepper noise and Rotation on watermarked image with the calculation of parameters like Mean Square Error (MSE), Peak Signal to Noise Ratio (PSNR), Signal to Noise Ratio (SNR), Signal Mean Square Error (S_MSE).**

Index Terms— Watermarking, Least Significant Bit (LSB), Mean Square Error (MSE) ,Peak Signal to Noise Ratio (PSNR),Signal to noise ratio(SNR),and Signal to Mean Square Error(S_MSE).

INTRODUCTION

Boundless number of replicas of the original content can be made from vulnerable digital content. This makes the content creators and content owners more alarmed about the copyrights management of their digital contents .Concern for the protection of copyrighted digital intellectual properties such as computer programs have been high. Digital Watermarking is the process of hiding or embedding an imperceptible signal (data) into the given signal (data). This imperceptible signal (data) is called watermark or metadata and the given signal (data) is called cover work. The watermark should be embedded into the cover work, so that it should be robust enough to survive not only the most common signal distortions, but also distortions caused by malicious attacks. The cover work can be in the form of an image, video or audio. Since this signal or pattern is present in each unaltered copy of the original image, the digital watermark may also serve as a digital signature for the copies. A given watermark may be unique to each copy e.g., to identify the intended recipient or be common to multiple copies e.g., to identify the document source.

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MAIN STAGES IN WATERMARKING

If we consider watermarking as a communication task, it can normally be described as three main processes: watermark generation and embedding i.e. information transmission, possible attacks i.e. transmission through the channel and watermark retrieval i.e. information decoding at the receiver side.

1. Generation
2. Embedding
3 .Distribution & Possible attacks
4. Detection

In Generation stage watermark is created and its contents should be unique and complex such that it is difficult to extract or damaged from possible attacks. Advantage of complex is that they provide reliable statistical properties and their detection can be shown with great certainty

In Embedding stage watermark is embedded in cover media. Embedding is directly related to extraction algorithm.

The distribution process can be seen as the transmission of the signal through the watermark channel which is distinguished from the broadcast channel. Possible attacks in broadcast channel may be intentional or accidental.

Detection process allows owner to be identified and provides information to the intended recipients. There are two kinds of detection: Informed detection and Blind detection.

TECHNIQUE USED

Least Significant Bit

There are many algorithms available for invisible digital watermarking. The simplest algorithm is Least Significant Bit (LSB). Insertion, in which each 8-bit pixel's least significant bit is overwritten with a bit from the watermark. Given the extraordinarily high channel capacity of using the entire cover for transmission in this method, a smaller object may be embedded multiple times..In a digital image, information can be inserted directly into every bit of image information or the more busy areas of an image can be calculated so as to hide such messages in less perceptible parts of an image .Steps of least significant bit :

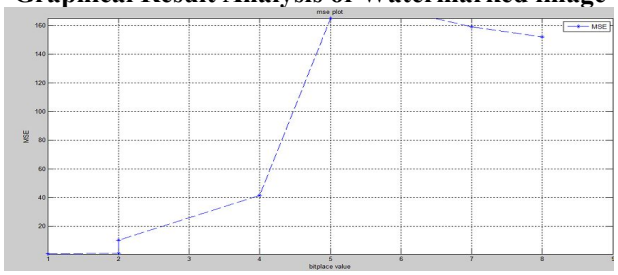
Convert RGB image to gray scale image.
Make double precision for image.
Shift most significant bits to low significant bits of watermark image.
Make least significant bits of host image to zero
Add shifted version (step c) of watermarked image to modified (step d) host image.

WATERMARK EMBEDDING ALGORITHM

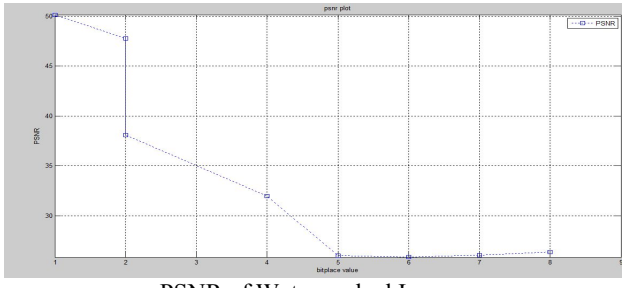
The embedding algorithm can be divided into the following steps:

Step 1: Read the host image.
Step 2: Convert host image from RGB image to gray image.
Step 3: Resize the image obtained in step 2 to required size (256pixels or 512pixels)
Step 4: Read the watermark image.
Step 5: Get the bit plane (1-8) to hide the watermark image in.
Step 6: If, watermark image to be hidden is bigger than the host image

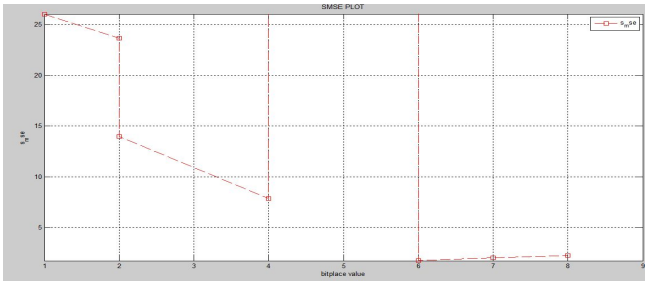
Graphical Result Analysis of Watermarked image



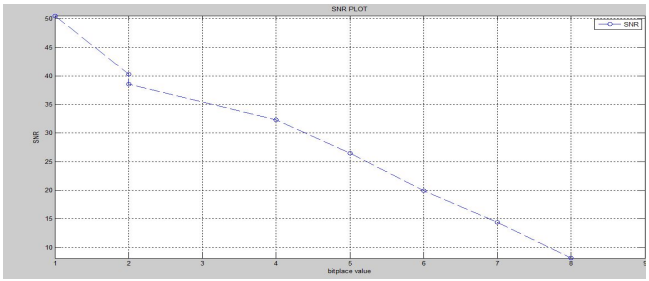
MSE of Watermarked image



PSNR of Watermarked Image

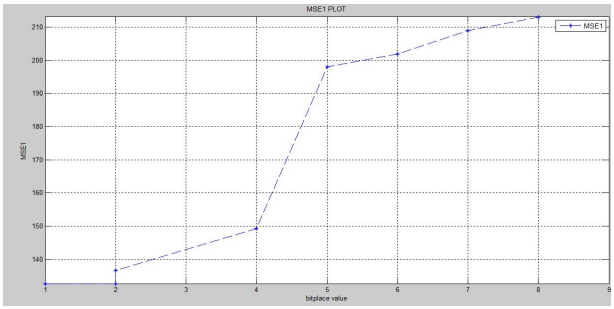


S_MSE of Watermarked Image

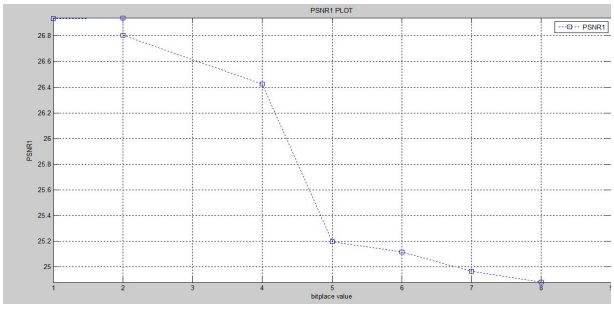


SNR of Watermarked Image

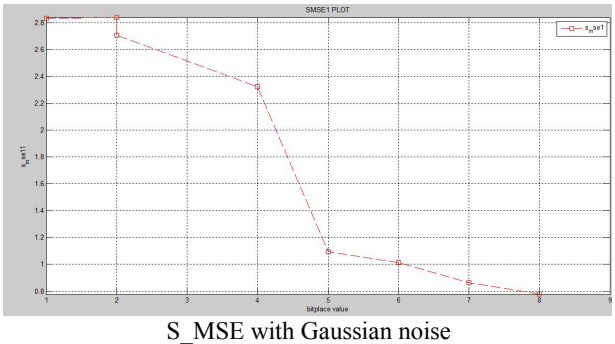
Graphical Result Analysis with Gaussian Noise



