CAPTCHA Interface: A new Develpoment of CAPTCHA for Efficient Representation

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ABSTRACT: Completely Automated Public Turning Test to tell Computers and Humans Apart is an acronym of CAPTCHA. CAPTCHA is test to testing where only human passing the test and not the malicious computer program or BOT. CAPTCHA is generating tests that computer cannot pass but human can easily pass. There are four types of different methods like text, image, audio and video based CAPTCHA. In this paper describe an image based CAPTCHA technique based on drag and drop mouse action. Given CAPTCHA test is easy for human but difficult or impossible for malicious computer program or bot.

KEYWORDS: Bot, CAPTCHA, Drag and Drop, Human, System.

I. INTRODUCTION

CAPTCHA stand for Completely Automated Public Turing test to Tell Computers and Humans Apart [1]. You have already seen CAPTCHA tests on lots of Websites. The image of several distorted letters is most common form of CAPTCHA. It is your job to type the correct series of letters into a form. If your letters match the ones in the distorted image, so you successfully pass the test otherwise you fail the test. CAPTCHA is a type of challenge-response test used in computing to determine whether or not the user is human [2]. Using CAPTCHA, only human can solved task so that CAPTCHA is prevent unauthorized access and keep data safe, such as preventing to send multiple emails, multi online ticket booking etc.

Accordance with text-based CAPTCHA technique the image-based CAPTCHA can be easy to solve by human and difficult by bots. Developing an image based CAPTCHA need to more information than text-based CAPTCHA. Because the users can easily identify how solve test. Here one important thing to design image based CAPTCHA test can be easy for human.

This paper is organized as follows. In section II, we describe overview of system developing CAPTCHA technique. In section III, we describe implementation of system. In section IV, represents conclusion.

II. RELATED WORK

In [4] authors develop novel family of graphical password systems built on CAPTCHA technology, which they call CAPTCHA as Graphical Password (CaRP). CaRP is both CAPTCHA and Graphical password scheme. CaRP is click-based graphical passwords where a sequence of clicks on an image is used to derive a password. In this, two graphical password schemes are newly proposed and there are Recognition-based CaRP and Recognition-Recall CaRP. Recognition-based CaRP are three category of scheme following ClickText, ClickAnimal and AnimalGrid. Recognition-Recall CaRP are two category schemes TextPoint and TextPoint4CR. In [5] author suggested approach is Drag and Drop CAPTCHA or DnD. This CAPTCHAs challenges uses conventional mouse events to recognize human intervention proof. If attacker computer knows answer of test but it can't pass this test without human intervention. In [6] author describe proposed CAPTCHA is dynamic image based three tier CAPTCHS system. The layers are Image access layer, Image processing layer and Presentation layer. A dynamic image based CAPTCHS is proposed keeping view that Turing test is perceivable by human but is difficult to crack by BOT. In these three layer architecture process are all the randomly selected images from image access layer are processed before submitting it to presentation layer. In [7] author presented approach to protect user's password against spyware attack. There introduction CAPTCHA into

the realm of graphical passwords to resist spyware programs and these are main contribution. CAPTCHA is Pass-image CAPTCHA. Authentication, it is a key area in security research, using these user's should be allowed to access to a given system or resource. Alphanumeric password is traditional and most common method for authentication but there is some problem in their usability and security.

