

# Review on Captcha: Graphical Password for Security

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**Abstract**--The utilization of passwords is a major point of vulnerability in pc security, as passwords are typically straightforward to guess by machine-driven programs running dictionary attacks. Several security primitives are supported AI mathematical issues. Using hard AI problems for security is emerging as an exciting new paradigm, but has been under explored. Completely Automated Public Turing Tests to Tell Computers and Humans Apart (CAPTCHAs) are one of the important in every of the necessary branches of Human Interactive Proof (HIP) systems. It is used for defensive against undesirable and malicious bot programs on the net. Captchas are wide used as a security live to limit access from bots. Graphical password systems area unit a sort of knowledge-based authentication that tries to leverage the human memory for visual data.

This paper reviews various types of CAPTCHAs such as CAPTCHAs based on text, based on image, based on audio, based on video, based on puzzle etc. Also focuses on the classification of graphical passwords. Finally reviewed the various applications of CAPTCHAs such as online polls, email spam etc in detail.

**Index Terms**- CAPTCHA, graphical password, security.

## 1. INTRODUCTION

A basic task in security is to make cryptographic discipline primitives supported hard mathematical issues that square measure computationally stubborn. As an example, the matter of number factoring is prime to the RSA public-key cryptosystem and also the Rabin cryptosystem [1].

CAPTCHA (Completely machine-controlled Public Turing check to inform Computers and Humans Apart) , additionally called Human Interactive Proof (HIP), is an automatic Turing check within which each generation of challenges and grading of responses square measure performed by laptop programs. Captchas based on Artificial Intelligence (AI) issues that can't be solved by current laptop programs or bots, but simply resolvable by humans. A consumer who provides an accurate response to a challenge is plausible to be a human; otherwise a bot. Captchas has been wide used as a security live to limit access from bots [2].

CAPTCHA technique was at the start designed to forestall spammers from registering free accounts within the free email services. Today CAPTCHAs don't seem to be solely used for the above than many more. They have been used to forestall spam emails [3].

## 2. CAPTCHA TYPES

They are classified supported what's distorted that's whether or not characters, digits, or images. Some kinds of CAPTCHAs given below in figure 1:

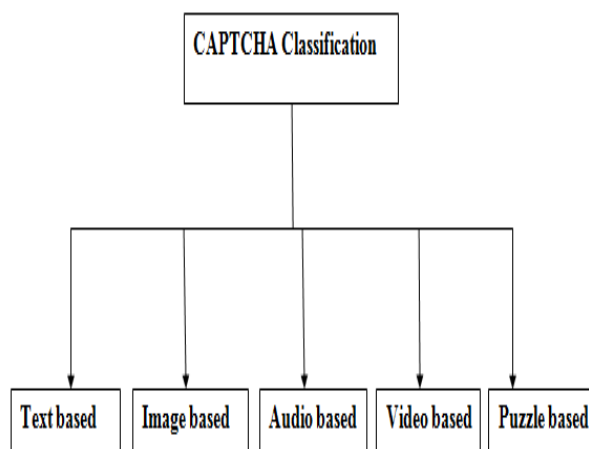


Fig. 1 Classification of CAPTCHA

**2.1. Captchas based on text:** It is a terribly easy to implement. It is terribly effective and needs an oversized question bank. In Text based captcha the amount of categories of characters and digits are terribly tiny that the drawback happens for user to spot the proper characters and digits. The text based captcha is feasible to spot the character and digit through Optical character recognition (OCR) technique.

CAPTCHAs supported texts are the foremost wide deployed schemes. Major internet sites like Google, Yahoo and Microsoft all have their own text-based CAPTCHAs deployed for years. Pessimial Print

is one among the primary text based theme. Baffle Text, ScatterType are text based schemes that generate insignificant pronounceable words. Following figure 2 shows some captchas based on texts:

