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Combocaptcha- A New Vision in CAPTCHA World

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Abstract

In this paper we have introduced a new form of CAPTCHA named "Combocaptcha". With the help of this Captcha a revolution is can be done in the field of image and imagination based Captcha. In this Captcha we have to identify the image which is basically a combination of two objects .Its efficiency and usability issues are proven here to better than original single image based or imagination based Captcha.

Keywords*: combination, captcha, usability, efficiency, DoS*

1. Introduction

We are living in a society dominated by information technology and in this era of information, huge amount of information is needed to be speedily processed and therefore we depend on Internet services for all kind of information gathering. In our daily life we often face a problem when surfing on internet is the delay response of server. We often call it generally "server down". But do we really care about the reason of the server down? It is a kind of attack named DoS that causes this kind of server behaviour. Denial of Service attack occurs when an intruder or attacker sends a number of requests to the server at a time. As a result, the server gets busy to respond to all those requests and the availability of the service to the legitimate users is reduced. So, it is a great concern to measure this attack.

For this purpose, at earlier different types of human puzzles have been introduced which needed a lot of human effort that reduces the usability of the test. In present time, Captcha (Completely Automated Public Turing Test to Tell Computers and Humans Apart) [1] is an advanced security mechanism [3] for addressing undesirable or malicious internet bot programs [7, 8]. Captcha is basically a challenge designed to distinguish humans from computer programs on the internet. To be useful, a Captcha must be easily solved by most of the humans, *i.e.,* the usability [13, 14], while being difficult to solve by computer programs. Captcha can be classified into primitive four categories:

Text based Captcha: It includes text [9] identification scheme.

Audio Based Captcha: It includes sound or speech recognition scheme.

Image based Captcha: It includes image recognition scheme.

Video based Captcha: It includes perception of a video using three words which describe the video best.

The naming of our Combocaptcha is also amazing. The term Combocaptcha is mainly formed by two words C*ombination* and C*aptcha*. As in this captcha test the users are given an image which are based on the combination of two objects, it is named as *Combocaptcha*.

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2. How Combocaptcha Works?

Our Combocaptcha is basically based upon images of animals, plants and other objects. The images we shall use here are kind of combination of two objects. In this we have to identify the objects or images by which the corresponding Combocaptcha is made up of. Users will be given a number of options. .Now users have to choose the two right options among the given ones by which the given image is combined with. Then click the submit button. From the survey results we have seen that the users can identify the combination of images within at most three times. So we shall give chances to users at most two times *i.e.*, the permit level for this captcha test will be two after which the service will be unavailable to protect the system from unauthorised attacks. Screenshots of our project are given below to show the working process of Combocaptcha.

Figure 1. Screenshot 1: Clicking Options –submit

Figure 2. Screenshot 2: Notifying Wrong Answer

Figure 3. Screenshot 3: User Gets Another Chance

Figure 4. Screenshot 4: Successful Attempt

3. Testing our Combocaptcha

We have gone through a survey with our new design of Combocaptcha on near about 150 male-female having different ages. The results are shown below.

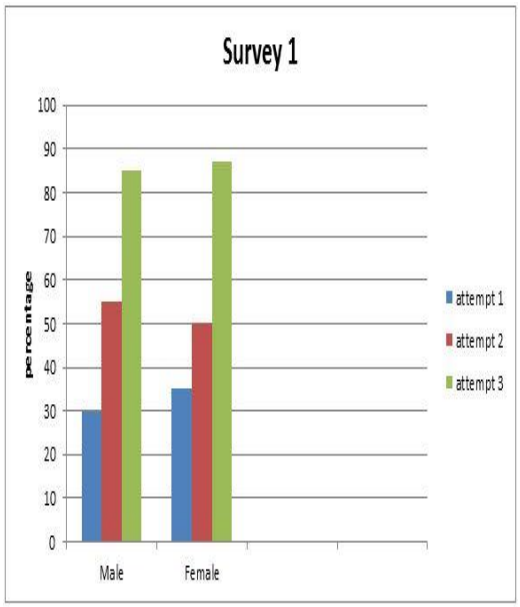

Figure 5. Successful Percentage (Sex Basis)

