Research of the CAPTCHA Application in Platform Based on AJAX

DONG CHEN
School of Computer Science and Information Technology
Zhejiang Wanli University
Ningbo, Zhejiang 315100
P. R. China

Abstract: Focusing on the additional test automation technique’s lack in the AJAX Web application and based on the AJAX key techniques and asynchronous work mode, a special asynchronous test automation method for the AJAX Web application is analyzed and designed. The design of the structure frame of the center of the AJAX test automation technique and a pair of program defined functions access and wait are introduced in detail.

Key-Words: AJAX; test automation ; asynchronous work mode

1 Introduction

In the rapid development of the network and widely used, the attacker damage to the normal operation of the network order and threat to network security. The attacker attack the use of public network services through the network automatically, achieve their personal ends. For example, published the contents of garbage increased burden on the web site administrator; to spread propaganda and fishing sites on the Internet for fraud; on-line up to vote, contrary to the principle of fairness; crazy web services account registered so that the slow pace of the server; violent crack user passwords so that the user information leak, and so on [1].

An attacker can have a network because of damage to the same site in response to the attacks and the legitimate users to submit the request. If the site users to be able to determine the legality of not allowing an attacker to obtain the requested services, will be able to stop the attacker's automatic attack[2]. Artificial intelligence expert referred to as a CAPTCHA (completely auto-mated public turing test to tell computer and humans apart, CAPTCHA) to verify the security mechanism, it is difficult to solve the problem of machines to distinguish between the computer and person by setting a person it is easy to solve. Such a mechanism will help site to determine the legality of uses: Computer program (computer or robot) or human, thus ensuring the stability of the site and users of information security, so that the normal operation of the network. The term CAPTCHA (for Completely Automated Turing Test To Tell Computers and Humans Apart) was coined in 2000 by Luis von Ahn, Manuel Blum, Nicholas Hopper and John Langford of Carnegie Mellon University. At the time, they developed the first CAPTCHA to be used by Yahoo[3].

The rest of the paper is organized as follows. In Section 2, we briefly describe the applications interactively of traditional Web and the new interactive Web applications. In Section 3, we compare how to make a CAPTCHA image. In Section 4 concludes the paper.

2 Overview of CAPTCHA

2.1 The applications interactively of Traditional Web

Users fill out the form field and click the submit button in General traditional Web applications. Then the entire form is sent to the server, the server will be transmitted to deal with it form the script (usually PHP or Java, may be the process of CGI or similar language), the script then sent back to complete the implementation of the new page. The page may have been filled with new forms of data, or it may be confirmation page, or have some of the original input data options page. The script on the server or the new procedure and return to form must wait. Into a blank screen, and then wait until the server to return data to re-draw. Fig1 shows the course [4] [5] [6].

2.2 The new interactive Web applications

Ajax full-called"Asynchronous JavaScript and XML", It is compound from the asynchronous communication technology by JavaScript, XHTML, W3C DOM, the core is JavaScript and
XMLHttpRequest. XMLHttpRequest make CSS Standardization, W3C DOM Analysis from the server-side XML information and respond to the dynamic display of information, XMLHttpRequest send Asynchronous request and receive response. JavaScript achieve all logic in the browser[7].

AJAX solves both of these problems. AJAX works by sending an XMLHttpRequest request instead of an HTTP request. XMLHttp requests are asynchronous, so while the XMLHttpRequest request is being processed behind the scenes, the user can continue interacting with the Web application. And when the XMLHTTP response is received, the Internet Explorer DOM can be used to repaint only the area of the Web page that holds the new data, rather than having to repaint the entire page. Fig2 shows the course.

2.3 CAPTCHA

At present, many of the platform design cannot be separated from CAPTCHA. CAPTCHA is the principle: every time the page to submit information, the system will automatically generate a random string of numbers or symbols (the CAPTCHA) only in designated areas enter the correct code to verify those to submit information to be successful[8][9]. So now a lot of the registration page, the user will be asked to submit information when they enter the CAPTCHA. There are also a number of malicious programs, continue to account for the specific password attempts, in the absence of adequate measures, the password is very likely to be out exhaustive. Therefore, Internet banking and other important login page, usually to verify the use of encryption technologies CAPTCHA to prevent a hacker on a particular registered user to use violence to break a specific procedure carried out continuously to prevent or try to log on to a continuous network of information submitted to the use of a network access methods[10].

CAPTCHA into digital type, character, symbol-based, multi-types. Such as Figure 3 on-line banking authentication CAPTCHA belonging to the digital type.

3 Problem Solution

3.1 Designe program

Therefore, we designed a program base on AJAX. The following are figures from such a select number of CAPTCHA number of steps to identify the application program.

(1) Users log on to the Web site, a request to start the registration process.

