

A NOVEL TEXT WATERMARKING ALGORITHM USING IMAGE WATERMARK

ZUNERA JALIL, M. ARFAN JAFFAR AND ANWAR M. MIRZA

Department of Computer Science
FAST National University of Computer and Emerging Sciences
A. K. Barohi Road, H-11/4, Islamabad, Pakistan
{ Zunera.jalil; arfan.jaffar; anwar.m.mirza }@nu.edu.pk

Received October 2009; revised February 2010

ABSTRACT. *Authentication and copyright protection of information contents has always been a concern in print media. The problem has become more critical with the increasing use of the Internet and digital technologies. Besides image, audio and video, the text is most extensively used medium travelling over the Internet. Digital libraries offer a quick and easy access to information such as e-books, archives, images, etc. However, making the protection of copyright is more complex and difficult. Increasing use of digital libraries, blogs and electronic commerce has made it necessary to protect digital contents. Digital watermarking came up as a solution for copyright protection problem. In this paper, we propose a novel text watermarking algorithm, which embeds the watermark image in the text (to be protected) logically using embedding algorithm and extract it later using the extraction algorithm. Experimental results demonstrate the effectiveness of the algorithm proposed in localized and dispersed attacks on the text. Objective evaluation methods like Normalized Hamming Distances (NHD), Peak-Signal-to-Noise-Ratio (PSNR), Weighted Peak-Signal-to-Noise-Ratio (WPSNR), Mean Structural Similarity Index Measures (MSSIM) and Normalized Absolute Error (NAE) metrics are used to measure the quality and similarity between original and extracted watermark images.*

Keywords: Digital watermarking, Information security, Image watermark, Document authentication, Copyright protection

1. Introduction. Copyright protection, piracy, steganography, watermarking and encryptions are certain terms used frequently in the digital world. The use of the Internet, e-commerce and digital libraries, mobile phones, iPods; has made the dissemination of information fast and easy [26]. However, it has become increasingly difficult to handle security, privacy and copyright protection issues of digital contents. Digital contents mostly comprises of text, image [23], audio, videos and software programs. Authentication and Copyright protection of image [25], audio, software and video has been given due to consideration by researchers in the past; however, the amount of work done to protect text is very scare. Text is the most essential and dominant part of websites, e-books, newspapers, articles, legal documents, reports and journals; but its protection has been seriously ignored. The threats of electronic publishing like illegal copying and re-distribution of copyrighted material, plagiarism and other forms of copyright violations need to be explicitly addressed [7], particularly for plain text.

Copyright protection of digital content, especially text, is such a need of time that cannot be neglected. Digital watermarking is one of the solutions for copyright protection and authentication of text documents and the amount of work done for watermarking of plain text is very insufficient. Digital Watermarking methods identify the original copyright owner(s) of the information contents. A digital watermark can be described