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| University of Missouri – St. Louis |
| Secure QR Code Authentication |
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## Abstract

In this project, I propose a secure QR code authentication system that enhances traditional authentication methods.

While QR codes are widely used for authentication, conventional systems simply attempt to match a displayed QR code to a database. In the best case, these standard QR code detection methods are simply unreliable in challenging environments such as in low-light conditions with user-induced motion blur. In the worst case, standard QR code detection methods are subject to cybersecurity threats.

To address these issues, this project integrates two key components: (1) Enhanced QR code detection using adaptive thresholding, homography transformations, and deblurring techniques to improve robustness in real-world conditions; and (2) A time-based system that ensures QR codes dynamically refresh to prevent reuse or replay.

This approach provides a secure and user-friendly authentication solution that can be deployed in various environments, offering improved protection while maintaining ease of use.