

Accepted Manuscript

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PII: S0167-4048(18)30578-9
DOI: [10.1016/j.cose.2018.05.012](https://doi.org/10.1016/j.cose.2018.05.012)
Reference: COSE 1349



To appear in: *Computers & Security*

Received date: 28 November 2017
Revised date: 18 May 2018
Accepted date: 20 May 2018

Please cite this article as: DaeHun Nyang, Hyounghick Kim, Woojoo Lee, Sung-bae Kang, Geumhwan Cho, Mun-Kyu Lee, Aziz Mohaisen, Two-Thumbs-Up: Physical Protection for PIN Entry Secure against Recording Attacks, *Computers & Security* (2018), doi: [10.1016/j.cose.2018.05.012](https://doi.org/10.1016/j.cose.2018.05.012)

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Two-Thumbs-Up: Physical Protection for PIN Entry Secure against Recording Attacks[☆]

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Abstract

We present a new Personal Identification Number (PIN) entry method for smartphones that can be used in security-critical applications, such as smartphone banking. The proposed “Two-Thumbs-Up” (TTU) scheme is resilient against observation attacks such as shoulder-surfing and camera recording, and guides users to protect their PIN information from eavesdropping by shielding the challenge area on the touch screen. To demonstrate the feasibility of TTU, we conducted a user study for TTU, and compared it with existing authentication methods (Normal PIN, Black and White PIN, and ColorPIN) in terms of usability and security. The study results demonstrate that TTU is more secure than other PIN entry methods in the presence of an observer recording multiple authentication sessions.

Keywords: Authentication; Personal Identification Number (PIN); Smartphone; Recording attack; Physical shielding; User studies

1. Introduction

Personal identification numbers (PINs) are a well-known and a widely utilized authentication method for many applications, including automated teller machines (ATMs), electronic door locks, and safes [1]. Most smartphones today use PINs to

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