ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 2, February 2016

A Study on Usability of CAPTCHAs on the Basis of Various Types of CAPTCHAs

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ABSTRACT:- Nowdays several daily activities such as communication, education, E-commerce, Entertainment and tasks are carried out by using the internet. To perform such web activities users have to register regarding the websites. In registering websites, some intruders write malicious programs that waste the website resources by making automatic false enrolments that are called as bots(computer programs).These false enrolments which occupies the resource of website hence reduces space, performance and efficiency of servers.So, it becomes necessary to differentiate between human users and Web bots (or computer programs) is known as CAPTCHA.CAPTCHA stands for **Completely Automated Public Turing Test To Tell Computer And Human Apart**. CAPTCHAs are used because of the fact that it is difficult for the computers to extract the text from such a distorted image, whereas it is relatively easy for a human to understand the text hidden behind the distortions. Many CAPTCHAs have been proposed in the literature that text-graphical based, audio-based, puzzle-based and mathematical questions-based. The design and implementation of CAPTCHAs fall in the realm of Artificial Intelligence. We aim to utilize CAPTCHAs as a tool to improve the security of Internet based applications.

KEYWORDS: Turing test, Worms and Spam, Bots, Math based CAPTCHAs.

I. INTRODUCTION

Nowadays internet is used for multiple activities by a huge number of people. These activities include communication, e-commerce, education, and entertainment. In all of these services the user has to register itself by filling an online form. However, bots are web programs that poses as a human, sign up for these free services automatically. Preventing online services from these automated-bots is a challenge. Is used to differentiate between human and bots.

CAPTCHAs is a completely automatic public Turing test to tell computers and humans apart CAPTCHAs is a test that humans can pass but computer programs cannot. such tests are becoming key to defending ecommerce systems. Without them, spammers can, for example, write simple automated scripts to create hundreds of free e-mail accounts with a single command. The e-mail service provider can choose not to validate the information supplied by uses, but ends up with thousands of useless accounts. On the other hand, the provider can assume the extra burden of validating this information, but risks crippling its systems with the extra burden that validation requires. By inserting a Captcha into the login and user creation process, system administrators can defeat these automated scripts and have some assurance that an actual human is associated with the account. Similarly, CAPTCHAs are also useful in defending online shopping or auction sites by preventing spammers from posting irrelevant or bogus bids to prevent other buyers from purchasing products.

Turing test:- The Turing test, which asks a series of questions of two players: a computer and a human.Both players pretend to be human and try to mislead the judge. Based on the answers given, the judge has to decide which one is human and which is a computer.

CAPTCHAs are the modren implementation of turing test.CAPTCHAs are similar to the Turing test in that they distinguish computers from humans, except that, with a Captcha, the judge is also a computer. CAPTCHAs also differ from the Turing test because they work on a variety of sensory inputs, whereas the Turing test is conversational. CAPTCHAs come in several different types. Most generally, the Captcha is simply an image composed of pseudorandom letters and numbers placed either in front of an obfuscating background or run through some degradation algorithm to make optical character recognition (OCR) of the final image impractical. This innovation has, in turn, attached value to the problem of solving CAPTCHAs and created an industrial market.Some Examples Of CAPTCHAs From Various Web Applications

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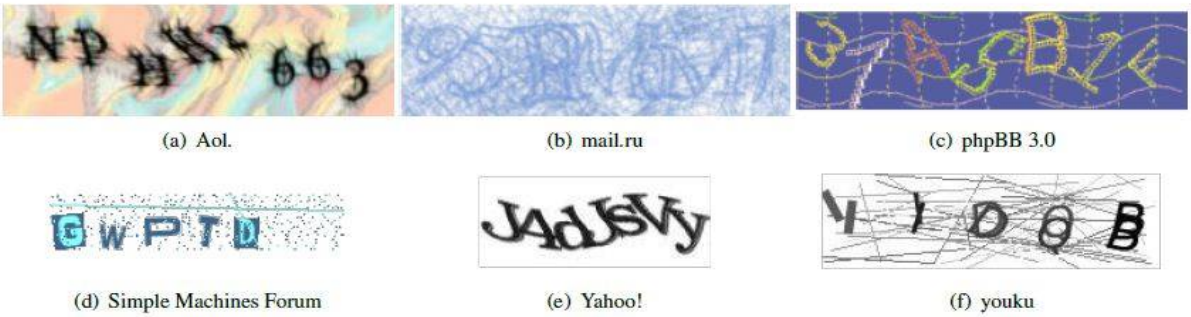

(a) Aol. (b) mail.ru (c) phpBB 3.0

(d) Simple Machines Forum (e) Yahoo! (f) youku

There are 3 basic properties that CAPTCHAs must satisfy:

- It should be easy for human users to pass.
- It should be easy for a tester machine to generate and grade.
- It should be hard for a software robot to pass.

