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Captcha as a Graphical Password Based on Hard AI Problems

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ABSTRACT: Many security primitives are based on hard mathematical problems. Use of hard AI problems for security is come into picture with impressive new pattern, but it is not completely explored. There are so many problems which are easy to solve for human brain but it is very difficult to solve for machine. For Example rotate the object by random degrees and with randomly chosen background.

This application is mainly used to differentiate between human and machine apart and to solve the “Hard AI Problem”. It also increases the security level and prevents the important data from threats by providing three levels of security. We present a new security originally based on hard AI problems, namely, a novel family of graphical password systems built on top of Captcha technology, which we refer as “Captcha as graphical passwords (CaRP)”. CaRP is both a Captcha and a graphical password scheme.

KEYWORDS: Graphical Password, CaRP, Captcha, Security Primitive, password guessing attack.

I. INTRODUCTION

Completely Automated Public Turing test (CAPTCHA) is use to tell Computers and Humans Apart. Hard AI Problems are problems which easily solve by human intelligence and which are difficult to solve by machine. Using hard AI problems for security is becoming visible as an exciting new paradigm, but this result has been under-explored.

This application, presents a new approach which is basically based on hard AI problems, which is a group of graphical password systems put up on top of Captcha technology. This technology we refer as “Captcha as graphical passwords (CaRP)”. CaRP indicates both Captcha and a graphical password scheme. The graphical-password technique is also called as graphical user authentication (GUA). CaRP determine a number of security problems, For Example online guessing attacks, relay attacks.

PROBLEM DEFINATION

To differentiate between human and robots using captcha as graphical passwords based on Hard AI problems to prevent the data from theft.

OBJECTIVE

To provide security to important data by using Hard Artificial Intelligence problem. Example: Provide security to data in crime branch.

GOAL

The main goal of this application is to make the data more secure as compared to data using existing applications, by using Captcha as a Graphical Password using Hard AI problem.

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II. RELATED WORK

In this application the system is providing three levels of security using Captcha as a Graphical Password based on Hard AI Problems.

To provide access to important data to the authenticated user three levels of security are provided. The levels of security are as follow:

Level 1:

User Login

- AES Algorithm:

The advance Encryption Standard Algorithm is used to encrypt the data. In this system AES algorithm is used to store user password in encrypted format.

Level 2:

First Level Captcha

At this level system will randomly generate one of the following type of captcha.

- **Grid Structure**

Here user have to select the images according to question provided by system from dynamic grid structure of images.



Fig. 1 Grid Structure Image

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- **Rotation Based**

Here system will provide a tilt object to user and user have to make it straight by rotating it clockwise or anticlockwise.

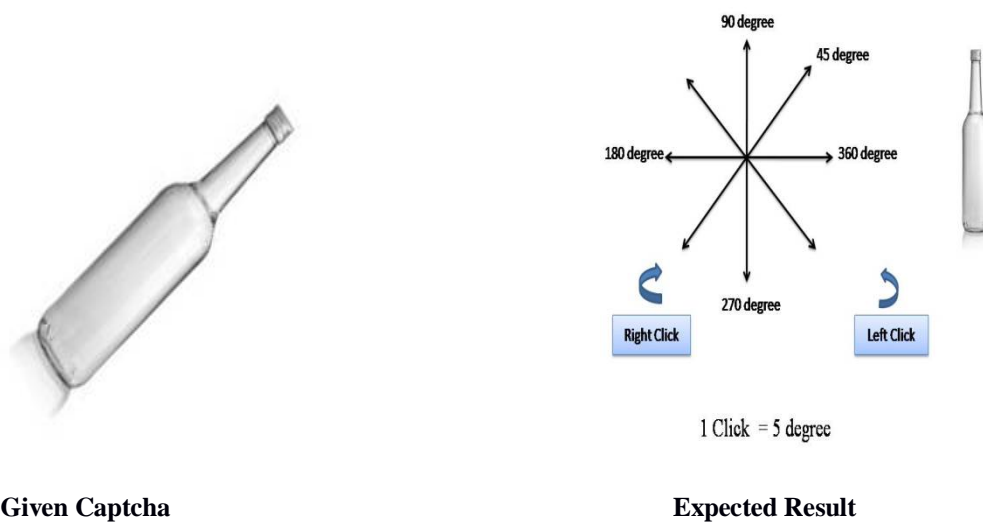


Fig.2 Object Rotation

Level 3:

Second Level Captcha

At this level system will randomly generate one of the following captcha.

