

AUTHENTICATION OF IMAGES BASED UPON RESTRICTED GEOMETRIC TRANSFORMATION

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ABSTRACT

A secure, keyless authentication strategy for images is proposed based on restricted geometric transformations. In contrast with conventional digital watermarking techniques where geometric transformations on the contents of an image are considered undesirable, the proposed WaQI scheme utilizes the restricted variants (of the quantum versions) of these transformations as the main resources of the watermark embedding and authentication circuits. This is accomplished by a careful analysis of the classical content of the image–watermark pair, based on which a bespoke watermark map that translates into the gate sequences of the quantum watermark embedding and authentication circuits is realized. Simulation-based experimental results involving the classical (i.e. conventional or non-quantum) simulation of the input images, watermark signals, and quantum circuits yielded a 25% improvement in terms of overall watermark-embedding capacity and between 7% and 50.7% in terms of the visible quality of the watermarked images in comparison with select digital watermarking methods for various pairs, thus, demonstrating both the feasibility and capabilities of the proposed WaQI scheme when the necessary quantum hardware are realized physically. This strategy work for more that single quantum data and open the door for other applications, those support quantum data.

KEYWORDS: Quantum Image, Authentication, Geometric Transformation, Watermarking, Watermarking Circuit