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REVIEW ARTICLE

AN IMAGE-BASED CAPTCHA SYSTEM USING CLICK

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ARTICLE DETAILS

ABSTRACT

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CAPTCHA stand for "Completely Automated Public Turing test to tell Computers and Humans Apart". It is a technique of testing where only human can solve it and computer-generated system (bots) could not get through it. In this paper, a new type CAPTCHA system is proposed. The proposed scheme named ClickShape, developed by using a technique based on image-based CAPTCHA. ClickShape will ask user to click on the shape displayed by the system. It is quite similar to image-based CAPTCHA where user have to choose any specific image, for example image of a signboard. As for this captcha image of a shape is easier to be recognize by human. This type of CAPTCHA had developed by using HTML, JavaScript, PHP and Cascading Style Sheets (CSS).

KEYWORDS

CAPTCHA, bots, image, system

1. INTRODUCTION

Web Services are major application provided on the Internet. These Web Services include free e-mail accounts, chat rooms, discussion board, blogs, on-line booking, and more. Along with the Web Services, there also essential issue on how to avoid massive and automated access to Web resources through malicious robots (automated program). For example, online discussion boards might get dumped by some garbage information, if the server did not provide suitable mechanism to prevent the robots [1].

The CAPTCHA (Completely Automated Public Turing Test to tell Computers and Humans Apart) has been widely used to prevent malicious program to access web resources automatically. In other words, the system can differentiate human and robot apart. It is also called Turing Test and in general HIPs (Human Interaction Proofs). CAPTCHAs typically display distorted characters which users must correctly identify and type to proceed with a web-based task intended only for humans, such as creating and account, posting to a blog, or making an internet purchase. This can ensure security to the website in preventing DDos attack that can cause disruption in web services [2].

2. PAGE LAYOUT

CAPTCHA uses many images processing procedure for example scaling text or rotating the image and so on. However, the processed results may not be recognized by human if the processed image is distorted too much. In other words, CAPTCHAs may not be recognized hardly by robots, but also difficult for people. We focused on developing image-based CAPTCHA because the text-based required user to type in the input can be quite annoying to some user [3].

Usability is an important issue of CAPTCHA due to the variety in the backgrounds of users, such as difference in age, culture, and language.

Therefore, designing a CAPTCHA system has to consider two factors: visual perception and cognitive judgments [4]. How to examine the usability of CAPTCHA is an important issue. Nielsen defined the usability by five quality components as follows [5].

- *Learnability*: How easy is it for users to accomplish basic tasks the first time they encounter the design?
- *Efficiency*: Once users have learned the design; how quickly can they perform tasks?
- *Memorability*: When users return to the design after a period of not using it, how easily can they re-establish proficiency?
- *Errors*: How many errors do users make, how severe are these errors, and how easily can they recover from the errors?
- *Satisfaction*: How pleasant is it to use the design?"

In terms of the usability of CAPTCHA systems, Yan and Ahmad claimed the following three usability criteria: accuracy, response time, and perceived difficulty [6]. Accuracy stands for "How accurately can a user pass a CAPTCHA challenge?". Response time stands for "How long does it take for a user to pass the test?". And perceived difficulty represents "How difficult to use do people perceive a CAPTCHA is?". Inspired from Nielsen's five quality components, Yan and Ahmad proposed a three-dimensional framework for using to examine the usability of CAPTCHAs.

Recently, there are many type of CAPTCHA that have been explored. All the research results can be categorized into four types: (1) Text-based, (2) Image-based, (3) Audio-based, (4) video and (5) puzzle [7]. The key characters of these types are briefly introduced as follows:

2.1 Text-based CAPTCHA

Text-based CAPTCHAs are word that presented in distortion form and ask user to recognize the word and retype it. This type of CAPTCHA is easy to use without learning or training. Text-based CAPTCHA is mostly used in developed websites such as Yahoo, Gmail, Facebook, YouTube and PayPal. Text-based CAPTCHA are hardly recognized by automated programs because of its distorted form. However, there are times that the word can be misrepresentative and hardly recognized by human [8].

2.2 Image-based CAPTCHA

Image-based CAPTCHAs ask user to identify the subject of an image. This type of CAPTCHA usually interacts with users by using pointing device for example mouse. In general, image-based CAPTCHA used lager web page area and need image database maintained at the server. Asirra asks users to identify photos of cats and dogs such as shown in Figure 1.



Figure 2: Example of image-based Captcha

2.3 Audio-based CAPTCHA

Audio-based CAPTCHAs ask users to recognize the word that is herd from the audio speech. Mainly, in this CAPTCHA contains three parts: vocabulary, noise and audio production [1]. The noises are added to the speech to prevent the bots from attacking easily. At first, the audio-based CAPTCHA is an alternative for visually-impaired people. Audio reCaptcha asks users to type digits heard from the speech with noise.

3. METHODOLOGY

The proposed scheme, ClickShape, tries to improve both security and usability of CAPTCHA. ClickShape attempt to achieve the following goals:

- 1) Security: To resist the attack of malicious programs.
- 2) Usability: To increase the rate of passing the test.

The process in authentication by using ClickShape system begins with interface viewing by a user. A user should click on the shape (image given) based on the instruction. Only one shape need to be click to prove that user is a human. If user makes mistakes, a new set of images and instruction will be displayed for user to take the re-test. If not, the system will not proceed since user is not a human.

3.1 Steps for Proposed Model

- Random shape(images) will be displayed.
- User click/choose shape based on instruction.
- The clicked shape will save data.
- The data is checked with the database if matches then user pass the test.

Figure 6: The ClickShape Design

3.2 System Design

The architecture of ClickShape CAPTCHA consist of three main parts which are collection of images, image processing engine and user interface. A collection or directory of images is a collection of images with the size around 150 X 120 pixels to 150 X 150 pixels in JPG/JPEG format. The images of shape will be displayed in a box randomly. Figure 6 show the ClickShape user interface.

4. CONCLUSIONS

A new type CAPTCHA system, ClickShape has been proposed in this paper. To pass the ClickShape test, users should click the right shape to verify that users are not bots. The main purpose to develop this CAPTCHA system is to make a user feels easy and clear on how to use it. It then can authenticate the user as a human not as bots.

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