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Image Based CAPTCHA as a Graphical Password

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ABSTRACT: Various security primitives uses hard mathematical problems. Use of hard AI problems for security is emerging and exciting new pattern, but has not yet been explored. In our project, we present a new security primitive based on hard AI problems, this system is named as Captcha as graphical passwords (CaRP). CaRP is Captcha as well as graphical password scheme. CaRP symbolize a number of security problems together, such as online guessing attacks, relay attacks, and shoulder-surfing attacks. Generally, a CaRP password can be found only probabilistically by automatic online guessing attacks even if the password is in the search set CaRP also offers well approach to address the well-known image hotspot problem in popular graphical password systems, like PassPoints, that generally leads to choices of weak password.

KEYWORDS: Imaged based CAPTCHA, Graphical CAPTCHA, Authentication, CAPTCHA, Passwords, Graphical Passwords, Security Attacks, Hard AI problem, Click based CAPTCHA, CaRP, Password Guessing Attacks, Security Primitives, etc.

I. INTRODUCTION

Today Security is most important issue in our daily life. Captcha is used for protection against different attack and to differentiate between human and robots. Basically CAPTCHA stands for Completely Automated Public Turing test to tell Computers and Humans Apart.In image based captcha system is click based graphical passwords scheme, where sequence of clicks on an image is used to derive a password. It can be applied on touch screen devices where on typing passwords is not more secure, especially for secure internet applications such as e-banks. It play vital role in security.This paper, gives brief idea about a new security primitive based on hard AI problems, which we call CaRP (Captcha as gRaphical Passwords). CaRP is click-based passwords, where a sequence of clicks on an image to derive a password. In our click-based captcha schemes, images used in CaRP are Captcha challenges, and a new CaRP image set is generated for every login attempt.CaRP gives protection against online dictionary based attacks on passwords, which have been for long time a major security issue for various online services. In early system mathematical and text passwords are used that are very difficult to remember, so image based captcha is easy to recognize and provide more security.

II. LITERATURE SERVEY

Paper1: Bin B. Zhu, Jeff Yan, GuanboBao, Maowei Yang, and NingXu IEEE transactions on information forensics and security, vol. 9, no. 6, june 2014.
Author has adopted a hard Artificial Intelligence problem i.e. animal click, text click and animal grid to provide a better security solution and it is highly reliable and easy to visualize. This authentication system is based on Animal Grid and Click text which can be used in smartphone as well as desktop computers.An Image CAPTCHA Based on Depth Perception. In this system 6 images of different objects and different sizes of images is used and user task is to order these images in terms of their relative size. Hadyn Ellis implemented the Science behind Passfaces. In this system 3x3 grid is used. User also uses the human faces or a numerical keypad value this value is corresponds to the faces on the grid. In that at least 3 to 7 faces user have to select for login process. But in this system required login time can be increased if user selects more passfaces.

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Paper 2:MayurPatel,NimitModiInternational Journal of Computational Engineering Research (IJCER) , VOL. 04, NO. 11, November-2014.
In this paper author implemented three different group of images i.e. 1. Famous Place, 2.Famous People, 3.Reputed Company Name each contains 25 images. This paper introduces image based captcha to protect user data or unauthorized access of information. In that password is created from images and text password. Current system is based on only text password but it has disadvantages small password mostly used and easy to remember. This type of password is easy to guess through different attack i.e. dictionary attack and brute force attack. In this paper we have proposed a new image password scheme. In this Recognition based technique is used with numerical password which provide more security and easy to remember text and graphical password.

III.MOTIVATION

Existing system is based on hard mathematical problem. This achieves limited success compared to hard AI problems. But our proposed system defense against online dictionary attacks which is big problem in earlier system. CaRP addresses a number of security problems altogether. The long text passwords are difficult to remember. If we use smaller password then they easily identify. So Image based captcha provide more security during authentication.

IV.PROBLEM DEFINATION

Use of Graphical Captcha is a new and convenient security primitive that will provide better security using hard AI problems. Existing system is based on hard mathematical problem. This achieve limited success compared to hard AI problems. But our proposed system defence against online dictionary attacks which is big problem in earlier system.

V. EXISTING SYSTEM

Security primitives are based on hard mathematical problems. Using hard AI problems for security is emerging as an exciting new paradigm, but has been underexplored.Afundamental task in security is to create cryptographic primitives based on hard mathematical problems that are computationally intractable.
reCAPTCHA is a free service that protects your site from spam . Used advanced risk analysis techniques to tell humans and bots apart. With the new API, a significant number of your valid human users will pass the reCAPTCHA challenge without having to solve a CAPTCHA. reCAPTCHA comes in the form of a widget that you can easily add to your blog, forum, registration form, etc.
Hundreds of millions of CAPTCHAs are solved by people every day. reCAPTCHA makes positive use of this human effort by channelling the time spent solving CAPTCHAs into digitizing text, annotating images, building machine learning datasets. This in turn helps preserve books, improve maps, and solve hard AI problems.