III. OVERVIEW OF SYSTEM

Here developing CAPTCHA is based on image. This novel image based CAPTCHA will be developing by using image with their segments. Image based CAPTCHA is some complex than text-based CAPTCHA but security of image based CAPTCHA is high than text-based CAPTCHA, here developing CAPTCHA is easy for human and more difficult for bot or malicious computer program. Now, describe developing CAPTCHA technique briefly in simple words. Developing novel CAPTCHA approach will be three boxes are there for passing the test. There are following: one original image box, second is drag-box with segments of original image and third is drop-box. Using familiar mouse action drag and drop is performing by user for CAPTCHA test. Here task of user is that dragging given drag-box segments one by one randomly and dropping randomly into the drop-box, most important thing matter on task, generated drop-box image will must like original image. All of these boxes are in one CAPTCHA Interface. Below Show the flow chart of system.
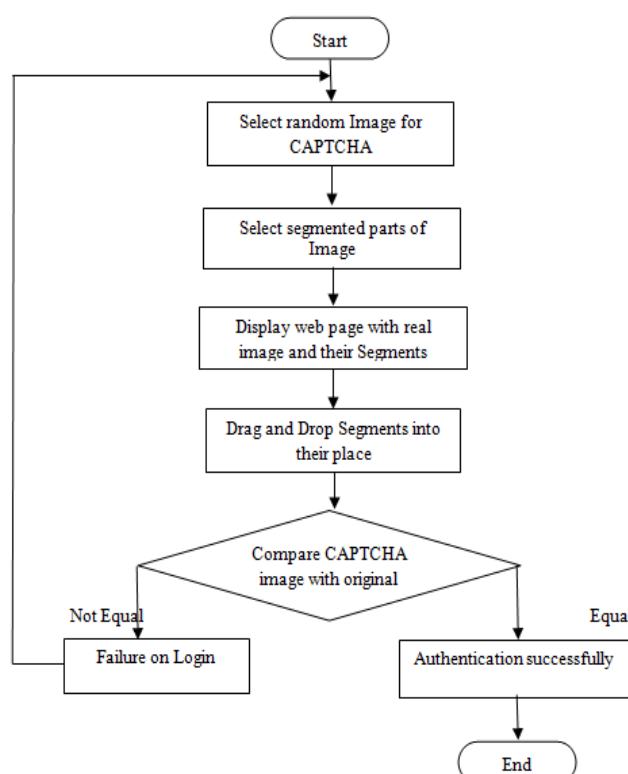

Fig. 1. Flow Chart of System.

IV. ALGORITHM OF CAPTCHA INTERFACE

Here below show algorithm of CAPTCHA Interface. Three operation action are describe on algorithm form and these are Input and output, drag and drop operation, and submit.

Algorithm: CAPTCHA Interface

Input: IM, DB1$_{\ldots\ldots,j}$, DI$_{1\ldots k}$

Where, j = 4 or 6 and k = 4 or 6 and j=k.
Output: Done

  // IM is sample random image and put into Original-box.
  // DB is number of Drop-Box and also Drop-boxes are same as Drag Images box.
  // DI is number of Drag-Box and drag-boxes are same as Cut images of Sample image.

Start:
int fill_DB=0;
list L=cut images;
l=random ((1...j) - L);   ['-': Minus Sign]
place(Lk,DIn);

//l is selected random image from list.
//place(Lk,DIn) is place selected random image from list to Drag Image box.
//fill_DB is filling box of drop-box.

Action for Drag & Drop Operation

int k, int j;
place(DIk,DBj);
fill_DB++;

// k is for Random image from DI.
// j is for Random position of drop box to drop image.
// place(DIk,DBj) is place random image from drag image box to drop image box.

Action for Submit

```
if(fill_DB=L.length)
{
        if(DB[i].value==L[i].value)
        {
              Done = true;
         }
      else
              Done = false;
              Error="Not Matched.. Retry";
}
else
{
      Done=false;
      Error="Filed all Drop Boxes"
}
end
```

    //DB[i].value==L[i].value is comparing the value of drop box [i] position with list [i] position.

V. IMPLEMENTATION

In implementation of image based CAPTCHA technique is begin with viewing by user interface. A user performs mouse action drag and drops all the images into their respective place. All images must be placed right place for

authorized as human user otherwise they will not authorized as human user. In this way prompt again with a new CAPTCHA needs to be solved.