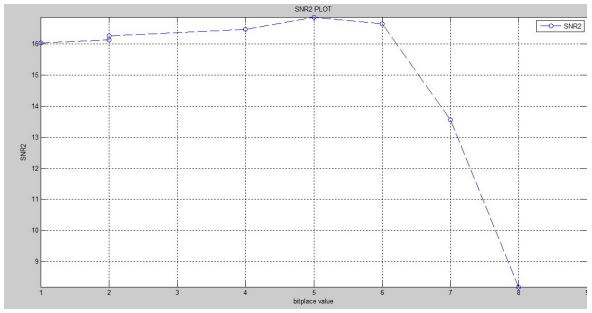
MSE with Gaussian noise



PSNR with Gaussian noise

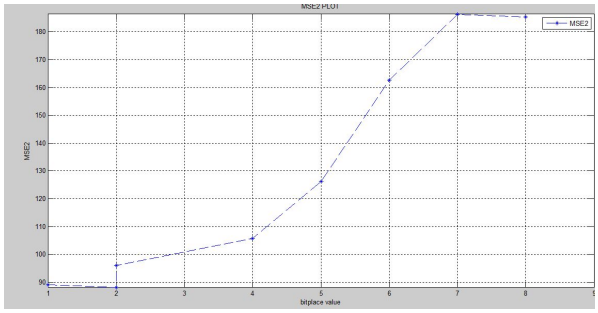


S_MSE with Gaussian noise

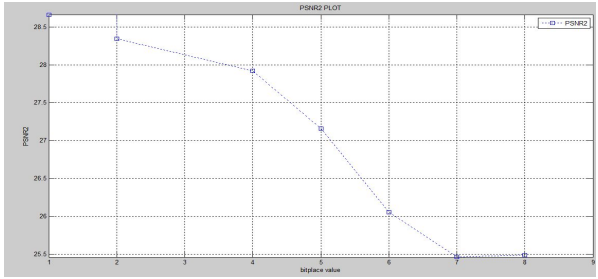


SNR with Gaussian noise

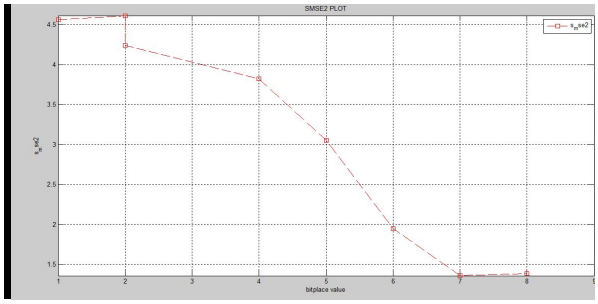
Graphical Result Analysis with Poisson Noise



