SIMULATION OF MULTILAYERED WATERMARKING APPLICATION IN MATLAB

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ABSTRACT

Research has focused on water marking of graphical content at multiple layer in order to reduce the probability of security threat. This research paper focuses on introduction watermarking application and image processing in Matlab. Finally research paper has represented the simulation of water marking using MATLAB. The graphical contents have been watermarked at two level in proposed simulation. The GUI tool of Matlab has been used in order to perform implementation.

Keyword: Watermarking, Image processing, MATLAB, Stegnography, Image processing

1. INTRODUCTION

Today's generation is witness of developments of digital media. A very simplest example of digital media is a photo captured by phone camera. The use of Digital media is common in present era. Other example of Digital media is text, audio, video etc.

In recent years, the proliferation of digital media has established the need for the development of tools for the efficient access and retrieval of visual information. At the same time, watermarking has received significant attention due to its applications on the protection of intellectual property rights (IPR). However, many other applications can be conceived which involve information hiding.

Watermarking is also hiding information inside the content, however the purpose is different. This information should not be hided completely; it should be recoverable indicating the owner or the source of this carrier.

Historically, watermarks were identifiable images or pattern in paper that appear lighter, darker, or more transparently then other parts of the paper. These watermarks were made by impressing a water-coated metal stamp or dandy roll onto the paper during manufacturing. Watermarks were first introduced in Bologna, Italy in 1282; they have been used by papermakers to identify their product, and also on postage stamps, currency, and other government documents to discourage counterfeiting. Therefore, as we can see, the watermarking is sort of steganography which is not completely concealed but could be recovered for demand and identify the owner.

II. Watermarking applications

The increasing amount of research on watermarking over the past decade has been largely driven by its important applications in digital copyrights management and protection. One of the first applications for watermarking was broadcast monitoring. It is often crucially important that we are able to track when a specific

video is being broadcast by a TV station. This is important to advertising agencies that want to ensure that their commercials are getting the air time they paid for. Watermarking can be used for this purpose. Information used to identify individual videos could be embedded in the videos themselves using watermarking, making broadcast monitoring easier. Another very important application is owner identification. Being able to identify the owner of a specific digital work of art, such as a video or image can be quite difficult. Nevertheless, it is a very important task, especially in cases related to copyright infringement. So, instead of including copyright notices with every image or song, we could use watermarking to embed the copyright in the image or the song itself. Transaction tracking is another interesting application of watermarking. In this case the watermark embedded in a digital work can be used to record one or more transactions taking place in the history of a copy of this work. For example, watermarking could be used to record the recipient of every legal copy of a movie by embedding a different watermark in each copy. If the movie is then leaked to the Internet, the movie producers could identify which recipient of the movie was the source of the leak.

III. LITERATURE REVIEW

There are several researches in the field of image processing with watermarking .Some have been listed below:

In 2015, Zihao Xiao et.al [1] wrote a robust and encrypted digital image watermarking method against print-scan. In this paper, a new method combining zero watermarking, blind watermarking and Arnold scrambling is proposed. The zero-watermarking algorithm in DCT low-frequency region avoids the limitation of watermarking capacity to a certain extent.

In 2017, Mahsa Boreiry et.al [2] wrote Classification of watermarking methods based on watermarking approaches. Many methods have been proposed in the field of video watermarking that are resistant to certain attacks, therefore some attacks can break the watermark. In 2012, Maria Chroni et.al [3] presented an embedding graph-based model for software watermarking.In this paper we first present an efficient codec system for encoding a watermark number w as a reducible permutation graph $F[\pi*]$ through the use of the self-inverting permutation $\pi*$ which encodes the number. In 2017, Lizhong Zhang et.al [4] wrote Relational databases watermarking for textual and numerical data. Experiments show that even the database suffers from approximately 70% of addition, alteration and deletion attacks, our method can achieve above 95% extraction rate of watermark. In 2014, Ziquan Hu et.al [5] presented Game theory based false negative probability of embedded watermark under unintentional and steganalysis attacks.The experimental results show that watermark detection reliability measured using our proposed method, in comparison, can better reflect the real scenario in which the embedded watermark undergoes unintentional attack and the attacker using steganalysis attack. In 2011, Xianzhen Jin et.al [6] wrote A digital watermarking algorithm based on wavelet transform and singular value segmentation of the watermark image. In 2014, PratikChavada et.al [8] wrote Region of Interest Based Image Compression. In 2015, Ali Tariq Bhatti et.al [9] presented Implementation of Lossless Huffman Coding: Image compression using K-Means algorithm & comparison vs. Random numbers & Message. In 2015,

MalwinderKaur et.al [10] presented A Literature Survey On Lossless Image Compression. They provided an overview of various existing coding standards lossless image compression techniques.

