

# CAPTCHA: A TOOL FOR WEB SECURITY

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**Abstract**—Malicious computer programs today have tried to target websites, which have a significant effect on their availability and security. The CAPTCHA is a tool that is an efficient way of solving this problem. CAPTCHA is a full automated public turing test. Many human activities are performed on the Internet every day, such as schooling, commerce, conversations etc. Some hackers write programs to automatically make false registrations, for example when registering in websites, that waste web resources while this may even stop the whole website. Thus, human users should be differentiated from CAPTCHA software systems. CAPTCHA handwritten picture may be a work around. In this paper literature review of CAPTCHA has been done in order to enhance our knowledge about how CAPTCHA can provide web security focusing in particular on handwritten CAPTCHA and audio, video CAPTCHA in general.

**Keywords** - CAPTCHA, Handwritten CAPTCHA, Web security, Image recognition.

## 1. INTRODUCTION

It's not a matter of debate that a CAPTCHA is needed on a web form. To keep the website up and running, it must be checked. This sector has not found bars since Alan Turing's first test [5]. Spammers are evolving hand in hand with CAPTCHA technologies. The CAPTCHA 'S' object recognition has received a lot of attention by studying the movement of CAPTCHA [9, 20] [8, 23]]. These have proven to be secure, but true end user recognition takes longer than text-based. A analysis of the manual recognition literature indicates that many algorithms such as lexicon driven and lexicon safe, parallel classifiers and combinations have been explored,

Handwriting Realization has been successfully applied in various areas including Postal Address Interpretation [40], Test Reading [31] as well as Reading forms [34]. Post-processing and empirical and holistic methodologies [28, 30, 32, 33, and 36,38 and 39].

Spam and so-called "bots" are generally acknowledged to be an problem and must be defended against. Many defensive solutions like email filtering may be used to remove spam and bot attacks, robust solutions such as HIPs and CAPTCHAs are required. Few of CAPTCHA 's widely used are:



**Fig. 1.1 Examples of CAPTCHA**

The website of Alta Vista was first used to block the abusive automatic transmission of URLs by CAPTCHA [25]. At CMU there have been more attempts in relation to HIPs [6, 41]. The concept of CAPTCHA was introduced and its compulsory characteristics established. There is a number of CAPTCHA schemes available for users on its web site [26] (e.g., Gimpy, Bongo, Pix). PARC has introduced new challenges for the last three years [27, 7, 29, 35], together with UC Berkeley. Mandatory Human Participation (MHP) is another form of authentication regime that generates character recognition puzzles by a pattern-morphic algorithm [42]. All currently commercially operating CAPTCHAs benefit from superior human capacity to read written text on the screen. Speeches, facial expressions and graphical turning measures are also used in many algorithms. Captchas are based on sensory abilities. Various types of CAPTCHA available include GIMPY, BONGO, Pix and Sound based CAPTCHA [26]. All CAPTCHA except Sound based CAPTCHA are image-based CAPTCHA.

Four authentication measures are available [26]:

- Initialization: the user communicates the concern that the server is authenticated.
- CAPTCHA Challenge: the user challenges a manuscript word picture and passes it to the user,
- User Response: Return the correct reply to the server,
- Check: the server tests the user response and tests if the answer matches the correct response. This allows the user access or refuses the transaction.



**Fig. 1.2 Example of Initialization Steps**

The whole sole purpose of this literature review is to lay down a solid theoretical foundation for studying CAPTCHA by analyzing and investigating state-of-the-art algorithmic developments in this burning research area. Four section is divided use this paper. Section 1 is Introduction dealing with basics of topic. Section 2 describes literature survey of CAPTCHA. Section 3 brings conclusion. The paper finally ends with references.

