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# Digital Data Theft Detection Using Watermarking

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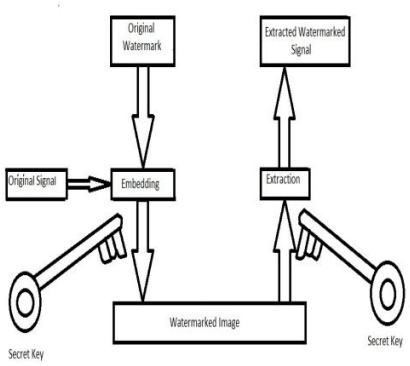
***Abstract— large amount of data is embedded in media and spread in the internet. This data can be replaced easily with the help of some software. Digital watermarking is a very useful technology in today's world, to prevent illegal copying of data. Digital watermarking can be applied to all forms of multimedia.***

***Keywords— Copyright protection, Digital Watermarking, Steganography, Information hiding, Robustness.***

## INTRODUCTION

In computer science information hiding or hiding data in a message is the important principle of steganography. Information hiding is mainly divided into three categories Cryptography, Steganography, and Watermark. Cryptography is the process of converting comprehensible data into unintelligible data that can't be able understand by unauthorized people. The authorized user with the key can decrypt the ciphertext. As many modifications were made in the field of multimedia and communications, now it became easy for the unauthorized users to decrypt a ciphertext into comprehensible data. Hence more complicated methods were developed to provide higher security than cryptography. These techniques are known as Steganography and Watermarking. Steganography is the time taking process. It hides data over a cover object in such a way that the sence of data is not detected by the hacker. Watermarking is related to the steganography. There is one main point in watermarking is that the invisible data is related to the cover object. Watermarking is mainly used for copyright protection, user authentication and security. Digital watermarking is the process of embedding a digital signal (audio, video or image) or hide a small digital data in comprehensible data which cannot be easily removed is called digital watermarking. Digital watermarking is also called data hiding.

*Watermarking block diagram*




Watermarking system is divided into three types embedding [1], attack and detection. In embedding technique an algorithm accept user and data as input to be embedded and implement the watermark signal. Then watermark signal is send to another host. If this person makes any changes to the watermark signal is called an attacking. There are various types of attack is possible on the watermarked signal. Detection is an algorithm which takes attacked data as input and Extract the watermark data from the attacked data

## II. TYPES OF DIGITAL WATERMAKING

There are two types of digital watermarking, they are

*A. Visible watermark*
*B. Invisible watermark*

A. *Visible watermark*- Visible watermark contains visible data or a band logo, used for the owner's identification. In visible watermarking, the watermark signal is visible in the picture, video or text.

Example- Logo of the channels such as Animal planet, SONY.. etc is on the right top corner of the television, it is visible


*Simple watermarked image*

*B. Invisible Watermark*- In invisible watermark the watermark data is not visible to user. The watermark is encoded in such a way that the watermark data is not visible to the unauthorized users (Attacker)[2]. Inivisible wayermarking is also used for the purposeof image identification and provide security to the image from being used by unauthorized users. Invisible watermarking also contains of encode and decode process.

Watermark insertion is represented as: O" = EU (A,W)

Where O is the original image, W is the watermark information being embedded, U is the user's insertion key, and E represents the watermark insertion function.

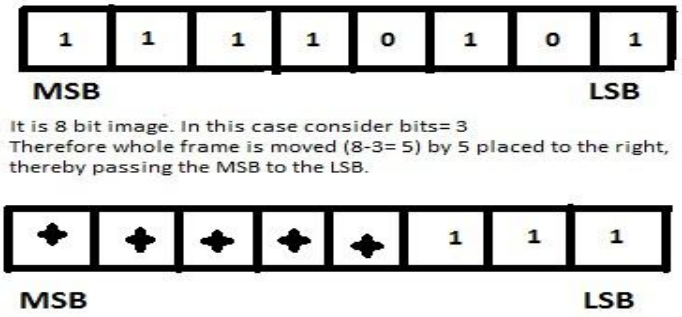
*Invisible Watermarking* [1] *(Least significant bit watermarking)*- Least significant bit watermarking is themost secured technique of watermarking. It also is applied to both visible and invisible watermarking. Spatial domain technique changes the pixels of one or two subset of the image.
*Let us see the one example on image watermarking process*