IV. TOOLS AND TECHNOLOGY

Hardware & software Requirement

Hardware Specification

1. CPU (1 Ghz & above)
2. Ram (2 GB)
3. Harddisk (10 gb free space)
4. High resolution Monitor

Software Requirement

1. Windows 7/8
2. Matlab

In order to perform task MATLAB is taken as simulation tool. MATLAB is known as language of technical computing. This is considered as a high-stage language with interactive atmosphere. MATLAB allows us to achieve computationally missions quicker as compared to other programming languages like PASCAL, C, COBOL, C++ & FORTRAN.

Matrix is known as rectangular numbers array in MATLAB environment. Its Meaning is attached to 1x1 matrices. The MATLAB has various mechanisms to store numeric & non-numeric data. It is best to consider whole thing as a matrix in beginning. Operations in MATLAB have been designed to be natural. Programming languages other than MATLAB perform task with numbers one on a time but MATLAB offers to run with complete matrices very rapidly & easily.

CHARACTERISTICS OF MATLAB

MATLAB is easiest & most productive software for engineers & scientists. There are several characteristics of MATLAB that are as follows:-

1. It is a High level language in order to perform technical computing.
2. It is having development environment to manage code, data & files.
3. MATLAB allows analysis of parameter in case of various routing schemes in case of wireless sensor netperform task.
4. This has interactive gears for various purposes such as iterative exploration, design & to solve problem.
5. MATLAB consist of Fourier analysis, filtering, optimization, Mathematical functions for linear algebra, statistics, & numerical integration.

6. Several wireless sensor netperform task researches have used MATLAB for simulation.

7. The two dimensional & three dimensional graphics functions have been used to visualize data.

8. MATLAB also provided tool to perform automated testing using automation tools such as ML Unit.

9. MATLAB is a gear to build custom, graphical & user interfaces.

10. There are many functions to integrate MATLAB algorithm that have outer applications with programming languages like PASCAL, C, COBOL, C++ & Fortran.

V. RESULT AND DISCUSSION

Design view of water marking application

The Design view of multilayered water marking application has been discussed below. Here the image is loaded in axes1. The key image for water mark is loaded in axes 2. The image is watermarked here at level 1. Then the axes 3 is loaded by second key to encode watermarked image at second layer. The encoded image is saved to the disk.
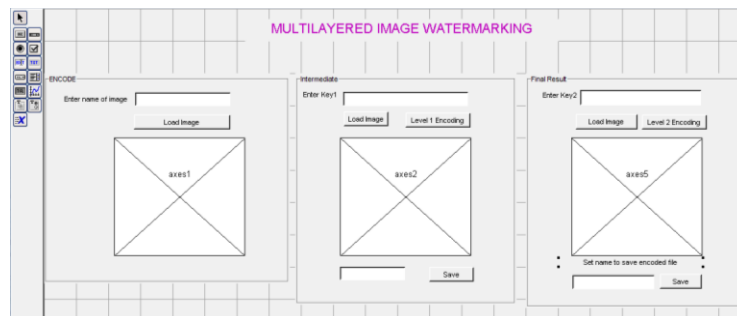
Fig 1 Multilayered image watermarking Design

The name of image is set to load image at initial level.
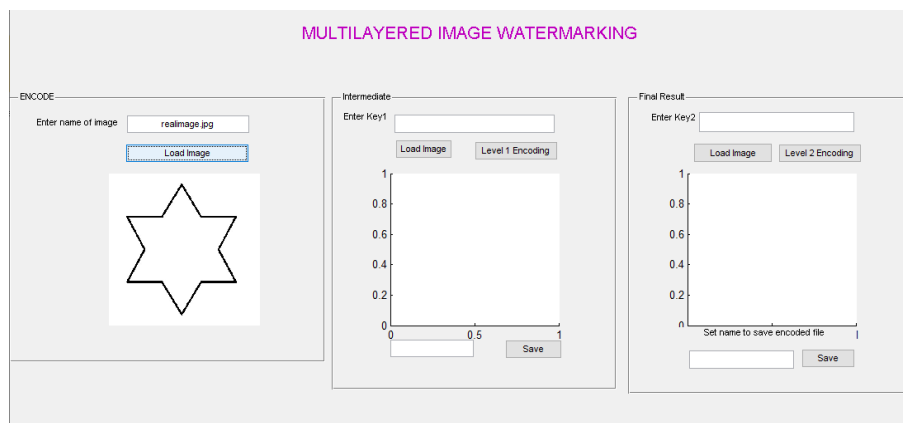
Fig 2 Image Loading