Here CAPTCHA system is based on three main parts: collection of images, image processing, and user interface. Collection of image is store in directory. Image size is 200×200 pixels and format is JPG or JPEG. Randomly select image from directory of 200 images. An image is format of JPG and appears in original image box. Figure 2 is show original image box interface. Original image is randomly select from directory and their segments. There segments is shown in figure 3 drag-box interface of image 1...j where j=4 or 6. In drag box interface images is 1...j where j=4 or 6. Original Image is cutting into 4 segments or 6 segments randomly for more security.
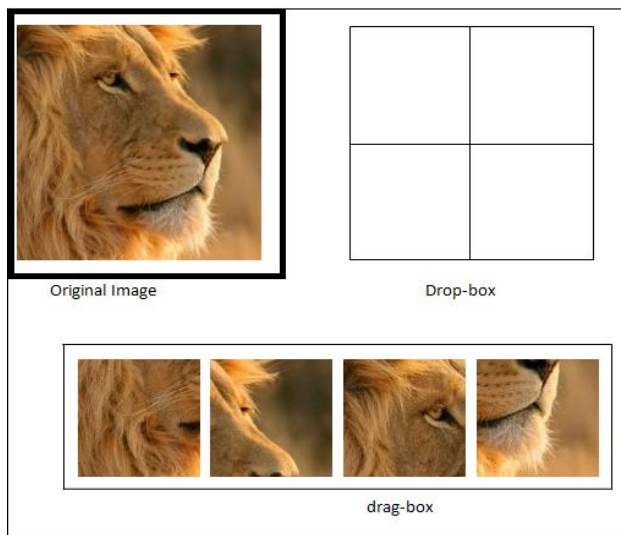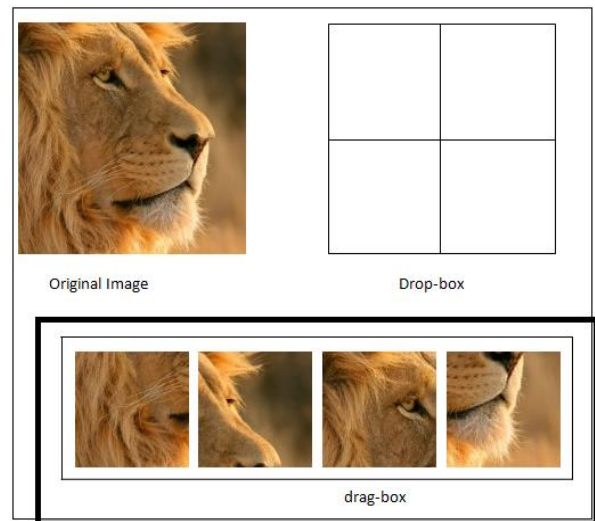

Fig. 2. Original Image box Interface.   Fig. 3. Drag-box Interface (image 1…j)

Drop-box interface is shown in figure 4 where images 1…k where k=j. In drag-box j=4 than drop-box k=4 when j=6 then k=6. This task performs using mouse action drag and drop images drag-box to drop-box. Drag and drop image randomly and place randomly, any type of sequence is not for drag and drop images. In figure 3 Highlighted image is draggable images for drop the right place of Drop-box interface.
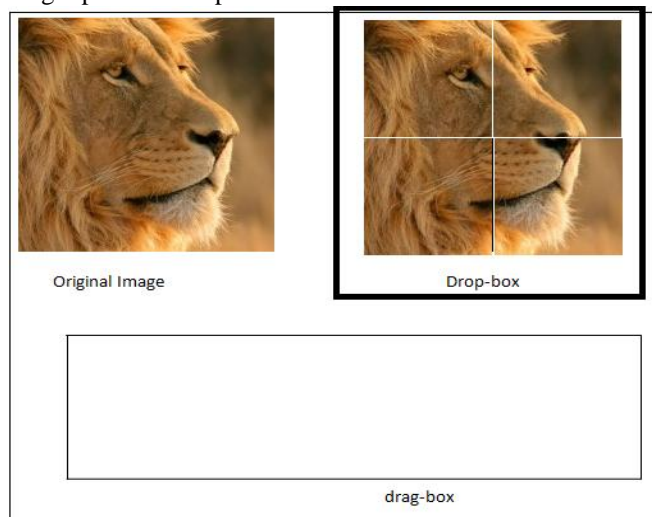

Fig. 4. Drop-box Interface(images 1...k).