- 8-Queens Problem

Here system will provide 8*8 matrix with four answer queens placed and other queens for solution to the problem.

user have to place

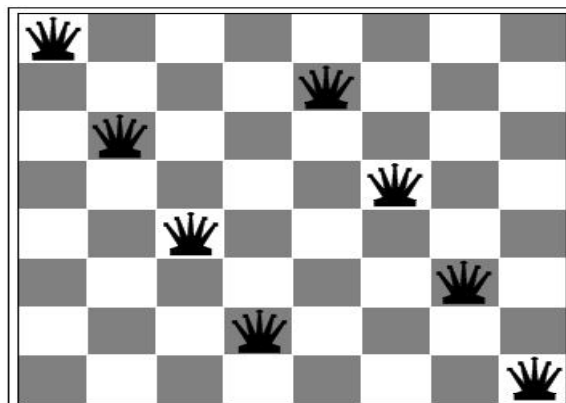


Fig. 3 8-Queens Problem



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- **16-Queens Problem**

Here system will provide 16*16 matrix with eight answer queens placed and user have to place other queens for solution to the problem.

Literature Survey:

Title	Author	Journal And Year	Description
Captcha as Graphical Passwords—A New Security Primitive Based on Hard AI Problems	Bin B. Zhu, Jeff Yan, Guanbo Bao, Maowei Yang, and Ning Xu	IEEE 2014	In this paper, we present a new security primitive based on hard AI problems, a novel family of graphical password systems built on top of Captcha technology, which we call Captcha as graphical passwords (CaRP).
Development of CAPTCHA System Based on Puzzle	Firkhan Ali, Bin Hamid Ali, Farhana Bt. Karim	IEEE 2014	This Paper provides main concept to develop this CAPTCHA system based on puzzle is to make a user easy and clear on how to use it. Then, it can authenticate the user as a human not as a machine or bots.
A Study on Captcha Recognition	Chii-Jen Chen, You-Wei Wang, Wen-Pinn Fang	IEEE 2014	There are many noisy lines and points in our testing captcha cases. This Paper Provides the probability pattern framework to recognize the target numbers in the captcha images.
What's Up CAPTCHA? A CAPTCHA Based on Image Orientation	Rich Gossweiler, Maryam Kamvar Shumeet Baluja	IEEE 2009	This paper present a new CAPTCHA which is based on identifying an image's upright orientation. This task requires analysis of the often complex contents of an image, a task which humans usually perform well and machines generally do not.
Breaking Microsoft's CAPTCHA	Colin Hong Bokil Lopez-Pineda Karthik Rajendran Adri'a Recasen	IEEE 2015	In This paper provides some alternatives to mitigate the weaknesses found. After a review on existing methods, we propose two alternatives: visual question-answer challenges and motion-based CAPTCHAs.

III. PSEUDO CODE

Step 1: Register New User.
 Step 2: Enter Username and Password.
 Step 3: Solve first level captcha.
 Step 4: Check the below condition for each attempt till three attempts.
 if (n=0)
 Display and solve Grid Captcha.
 elseif n=1
 Display and solve Rotation Captcha.

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Step 5: Solve second level captcha.

Step 6: **If** (attempt>3) //Attempts of first level captcha

Check the below condition for each attempt till three attempts.

If (n= =0)

Display and solve 8 Queens Problem.

elseif n= =1

Display and solve 16 Queens Problem.

Step 7: **If:** second level captcha is not solved.

then user gets block.

else:

then login successfully.

Step 8: If user is get block

then unblock by entering correct OTP .

Step 9: End.

IV.SIMULATION RESULTS

In this figure the image is of grid captcha. In this we have created the dynamic grid of images for captcha generation. In this there are three answer images and user have to select the answer images as per question.