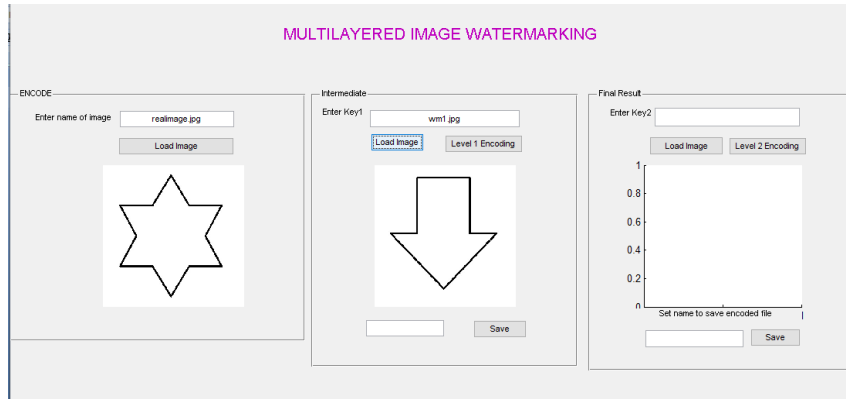**In next step the key1 is set for water marking.**

Fig 3 Loading Key1 for Encoding

Following window appears when level1 encoding is done.
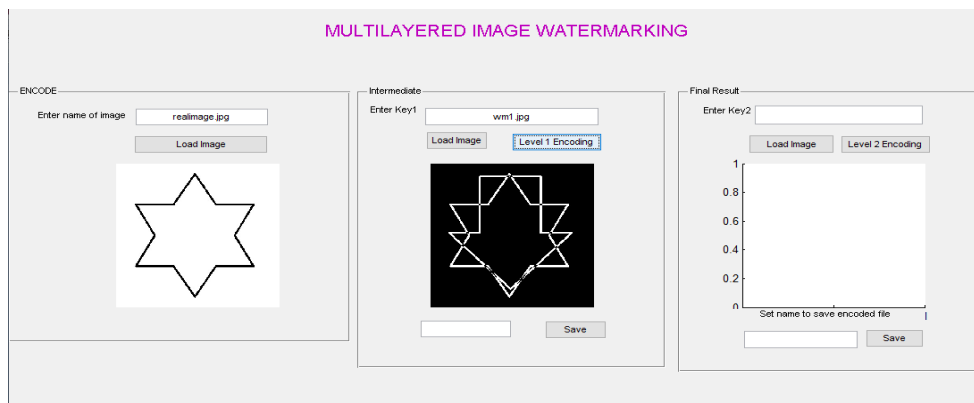

Fig 4 Encoding at level 1

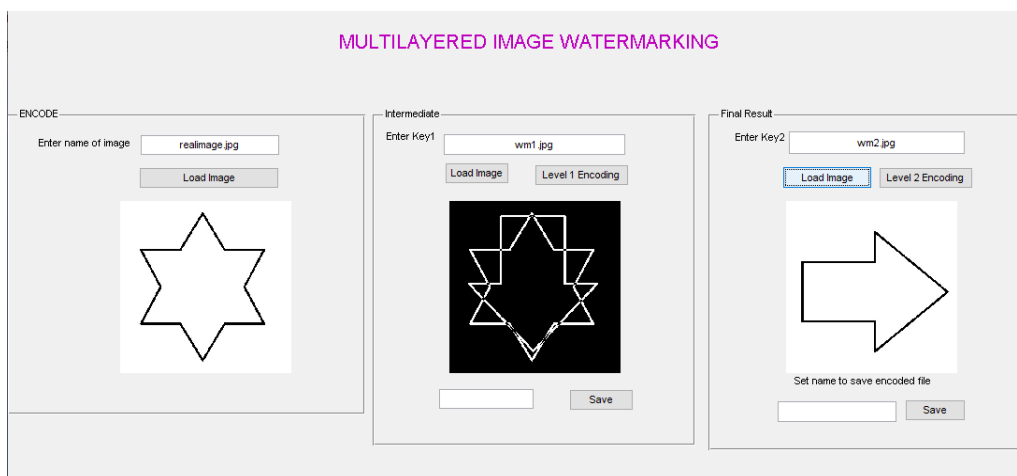**In next phase the encoding has to be performed at level 2 so key 2 is loaded.**

