



Highly Secured Intellectual Graphical CAPTCHA

Devendra Kumar

M.Tech. Research Scholar

*Oriental Institute of Science & Technology,
Bhopal (M.P.), [INDIA]*

Email: kumardevendra04@gmail.com

Sanjay Sharma

Assistant Professor

*Oriental Institute of Science & Technology,
Bhopal (M.P.), [INDIA]*

Email: sanjaysharmaemail@gmail.com

Abstract—Use of CAPTCHA becomes necessary and very common in every website as it works as a defensive method or technique in the perspective of spam attacks. In the proposed system a type of CAPTCHA is introduced in which to recognize whether the user is a human or a robot, user needs to solve a game. In that game, user needs to find an object which the system asked for. The image shows will consists of number of objects, among them, user needs to find certain object that too in a particular time limit to prove his/her identity. Within the time period, if a user finds the object, the contact form will be open. This requires deep observation to find out the desired objects among various objects and 5 wrong clicks will end the game and CAPTCHA verification will be failed.

Keywords:—Gaming CAPTCHA, Puzzle, Robot, Action Script, WAMP Server, MySQL.

1. INTRODUCTION

If any of the owner of any particular website having issues with the comments on that website, emails or any other unusual activities which is actually done by the spammers and the owner expects the genuine user's input, so in those cases, one can use CAPTCHA submissions with the intention of keeping spammers away from their websites. Working of CAPTCHAs is like Turing Tests. These tests are used to test the intellects of a system to differentiate a human from a machine depends upon the questions asked to

both of them. So in the test which is actually performed by the technique of CAPTCHA, users will be asked by some random small task which a robot or software will not be able to perform.

Those tests may contain some JPEG or GIF images because robots are able to recognize the presence of an image by examine the source programming but can't identify what that image represents or depicts. Even some of the image CAPTCHAs is so tough to read by the user. In those cases, generally users have the option to ask for a new one. As shown in figure 1, system asked to write those mismanaged text in the given box to prove their identity. It's a type of text CAPTCHA.



Figure 1. Text CAPTCHA

In the proposed technique a user needs to successfully completed the task instructed in the game that too in the given period of time to complete the CAPTCHA and to prove his/her identity. After that successful attempt, the form will unhide which is attached behind the

CAPTCHA. If the user is not able to solve the CAPTCHA, the session will be expired but he/she will get another chance to retry the CAPTCHA.

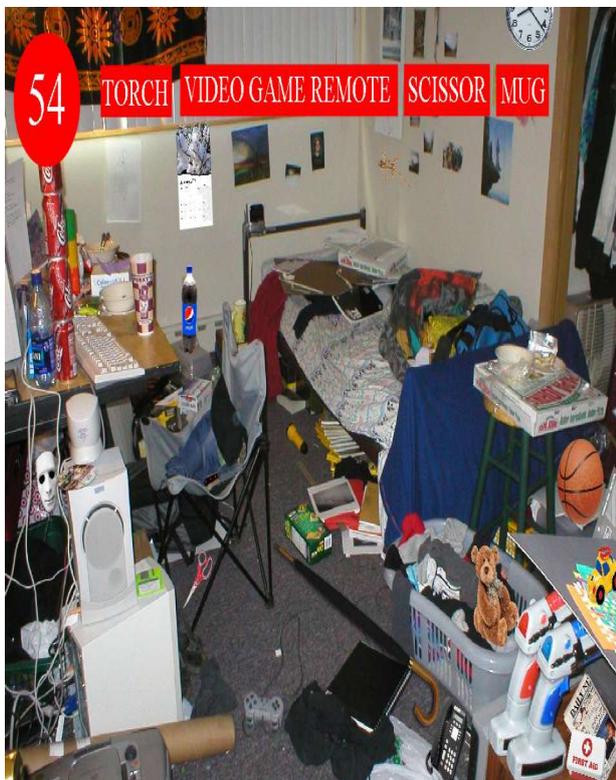


Figure 2. Proposed Gaming CAPTCHA

2. PROBLEM STATEMENTS

The strategy used in the existing system is drag and drop which is very simple to accomplish the task given to solve the CAPTCHA and justify the user present is not a Robot. Here in the system the target and the object used is dynamic and both are set in different positions in each frame but as the system is being studied it has noticed that, from the very first frame, the movement of the object is fixed in terms of length i.e. 2 cm towards the object.