Nowadays all work is mostly done on Internet likewise education, shopping (e- commerce), net banking, Social. On those site users need to fill out registration form by entering all personal information in order to surf that particular website and many kind of other survey form to surf website. Today due to increased technology hacking software is available to fill all details automatically. Hence attacker attacks by false entry on such site to increase traffic, occupy the resource of website reduce the performance and efficiency of server and some time it may stop the entire web site. CAPTCHAs must provide mainly two requirements:

Robustness: Robustness is capability to resist or decrease attack on computer.

Usability: Usability is the easy for human who pass with this CAPTCHA challenge.

A CAPTCHA is one kind of program that generate and grade test that mostly all human being pass but current computer program not able to pass.To analyze the strength of CAPTCHA implementations on the Internet,During the research CAPTCHA protection on three types of forms were reviewed:

- Registration pages
- Forgotten password functionality
- User comment fields for blog posts, news articles, and other content

II. USES OF CAPTCHAs

CAPTCHAs have several applications for practical security:

• **Preventing Comment Spam in Blogs:** Most bloggers are familiar with programs that submit bogus comments, usually for the purpose of raising search engine ranks of some website (e.g., "buy penny stocks here"). This is called comment spam. By using a CAPTCHA, only humans can enter comments on a blog. There is no need to make users sign up before they enter a comment, and no legitimate comments are ever lost.

• **Protecting Website Registration from Bots:**Several companies offer free email services. Up until a few years ago, most of these services suffered from a specific type of attack: "bots(web programms)" that would sign up for thousands of email accounts every minute. The solution to this problem was to use CAPTCHAs to ensure that only humans obtain free accounts. In general, free services should be protected with a CAPTCHAs in order to prevent abuse by automated scripts.

• **Protecting Email Addresses From Scrapers:** Spammers crawl the Web in search of email addresses posted in clear text. CAPTCHAs provide an effective mechanism to hide your email address from Web scrapers. The idea is to require users to solve a CAPTCHA before showing your email address. A free and secure implementation that uses CAPTCHAs to obfuscate an email address can be found at RECAPTCHAs Mail Hide.

• **Online Polls:** As is the case with most online polls, IP addresses of voters were recorded in order to prevent single users from voting more than once. CAPTCHAs ensures that only humans can vote.

• **Preventing Dictionary Attacks:** CAPTCHAs can also be used to prevent dictionary attacks in password systems. The idea is simple: prevent a computer from being able to iterate through the entire space of passwords by requiring it

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to solve a CAPTCHA after a certain number of unsuccessful logins. This is better than the classic approach of locking an account after a sequence of unsuccessful logins, since doing so allows an attacker to lock accounts at will.

• **Search Engine Bots:** It is sometimes desirable to keep webpages unindexed to prevent others from finding them easily. There is an html tag to prevent search engine bots from reading web pages. The tag, however, doesn't guarantee that bots won't read a web page; it only serves to say "no bots, please." Search engine bots, since they usually belong to large companies, respect web pages that don't want to allow them in. However, in order to truly guarantee that bots won't enter a web site, CAPTCHAs are needed.

• **Worms and Spam**: CAPTCHAs also offer a solution against email worms and spam: "I will only accept an email if I know there is a human behind the other computer." A few companies are already marketing this idea.

III. ISSUES WITH CAPTCHAs

- **Code unreadable**
- **Hear it** - Click **Need audio assistance?** above the CAPTCHA to hear the code read aloud.
- **Try a different code** - Click **Can't read this code?** below the CAPTCHA to see a different code.

✓ CAPTCHA code doesn’t display
✓ Enable JavaScript in your browser.
✓ Ensure your browser is properly displaying images.
✓ Turn off browser add-ons and plug-ins.
✓ Try using a different, supported browser

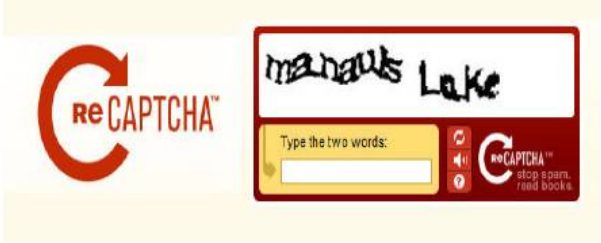
IV. TYPES OF CAPTCHAs

CAPTHCAs means presenting a challenge response test to the users or humans. They are classified based on what is distorted that is whether characters, digits, or images. Some types of CAPTCHAs are given below:

i. CAPTCHAs based on text.
ii. CAPTCHAs based on picture.
iii. CAPTCHAs based on puzzle.
iv. CAPTCHAs based on maths.
v. CAPTCHAs based on audio.
vi. CAPTCHAs based on video.

i. **Text Base CAPTCHAs:** Text captcha is most widely used by various web applications. It is reliable, but some of the distorted word images are rather hard to solve.Inorder to solve that it allows you the option to “reCAPTCHA,” on clicking reCAPTCHA we receive a whole new pattern to solve. Especially for blind people they provided the facility of audio CAPTCHA, if the person is unable to visually make out the word. Text based CAPTCHAs is very easy to implememt. Also it is very effective and requires a large question bank. In Text based CAPTCHA the Number of classes of characters and digits are very small so the problem occurs for user to identify the correct characters and digits. The text based CAPTCHA is possible to identify the character and digit through Optical character recognition (OCR) technique. In Text based CAPTCHAs simple questions asked for example based on arithmetic equation are given below

a. What is four plus three (4+3=?).
b. What is five minus two (5-2=?).
c. Which of cabbage, apple and table is vegetable?