Fig 5 Loading Key 2 for encoding at level 2

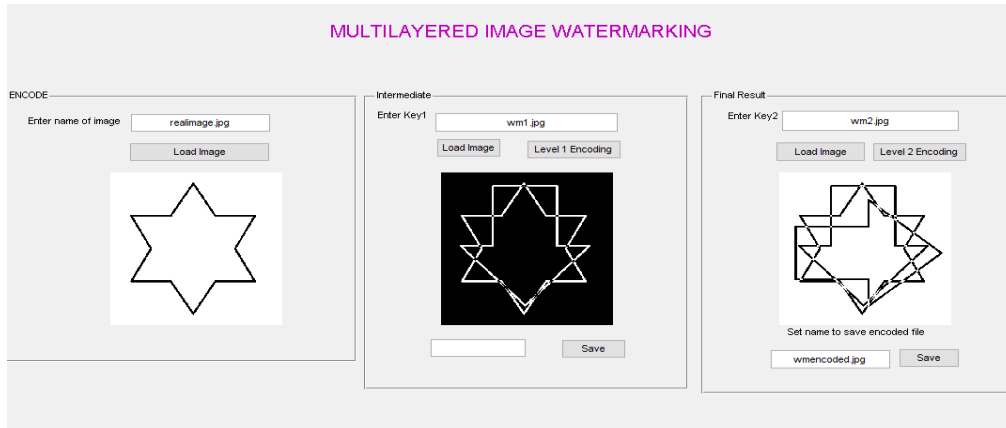**Following result are displayed when encoding at level 2 is performed.**

Fig 6 Performing Level2 encoding

If user save the encoded image it is saved in the local watermark directory as shown in following figure.
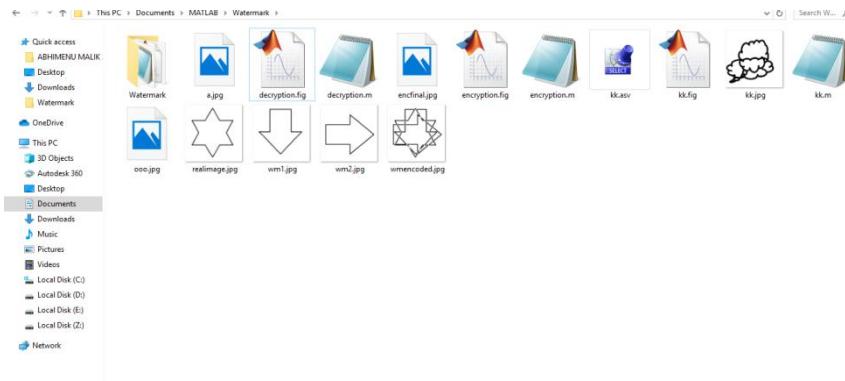

Fig 7 Saved Water mark image

In order to decode the watermark image the water mark decoding application has been developed. The encoded image is loaded here.
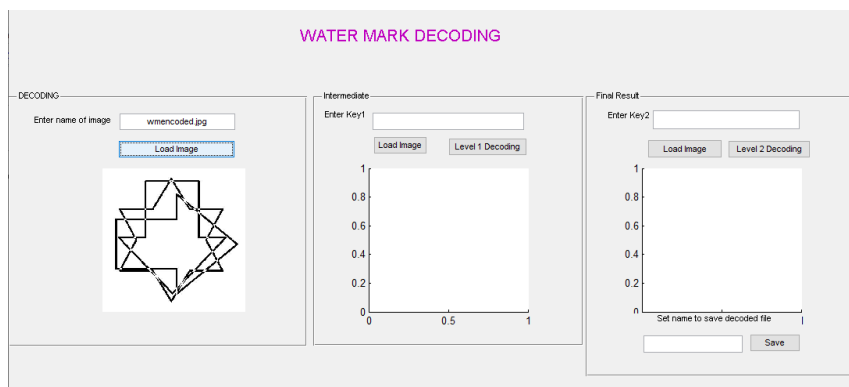

