

126. A SECURE WATERMARK DETECTION AND PRIVACY PRESERVING STORAGE BASED ON COMPRESSIVE SENSING

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Privacy is a critical issue when the data owners outsource data storage or processing to a third party computing service, such as the cloud. In this paper, we identify a cloud computing application scenario that requires simultaneously performing secure watermark detection and privacy preserving multimedia data storage. We then propose a compressive sensing (CS)-based framework using secure multiparty computation (MPC) protocols to address such a requirement. In our framework, the multimedia data and secret watermark pattern are presented to the cloud for secure watermark detection in a CS domain to protect the privacy. During CS transformation, the privacy of the CS matrix and the watermark pattern is protected by the MPC protocols under the semi-honest security model. We derive the expected watermark detection performance in the CS domain, given the target image, watermark pattern, and the size of the CS matrix (but without the CS matrix itself). The correctness of the derived performance has been validated by our experiments. Our theoretical analysis and experimental results show that secure watermark detection in the CS domain is feasible. Our framework can also be extended to other collaborative secure signal processing and data-mining applications in the cloud.

Journal of Science and Innovative Engineering & Technology