

Reversible Watermarking Techniques for Image-Based Authentication

Atharv Kulkarni¹, Pravin Amate², Rushikesh Alkunte³

Student, Department of Computer Engineering¹²³⁴

Dept. of Computer Engineering⁵

Adsul's Technical Campus, Chas, Ahilyanagar, Maharashtra, India

Abstract: *This paper presents a reversible data hiding (RDH) technique integrated with image-based authentication to enhance secure image transmission in open and untrusted networks. Unlike conventional steganography and watermarking methods that often distort the cover image permanently, the proposed RDH approach enables perfect recovery of both the embedded data and the original image. The system employs histogram shifting for reversible embedding and utilizes an authentication image to generate a unique encrypted signature that restricts data extraction to authorized users only. Experimental evaluation demonstrates high Peak Signal-to-Noise Ratio (PSNR), zero Mean Square Error (MSE), and strong resistance to unauthorized access. The results confirm that the combination of RDH and image-based authentication provides a lossless, robust, and efficient solution for secure multimedia communication*

Keywords: Reversible Data Hiding (RDH), Image-Based Authentication, Histogram Shifting, Secure Data Transmission, Steganography, Feature Hashing, Image Security, PSNR, Lossless Recovery, Data Embedding Techniques

