

DIGITAL WATERMARKING SCHEME FOR QR CODE SECURITY

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Product Background



- QR code image digital watermarking with tamper localization and exact recovery using multi-level authentication.
- Automated calculation of watermark detection result and better visualization of tamper detection and QR code image recovery results.

Novelty/ Originality/ Inventiveness

- Watermark Embedding
- Tamper Discovery
- QR Code Image Authentication
- Watermark Extraction
- Recovery and Restoration

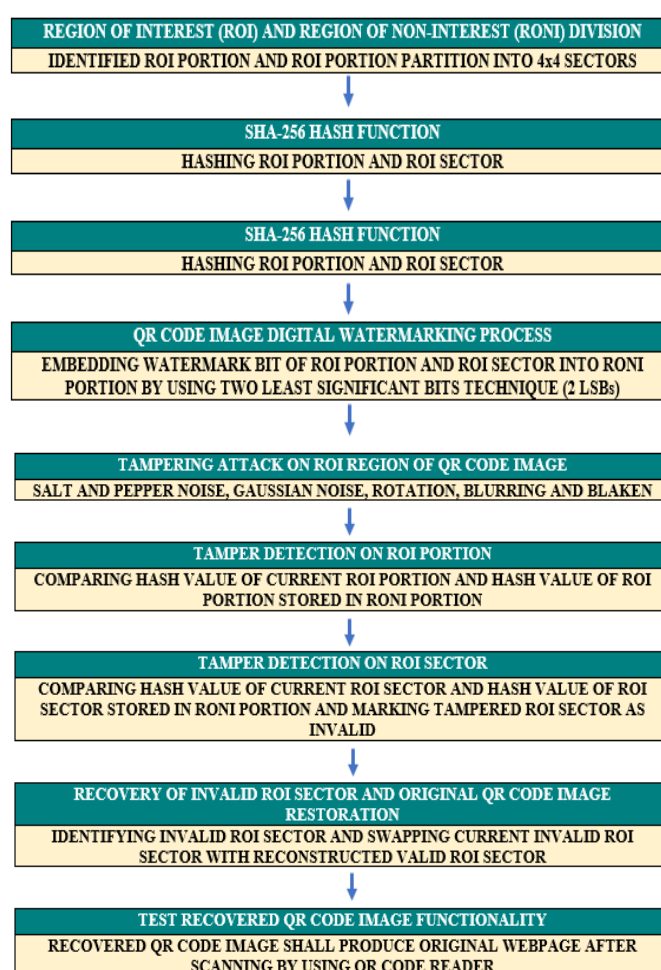
Benefits/Usefulness/ Applicability

- Protect the integrity of information stored in QR code image.
- Preserve the quality, scanning and decoding functionality of QR code image.

Objective

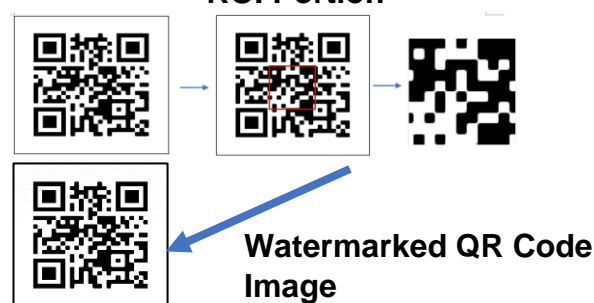
- To study current watermarking technique for strengthening QR code image authentication and security.
- To propose the tamper localization, embedding and recovery theory of digital watermarking scheme on protecting QR code image integrity.
- To evaluate the appropriate image processing watermark technology concept on QR code image without damaging the original quality of the QR code content for future work.

Methodology



Result

Original QR Code Image With Marked ROI Portion



Tamper Detection And Recovery

Input QR Code Image	Elapsed Time Of Watermarking Process (second/s)	PSNR	MSE	Total Size Of RONI Used For Embedding (pixel)	Image Data Size Before Embedding Watermark (KB)	Image Data Size After Embedding Watermark (KB)
Sample 1	0.3594	47.3204	1.2051	33152	1.91	5.64
Sample 2	0.3438	46.6528	1.4054	33152	1.87	5.65
Sample 3	0.2813	46.9274	1.3193	33152	1.89	5.49
Sample 4	0.4531	47.1845	1.2435	33152	1.86	5.52
Sample 5	0.5313	46.5039	1.4544	33152	1.85	5.55
Average	0.3938	46.9178	1.3255	33152	1.88	5.57

Problem Statement

- Challenge faced in protecting the confidentiality and integrity of information stored in QR code image from publics.
- Copyright infringements of QR code image can be easily conducted by unauthorized parties leading to counterfeiting problem.
- Spoiled QR code and illegal manipulation of QR code alteration information may occur to produce QR code malfunction.

Scope

- The type of digital media used is image only.
- Programming language that focuses on the watermarking scheme and recovery on QR code image experiment.
- Exploration of the method used in watermarking for QR code by listing out the concept and term.

Conclusion

QR code image digital watermarking can

- protect the integrity of information stored in QR code image,
- preserve the quality, scanning and decoding functionality of QR code image,
- detect and recover the destroyed area and modified area of QR code image to its original state.