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**CERTIFICATE**



*This is to certify that the project work entitled*

“**SEQUORO: QRCODE BASED OPEN AUTHENTICATION**”

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**ABSTRACT**

The design of secure authentication protocols is quite challenging, considering that various kinds of root kits reside in PCs (Personal Computers) to observe user’s behavior and to make PCs untrusted devices. Involving human in authentication protocols, while promising, is not easy because of their limited capability of computation and memorization. Therefore, relying on users to enhance security necessarily degrades the usability. On the other hand, relaxing assumptions and rigorous security design to improve the user experience can lead to security breaches that can harm the users’ trust. In this project, we demonstrate how careful visualization design can enhance not only the security but also the usability of authentication. To that end, we propose two visual authentication protocols: one is a one-time-password protocol, and the other is a password-based authentication protocol.

Our approach to solving the problem is to introduce an intermediate device that bridges a human user and a terminal. Then, instead of the user directly invoking the regular authentication protocol, she invokes a more sophisticated but user-friendly protocol via the intermediate helping device. Every interaction between the user and an intermediate helping device is visualized using a Quick Response (QR) code. The goal is to keep user-experience the same as in legacy authentication methods as much as possible, while preventing key- logging attacks.

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**LIST OF ABBREVIATIONS**

QR code : Quick Response Code

oAuth : Open Authentication

TOTP : Time Based One Time Password

API : Application Program Interface

RSA : Rivest Shamir Adleman

AES : Advanced Encryption Standard

MAC : Message Authentication Code

HMAC : Hash based Message Authentication Code

SHA : Secure Hash Algorithm

SMS : Short Message Service

JSP : Java Server Page

SQL : Structured Query Language