## 2. LITERATURE SURVEY

CAPTCHA method is always used as a test that is easy for man to qualify, but difficult for abusive bots. A CAPTCHA is a software that can create and pass grade tests most people do, but automated web -bots are not able to pass them. An excellent manuscript given by Mukta Rao, Nipur Singh [1] on Handwritten CAPTCHA image is one mechanism for blocking spam-boats for web survival to enhance the web security. It is done in two ways, firstly, by introducing randomness which results in recognition complexity for spam boats and secondly, the ability of humans to recognize hand written characters. It results in acceptance of hand written CAPTCHA. Quoting case studies from online resources including Google, MSN, Yahoo, Rediffmail, Mail.com old, IEEE, Beeline, MT Sold, MTSnew, Megaphone, Skylonk. Some crucial observations include that either letters or numbers can be used. Only one single word can be used so same word length for all CAPTCHAs. In case of multiple words, all words exist in same line. Clustering Techniques of ANN are used to create three clusters namely, 26 small English letters, 26 capital English letters and 10 numeric digits (0-9). Random function is used to find size of the CAPTCHA word. The usage of dictionary terms has improved the possibility of usability. CAPTCHA Algorithm proposed had been well tested on online sever and was able to withstand the direction of current OCR programs. It is light weight, safe and highly efficient algorithm. But certain number of drawbacks still remain like security still remains an important issue and secured CAPTCHA image generation still remains an open challenge. In case incorrect recognition takes place while understanding type of words of CAPTCHA image a huge amount of time loss and wrong result is the big disadvantage. More effective web system is the need of the day to Render the site safe and spam bot robust.

Jing Song Cui et al.[8] notes that three-layer CAPTCHA can be introduced as security threats in 2-dimensional static CAPTCHA are increased because of the rapid growth of Pattern Recognition and artificial technologies. A realistic, stable three-layer dynamic CAPTCHA is proposed to combine biological vision theory with a single frame zero information theory that is beneficial for humans to understand and very difficult for bots and spammers to identify.

Single picture, zero information theory makes good use of the machine pitfalls when it is required to identify multiple moving objects from a difficult context. It remains impossible even with several frames for a computer program to crack. A framework three layers build CAPTCHA, which avoids attacks to improve visual effects effectively and thus opens new directions for the next-generation CAPTCHA architecture.

The application of human interactive evidence (HIP) has been introduced in [10]. The emphasis is to leverage the gap between human-computer abilities between hand-written word images in the fight against violent attacks. This uses a set of authentication protocols that people can pass, but modern systems cannot. We are based on predictive checks. Characters small or large, rotating, handwritten or typed screen can be recognized by individuals.[28]. This paper is designed to present CAPTCHA handwritten and to test the output of the CAPTCHA handwritten generation algorithm.

Ritendra Dattas, et al [2] propose in their paper IMAGINATION, the framework to generate attack-resistant, user-friendly and imaging-based CAPTCHAs (IMAge Generation for INternet AuthenticaTION). They create managed distortions on randomly selected images and provide the user with an annotation from a certain word list. Range is carried out in such a way as to fulfill the incongruous requirements of low awareness and high resistance to attack by image retrieval systems based on contents. Word choices are deliberately made to avoid confusion and to prevent attacks based on the statements themselves. IMAGINATION, an image-friendly



CAPTCHAs generation system, is resilient against automated attacks. A two-stage user interface enables rapid testing of the human and costly computers, provided a set of images of basic concepts. Controlled image composite distortions preserve visual clarity in order to distinguish people while making computer devices difficult to identify. The two-round cycle of clicking and annotation allows a user to click 4 times in total on the gui. A selection of 8 images is provided in the method to the user to create a composite photo if the position of the click is near one of the centers a guided deformation is performed on the selected image and a series of words are displayed. The user then selects an image that is annotated by clicking near his geometrical middle. When the click is not in the vicinity of any node, the check is resumed. If not, click and annotate process will be repeated once again and the CAPTCHA will be considered cleared. The click process is used in order to restrict the wording of the random assault rate. The distortions are applied in such a way that it preserves sufficient visual visibility for human recognition and automatic recognition.

As a conclude, a new algorithm in producing word choices addressing user-friendly and security concerns is suggested. This suggests a systematic approach in which composite distortion can be selected for inclusion in the permissible distortion collection and experiments obtain four such distortions.