In that considered CAPTCHA technique, object used to drop is elephant and the target used is well on which the object is to drop. Both the object and the target can be easily recognized by the technique of image processing. Dragging to the entire position of the frame will solve the CAPTCHA within few seconds.

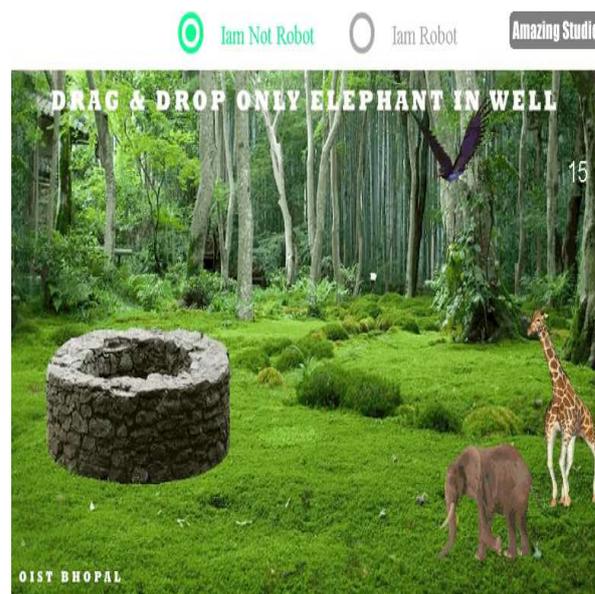


Figure 3. Drag and Drop Gaming CAPTCHA

3. PROPOSED WORK

In this system there will be a CAPTCHA appears which will ask a user to find and click on some of the items from the image which is not easy because it requires mental ability to find our desired items.

The user needs to find the particular item or thing which will be asked during the time of authentication. To make it more authentic, timer is also given of 60 seconds, under which the user needs to find the asked item among those given in the picture

Some of the brief drawbacks of the base paper modified in the proposed system are as follows :-

- The method of drag and drop will not use in the proposed system.
- The system offers only five attempts to solve a CAPTCHA. After the 5th attempt, the system will end the verification of that particular user.
- There will be a time limit to solve a CAPTCHA as well as for form submission.

- There is no URL for form, form fields are hidden behind the game, and it can only be visible if user played successfully.
- Input fields will be open along with target achieved, one by one.

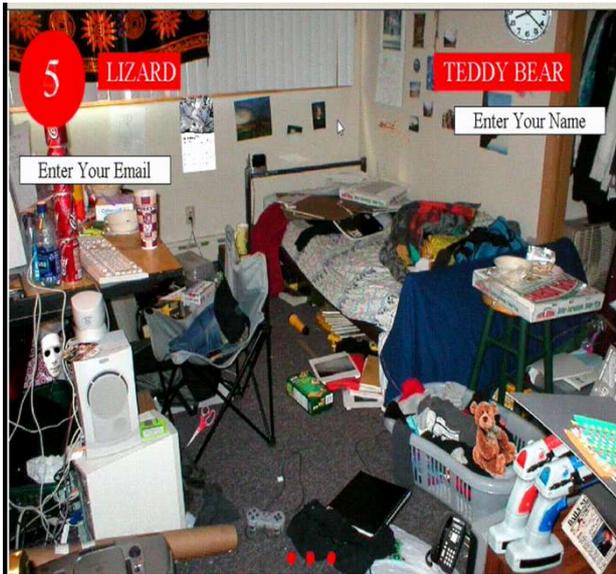


Figure 4. Open fields in CAPTCHA



Figure 5. CAPTCHA Reload Option

4. PROPOSED METHODOLOGY

The tactics of the technique proposed in the paper is based on the flow chart shown in Figure 6 where the game used to solve the CAPTCHA starts with the timer of 60 seconds where user will ask to find four targets and click on it. If user will be able to complete the task within the given time limit, he will be

directed to the sign up form columns one by one. User will get 5 attempts to complete the task asked in the CAPTCHA.