*Steps-*

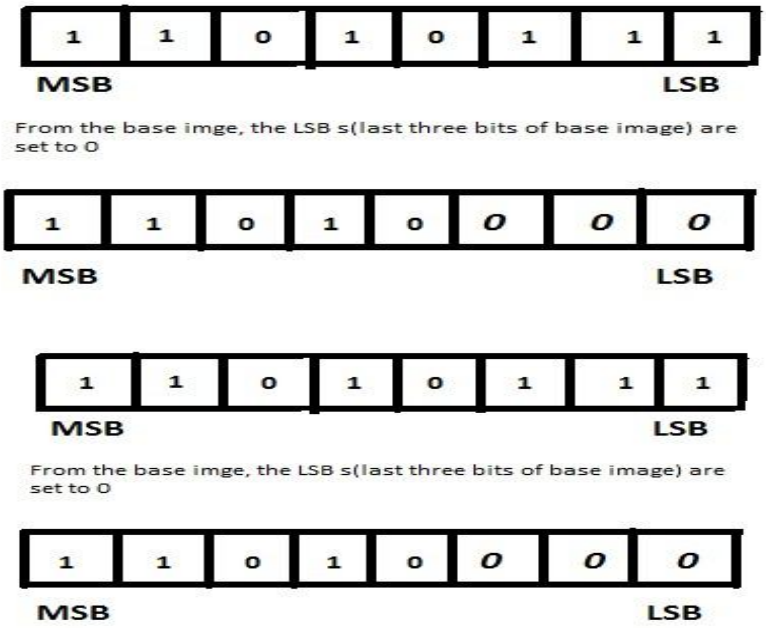
1) For the image testing standard images A and B will be selected. The base image or original image is A for which watermaking is added . The watermarking image is B that will be added to the original image A.
2) The least significant bits (LSB) of the original image A will replaced with the most significant bits(MSB) of the water marking Image B[2]
3)The resulting image that comes after the combination of both A and B images is Final image C will be watermarked image. Hence C contains an image A which LSB bits are replaced with the MSB of the image B. The original image and Watermarking image is taken in binary code form-

WatermarkImage=11110101
Base Image = 11010111

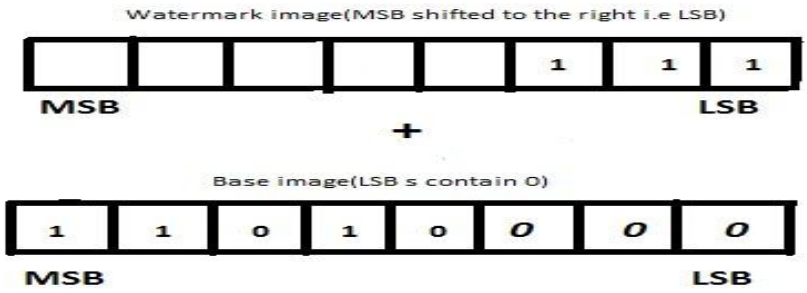
 




Base image=




Here the LSB of the original image is replaced with zeros and the MSB bits of the watermark image will be shifted to LSB bits



Final image=


The Final water marked image contains 5 MSB bits of original image and 3LSB bits of the water mark image

*Base Image*


*Watermark Image*

*Watermarked Image*


## III. REQUIREMENTS OF DIGITAL WATERMARKING

The requirements of digital watermarking are

A. *Transparency*- making the watermark image clear and transparent without effecting the quality of original image .
B. *Robustness*- This is one of the requirements of the watermarking .it means the watermark which is designed must be resistible to all kinds of attacks by the unauthorized users and hackers.
C. *Capacity*- it describes the amount of data that can be embedded into multimedia formats such as image, audio, video or text for retrieving the prefect data of watermark during extraction.

## IV. CONCLUSION

In this paper we describes about different types of watermarking and its techniques. There are two types of digital watermarking techniques they are visible and invisible watermarking techniques. It provides authentication for owners. Hence by using these watermaking techniques the data can be protected and stored from the unauthorized users.

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## VI. REFERENCES

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