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A PROJECT REPORT ON

CONTENT AUTHENTICATION OF DIGITAL IMAGES USING FRAGILE AND SEMI-FRAGILE WATERMARKING

Sponsored by K.S.C.S.T and submitted to Visvesvaraya Technological University in partial fulfillment of the requirement for the award of Bachelor of Engineering degree in Computer Science and Engineering.

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Abstract

The past few years have witnessed an increasing use of digitally stored information. The digital image is easy to edit, modify and exploit and at the same time, image editing programs are becoming more powerful so that even an amateur can maliciously modify digital images and create perfect forgeries without leaving any trace on the original image. Techniques to establish the authenticity and integrity of digital images are essential. Especially, when the work content is used for the content sensitive fields such as photojournalism, courtroom evidence, medical applications, or commercial transaction, the originator of the content has to be verified while ensuring the content has not been changed, manipulated or falsified. This kind of authentication is called "exact" authentication. On the other hand, some applications do not need exact authentication and only require some selective places in the work to be authenticated. Such authentication is termed as "selective" authentication, which distinguishes between malicious and non-malicious attacks.

In this project, a content authentication system has been designed and implemented that provides both "selective" and "exact" authentication. A secure fragile watermarking algorithm has been implemented that provides higher fragility and fidelity. A secure hash is generated from each block of the image using Hash Block Chaining Version-2 (HBC2) algorithm and inserted in that block using CPT based data hiding technique. To provide the "selective" authentication, a semi-fragile watermarking technique based on eigen values and eigen vectors of real symmetric matrix generated by the pair of four pixels has been implemented. A signature bit for detecting malicious tampering on an image is generated using dominant eigen vector.

The content authentication system has been implemented using MATLAB. Experimental results show that the fragile watermarking system possesses a high data payload and high transparency, when compared to existing algorithms. Attack analysis ensures the high fragility of the system. The results of the semi-fragile watermarking system show that this algorithm can resist JPEG compression avoid malicious attacks and detect malicious tampering correctly. This algorithm has been compared with existing algorithms and results show the greater robustness capability. A user friendly tool that provides GUI to operate both the authentication systems has been implemented.