CLICK TEXT GRID:
An Click Text is a recognition based CaRP scheme built on top of text Captcha grid. The text captcha contains alphabet comprise of characters without any confusing.i.e, Letter “O” and digit “0” may cause confusion in that image grid and so this characters should be excluded and only alphabets are used. A Click Text password is a sequence of characters in the numbers, alphabets, and special characters like e.g.,=“A@B#9CD8$7”.at time of generation, every characters position is tracked to check a exact accuracy for the location of the character. After that this characters should be tested, and then only those suitable characters will be placed on images. This authentication server relies on the ground truth and hash values stored at the time of user registration; it helps to identify the characters corresponding to user clicked points at the time of login of user. That Click Text images, characters can be arranged randomly on 2D space. This types of challenges different from normal type of text Captcha challenges.

IMAGE WITH NUMBER GRID:
Applied in the mapping step, these make it difficult for computers to automatically recognize images in the generated image pool, but humans can easily identify different instance of images generated in grid. An CaRP should have a large effective password space to overcome human guessing attacks. Image grid is a combination of Click image and CAS (click a secret)(i.e.)Images behind a number grid. To enter a password, a Click image is displayed first to user. After an Image is selected, an image of n× n grid appears on screen, with the grid cell size which equals the bounding

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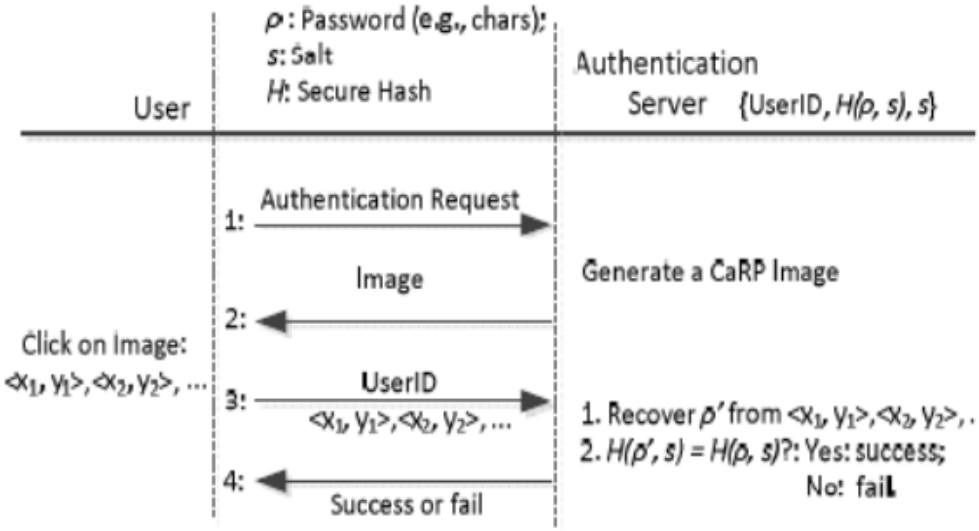
rectangle of the selected image. Each grid cell is labelled to help users to identify. The bounding rectangle of the selected image is identified, an image of n× n number grid with the identified bounding rectangle as its grid cell size is generated. If the grid image is too big or too small for a user to view, then the grid image is fitted to a suitable size. After that the user will click the respective image from the background grid thus abovephenomena is repeated until the user has finished entering their password.

AUTHENTICATION USING CARP SCHEME:



This CAPTCHA schemes are used with additional protection such as secure channels between clients and the authentication server. This authentication server (AS) stores a salt (s) and a hash value H (P, S) for each user ID by MD5 algorithm, where the password of the account is are not stored only hash values. This CaRP password is a sequence of clickable points of visual objects that the user selects at the time of registration, (AS) generates a CaRP image and records the locations of the objects in the image given. Then the time of authentication that the user needs to clicked on the image. After that the authentication server retrieves salt (S) of the account, calculates the hash value of (P) and compare with the salt, and then match the obtained result with the hash value which is already stored for that account. Validation succeeds only if the two hash values get matched. This series of process is called the basic CaRP level authentication.