Fig 8 Loading image for decoding

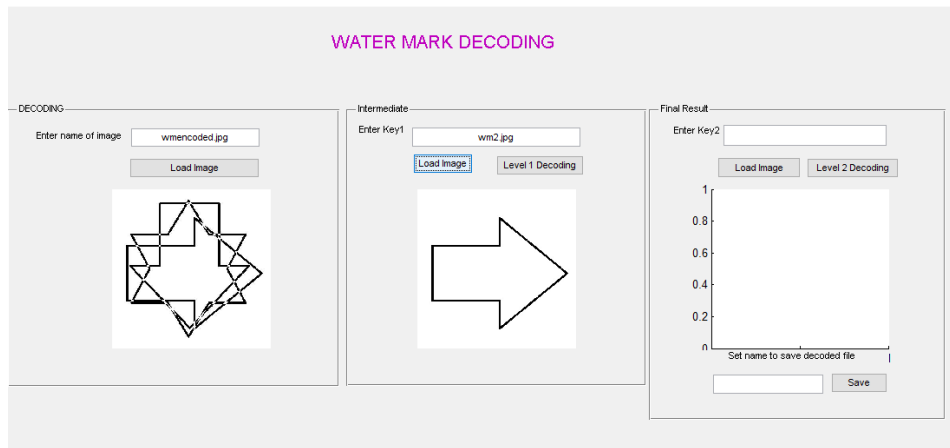**Then the key2 to decode watermark at level 1 is loaded.**

Fig 9 Loading key1 for decoding

When decoding operation is performed then following window appears. Image decoding at level 1 is same as image encoding at level1.
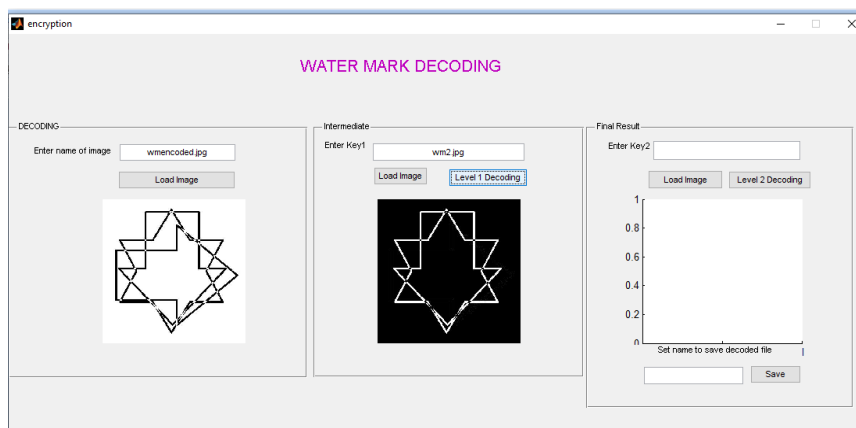

