Audio Watermarking using LSB Coding

Saideep Dicholkar, Adil Khatri, and Chandan Choudhary

Abstract—**Watermarking is a technique, which allows an individual to add hidden copyright notices or other verification messages to digital audio, video, or image signals and documents. In our proposal, for Audio Watermarking, a Watermark is encrypted using Pseudorandom Generator and is embedded on the audio file using LSB technique. Here, in audio watermarking we have embedded the encrypted watermark on the audio file, due to which removal of the watermark becomes least probable. This would give the technique a very high robustness. In the retrieval, the embedded watermark is retrieved and then decrypted. This method combines the robustness of Transform domain and simplicity of spatial domain methods.**

I. INTRODUCTION

Digital watermarking is a technology, which allows a secret message or private information to be hidden in a computer file, without the detection of the user. The watermark is not apparent to the user, and does not affect in any way, the use of the original file. Watermark information is predominantly used to identify the creator of a digital file, i.e. a picture, a song, or text. In digital watermarking an imperceptible signal "mark" is embedded into the host image, which uniquely identifies the ownership. After embedding the watermark, there should be no perceptual degradation. These watermarks should not be removable by unauthorized person and should be robust against intentional and unintentional attacks or illegal use without the proper permissions.

II. AUDIO WATERMARKING

Digital audio watermarking involves the concealment of data within a discrete audio file. Applications for this technology are numerous. Intellectual property protection is currently the main driving force behind research in this area. To combat online music piracy, a digital watermark could be added to all recording prior to release, signifying not only the author of the work, but the user who has purchased a legitimate copy. Messages encrypted with the secret key can only be decrypted using the secret key.

III. LSB TECHNIQUE

The most straightforward method of watermark embedding would be to embed the watermark into the least significant bits of the cover object. Given the extraordinarily high channel capacity of using the entire cover for transmission in this method, a smaller object may be embedded multiple times. This technique is a spatial domain Watermarking technique. The embedding of the watermark is performed choosing a subset of audio file and substituting the least significant bit of the chosen file with watermark bits. Extraction of the watermark

Saideep Dicholkar, Adil Khatri, Chandan Choudhary are with Computer Engineering, D.J. Sanghvi College of Engineering

is performed by extracting the least significant bit of each of the selected audio file. If the extracted bits match the inserted bits, then the watermark is detected. The implementation of this algorithm is quite simple. Using the Least Significant Bit manipulation, a huge amount of information can be hidden with very little to negligible impact to audio quality.

IV. DATA EMBEDDING

On the embedding side, the Audio file and the text file are selected. The Text file is encrypted using Pseudorandom Number Generator. The Encrypted Text file is embedded on to the audio file using LSB technique, thus creating the watermarked Audio file.
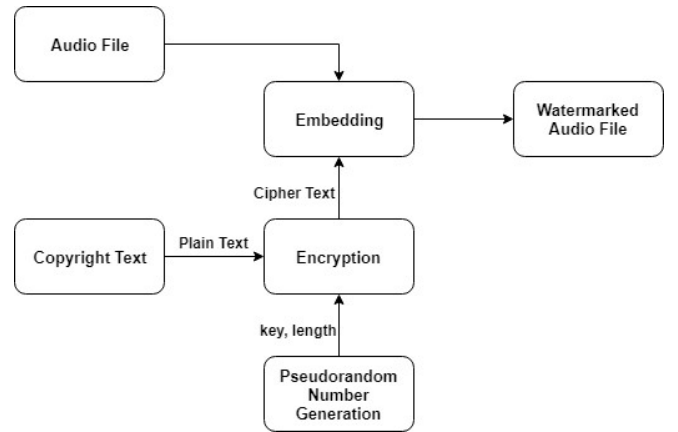

Fig. 1. Embedding and Encryption

V. DATA EXTRACTION

In the extraction part, the cipher text, which was embedded in the audio, is retrieved using LSB Technique. Then the cipher text is decrypted to plain text using Pseudorandom Number Generator. And, thus the original Text file used for the Watermarking is retrieved. If the retrieved Text file matches the original Text file, then we can say that the received Audio file is original without any modifications.
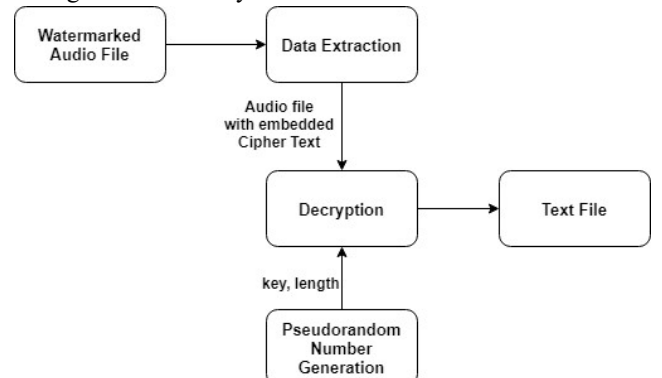

Fig. 2. Extraction and Decryption

VI. Conclusion

Thus, Audio Watermarking using LSB Technique and Encryption designed to overcome the vulnerability of spatial domain technique. Digital watermarking is an exciting new field: It is exciting for researchers as it is a new field and there is an opportunity to do pioneering work. It is exciting for entertainment companies, museums and libraries because it offers the promise of better protecting their multimedia content from piracy. It is exciting for consumers because better multimedia protection could lead to cheaper, better, and more freely available entertainment and educational materials. Few watermarking techniques have been tested by talented and well-motivated attackers while other techniques exhibit greater (but differing) degree of effectiveness in resisting attacks. With the increasing use of internet, effortless copying, tempering and distribution of digital data, and shrewd attackers watermarking will always be a growing field.

VII. References

https://en.wikipedia.org/wiki/Audio_watermark
https://ieeexplore.ieee.org/document/7955379
https://ieeexplore.ieee.org/document/5381136/

Michael Arnold, Stephen D. Wolthusen, "Techniques and Applications of Digital Watermarking and Content Protection", Artech House Publishers, July 2003.