## A Second Look at Gesture-Based Passwords: Usability and Vulnerability to Shoulder-Surfing Attacks

Authors : Lakshmidevi Sreeramareddy, Komalpreet Kaur, Nane Pothier

**Abstract :** For security purposes, it is important to detect passwords entered by unauthorized users. With traditional alphanumeric passwords, if the content of a password is acquired and correctly entered by an intruder, it is impossible to differentiate the password entered by the intruder from those entered by the authorized user because the password entries contain precisely the same character set. However, no two entries for the gesture-based passwords, even those entered by the person who created the password, will be identical. There are always variations between entries, such as the shape and length of each stroke, the location of each stroke, and the speed of drawing. It is possible that passwords entered by the unauthorized user contain higher levels of variations when compared with those entered by the authorized user (the creator). The difference in the levels of variations may provide cues to detect unauthorized entries. To test this hypothesis, we designed an empirical study, collected and analyzed the data with the help of machine-learning algorithms. The results of the study are significant. **Keywords :** authentication, gesture-based passwords, shoulder-surfing attacks, usability

**Conference Title :** ICHCIUEM 2020 : International Conference on Human-Computer Interaction and Usability Evaluation Methods

**Conference Location :** New York, United States **Conference Dates :** August 10-11, 2020

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