HIPUU: a Universally Usable Approach to Defeating Automated Bots

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Abstract

There is clearly a need on the web for security features to stop spam and bots. However, many security features on web sites are not accessible for people with disabilities. A common form of security on web sites is a human interaction proof. HIPs are used to differentiate between humans and automated bots. The most common form of HIP is known as a CAPTCHA (Completely Automated Public Turing tests to tell Computers and Humans Apart), but visual CAPTCHAs are inaccessible, and existing audio CAPTCHAs are very hard to use. We have created an alternative form of human interaction proof, which is both secure and accessible. This presentation will give an overview of the HIPUU concept and evaluation testing.

Introduction

There are a large number of individuals who have impairments. The national Federation of the Blind estimates that 1.3 million people in the USA are legally blind and 10 million people has some form of visual impairment[1]. While many people with impairments face challenges on the web, because the web is primarily a visual medium, people who are blind face the greatest challenges. These individuals also tend to use assistive technologies, such as screen readers, and refreshable Braille displays. There are guidelines that describe how to make web sites accessible (see www.w3.org/wai), and there are laws that require web sites of government agencies to be accessible[2].

Security features pose a great challenge to people with impairments. Many security features are designed to be challenging, and have time limits. To simply make these features easier, or to delete them, would mean a lower standard of security. These security features are necessary to ensure less spam and viruses

on the web. The problem is that the security features, such as HIPs, are designed to differentiate between humans and computers, but often, these tools instead differentiate between who can see, and who cannot see. Security features are often visually-based.

Existing CAPTCHAs and HIPs

ReCAPTCHA is the most widely used CAPTCHA tool on the Internet today. Developed by Carnegie Mellon University it was the first CAPTCHA developed, and the first CAPTCHA to add audio functionality for use by users with visual disabilities[3]. In this CAPTCHA, two distorted words are presented to the user. The user then has to identify one of those words and type it in a text box. The audio option that is available follows a separate track in which the user has to identify numbers that are spoken while background noise is played. A study was conducted on the audio feature of ReCAPTCHA with blind users and the results showed very clearly that although that feature was intended to be usable for the blind, it fell quite short of its goal[4]. Because of the distortion that is added to the audio files the sound becomes so poor that it is very hard for the user to identify what needs to be identified.

[3]

Figure 1: Screenshot of the ReCAPTCHA CAPTCHA tool

Clearly, ReCAPTCHA and other similar CAPTCHAs do not work well for people with disabilities, however, even people without impairments struggle with the use of CAPTCHAS. A vast majority of users complain about distortion levels involved with visually based CAPTCHAs and become frustrated when interfacing with them. The elderly population especially finds visually based CAPTCHAs very hard to use!

HIPUU: The Human-Interaction Proof, Universally Usable

Based on the documented challenges of web-based security features, we decided to build a new approach to web-based security that is both accessible and secure[5]. We named it HIPUU: Human-Interaction Proof, Universally Usable. Instead of using distorted text or sounds of text (Similar to ReCAPTCHA), HIPUU uses integrated images and sound clips that are not textual in nature. The sound clips and images are of easily recognizable objects or events. These include the general categories of weather, musical instruments, animals, and household objects. The combination of an image and a related sound means that people can use whichever track (visual or audio) they are able to use, and in fact, can use both. One benefit of HIPUU is that if a visual user is having trouble identifying an image, he or she can always listen to the sound as well to provide additional information.

Figure 2: Screenshot of the HIPUU Three Object Free text Version

The reason that it was decided to use images and sound clips as opposed to distorted text and spoken language is based on the technologies that are available today for recognizing spoken language, and character recognition. While it is known that there are numerous available tactics for identifying spoken language (speech recognition software), and alpha-numeric character (vector mapping), as of today there are no automated processes that can identify

random sound, or random images. This allowed HIPUU to present these images and sounds without having to add any sort of distortion that may confuse a user as to what they are hearing or seeing, but still providing the same level of security against automated bots.

Initial study results and user feedback from both sighted and blind users have been very positive for HIPUU. Both groups have been able to solve HIPUU at very high success rates, and have given it very high satisfaction ratings in both ease of use, and time used to complete[4].

At the conference, the development and evaluation of HIPUU will be further discussed, and demonstrations of ReCAPTCHA and HIPUU will be presented.

References

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