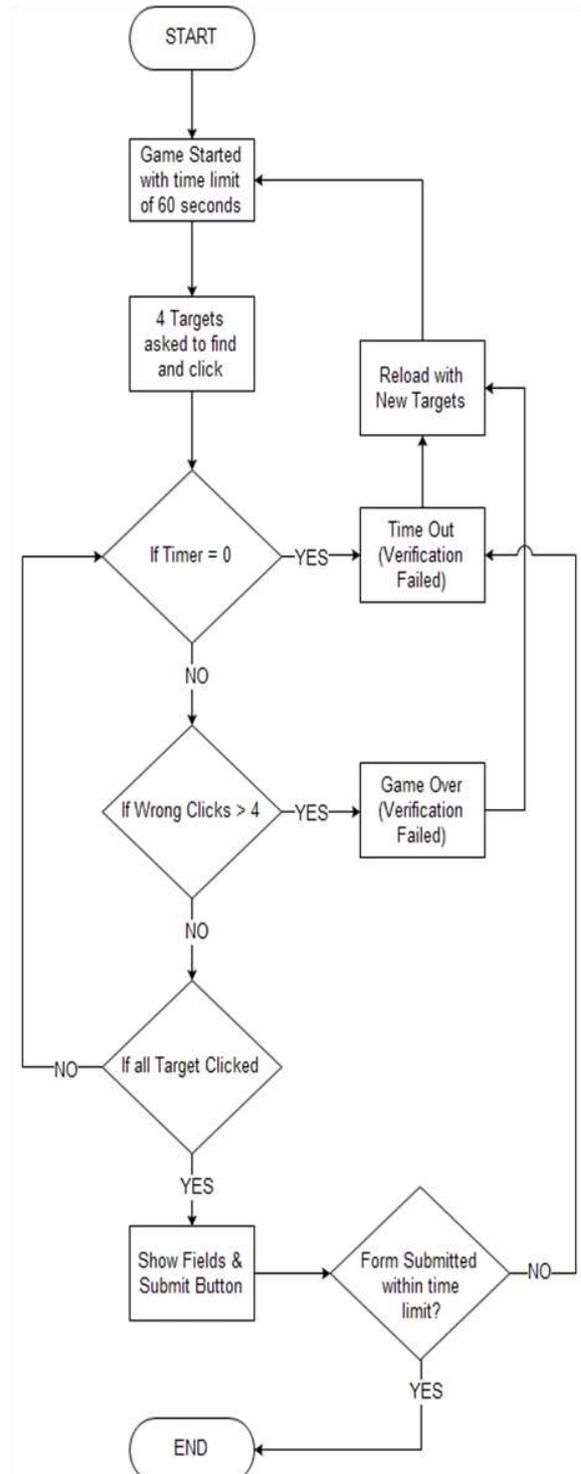


Figure 6. Flow Chart of game used to solve the CAPTCHA

An algorithm to intellectually solve the task for the proposed technique of CAPTCHA will be shown in the below algorithm.

4.1 ACB (Absolute Click Based) Algorithm

Input: Mouse_Click C

Target Click i

Wrong Click j

Wrong Target Tw

Time Counter k

Correct Target Tc

Output: All Targets Clicked

(Note that all layers having various objects are in a single frame)

Check for wrong clicks and it should be less than 5, user will have only 4 wrong attempts

```
while (j<5) // Wrong Clicks
```

```
do
```

```
{
```

```
If Mouse_Click == Tw Then
```

```
{
```

```
Mouse_Click_enable = true;
```

```
j++
```

```
}
```

```
}
```

If user clicked 5 wrong targets then verification will be failed and clicks will be disabled

```
if (j==5) {
```

```
Mouse_Click_enable = false;
```

```
Print_text=CAPTCHA verification
```

```
failed;
```

```
}
```

Time allotted is 60 seconds to solve CAPTCHA as well as form submission, clicks will not work after 60 seconds and verification will be failed

```
For k = 1 to 60 //seconds
```

```
if (k==0)
```

```
{
```

```
Mouse_Click_enable = false;
```

```
Print_text=Time Over;
```

```
}
```

```
End //End for loop
```

If user clicked on all four right targets then verification will be successful and form as well as button will be visible

```
For i=1 to 4 //Four Targets
```

```
If Mouse_Click == Tc Then
```

```
{
```

```
print_text=Target Achieved;
```

```
Input_fields Visible =true;
```

```
Submit Button Visible =true;
```

```
}
```

```
else {
```

```
Input_fields Visible =false;
```

```
Submit Button Visible =false;
```

```
}
```

```
End //End for loop
```

```
End
```

