



Towards a Universally Usable CAPTCHA

Graig Sauer, Harry Hochheiser, Jinjuan Feng, and
Jonathan Lazar

Department of Computer and Information Sciences,
Towson University
8000 York Road, Towson, MD 21252
{gsauer1,hhochheiser,jfeng,jlazar}@towson.edu

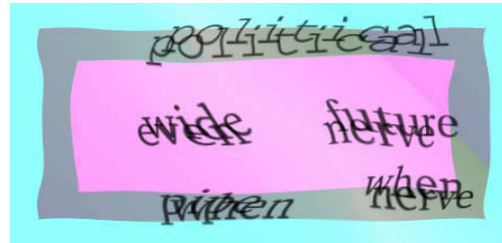


Introduction

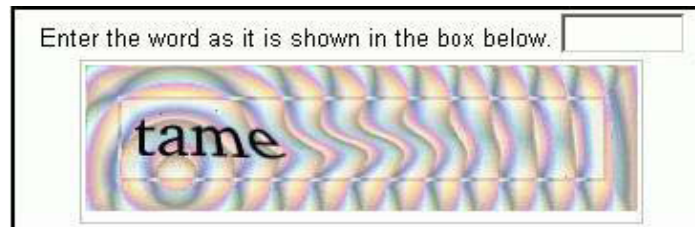
- What is a CAPTCHA?
- Widely used CAPTCHA products
- CAPTCHA categories
 - Character
 - Image
 - Anomaly
 - Recognition
 - Sound

CAPTCHAs

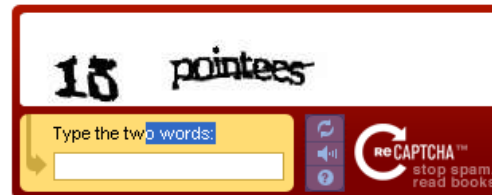
- Gimpy



- EZGIMPY



- ReCAPTCHA



submit



CAPTCHA Accessibility Concerns

- Typical security and privacy tools rely on visual cues that are not accessible for visually impaired users
- To deal with this problem developers have started to add audio substitutes to their products



ReCAPTCHA Demo

Accessibility / Usability Study



- Audio CAPTCHA
 - ReCAPTCHA
- Potential concerns we wished to analyze
 - User Comprehension
 - Cognitive Load
 - Interference with screen readers
 - Frustrations created by the CAPTCHA



Study Design

- ReCAPTCHA
 - Audio
- Participant computer
 - Jaws
 - External Aids Used
 - Braille Note Taker
 - MS Word
- Test
 - Six attempts (one practice)
 - Short Demographics survey