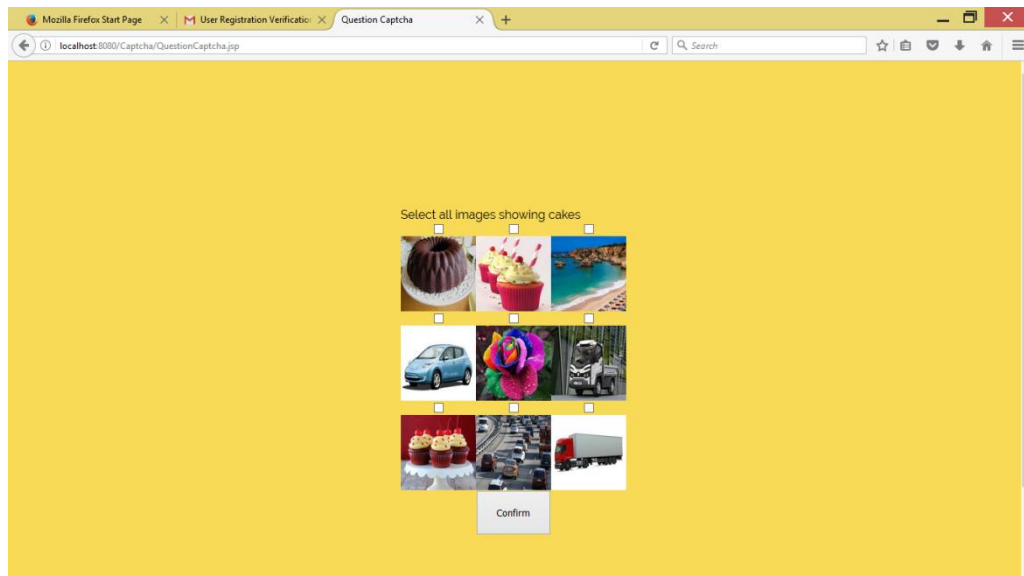


Fig.4 Grid Captcha

In this figure the image is of Rotation Captcha. The System will provide tilt image and the user have to make it straight. have to straight it.

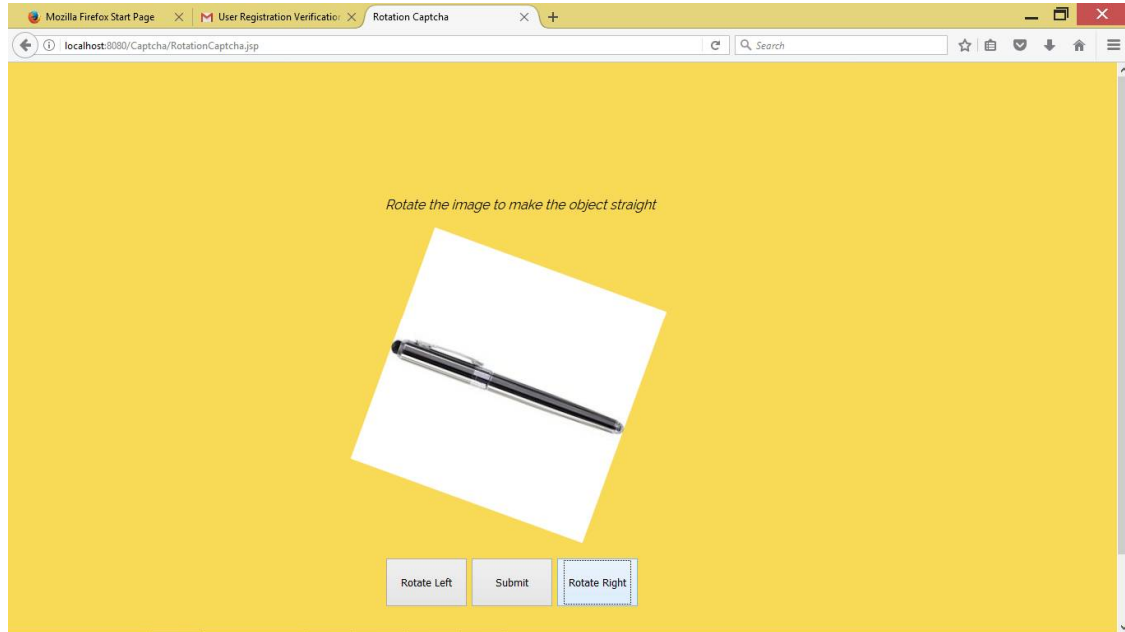


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Captcha

In this figure the image shown is the 8 Queens Problem. The system will provide 4 queens and the remaining queens are placed by the authenticated user.

