Improved Video Captcha

M. Kameswara Rao
K.L.University/Department of Electronics and Computer Engineering, Guntur, India
Email: kamesh.machiraju@kluniversity.in

M.S.V.K. Maniraj and B. Sneha Ganga
K.L.University/Department of Electronics and Computer Engineering, Guntur, India
Email: {maniraj.sai, snehaganga.b}@gmail.com

Abstract—“CAPTCHA” means ‘C’ompletely ‘A’utomated ‘P’ublic ‘T’urning test to tell ‘C’omputers and ‘H’umans ‘A’part. This is used to improve the security for internet Based applications. It is an automated test used to find whether the user is a human or a bot. This is mandatory to know because many bots are developed to illegally use the Internet sites content. CAPTCHA give a text or an image and asks its user to enter the same text. But some types of CAPTCHA are being broken by bots and some CAPTCHA are not user understandable i.e. they are difficult to read by humans. Many new types of CAPTCHA techniques were introduced to improve the security of the internet sites like 3D CAPTCHA, Devanagari CAPTCHA etc. In this paper we are going to introduce a new technique for CAPTCHA which is hard to break by the bot. The new technique is that we write a program that counts the number of pulses of a human body. This is very hard for a bot to break the CAPTCHA that can only work for the number of pulses of a person.

Index Terms—Captcha, HIP, OCR(Optical Character Recognition)

I. INTRODUCTION

CAPTCHA - Completely Automated Public Turing test to tell Computers and Humans Apart, are computer software in which a class of automated challenges are used for differentiating bots (Computer programs) and legitimate human users over internet. They have many practical applications such as providing security to web pages, including abuse prevention of online services [14,15] like free email services from several bots [4].

Hard artificial intelligence problems are the present implementations. Few types are Processing natural languages (linguistic CAPTCHAs), Recognizing characters (text-based CAPTCHAs), understanding images (image-based CAPTCHAs), and speech recognition (audio-based CAPTCHAs).Most commercial implementations require the user to transcribe a string of distorted characters within a noisy image. CAPTCHAs which rely on a human’s ability to recognize distorted characters have been broken through techniques such as shape matching, distortion estimation, and even simple pixel counting [5].

II. RELATED WORKS

A. Text-based CAPTCHAs

The easiest way to implement CAPTCHA is using Text-Based CAPTCHA technique. Distorted forms of case-sensitive letters, case-insensitive letters and digits are used in the implementation of this technique. This CAPTCHA technique is used in may famous webpages like Flipkart, Gmail, PayPal, Yahoo etc [7]. Different types of text-based CAPTCHA are Gimpy, Baffle-Text and MSN-Captcha [12].

Figure 1. Text based captcha

Gimpy Captcha: Optical character recognition is the base for Gimpy CAPTCHA technique. In this technique different words are selected from the dictionary and those words will be displayed on the screen. The words are displayed in the form of an image in which they are disfigured or missmaged or corrupted. User should recognize the word from the image and enter it in the given space for allowing him to access the services. It is further modified as Ez-Gimpy Captcha [13].

Figure 2. GIMPY captcha

Baffle-Text Captcha: Modified form of Gimpy CAPTCHA is Baffle-Text CAPTCHA and this technique
is designed by Henry Baird at California University, Berkeley. In this technique random characters are chosen to create a pronounceable text. User need to recognize it and user need to type the correct word [6].

Limitations: The main disadvantage of the text based CAPTCHA is that the user can use certain software’s to identify the characters that are embedded in the text CAPTCHA technique.

B. Image-based CAPTCHAs

In this technique, users are given access to services when they choose the images that are having some similar properties from a group of images [8]. Pix CAPTCHA and Bongo CAPTCHA are common types of Image-Based CAPTCHAs [3].

Pix Captcha: Pix Captcha contains a big database containing photos and animations of the several general objects (a pen, a tumbler or a pet animal etc.) those are used in our daily life. A group of images present in the database, those are related to a same object are shown to the user. User is need to type the name of the object or concept present in the group of pictures displayed.

Bongo Captcha: Mikhail M. Bongard developed an Image-Based CAPTCHA called Bongo CAPTCHA. Technique used in this is, user should solution for a visual pattern problem [9]. Two blocks with different series are shown one on the left and other on the right side. Both right and left will have different series in them, user should identify the differences between both the series and make them apart.

Limitations: The main limitation of image based CAPTCHA is that the users who are visual impaired cannot pass this CAPTCHA and the other limitation for this CAPTCHA technique is- if the description does not match with the description present in the database of web services then the CAPTCHA gets failed even if the perspective of the user is true.