(2) Randomly select a number of figures, such as 4, at the same time they will be stored in the server Session State.

(3) Random selection show figures.

(4) In the server memory in this generation of 4-digit map.
(5) Randomly selected image transformation algorithm.
(6) Random conditioning transform parameters.
(7) Memory image of the implementation of the transformation.
(8) Random selection algorithm and generates the background image.
(9) Superimposed digital image and background image.
(10) Output to the user registration page, including synthetic image.
(11) Web users to enter information and images to fill in recognition of Chinese characters, submitted to the server.
(12) Server to determine the number of users identified with the digital preservation of Session.

In this program, CAPTCHA test procedures and registration page on the same server running close together.

3.2 Declaration to protect the resources

In the application documents to describe the deployment of (web.xml), respectively, on the <web-resource - collection>, <auth - constraint>, <user - da2ta - constraint> element in the definition, namely the realization of the Declaration to protect the resources, and the roles and Transfer Protocol. And to increase <login - config> element in the definition of user submitted after the jump page.

3.3 Make a CAPTCHA image

(1) Generation program
$im=imagecreate(70,35)
$gray=ImageColorAllocate($im,200,200,200);
//For the regional distribution of a color image imagefill($im,68,30,$gray);
// Regional $gray image as a background color for filling
while(($authnum=rand()%10000)<1000);
// Have a design in line with the requirements of the random number
imagestring($im,5,10,3,$authnum,$black);
//To the level of function will be randomly generated value in painting the image in the region designated location
for($i=0;$i<200;$i++)
//In the image to add extra pixels to avoid scanning through the graphical approach to the random number to obtain information
{$randcolor=ImageColorAllocate($im[rand(0,255)],rand(0,255),rand(0,255));
// A randomly generated color pixels
imagesetpixel($im[rand()%70],rand()%30,$randcolor);
//In the image of the region on the location of the random drawing pixels on this point
}
ImagePNG($im);
//PNG image format to be exported to the form page display
ImageDestroy($im);
//Once completed picture output would destroy the image, the release of its image associated with memory

(2) Ajax graphics mode to achieve the procedure code
(1)Ajax engine in the user's browser to achieve
<script language="javascript">
var httprequest=false;
httprequest=new ActiveXObject("Microsoft.XMLHTTP");
//IE-based browsers have a XMLHttpRequest object, the Ajax engine that is the core of the object
document.getElementById("codeimg").innerHTML ="<img src="image.php"height="35"width="70">";
//Positioning the graphics display area code function loginRequest(url){
//This function is a function of the XMLHttpRequest object to the adoption of asynchronous data to the server-side authentication procedures to determine url="checkcode.php?checkcd="+checkcd;
//Location of the server-side validation process
loginReq.open("post",url,true);
//Through the post to send a request to the server
loginReq.onreadystatechange=processLoginResponse;
//After a complete authentication server processLoginResponse function will be to complete
}
function processLoginResponse(){
// This function to deal with authentication server after the completion of the follow-up to deal with
var res=loginReq.responseText;
// XMLHttpRequest object to the back-end server to verify the results given the value of variable res
if(res==1){
window.alert("CAPTCHA error!");
//To determine an error code and prompts the user
document.getElementById("codeimg").innerHTML ="<img src="image.php"height="35"width="70">";
//Positioning the new code of the graphics display area will have a new code of graphics which users enter a new code
else
window.alert("CAPTCHA correct!");
//Code to determine the correct forms and
information submitted to the server storage
</script>

⑵The graphics display area code
<span id="codeimg"></span>
//Span tag graphic elements on the ground to generate
the code generated graphics procedure provides a
display space, Ajax engine through the elements of
the id to verify the location graphics display area of
the code.

3.4 The server-side code to determine
procedures
$query="select count(*)from checkcode where
chk_code='$checked'";
// The user to input the code for information, the
server side of the database to find and return to the
eligible number of items of data.
$count=mysql_result($result,0,0);
// Implementation of the above statements and the
results given in the variable $count
if($count==0)
$res=1;
// $count = 0 that did not meet the requirements of the
project data that the user enters the wrong code
else
$res=0;
// Otherwise, show that the user enters the correct
code
echo$res;
// The results will be conveying this message to
XMLHttpRequest object, and to bring back to the
Ajax engine

4 Conclusion
This paper introduces a technique that allows writing
lightweight test automation to verify the functionality of
AJAX Web application. The technique easily
generalizes to arbit rarely complex applications and
works for any AJAX enabled application, regardless
of the implementation technology.

The test automation system is lightweight and is
designed specifically to extend easily. Notice that the
test method is not fully automated: it has to manually
click on the Run Test button to launch the automation.
Another extension to the AJAX test automation is
automating the process of saving test scenario result.
Both of them need to further research and design.

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