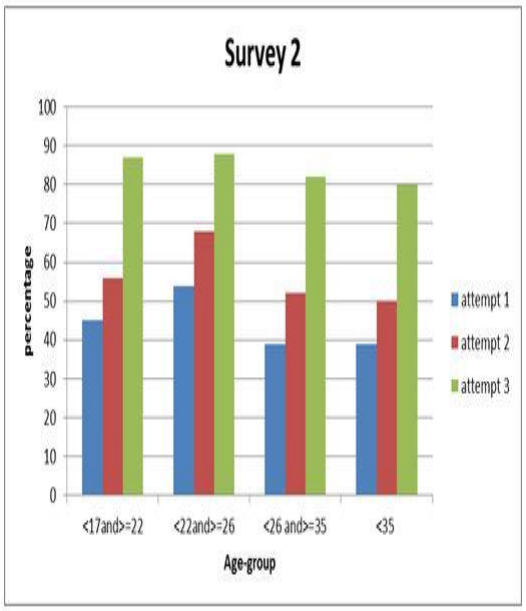

Figure 6. Successful Percentage (Age Basis)

During the survey we got interacted with the users and from the response of the users to the Combocaptcha we can summarize the reasons for the Combocaptcha appreciation as below.

Firstly, our Combocaptcha is easy to understand while solving *i.e.*, it ensures high understand ability.

Secondly, it requires less human effort to solve.

Thirdly, the images those are given to solve are interesting to look at.

Fourthly, monotonous text captchas can be avoided by this kind of images.

The analysis of the survey gives a clear indication that almost all the users can solve the Combocaptcha in maximum three attempts. Therefore, we have determined the attempt level at most two. After the attempt of twice the service can be blocked from the server which can prevent unnecessary access of information.

4. DoS Attack V/s Combocaptcha

DoS attacks make a service on internet unavailable for the legitimate users. The unauthorized intruder sends a huge number of requests at a time to the service so that the service gets unavailable to the authorized users. Combocaptcha gives a maximum of two attempts to pass the test. As a result the intruder cannot get chance to pass the test after second try and the service is protected from getting DoS attacked. It is also checked that the computer bot programs are unable to judge these combinations that an image is made up of. Therefore, our Combocaptcha, we can say have enough potential to prevent against DoS attacks as a mean of authorization.

5. Evaluation

We have compared our Combocaptcha with some other types of captcha namely text captcha, Assira, Rotation captcha and the result is shown in Figure 7. From this analysis we can easily see the potentials of our Combocaptcha. We can also notice that the green bar in the case of Combocaptcha is not presented as it is not implemented in applications thoroughly.

The potential factors of our Combocaptcha can be jotted down as below.

Firstly, positive user response towards Combocaptcha.

Secondly, efficiency of Combocaptcha is higher than the other image based captchas.

Thirdly, it takes less time to solve the Combocaptcha *i.e.*, time complexity is less.

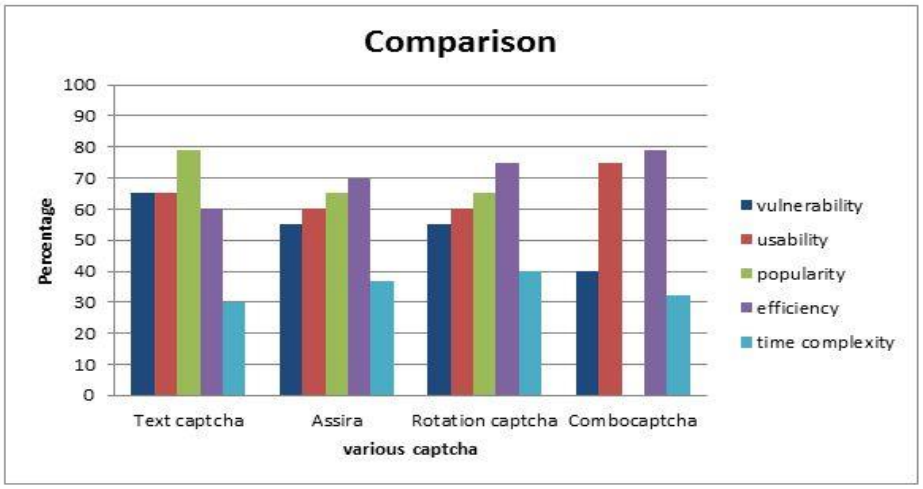

Figure 7. Comparison Result of Different CAPTCHAs

Fourthly, vulnerability is less in Combocaptcha and as we have said earlier can easily prevent unauthorized attacks

6. Conclusion

From the above discussion we can conclude that our Combocaptcha can create a new vision in world of image based captcha. With the progress of technology, different captcha designers are designing different types of CAPTCHA with various types of design parameters. Along with the disadvantage of the monotonous and vulnerable text based CAPTCHAs it is the time to move to efficient and robust image based CAPTCHAs which are also interesting to solve without so much burden on the users. In the paper we have also shown the potentials of our Combocaptcha. In our future work, we wish to apply some sound applications to our Combocaptcha with same approach to make it general even also for different physically disabled users.

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