In figure 4 shown all segments of original image had been placed into their respective place. Here shown all segments of parts of original image 1...j placed correctly drag-box to drop-box. This task performs using mouse action drag and drop. Image segments one time drag and drop then again cannot drag from the drop-box for change. Only one time drag from drag-box and drop to drop-box.

When all the image segments had been placed with their right place same with original image in the original image box so it is pass the test otherwise another CAPTCHA image will generated automatically and that user need to solve the test again for authentication.
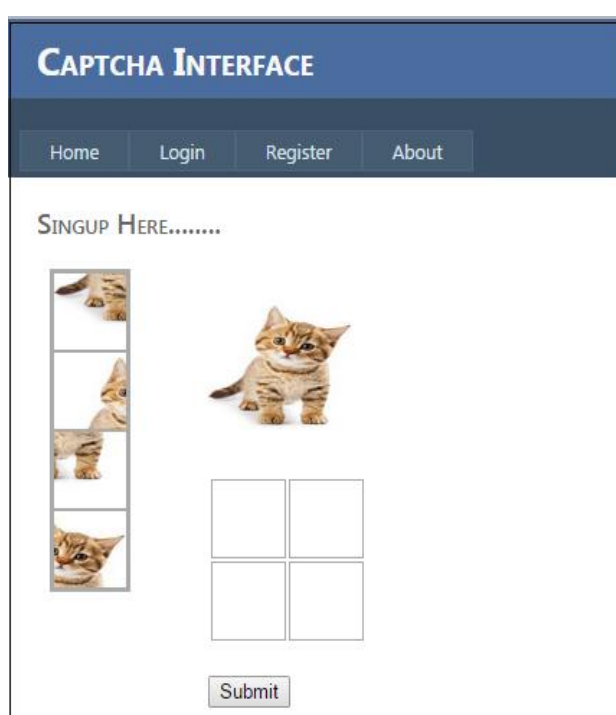

Fig. 5. CAPTCHA Interface in registration page.   Fig. 6. CAPTCHA Interface in login page (j=4).

Real time system or website, show how to implement the CAPTCHA interface technique. This CAPTCHA interface can put into any website where authentication is required in registration page and login page and etc. In Figure 5 has show CAPTCHA interface in registration page of website for authentication. After the all registration information like username, emailed, password, confirm password fill into the registration page and submit then one test pass by user for verify the user is human or bot. That is CAPTCHA is CAPTCHA Interface for shown in figure 5.

At time of login, in figure 6 and figure 7 it also shown CAPTCHA interface in login page for authentication. In figure 6 image segments is 4 parts of original image and CAPTCHA is solve by human in this CAPTCHA Interface technique and in fig. 7 have 6 segments parts of image like 4segment parts. Here 4 and 6 parts is randomly select for provide more security to the system.
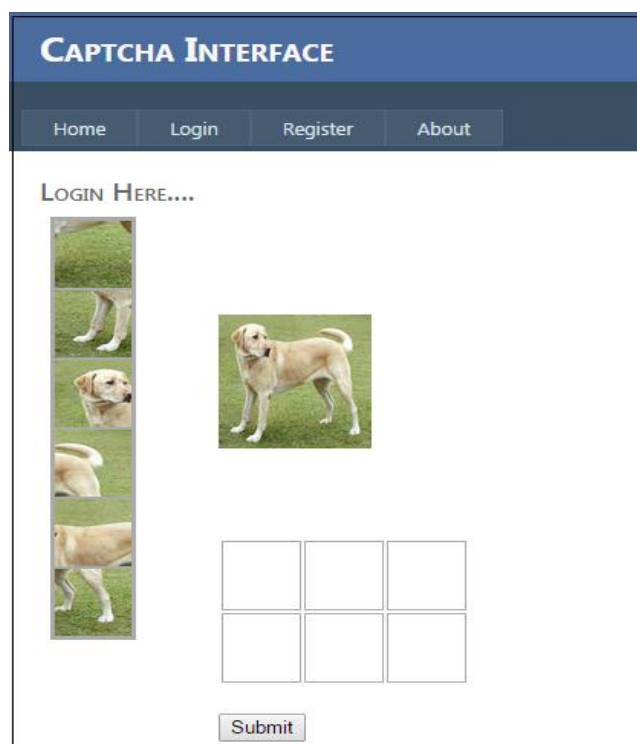
Fig. 7. CAPTCHA Interface in login page (j=6).

