

# **Accessibility and Graphical Passwords**

Sonia Chiasson, Alain Forget, Robert Biddle  
Carleton University, Ottawa, Canada

# Click-based graphical passwords

PassPoints



Persuasive CCP (PCCP)

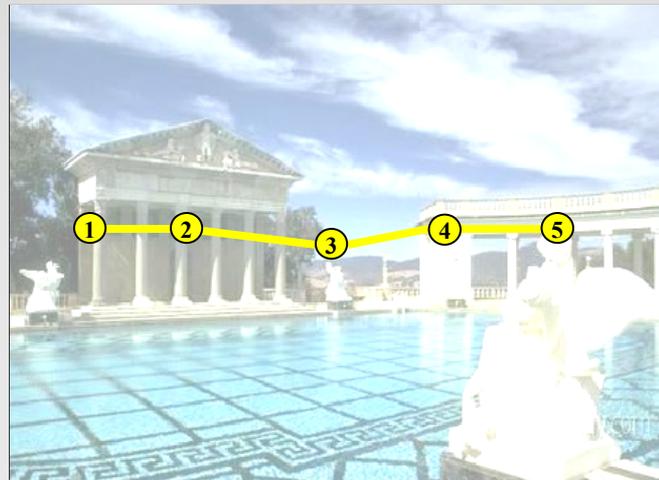


Cued Click-Points (CCP)



# Accessibility?

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

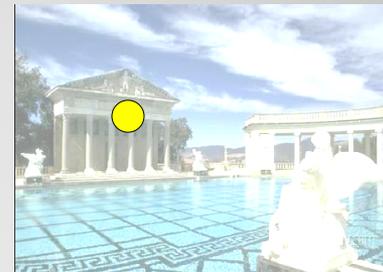


# Content vs Presentation

- 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

**chiasson@scs.carleton.ca**

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