

Accessibility and Graphical Passwords

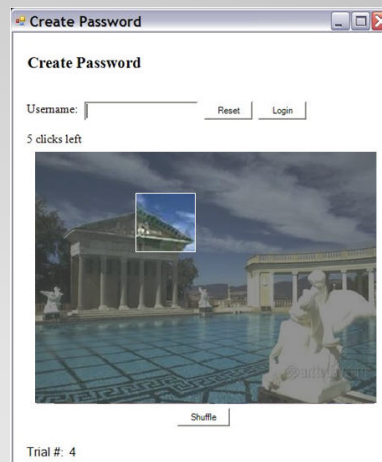
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Click-based graphical passwords

PassPoints



Persuasive CCP (PCCP)

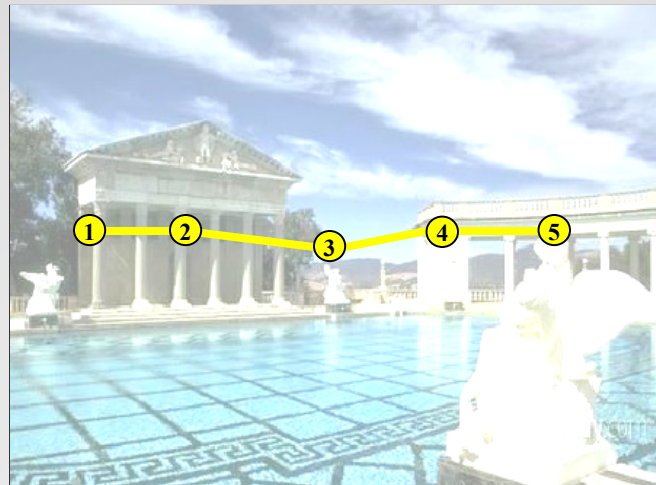


Cued Click-Points (CCP)



Accessibility?

- Inaccessible for some user populations
 - Rely on vision
 - Rely on fine motor control

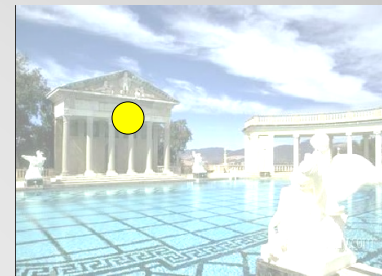


Content vs Presentation

- Semantic content should be separated from presentation modality
 - Same content linked with different modalities
 - E.g. Cascading Style Sheets in web design

Structure of click-based graphical passwords

- Presentation: Cue
 - System triggers memory of password
 - Displays image
- Selection: Response
 - User provides secret
 - Clicks on specific area



Generalized Cue-Response Authentication Model

- Presentation: any cue, any modality
 - Image, text, sound, haptic, video...
- Response: any user input, any modality
 - Clicking, typing, verbal, gesture, mouse movement...

Example: PassSounds

- Cue: Music clip
 - What is an acceptable length?
- Response: Click at appropriate time
 - How accurate can users be?
 - Musicians can synchronize at approximately 250ms
 - How many clicks?

PassSounds: Security

- PassPoints:
 - Image size 451x331
 - 5 clicks
 - Tolerance 19x19
 - Theoretical password space $1.2 \times 10^{13} \approx 43$ bits
- PassSounds:
 - 30-second clip
 - 5 clicks
 - Tolerance 1 second
 - Theoretical password space $1.4 \times 10^5 \approx 17$ bits

Hotspots and Patterns

- PassPoints

- Choose similar
 - Click-points on an image (hotspots)
 - Patterns (lines)
- Minimize by:
 - Using several images
 - Helping select passwords

- PassSounds

- Choose points related to
 - Lyrics
 - Beats
 - Sequential order
- Minimize by:
 - Using several clips?
 - Suggesting clicks?
 - Identifying other elements in the clip?

Alternatives

- Any combination of presentation and response
 - Audio
 - As a cue to trigger behaviour other than click
 - Haptics
 - As a cue or as input
- Allow users to select their preferred modalities for a given system
 - In-progress
- Caution:
 - Cue and response cannot be evaluated in isolation

Summary

- General cue-response authentication
 - Allows for
 - separation of cue and response
 - modalities most appropriate for different users

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<http://hotsoft.carleton.ca/security>