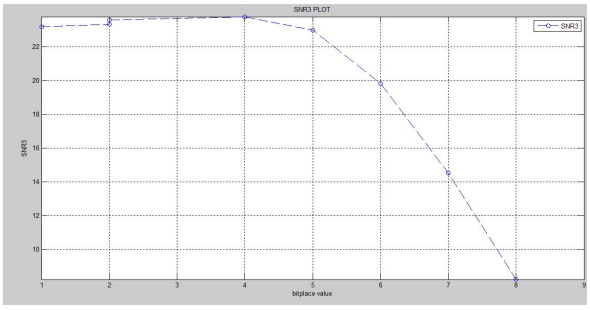
MSE with Poisson noise



PSNR with Poisson noise

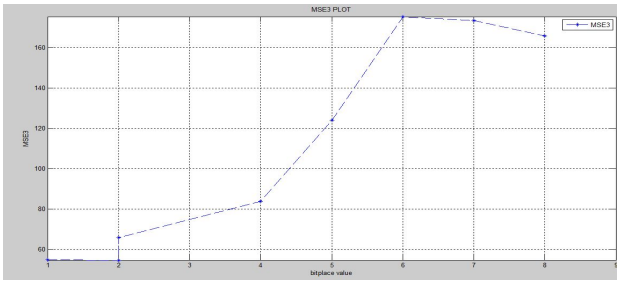


S_MSE with Poisson noise

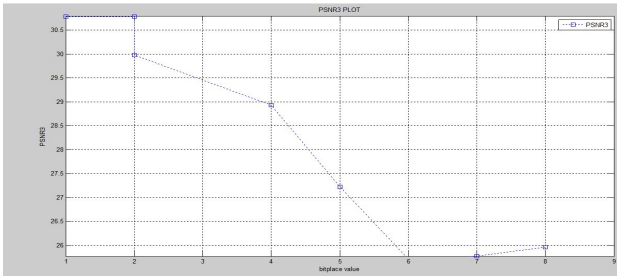


SNR with Poisson noise

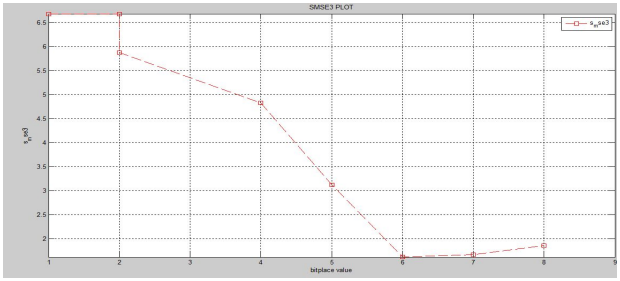
Graphical Result Analysis with Salt & Pepper Noise



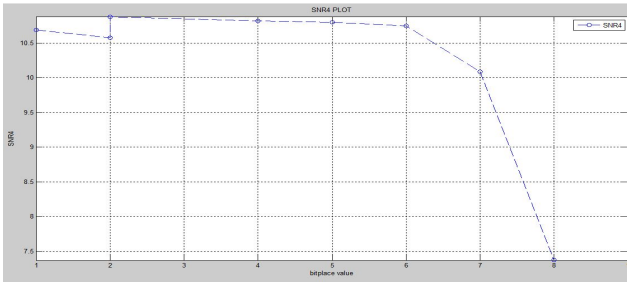
MSE with Salt & Pepper Noise



PSNR with Salt & Pepper Noise

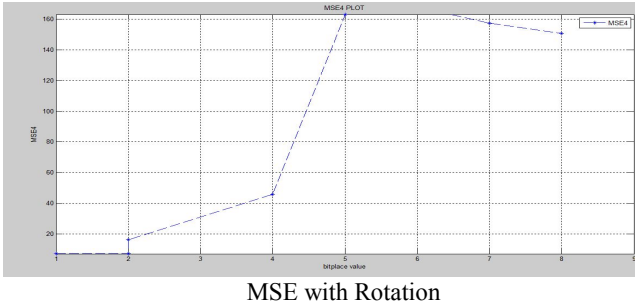


S_MSE with Salt & Pepper Noise

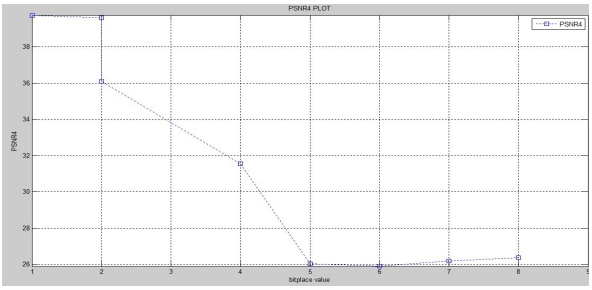


SNR with Salt & Pepper Noise

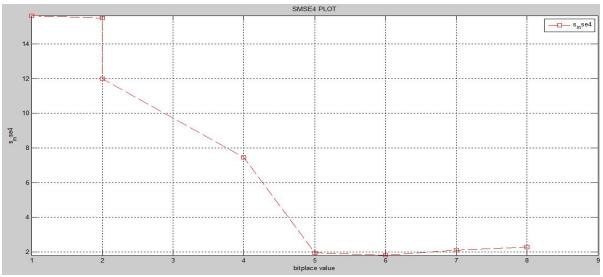
Gr Graphical Result Analysis with Salt & Pepper Noise



MSE with Rotation



PSNR with Rotation



S_MSE with Rotation

CONCLUSION

This paper evaluates the basic information about the digital watermarking technique describing the main stages the technique undergoes. The graphical result shown using the proposed LSB algorithm using MATLAB is more challenging to attacks on the watermarked image with the high-quality output image.

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