

## Non-Confidential Description - PSU No. 3125 "Image-Based CAPTCHAs for Website Security"

### Keywords:

CAPTCHAs; Web security; Internet authentication or verification; automated Turing test, image retrieval

### Links:

[Inventor website - 1](#)

[Inventor website - 2](#)

[Demo website \(www.alipr.com/captcha\)](http://www.alipr.com/captcha)

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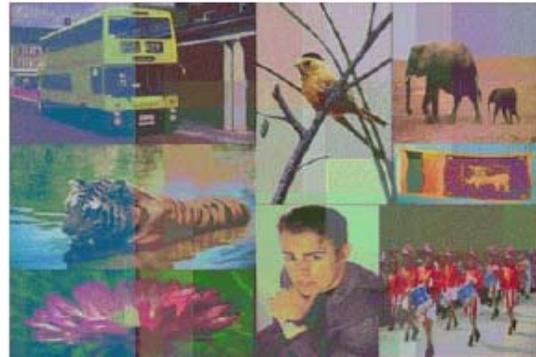


Fig 1: Imaged-based CAPTCHA example

### Background

Websites have often been attacked by malicious programs that register on a massive scale. This has driven many websites to require an authentication process whereby a test is given to tell humans and computers apart to help prevent automated use of the Website by computers. When a computer program is able to generate such tests and evaluate the result, it is known as a CAPTCHA (Completely Automated Public test to Tell Computers and Humans Apart). CAPTCHA-based security helps to ensure that such attacks are not possible without human intervention, which in turn makes them ineffective. A CAPTCHA acts as a security mechanism by requiring a correct answer to a question which only a human can answer any better than a random guess. Most current CAPTCHAs are text-based and an example is shown to the right (Fig 2). Some example CAPTCHA implementations can be found while registering for a new Yahoo! Account or signing up for PayPal. However, text-based CAPTCHAs are increasingly being broken into by using automated computers using object-recognition techniques with high accuracies. This reduces the reliability of security protocols based on text based CAPTCHAs.



Fig 2: Text-based CAPTCHA

### Invention Description

We have created a system for the generation of attack-resistant, user-friendly, image-based CAPTCHAs. We produce controlled distortions on randomly chosen images and present them to the user in the form of a mosaic (Fig 1). The images are distorted in a way that precludes the use of state-of-the-art computer image recognition technologies. In a preferred implementation of our technology, we use a two step verification process. In the first step, the user clicks near the center of any picture in the mosaic. In the second step, the user is asked to identify a distorted image by selection from a list. This two-round click-and-annotate process makes the CAPTCHA user friendly and very effective. Technology can be tested at [www.alipr.com/captcha](http://www.alipr.com/captcha).

### Advantages/Applications

- Increase security over text-based CAPTCHAs with no hard to read text
- Simple click-based system with no typing necessary