In the form of a 3D animation, Jing-Song Cui et al[9] provides a non-OCR CAPTCHA approach focused on the detection of moving objects in images. The new technique could avoid attacks based on the identification of images and moving video objects. It proves to be a kind of modern, secure and functional method combined with simple human use.

The CAPTCH work has been carried out in several different regions of the world since its launch, and major processes split it into following parts [41]: OCR based simple, complex methods and Non-OCR based methods. Determine the original content elements package.

Randomly create a test code and place the animation displayed.

Draw video frames. Drawing of frames creates animation.

Save the animation and repeat every frame drawing.

In this post, the authors suggest a new design theory of zero information per frame.that no details on the contents of the verification code will be leaked from each animation frame, so that current computer programmes experience problems attacking using OCR methods. This form of CAPTCHA gives users much easier recognition.

. In their article M. Hassan Shirali-Shahreza et al [3] suggest a way of distinguishing between the human user and the computer machine by identifying and locating an object from other objects. This method mainly has no text, so the problem is as though it plays an audio file. This procedure is not published. People who donot know how to read and write can easily use this method. It is more difficult than reading a text to understand the words spoken by computer programmes. This paper provides a way to differentiate between people and computer machines, by displaying certain photos at the same time and by speaking out the question to the user rather than choosing a response as certain object. Since this method consists of three stages (recognition of the expression, the recognition of the object type and the identification of the object), and no computer can perform any of these three operations properly, this method can effectively resist computerized attacks.This is nice that certain groups of people with disabilities can use this approach effectively without much help to reach any age group.

The algorithm for adaptive noise reduction is discussed by Anjali Chandavale et al. [4] from CAPTCHA based on audio, thus helping to assess CAPTCHA 's power. To visually impaired users who visit the web with screen-reading programs this form of CAPTCHA was developed Audio / Voice-based CAPTCHA. Audio CAPTCHA is not open to users who can not view a CAPTCHA (because it is difficult to read) This method is divided into two steps and it is not in order as an input that passes through noise reduction processes in order to obtain a clean expression. Expression to Text Converter translates this clean expression into text form. This paper is based on the algorithm of adjusted spectral subtraction and changed context Algorithm of Square Error (MMSE). A easy software is designed to operate on speech frames that are lower than the SNR values by Modified Spectral Subtraction Algorithm Therefore, the method of noise reduction applied in these two algorithms removes value and incorporates the noise reduction mechanism in order to generalize it into a universal solution for all noise issues. The developed algorithm provides 80% precision for standard data set with variations in size, duration, accent and pitch in a noisy atmosphere

In his paper, Loperst [23] proposes a new paradigm for CAPTCHA building that provides simultaneous value both to online security research and pattern recognition research. Alternatively, it seeks to extract and integrate it in research to solve actual problem of interest to punish intruders who try to intentionally intrude to break CAPTCHA's on the WWW..Instead of discarding the feedback received by users of a web site, the authors claim that they should use it as simple labels to train and evaluate new classifiers for the implementation of specific pattern identification tasks in important areas under investigation. A page is selected and used simply by chance from the digital library. A variety of CAPTCHA tasks are posed to the user. All of these are related to the fact that they respond on a scanned image of a handwritten page in the dirt. The method and steps remain the same as any CAPTCHA algorithm, but enticing alternatives to the conventional approach to building the CAPTCHA are suggested.

## CONCLUSION

Web servers are still a challenge to defend against attacks. Different approaches may avoid attacks by offering efficient solutions from CAPTCHA based on both image recognition and object recognition in screened images.

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Those prove to be a kind of new, safe and achievable CAPTCHA in combination with simple use for humans. Algorithms can be developed that can interpret the distorted text generated in some cases at a success rate of over 90 percent by many commonly used traditional CAPTCHAs. Given that users are not willing to solve complicated CAPTCHA and spammers are still available to crack basic CAPTCHAs, more ways to safe and spam bot resistant web forms should be found.

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