Observation Study on Usability Challenges for Fingerprint Authentication Using WebAuthn-enabled Android Smartphones

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Introduction

Passwords and Security / Usability Problems

Security:
Reuse password…
Usability:
Hard to remember
Need another device …

Usable solution
for lock screen

Expectations for New Authentication Protocol: WebAuthn

- Various authentication methods can be provided for websites by using Web Authentication (WebAuthn; W3C standard).
- Biometrics, e.g. fingerprints, can be **alternatives to passwords**
- Our website (Yahoo! JAPAN[1]) has adopted WebAuthn.
- Users can login using fingerprint authentication with their WebAuthn-enabled Android smartphones in the same manner as screen lock with fingerprint.

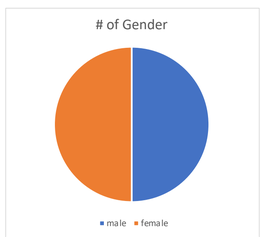
Contributions

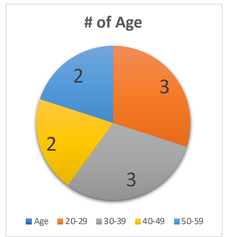
1. First user study of WebAuthn usability on fingerprint authentication.
2. Design implications for improving usability.

[1] ; https://www.yahoo.co.jp/

Methodology

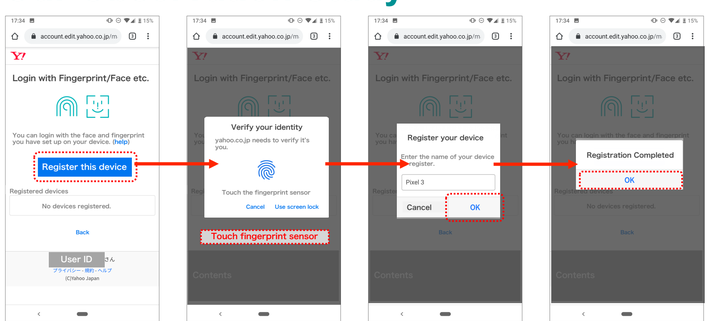
Participants





- Android smartphone users
- They have their own accounts on our site
- They had **never done WebAuthn registration** or tried but **failed the setup**
- Employed
- Most of them (9/10) have non-IT-related profession

Our Observation Study



Asked participants to use actual authenticator registration service (see left)

Get many comments through conversations with moderators.

Study Results

1. System Usability Scale (SUS) Analysis

- SUS score**: 63.5 (average),** which is "**Marginal high.**"

2. Objective analysis

G1: Unlocking smartphone. (all participants succeeded)
G2: Completing authenticator registration. (only **3** participants succeeded)

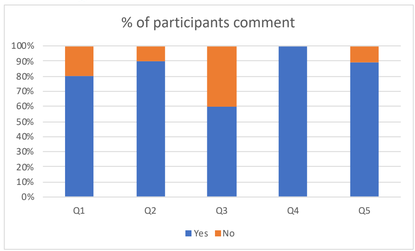
- 7 participants could not hold their fingers over the sensor.
- **All tapped the fingerprint-like icon on the dialog box** displayed by the WebAuthn function.
- Comments of non-successful participants (all of whom tapped fingerprint icon):

P1: "***I'm tapping with my middle finger because I have registered that finger for screen unlock.***"
P7: "***I don't know about the sensor. I only know this (tapping the fingerprint icon).***"

G3: Completing login using registered authenticator. (9 participants succeeded)

- [Goal] Participant can login using the registered authenticator after logging out.

3. Subjective Comment Analysis



Q1: Passwords reused at multiple sites?
Q2: Know fingerprint login authentication?
Q3: Willing to login with fingerprint?
Q4: Read dialog when you registere authenticator?
Q5: Continue to use fingerprint authentication for login?

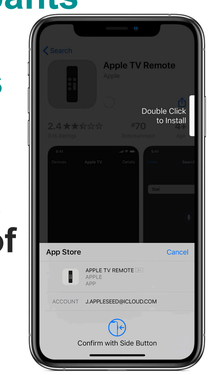
Discussion and Design implications

Fingerprint Authentication Usability is Good for Participants

- Usability is good for almost participants [**Q1, Q3, Q5**].

Fingerprint Dialog Usability is Not Good for Participants

- Participants frequently tapped their fingerprints on the icon, unexpectedly [**Q1, Q2**].
- Participants felt not so good about fingerprint dialog [**Q4, Q5**].
- **Things displayed in the box did not remind participants of the fingerprint authentication**.
  - Dialog should be implemented like Apple's side button (see right)



https://support.apple.com/en-us/HT208109