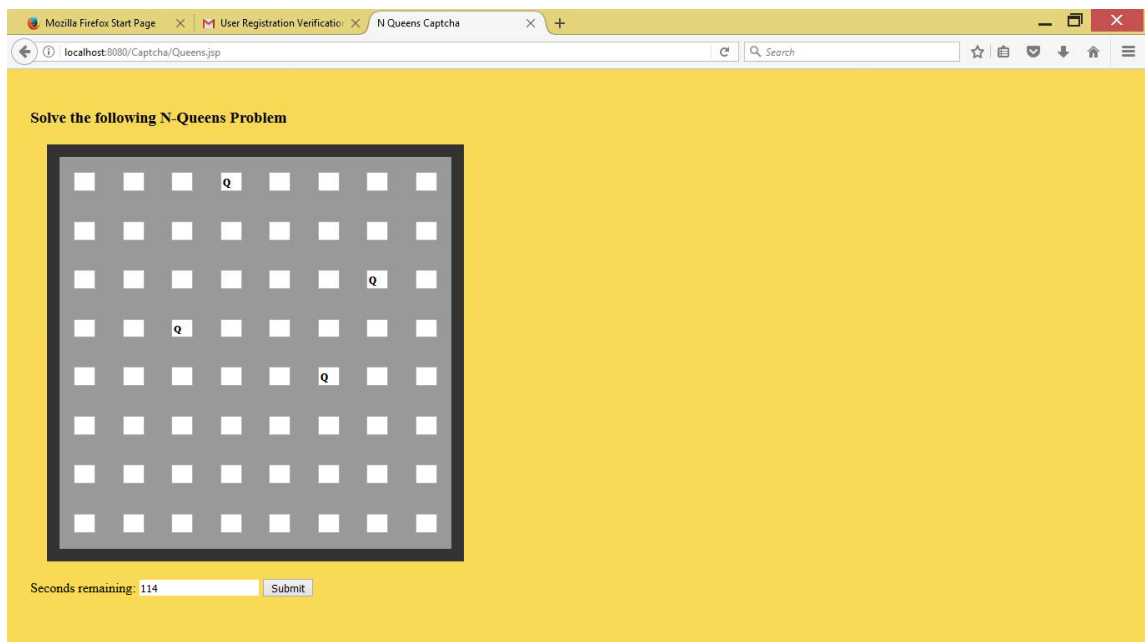


Fig.6 8 Queens Problem

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In this figure the image is of 16 Queens Problem. The system will provide 8 queens and the remaining queens are placed by user.

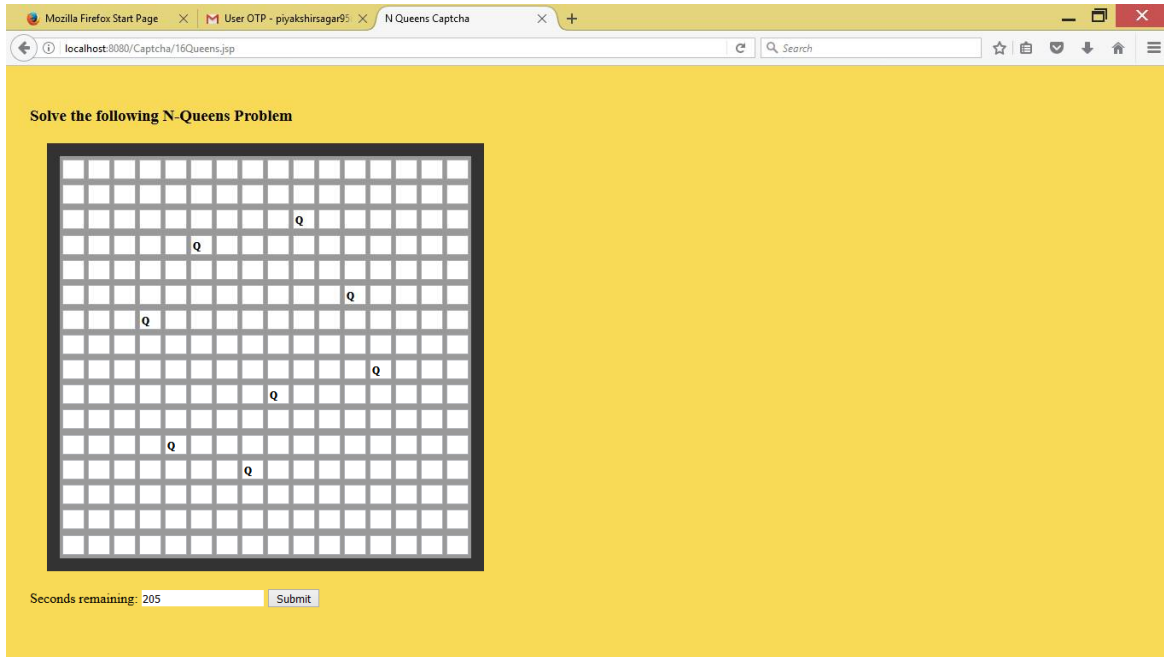


FIG.7 16 QUEENS PROBLEM

V. CONCLUSION AND FUTURE WORK

- In this application we mainly concentrate on solving the Hard AI problem and providing the security to the system.
- This application has features to handle Hard AI problems problem. For that we are using CAPTCHA as a graphical password based on hard AI problem.
- In this system we are giving the access to only authenticated user.
- This application reduces the chances of data getting hacked by hacker or updating data from system.

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BIOGRAPHY

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