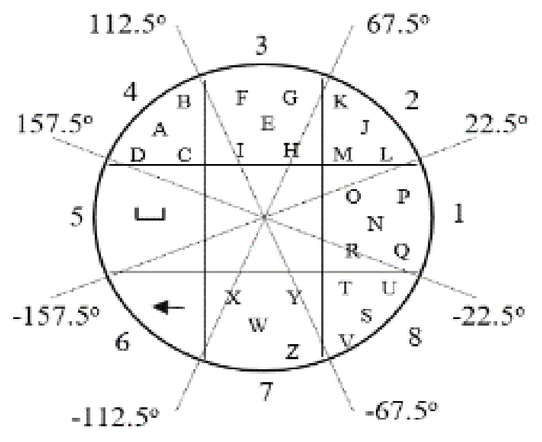
Implicit One-handed Mobile User Authentication by Induced Thumb Biometrics on Touch-screen Handheld Devices

Lina Zhou*, Jianwei Lai†, and Dongsong Zhang*

*The University of North Carolina at Charlotte; †Illinois state university

https://canshot.github.io/kaim2/funded2/



Challenges

- Most mobile user authentication (MUA) methods face a significant tradeoff between security and usability.
- Mobile users often interact with devices with one hand, even when both hands are available.
- One-handed MUA faces the challenges of thumb mobility, visual occlusion, and low accuracy.
- Continuous MUA is under studied relative to point-of-entry MUA.

Scientific Impacts

- Groundwork for one-handed MUA in support of both point-of-entry and continuous MUA.
- Induced thumb biometrics from interaction with the touchscreen of a mobile device to improve the security of MUA.
- New design principles for improving the usability of one-handed MUA by providing implicit MUA.
- Accessible MUA solutions for users with situational and visual impairments.

Solutions

- Address the security-usability tradeoff by enabling implicit one-handed MUA on touch screen mobile devices.
- Explore induced thumb biometrics to support one-handed point-of-entry and continuous MUA.
- Fuse thumb biometrics from multiple modalities, including password, target selection, continuous text entry, etc.
- Enable sight-free MUA interaction via the support of keypress-less text entry.

Broader Impacts

- Address the increasing needs of one-handed MUA with touch-screen mobile devices.
- Improve security and usability of MUA simultaneously
- Improve the accessibility of MUA for users with upper-limb loss, hand or vision impairments.
- The interdisciplinary work will promote training and learning in security and privacy, human-computer interaction, machine learning, mobile accessibility, and behavioral science.
- The project outcomes are used to develop modules in information systems courses.
- Three PhD students and four Master's students have been funded through this project. Three are female students.
- Two PhD students and one Master's student have co-authored their first paper(s).
- One MS student successfully defended her thesis.