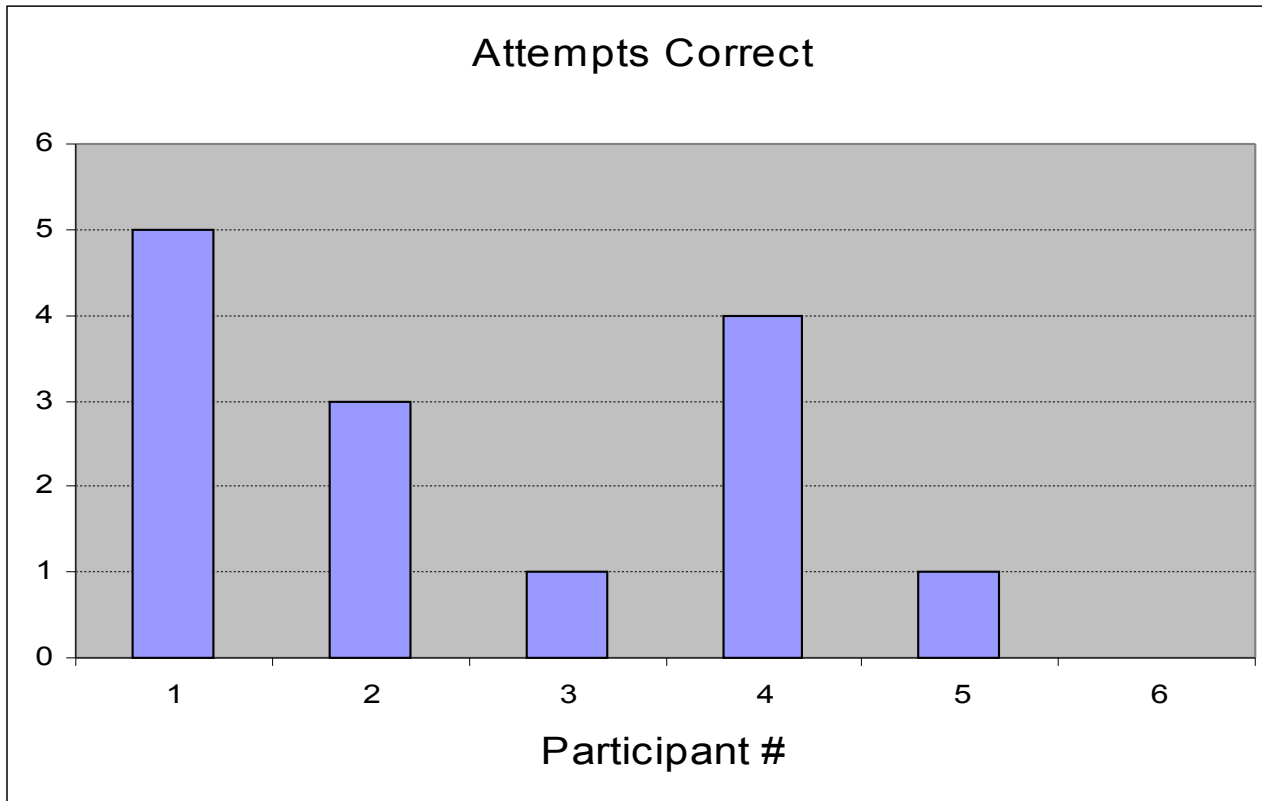
Demographics

Participant	Years of Computer Use	Hours of Computer Use Per Day	Jaws Experience on a scale of 1-10 (1 Being the lowest)
1	18	4	7
2	4	6-8	7
3	15	7-8	8
4	10	7	9
5	20	10	1
6	20	8	10

- Average years of computer use: 14.5 years
- Average hours of computer use daily: 7.25 hours
- Average Jaws experience: 7 on a scale of 1-10