LIMITATIONS OF EXISTING SYSTEM:

The existingcaptcha has achieved just a limited success as compared with the CaRP primitives. Generallyexistingthat can be easily influenced by various attacks like brute force attack,shoulder surfing attack, etc. If we use long text passwords then that are difficult to remember and thus increase the complication.The use of hard AI problems in security has the notable primitive and which can be generally separates human and robot by difficult AI problems.The existing system paradigm has achieved just a limited success as compared with the cryptographic primitives based on hard math problems.By using this hard AI (Artificial Intelligence) problems for security, initially proposed in,is an exciting new paradigm. In this paradigm, the most notable primitive invented is Captcha, which distinguishes human users from computers by presenting a challenge and problems.

VI. PROPOSED SYSTEM

In this system we present a new security primitive based on hard AI problem and named as “Image based CAPTCHA system”.We implement a graphical password systems built on top of Captchatechnology,which is known as Captcha as graphical passwords (CaRP). CaRP is consistingof both a Captcha and a graphical password scheme. It provides

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reasonable security and usability. It is flexible and compatible. This is widespread and considered as a top cyber security risk. Provide protection against online dictionary attacks. It is also very easy to recognize for humans and also easy to remember.
In our system is Recognition Technique based system. In this technique there are different group of image is used. Each group contains 9 images. For selection user has to select at least three image from group during registration phase. At a login time again there is captcha is present. The user has to click on three images from the 9 set of images. This graphical captcha system provides protection against shoulder surfing attack, dictionary attack, brute force attack using text graphical password.

6.1 DESIGN

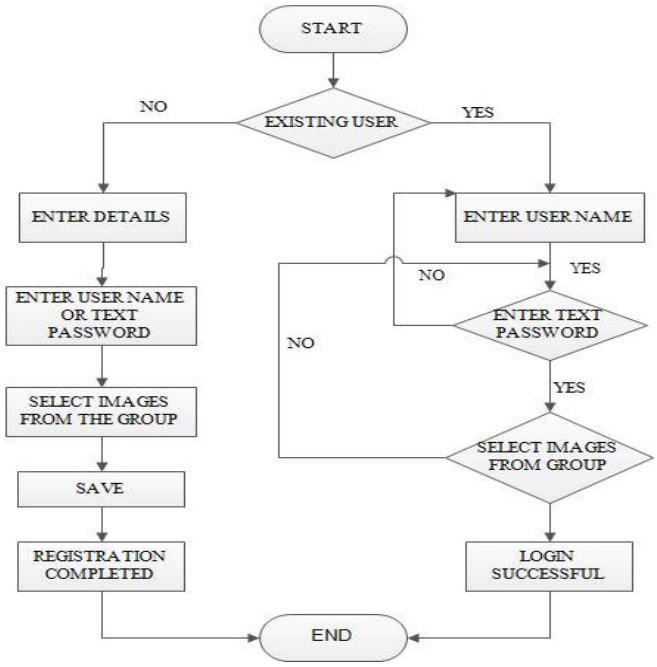

Fig. 1.0 Flowchart of System

1. On user side user must enter user name. If it exist in database then he/she must unique password and then need to face image CAPTCHA for successful login.
2. If user is new to this page, then he/she must first register through register page provided by entering the password confirming it to show its uniqueness.
3. If on user side user failed to cracks the captcha test then random sequence of images are generated.

6.2 ALGORITHM

MD5 (Message-Digest algorithm 5): is a widely used cryptographic function with a 128-bit hash value. MD5 has been employed in a wide variety of security applications, and is also commonly used to check the integrity of files.An MD5 hash is typically expressed as a 32-digit hexadecimal number.
ALGORITHM:-MD5 processes a variable-length message into a fixed-length output of 128 bits.
STEPS: 1.The input message is broken up into chunks of 512-bit blocks (sixteen 32-bit little endian integers),the message is padded so that its length is divisible by 512.
2.The padding works as follows: first a single bit, 1, is appended to the end of the message.
3.This is followed by as many zeros as are required to bring the length of the message up to 64 bits fewer than a multiple of 512.
4.The remaining bits are filled up with a 64-bit integer representing the length of the original message, in bits.

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5.The MD5 algorithm uses 4 state variables, each of which is a 32 bit integer (an unsigned long on most systems). These variables are sliced and diced and are (eventually) the message digest. The variables are initialized as follows: A = 0x67452301 B = 0xEFCDAB89 C = 0x98BADCFE D = 0x10325476.
6. Now on to the actual meat of the algorithm: the main part of the algorithm uses four functions to thoroughly goober the above state variables. Those functions are as follows:
F(X,Y,Z) = (X & Y) | (~(X) & Z) G(X,Y,Z) = (X & Z) | (Y & ~(Z)) H(X,Y,Z) = X ^ Y ^ Z I(X,Y,Z) = Y ^ (X | ~(Z)) Where &, |, ^, and ~ are the bit-wise AND, OR, XOR, and NOT operators
7. These functions, using the state variables and the message as input, are used to transform the state variables from their initial state into what will become the message digest. For each 512 bits of the message, the rounds performed (this is only pseudo-code, don't try to compile it) After this step, the message digest is stored in the state variables (A, B, C, and D). To get it into the hexadecimal form you are used to seeing, output the hex values of each the state variables, least significant byte first. For example, if after the digest:
A = 0x01234567;
B = 0x89ABCDEF;
C = 0x1337D00D
D = 0xA5510101
Then the message digest would be: 67452301EFCDAB890DD03713010151A5 (required hash value of the input value).