VI. EXPERIMENTAL RESULT

Time complexity of CAPTCHA Interface is shown in the below table 1 accordance with 4 parts or 6 parts of original image. On different server those are Visual Studio (VS) server Internet Information service (IIS) server and on the internet to hosting the website and to run this CAPTCHA interface algorithm website in those servers and get different values. Getting multiple different values for 4 parts and 6 parts and finally calculate average values on different server and put into table 1. Here show comparison of time complexity of 4 parts of image and 6 parts of image is different in table 1. This experimental has been run on HP pavilion dv6 processor Intel(R) Core(TM) i3 CPU, 32 bit operating system.

Table. 1. Comparisons of Time Complexity According Image Parts (4 or 6).

No. of Parts of Image	Time(sec)		
	VS Server	IIS Server	Internet
4 parts	0.0012943	0.0011454	0.00068151
6 parts	0.0013452	0.00114685	0.00069191

VII. CONCLUSION

In this CAPTCHA interface technique is image based CAPTCHA technique have lot of knowledge and using this CAPTCHA technique for authentication websites and securing the data, spam, online services. Main purpose to

developing this type of CAPTCHA technique is to make easy for user and easy to how to use it. Only human user can authenticate not bot or malicious computer program. An advantage of this CAPTCHA Interface technique is following:

➢ Simple and easy for user to performing task.

➢ For testing authentication provide good mechanism by using CAPTCHA.

➢ Implementation of this technique is easy and simple.

➢ Difficult for bot because mouse action drag and drop only human perform run time.

➢ The development of CAPCHA Interface does not need a special technique requirement like video or audio [3].

For future work it will be developed for multi-platform systems like Smartphone, Tablet and etc. At last, CAPTCHA Interface is successfully met the objective and have simple, smooth process of development.

ACKNOWLEDGMENT

REFERENCES

1. Wei-Bin Lee, Che-Wei Fan ,Kevin Ho, Chyi-Ren Dow , and "A CAPTCHA with Tips Related to Alphabets Upper or Lower Case," in Seventh International Conference on broadband,Communication, Wireless Computing and Applications, 2012.
2. Ahn, L. Von., Blum, M. & Langford, J., "Telling Human And Computers Apart Automatically," Communications of the ACM. Vol 46, August, 2003 pp 57-60.
3. Bursztrin, E., Beauxis, R., Paskov, H. S., Perito D., fabry. C. & Mitchell, J.C., "The Failure of Noise-Based Non-Continuous Audio Captchas," proc, IEEE Symposium on security and Privacy. IEEE Computer Society, 2011.
4. Zhu, B.B.; YAN, J.; Guanbo Bao; Maowei Yang; Ning Xu, "CAPTCHA as Graphical Passwords—A New Security Primitive Based on Hard AI Problems," Information Forensics and Security, IEEE Transactions on , vol.9, no.6, pp.891,904, June 2014.
5. Desai, A.; Patadia, P., "Drag and Drop: A Better Approach to CAPTCHA," India Conference (INDICON), 2009 Annual IEEE , vol., no., pp.1,4, 18-20 Dec. 2009.
6. ur Rahman, R.; Tomar, D.S.; Das, S., "Dynamic Image Based CAPTCHA," Communication Systems and Network Technologies (CSNT), 2012 International Conference on , vol., no., pp.90,94, 11-13 May 2012.
7. Liming Wang; Xiuling Chang; Zhongjie Ren; Haichang Gao; Xiyang Liu; Aickelin, U., "Against Spyware Using CAPTCHA in Graphical Password Scheme," Advanced Information Networking and Applications (AINA), 2010 24th IEEE International Conference on , vol., no., pp.760,767, 20-23 April 2010.