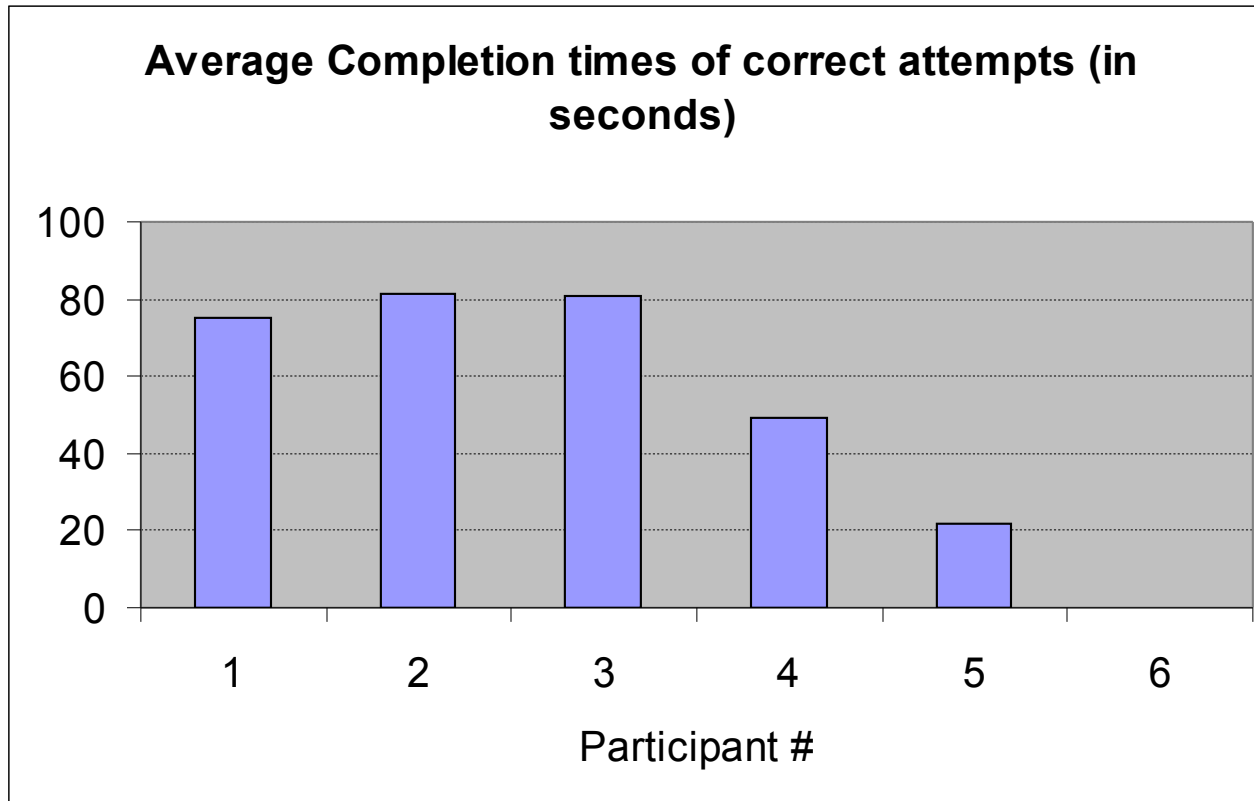


Results



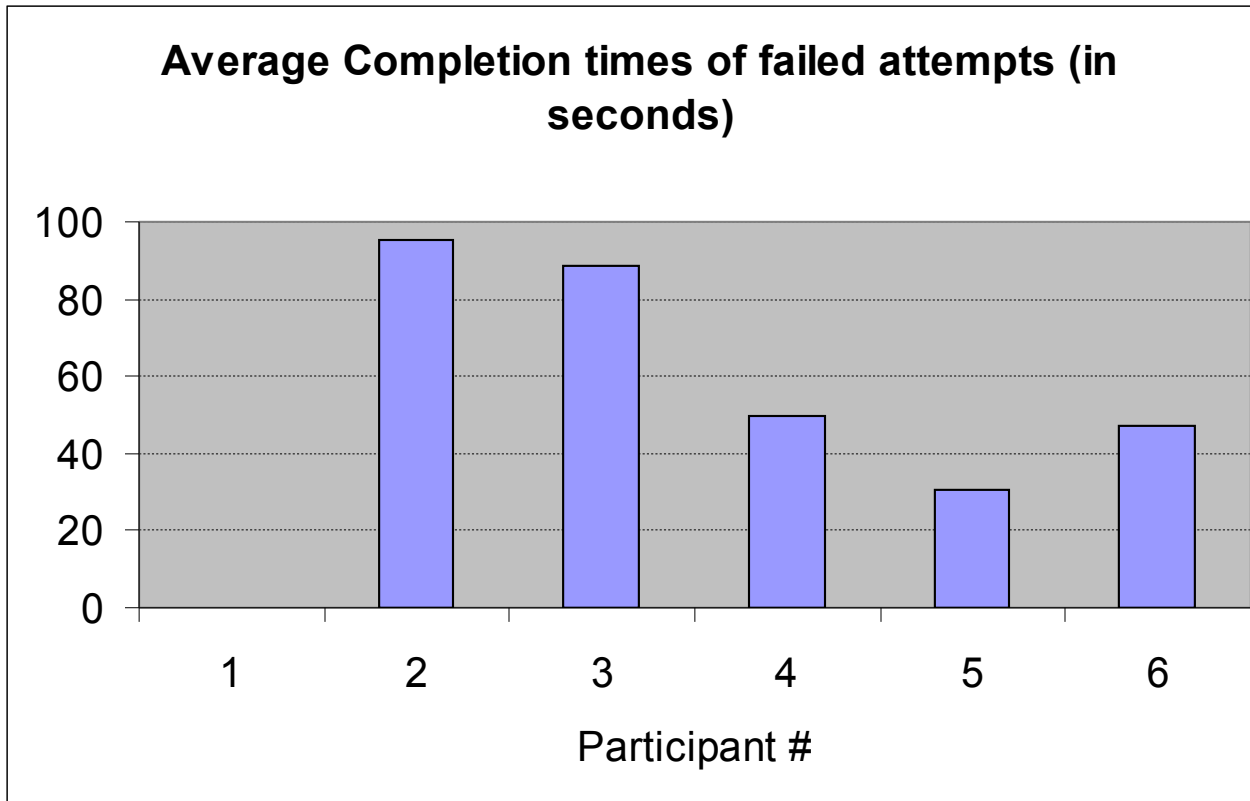
- Average: 2.33

Results Cont.



- Average: 65.64 seconds

Results Cont.



- Average: 59.56 seconds



Results cont.

- Average Correctness Rate
 - 46%
 - Acceptable rate is 90% correct (Chellapilla et al.)
- Average times
 - Failed attempts: 59.56
 - Correct attempts: 65.64
 - Suggested CAPTCHA completion time
 - 51 seconds (Schluessler et al.)
- Participants that used some sort of external aid (Braille note -taker or MS Word) were much more successful than those that did not use these aids.



Discussion

- Use of external aids
 - Accessibility vs. Usability
- Success rate
 - 46% correct completion rate vs. Acceptable 90%
- Time to complete
 - Average time 14.46 seconds longer
- Participant complaints
 - Audio Clarity
 - Guessing answers

Towards an Accessible CAPTCHA

- Universal Usability
 - products and services that are usable for every citizen
 - Separation between systems
- Human-Interaction Proof, Universally Usable (HIPUU)
 - Visual and Audio HIP
 - Challenges
 - Search Space
 - File recognition (checksums, signatures)
 - Input type
 - Expanded Prototype
 - Sound merging
 - Drop down list
 - Free Text Input
 - Universal Usability
 - Both visual and audio systems deployed concurrently

HIPUU



Please Select Answer 1



Please Select Answer 2



Please Select Answer 3



Conclusions/Future Research

- Further development of the HIPUU prototype
 - Expansion of Search Space
 - Free Text vs. Drop Down List
 - In-audible white noise
- User testing
 - Usability study of expanded HIPUU
 - Free text study
 - Online user study



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