Fig 10 Image decoding at level 1

Following window represents the loading of key2 for level2 decoding
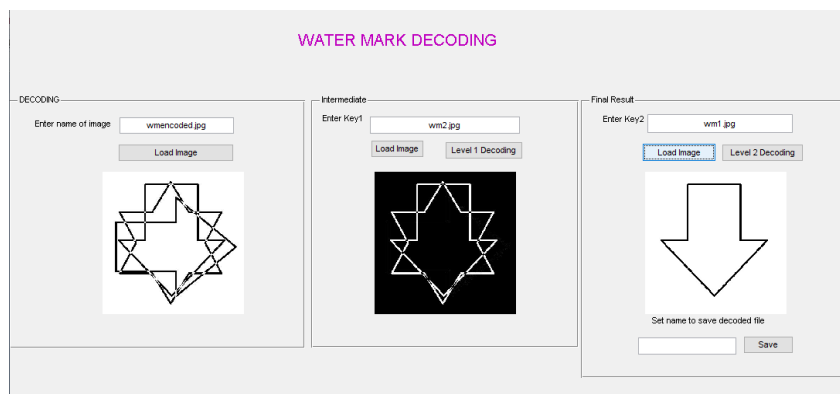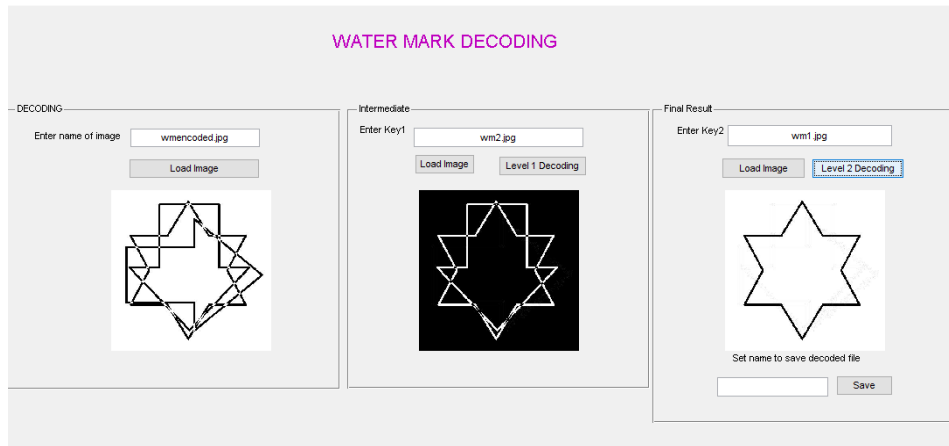

Fig 11 Loading key2 for decoding

When decoding operation is performed then following window appears. The original image is restored after decoding.

Fig 12 Image after decoding

VI. CONCLUSION

Watermarking is a very active research field with a lot of applications. Although it is a relatively new field, it has produced important algorithms for hiding messages into digital signals. These can be described by many different models. Two broad categories for these models were described in this essay. These are communication-based models and geometric models. Communication-based models can be further divided into those which use side-information and those that don't. One example system was used to illustrate non-side-information models, and two example systems were used to illustrate side-information models. Each of these systems has its advantages and disadvantages, and each one trades some important watermarking property for another. The choice of which to use relies on the underlying application's requirements.

Of course the examples provided in this essay are only a small sample of the many different approaches to watermarking. Examples of other approaches that have not been mentioned include those which operate in the frequency domain and take advantage of DCT coefficient and wavelet coefficients.

VII. FUTURE SCOPE

The research work would be beneficial to provide the study the existing researches in the field of watermarking in image processing. It would analyze the loopholes of existing researches related to watermarking in image processing. The research work would offer the research work related to watermarking in image processing. This research would explain the watermarking technology more fundamentally. Finally the images with watermarks embedded have been tested and then the features and quality of embedded watermarks are analyzed. The surviving abilities of watermarks are verified and the description of the testing process and results are given.

REFERENCES

[1] Z. Xiao and C. Feng, "A Robust and Encrypted Digital Image Watermarking Method Against Print-scan," pp. 696–700, 2015.

[2] M. Boreiry and M. Keyvanpour, "Classification of Watermarking Methods Based on Watermarking Approaches," pp. 73–76, 2017.

[3] M. Chroni and S. D. Nikolopoulos, "An Embedding Graph-based Model for Software Watermarking," 2012.

[4] L. Zhang, W. Gao, N. Jiang, L. Zhang, and Y. Zhang, "Relational Databases Watermarking for textual and numerical data," pp. 1633–1636, 2011.

[5] H. U. Ziquan, S. H. E. Kun, W. Jianghua, and T. Jianguo, "Game Theory Based False Negative Probability of Embedded Watermark Under Unintentional and Steganalysis Attacks," pp. 114–123.

[6] J. I. N. Xianzhen and F. Zhilin, "A Digital Watermarking Algorithm Based on Wavelet Transform and Singular Value Segmentation of the Watermark Image," pp. 2327–2330, 2011.

[7] G. Voyatzis, N. Nikolaidis, and I. Pitas, "DIGITAL WATERMARKING : AN OVERVIEW."

[8] I. Engineering, "in wavelet domain," pp. 209–211, 2011.

[9] N. V. Assistant, K. S. Assistant, and C. S. Kumar, "Invisible Watermarking In Printed Images," 2016.

[10] C. Lu and C. Hsu, "Near-Optimal Watermark Estimation and Its Countermeasure : Antidisclosure Watermark for Multiple Watermark Embedding," vol. 17, no. 4, pp. 454–467, 2007.