Multilevel Authentication Employing Watermarking based on QR Codes, Mobile OTP, and Hadamard Transformation

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Abstract: *High-speed internet technology has made it possible for users to transact with banks more quickly thanks to online banking services. The increased connectivity also creates numerous online security holes like phishing and pharming. By confirming the user's legitimacy, this mobile banking problem may be resolved. Here, we suggest a hybrid system that makes use of QR codes, One-Time Passwords (OTPs), and digital watermarking—a method of data concealment. The bank generates QR codes using OTP as the key to the watermark sequence. Here, OTP can be utilised for the initial authentication verification. The sequence for the second level of verification is concealed throughout the watermarking process using the Hadamard transformation. Online transactions may be made with maximum security thanks to the OTP and watermark combination. One benefit of this strategy is that the QR code may be created within a limited design window with a suitable real-time extraction method. Performance may be assessed by utilising an android application, including the real-time extraction using a mobile device.*

Keywords: In OTP, Hadamard transformation, QR code, digital watermarking, and Hamming distance

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