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ii. **Picture Based CAPTCHAs :** Picture CAPTCHA by Picatcha provides the user with an elementary choice of choosing the correct image that they are asked to identify. They never get harder than basic images so you won't have to worry too much about your users not being able to depict the difference between them and the incorrect images.Graphics-based CAPTCHAs are challenge-tests in which the users have to guess those images that have some similarity. For example: visual puzzles. In image based CAPTCHAs user is required to identity image. The advantage of image based CAPTCHA is that pattern recognition is hard AI problem and therefore it is difficult to break this test using pattern recognition technique. Example of images based CAPTCHA are given below. Example of Picture based CAPTCHA

iii. **CAPTCHAs based on puzzle :** In puzzle based CAPTCHA, a given picture is divided to different parts. A user is supposed to combine these chunks so as to form the complete picture same as the original one. Human can easily combine these chunks and complete this task. Example of puzzle based CAPTCHA are given below.

iv. **Maths Solving CAPTCHAs :** if your users can't solve these basic math problems then maybe you don't want them commenting on your threads anyways. These provide you with easy to read numbers that must be added in order to get past the CAPTCHA.Example of Math Solving CAPTCHA.

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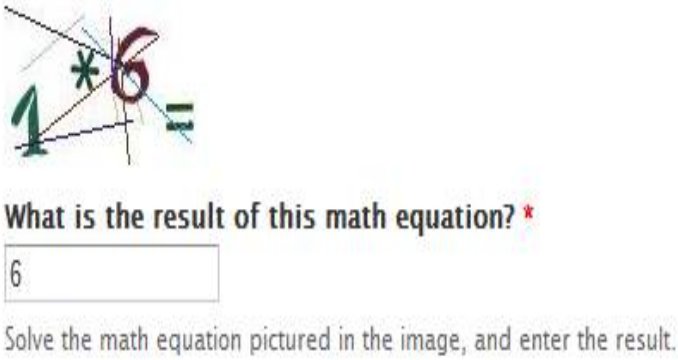

v. **Sound (Audio) Based CAPTCHAs:** Sound based CAPTCHAs are focused around the sound-based frameworks. These CAPTCHAs are produced for outwardly incapacitated clients. It contains downloadable sound cuts. In this kind of CAPTCHA, first the client listens and after that submits the talked word. The Nancy Chan an understudy from the City University in Hong Kong actualized the main sound-based framework name ECO. The sound built framework is situated in light of the distinction in the capacity between machine machines and people in perceiving talked dialect.The project picks a succession of digits and words haphazardly and renders the words and number digits into sound cuts and bends it. The contorted sound cut is then introduced to the client to enter the right word or number. The client is asked to enter precisely the same words as talked the sound cut. Example of Audio CAPTCHA:

Fig. 9 Audio CAPTCHA

vi. **CAPTCHAs based on video:** Video CAPTCHA is a newer and less commonly seen CAPTCHA system. In video-based CAPTCHAs, three words (tags) are provided to the user which describes a video. The user's tag must match to a set of automatically generated ground truth tags then only the test is said to be passed. The term video CAPTCHA is used to any CAPTCHA that uses a video as its means to present information to a user . Although video CAPTCHA is limited, both commercial andacademic application do exist. Example of video based CAPTCHA are given below. Example of Audio CAPTCHA:

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IV. DRAWBACKS OF DIFFERENT TYPES OF CAPTCHAs

S.no	Different types of captcha	Drawbacks
1	Text based captcha	1. In text images, user has some problem to identify the correct text or characters. i. Multiple fonts. ii. Font size. iii. 3.Blurred Letters iv. Wave Motion. 2. It can be easily identified by OCR techniques.
2	Images based captcha	Some users face problem of image identification who have low vision or due to blurring of images.
3	Audio based captcha	1. It is available in English therefore end user must have a comprehensive English vocabulary. 2. Character that have similas sound.
4	Video based captcha	Due to large size of file, users face problem to download video and find correct captcha
5	Puzzle based captcha	The task is not easy for users because puzzle based captcha take more time to solve the puzzle and identify actual arrangement of puzzles.
6.	Maths based captcha	User must have mathematical knowledge

V. CONCLUSION

In this paper, we have studies about captcha and various uses of captcha in web applications. we have studied the different kinds of CAPTCHA have developed yet. We also discuss various types of captcha and their drawbacks of different CAPTCHA based on Text, Images, Audio, Video and Puzzles. Captcha provide security from bot(web programs).and we will discuss issues in detail in future regarding captcha. But however lately it is seen that robot using advanced technologies such as Optical Character Recognition (OCR) can easily solve CAPTCHA.

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BIOGRAPHY

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