5. RESULT ANALYSIS

Table No. 1. Result Analysis 1

USER	Time Taken For Successful Attempt Till Submitting Form (In Seconds)	Failed or Success To Solve CAPTCHA
U ₁	51	Success
U ₂	40	Success
U ₃	Time Out	Failed
U ₄	44	Success
U ₅	56	Success
U ₆	39	Success
U ₇	43	Success
U ₈	58	Success
U ₉	39	Success
U ₁₀	42	Success

5. RESULT COMPARISON

Table No. 2. Result Comparison I

SCHEME	PRESENT	PROPOSED
Total no. of Users (N)	30	30
Total no. Successful Users	30	26
Total no. Unsuccessful Users	0	4
∞ (Mean Time)	10.6	46.92
σ (Standard Deviation)	2.92	7.93
σ^2 (Variance)	8.57	62.91
Minimum Time Recorded	6	35
Maximum Time Recorded	15	59

If a game can be solved in minimum 6 seconds that game must be simple and breakable. No failed users at all, it means that game can be solved in each and every attempt which does not require intellectual efforts.

Table No. 3 Result Comparison II

	<i>Present</i>	<i>Proposed</i>
Time to Solve CAPTCHA	15 Seconds per CAPTCHA	60 Seconds
Target & Object Position	Dynamic	Dynamic
Completion Time	5-8 Seconds	35-46 Seconds
CAPTCHA Session	Yes	No
Page Session	Yes	No
Game's Graphics	High & Attractive but simple	High, Attractive & Intellectual
Complexity Level	Low	Moderate
Lowest Time Recorded	6 Seconds	35 Seconds
Database Used	Yes	No
Session Token	Yes	No
Game Type	Drag and Drop	Click Based
Background Complexity	Low	High
Attacks	SQL injection affects because CAPTCHA is based on database	No SQL injection because no database is used to verify the CAPTCHA, verification is inbuilt inside the game
	Image Processing affects because only 4 highlighted objects are present	No image processing works because background contains so many objects with complex background
	Brute Force Attack affects because wrong attempt has no limit	Brute Force Attack does not affect because user has only 4 wrong attempts
Verification Steps	Form is visible and CAPTCHA appears later	Form is invisible & input fields getting visible along with CAPTCHA verification

6. CONCLUSION & FUTURE SCOPE

The Highly Secured Intellectual Graphical CAPTCHA provides most intellectual CAPTCHA till now and it will be better able to recognize whether you are human or robot. This is the new era of CAPTCHA where you will enjoy your CAPTCHA along with best security. Robot may perform wrong attempts or hacker try to crack CAPTCHA with many no. of random click and in this proposed system wrong clicks will disable the CAPTCHA and new problem will be arrived with different targets.

The current proposed concept of intellectual gaming CAPTCHA can be enhanced in future with more intellectual and artificial problem based CAPTCHA that can be solved within few seconds that would be impossible to solve for robots but easily possible by human with best level of security in the field of CAPTCHA.

REFERENCES:

- [1] JingSong Cui, Li Jing Wang, JingTing Mei, Da Zhang, Xia Wang, Yang Peng, WuZhou Zhang, "CAPTCHA Design Based on Moving Object Recognition Problem", IEEE Transaction, 2009.
- [2] Jing-Song Cui, Jing-Ting Mei, Xia Wang, Da Zhang, Wu-Zhou Zhang, "A CAPTCHA Implementation Based on 3D Animation", IEEE Transaction, 2009.
- [3] Chun-Ming Leung, "Depress Phishing by CAPTCHA with OTP", IEEE Transaction, 2009.
- [4] Aadhirai R, Sathish Kumar P J and Vishnupriya S, "Image CAPTCHA: Based on Human Understanding of Real World Distances", IEEE Transaction, 2012.
- [5] Song Gao, Manar Mohamed, NiteshSaxena and Chengcui Zhang, "Gaming the game: Defeating a game CAPTCHA with efficient and robust hybrid attacks", IEEE Transaction, 2014.
- [6] Artem Shumilov, Andrey Philippovich, "Cloud-Based CAPTCHA Service", IEEE Transaction, 2016.
- [7] Vipin Kumar and Atul Barve, "Dynamic Object and Target based Gaming CAPTCHA for Better Security Analysis", International Journal of Computer Applications (0975 – 8887) Volume 162 – No 5, 2017.