C. Video-based CAPTCHAs

A public database containing different videos is taken and a video is selected from it and user should describe about the video in three words and those three words will be presented in the video. Submission of those three words can be done by user at any time after the video starts playing [10]. The user’s description about the video should match with the automatically produced description about it then only user is allowed to access the services provided by the webpage [2].

Limitations: In video based CAPTCHA the main disadvantage is that the user’s description about the video should match with the description written in the data base where it get fails. The other disadvantage is that it takes more memory space and takes time to give the response for the user.

D. Audio-based CAPTCHAs

Audio-Based CAPTCHAs works upon the sound-based systems. These CAPTCHAs are produced for those who face problem with their vision. It has downloadable audio-clips. In this user should listen to the audio and write a description about the asked question and then
submit the form. The first system which was named ECO was put into operation at City University in Hong Kong by Nancy Chan [1].

**Figure 7. Audio based captcha**

*Limitations:* In this CAPTCHA the users mainly face the problem with the type of audio clippings i.e. if the user doesn’t have the required plug-ins, audio can’t be played and user cannot complete the CAPTCHA.

**E. Puzzle CAPTCHA**

In puzzle CAPTCHAs the users have to understand a distorted picture which is divided into segments [11]. The user is then supposed to arrange all those divided segments to form a complete picture. If it matches the picture in the data base then we can confirm that the activity is done by the human and can avoid the miss use of web services [3].

**Figure 8. Puzzle captcha**

*Limitations:* In puzzle based CAPTCHA if the user did not understand the puzzle properly he fails the test of CAPTCHA and another disadvantage is that if the bots have a software that can automatically solve the given picture puzzles then the web services may be misused.

### III. PROPOSED TECHNIQUE

**A. Improved Video CAPTCHA**

In improved video CAPTCHA during registration for a web service the web page asks the customer to watch the video to be played and the a question related to that video is displayed along with the options. The user should understand the video and click on the options provided under the question.

**B. Flow Chart**

- Go to the computer
- Open web page
- Enter details in form
- Enter CAPTCHA
- Check CAPTCHA
- Submit Form and Direct to web Service
- Stop

**Figure 9. Flow chart of captcha**

**C. Algorithm of Improved Video Captcha Technique**

1. Go to the web page and fill the registration form.
2. Download the CAPTCHA and watch the video.
3. Select the option answer for the question after watching the video.
4. If answer chosen matches with the option in the database then direct the web page so that the user can use the web service.
5. If answer doesn’t match with the answer in the database then reload the CAPTCHA.
6. This process continues until the entered answer is correct.

**D. Screenshot**

**Figure 10. Sample screenshot of improvised video captcha**
Limitations: The improved video CAPTCHA had the limitation with the size of the video and the clarity of the video.

IV. RESULT AND ANALYSIS

The results for the improved video CAPTCHA survey, with our analysis are as follows. We received 22 answers from the first survey, 22 answers from the second and 52 answers from the web survey.

Correct answers were calculated according to the algorithm described earlier, with minimum concordance levels of 80%, 85%, 90% and 95%. For each participant, the number of completed challenges was calculated. The ratio of this number to the number of challenges with at least one known part is then considered to be the success rate. Increasing the minimum concordance generally increases the human success rate. This is because the video played with deviant classifications are less likely to reach the minimum concordance level and thus be used to identify wrong answers. Where most participants fall in the >90% range, but some appear in lower ranges than for the lower concordance levels. The success rates of the younger participants are more evenly spread out across the spectrum than those of the older participants for all concordance levels but the highest. As the number of video’s that can be used as discriminators decreases, so does the number of incorrect answers. Thus, the probability of guessing non-wrong answers by chance increases. The random success rates are greater than 50% for most minimum concordance levels and challenge sets. In light of this, human success rates for a challenge based on the video played, based on the survey participant the questions for the video played were calculated for minimum concordance levels of 80% and 85%. With minimum concordance levels of 90% and 95%, only 12 and 5 questions for a video respectively had sufficiently concordant ratings to be considered known, so those levels were left out.

V. FUTURE SCOPE

The improved video CAPTCHA have more future scope where the quality of the video should be improved and the buffering time for the video to play should be reduced and the video should take less memory space. In real time applications the videos can be redirected from the already existing web pages and the we can even provide a facility for the users to choose their own interesting category so that the video related to that category plays and the questions are displayed accordingly to the video.