VII. IMPLEMENTATION AND RESULT

When a new user comes it has to register through following registration form:

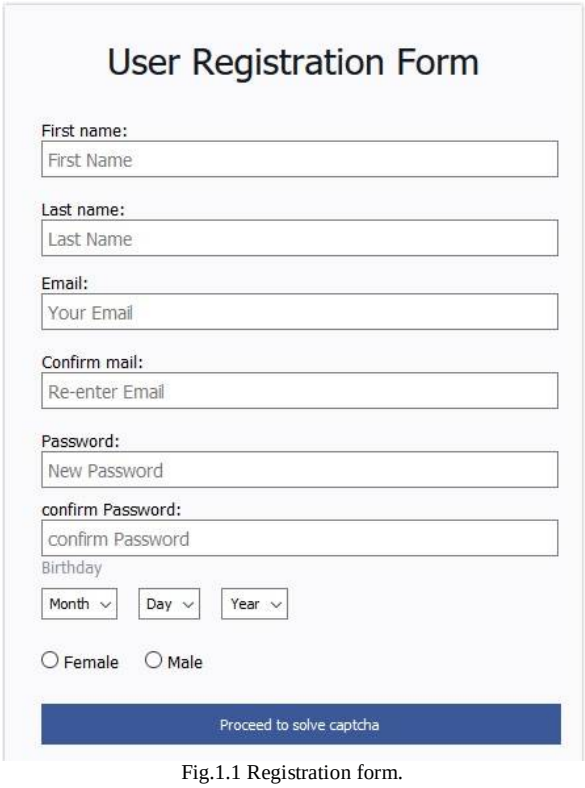

Fig.1.1 Registration form.

If any new user visits the webpage he/she may first need to register with the website, and if the user is already registered he/she may need to login to the website. At the both times user may need to pass image captcha

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provided by system to differentiate between human and robot. This test is based on question answer problem in which user have to select appropriate image.

When user click on captcha test

Fig.1.2 Image CAPTCHA

after click on particular imagecaptcha:

Fig.1.3 Result of CAPTCHA after click

When user wants any important information from any website then he/she have to register with the page. The system is based on challenge response method.if user already registered then they have to login with the page and for this user have to solve the CAPTCHA test. When user click on any image i.e. suppose we give instruction as 'Select cookies from following images' when user selects all the cookies images then only user will be proceed to next page. It means that the user solve the CAPTCHA test correctly. And if the user failed to identify the images then after clicking refresh the random CAPTCHA will be generated. For selecting wrong images the error message will be prompted and the user will not be able to register till he/she not pass the correct Captcha challenge.

Comparison of existing system and proposed system:

Sr. no	Parameters	Existing System	Proposed System
1	Approach	Number, Text grid	Image grid
2	Security	Moderate	High
3	Loading Time	Less	Moderate
4	Complexity	Moderate	Less
5	Interface	Less user friendly	More user friendly

Fig.1.4Proposed v/s Existing System

VIII. ADVANTAGES

1. It offers reasonable security and usability and appears to fit well with some practical applications for improving online security.
2. This threat is widespread and considered as a top cyber security risk. Defense against online dictionary attacks is a more subtle problem than it might appear.
3. Easy to use for humans due to low friction and effortless interaction.
4. The system also has creation value and can be implemented on touch screen devices.

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IX. CONCLUSION

Our proposed system provides more security to data and protection against different attack. The system is easy for humans and difficult for bots. Our system is based on graphical captcha. For successful login user has to select correct image from the given set of images. If user is only able to select correct image then he she only be able to get access to given webpage.

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It is glad opportunity for us to present the project "IMAGE BASED CAPTCHA SYSTEM" expressing our heart left gratitude to all those who have liberally offered their valuable suggestions towards the completion of the project.The credit of our proposed system goes to our Prof.Mangale S.R. (RMCET, Ambav, Ratnagiri) whose positive attitude, encouragement and moral support lead to the success of the paper.

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BIOGRAPHY

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