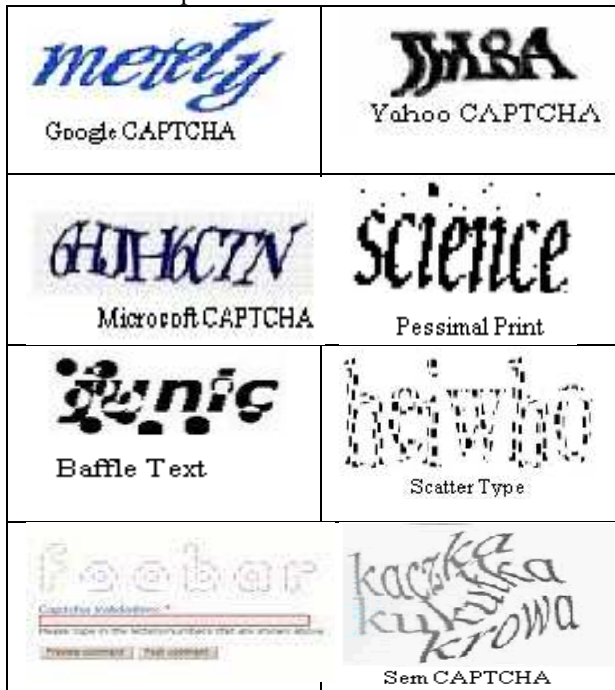


Fig 2: Some CAPTCHA based on text

**2.2 Captchas based on image:** In image based captchas user is needed to identify image. The advantage of image based captcha is that pattern recognition is difficult AI issue and so it's difficult to interrupt this check mistreatment pattern recognition technique. Example of image based CAPTCHA given below in figure 3.



Fig 3 Image Based Captcha

**2.3 Captchas based on audio:** Audio-based CAPTCHAs are depends the sound-based systems. These CAPTCHAs are developed for visually disabled users. It contains downloadable audio-clips. During this variety of CAPTCHA, first the user listens and at that time submits the word. The program picks a word

or a sequence of numbers arbitrarily, renders the word or the numbers into a sound clip and distorts the sound clip; it then presents the distorted sound clip to the user and asks users to enter its contents. This CAPTCHA is predicated on the distinction in ability between humans and computers in recognizing language. Nancy Chan of town University in Hong Kong was the primary to implement a sound-based system of this kind. The concept is that somebody is to expeditiously disregard the distortion and interpret the characters being read out whereas computer code would struggle with the distortion being applied, and want to be effective at speech to text translation so as to achieve success. This is often crude thanks to filter humans and it's not thus common as a result of the user needs to understand the language and also the accent during which the sound clip is recorded. Following figure 4 shows an example of audio based captcha [4].



Fig 4 Audio Based Captcha

**2.4 Captchas based on video:** Video captcha may be a newer and fewer ordinarily seen captcha system. In video-based captchas, 3 words square measure provided to the user that describes a video. The user's tag should match to a group of mechanically generated ground truth tags then solely the check is alleged to be passed.

The term video captcha is employed to any captcha that uses a video as its means that to gift data to a user. Though video captcha is proscribed, each industrial a tutorial application do exist. Example captcha supported video is given below in figure 5.



Fig 5 Video Based Captcha

**2.5 Captcha based on puzzle:** typically in puzzle based captcha a given image is split to chunks [2, 5]. A user is meant to mix these chunks therefore it will make whole image same as the original one [5]. Following figure 6 shows an example of puzzle based captcha:

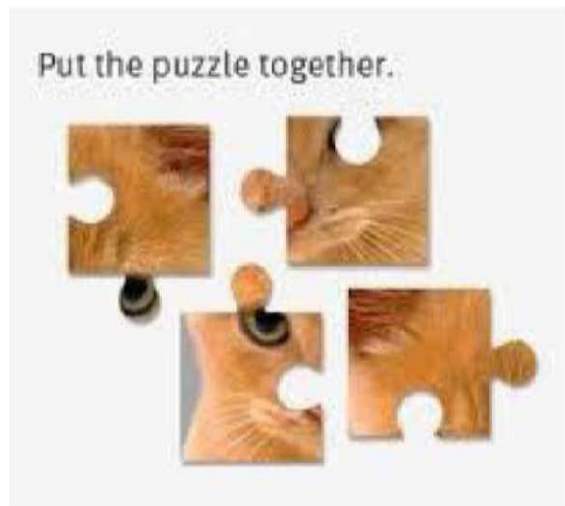


Fig 6 Puzzle Based Captcha

### 3. GRAPHICAL PASSWORDS:

Graphical passwords (GP) use photos rather than text passwords and square measure partly driven by the very fact that humans will keep in mind photos additional simply than a string of characters. Graphical based passwords schemes will be generally classified into three main categories:

**3.1 Recognition based Systems:** this method is additionally referred to as Cognometric Systems or Search metric Systems. Recognition primarily based techniques involve characteristic whether or not one has seen a picture before. The user should solely be ready to acknowledge antecedently seen pictures, not generate them unaided from memory.

**3.2 Pure Recall based systems:** additionally referred to as Drwanmetric Systems. In pure recall based ways the user has got to reproduce one thing that he or she created or elite earlier throughout the registration stage.

**3.3 Cued Recall based systems:** additionally known as Iconmetric Systems. In cued recall-based ways, a user is supplied with a touch in order that he or she will be able to recall his his/her word [6].

### 4. RELATED WORK:

Chellapillas' et al attacked variety of early captchas victimization machine learning algorithms, and that they achieved four.89% success on Associate in Nursinging early version of Google's CAPTCHA (around year 2004. In 2007, we tend to develop a way that exploited gaps (white space) between characters in Google's CAPTCHA at the time, and our attack

achieved twelve-tone system success. it absolutely was reported in this some spammers succeeded in breaking the Google CAPTCHA victimization two compromised zombie hosts, with every host employing a variation of their attack. This attack claimed successful rate of two hundredth, nevertheless no technical details are discovered. Associate in Nursinging attack on ReCAPTCHA employing a combination of image process and OCR techniques was reported with successful rate of seventeen.5%. At DEFCON'18, Houck conferred another attack on ReCAPTCHA; victimization each character segmentation and character model matching technique, his attack achieved 100 percent success on Associate in Nursinging early version of ReCAPTCHA and thirty first success on a more modern version [7].

Graphical passwords were originally outlined by Blonder (1996) [8]. Partha Pratim Ray et al. enforced the Ray's Scheme: Graphical parole based mostly Hybrid Authentication System for good hand-held Devices this theme is planned for good hand-held devices (like good phones that are PDAs, iPod, iphone, etc) that area unit a lot of handy and convenient to use than ancient microcomputer systems [9].

Jeff Yan and Ahmad salaat El Ahmad Authors talks regarding usability problems that ought to be self-addressed within the style of text-based CAPTCHAs and planned a straightforward framework for examining usability problems with CAPTCHAs, and showed that this framework is applicable to text-based CAPTCHAs. They are doing not claim the list of usability problems with all the captchas, and encourage researchers to spot a lot of them victimization our framework. Specially, lots a lot of are often explored for sound-based and image-based CAPTCHAs [10].

M.S.Vinu, R.T.Nivetha, M. Mano Chitra, K.Priyadharsini4 authors conferred the implementation of persuasive cued click points, graphical parole themes together with security and authentication mechanisms victimization ancient parole scheme beside secret key generation and life science. And to boost the effective security area to support users in choosing passwords of upper security, the target is to produce security mechanisms for the users and that makes the attackers troublesome to guess the passwords [11].

Gerardo Reynaga and Sonia Chiasson authors conferred the results of two usability studies, a user study and a heuristic analysis, of captchas on smartphones. This work is a vital step aimed toward understanding user frustration common to existing and deployed captchas on smart phones. Our results recommend that participants most popular schemes that involve fast, straightforward challenges with very little or no distortion. Sadly existing captcha schemes that were most popular by users fail to produce adequate security [12].

## 5. PROPOSED METHODOLOGY

The flow of proposed methodology is given below in following figure:

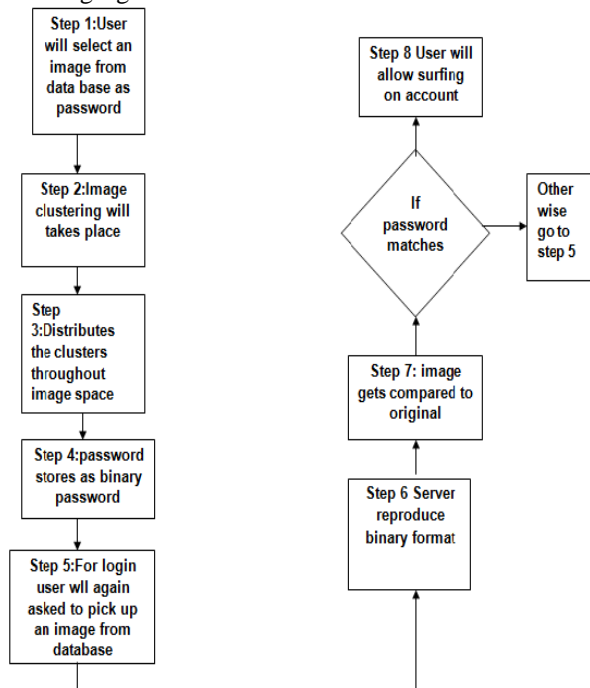


Fig. 7 Data flow diagram of proposed methodology.

Step1: At the time of registration user will select an image from database as password.

Step2: Image clustering will take place.

Step3: Distributes clusters throughout image space

Step4: Converted into binary format and stores as a binary password.

Step5: At the time of login user will again pick up an image captcha as password from database.

Step6: Server reproduces the binary format of selected password.

Step7: If password produced is matches then go to step8 otherwise it will go to step5.

Step8: After matching of password user will allow surfing on account.

## 6. APPLICATIONS

CAPTCHAs are employed in varied net applications to spot human users and to limit access to them. A number of them are:

1. On-line Polls: Bots will make mayhem to any unprotected on-line poll. They may produce an outsized variety of votes which might then incorrectly represent the poll winner in spotlight. This additionally ends up in bated religion in these polls. CAPTCHA is employed in websites that have embedded polls to guard them from being accessed by bots, and thence quote the reliableness of the polls.

2. Protective net Registration: many corporations supply free email and different services. Till recently, these service suppliers suffered from a heavy drawback – bots. These bots would cash in of the

service and would sign on for an outsized variety of accounts. This typically created issues in account management and additionally enhanced the burden on their servers. CAPTCHAs will effectively be wont to filter the bots and make sure that solely human user square measure allowed forming accounts.

3. Preventing comment spam: Most bloggers square measure at home with programs that submit sizable amount of machine-driven posts that square measure finished the intention of accelerating the computer program ranks of that web site. CAPTCHA is used before a post is submitted to confirm that solely human users will produce posts. A CAPTCHA will not stop somebody World Health Organization is set to post a rude message or harass Associate in nursing administrator; however it'll facilitate stop bots from posting messages mechanically.

4. Computer program bots: it's typically fascinating to stay sites unindexed to stop others from finding them simply. There's Associate in Nursinging HTML tag to stop computer program bots from reading sites. The tag, however, does not guarantee that bots will not browse an internet page; it solely serves to mention "no bots, please." computer program bots, since they typically belong to massive corporations, respect sites that do not wish to permit them in. However, so as to actually guarantee that bots will not enter an internet web site, CAPTCHAs square measure required.

5. E-Ticketing: price ticket brokers like Ticketmaster additionally use CAPTCHA applications. These applications facilitate stop scalpers from bombarding the service with large ticket purchases for giant events. While not some variety of filter, it's doable for a plunger to use a boot to put tons of or thousands of price ticket orders in an exceedingly matter of seconds. Legitimate customers become victims as events sell out minutes once tickets become accessible. Scalpers then attempt to sell the tickets on top of face worth.

6. Email spam: CAPTCHAs additionally gift a plausible answer to the matter of spam emails. All we've got is to use a CAPTCHA challenge to verify that so somebody's has sent the e-mail [13].

## 7. CONCLUSION

This paper reviewed the different types of CAPTCHAs and different types of graphical passwords. CAPTCHAs are basically divided into five types as image based, text based, audio based, video based and puzzle based. Presented the various related work which is done by various authors. We proposed secure technique provides protection against online dictionary attacks on password. At the end we have studied various applications such as online polls, email spam, search engine bots etc.

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