

## Face Captcha

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**Abstract:** Now a day's use of smart phone increases tremendously. User gives the priority to the touch screen mobile or tablets which is based on touch screen technology. Security level in these devices is not much as compare to the desktop computer. Today user uses the touch screen devices for online transaction. At this point issue of security is created, which is most important from user point of view. There is need of very effective online security. For that purpose CAPTCHA is used at start of any application to determine whether or not the user is human. CAPTCHA is abbreviation for Completely Automated Public Turing Test to Tell Computer and Human are Apart. This is sure option for the online transaction. It is helpful to reduce crime in online shopping or any else. It is used to prevent the automated attacks in that user have to perform task that are easy for human but challenging for computers. Actually it increases the one level of security. Hence to provide advanced security we providing new version of image based CAPTCHA called as Face CAPTCHA. It has 0 percent attack rate.

**Keywords:** CAPTCHA, Image CAPTCHA, mobile security.

### 1. Introduction

What is CAPTCHA?

CAPTCHA is abbreviation for "Completely Automated Public Turing Test to Tell Computers and Human Apart". CAPTCHA is used to prevent attacks from bots for preventing websites. Human's can easily understand distorted images but it is very

difficult for computer. It is test to check user is Human not a robot or any computer device. CAPTCHA first

Time used in 2000 by Luis von Ahn, Nicholas J. Hopper, Manuel Blum of Carnegie Mellon University and John Langford of IBM. CAPTCHA requires combination of various images, alphabets, digit, sometime addition of distortion also appears in the CAPTCHA.

## Need of CAPTCHA

CAPTCHA are mainly designed to stop the attacks from computer (robot), these are easy for the human but very challenging for non human being. CAPTCHA are also used to prevent email, instant messaging and text message spam. These provide the additional security level.

Most of the time CAPTCHA are paired with our any account login form to prevent the brute force password attacks. User can get grant only if he or she recognize correct face of Human being. This task is not much difficult for Human being.

## Face CAPTCHA:

This is new image based CAPTCHA called as Face CAPTCHA. This is mainly used for touch screen devices like mobile phone, Tablets, etc. this makes CAPTCHA more friendly with user. In this CAPTCHA user have to select correct human face. This task is very easy for normal human being but it become more difficult for computer or bots. User can not much easily select correct human face because of some distortion in the CAPTCHA. Distortion is one part of CAPTCHA which is used for the distortion in the images. It contains face and non face images. In non faces any cartoon or any non human face image. If user selects the non face image then CAPTCHA can't permit the user for further process. Following diagram gives the whole idea about Face CAPTCHA.

## 2. Literature Survey

Concept of CAPTCHA is first time coined by Von Ahn. CAPTCHA is combination of art and science. Most of the traditional CAPTCHA's are based on the text. In this CAPTCHA computer generate the challenge by combining letters and digits. There are various combinations of letter's and digits. At the last some noise is added in the form of distortion. Text CAPTCHA are very easy to understand, and very small. There are audio CAPTCHA also present for blind person. In this CAPTCHA user can hear the combination of letter and digit and according that user can enter the text in the text box and he/she will granted for further process. Following are the some types of CAPTCHA.

### Types of CAPTCHA:

#### 2.1 Text Based CAPTCHA

These CAPTCHA are consisting of only combination of text and digit. User has to enter the given text in the text box correctly. These are very simple and easy.

Example: ALTA VISTA



Figure 2.1: ALTA VISTA

#### 2.2 Image Based CAPTCHA

These CAPTCHA are consisting of only combination of images. User has to fulfill the given condition or to select the human face like in the Face CAPTCHA. These are very simple and easy for human only but very difficult to bots.

Example: Scene Tagging CAPTCHA



Figure 2.2: Scene Tagging CAPTCHA

#### 2.3 Audio Based CAPTCHA

These CAPTCHA are mainly used for blind person. Blind person can hear the sound which contains alphabets or word or any combination of letter and digit like text CAPTCHA, and according that user can enter the correct text.

Example: Audio CAPTCHA

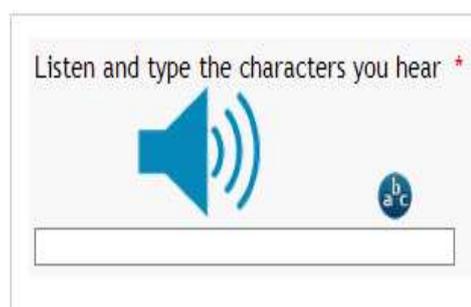


Figure 2.3: Audio CAPTCHA

### 3. Generation of face captcha

In the generation of Face CAPTCHA mainly 3 steps required which are given below:

#### 3.1 Background Generation

Size of CAPTCHA is 400 X 300 pixels. Background containing no. of rectangles in different colors and size. This size is compatible with resolution of mobile devices. Colored rectangle scatters in the background, which makes complex background.

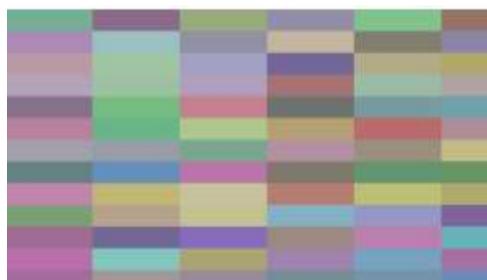


Figure 3.1: Background Generation

#### 3.2 Image Selection

After creating background, we have to select the image for CAPTCHA. Images contain Face and non face images. These are selected to be embedded such that

$$n(\text{total}) = n(\text{Face}) + n(\text{non Face}) \geq 2;$$

$$n(\text{non Face}) \geq 1;$$

Here n (total) is no. of Face & no. of non Face images. There should be at least one Face image to successfully solving of CAPTCHA, and at least 2 non Face images to provide a falsy target in case attackers can detect the location of embedded images. While image selection, no any images is overlapping other images and no any images outside of CAPTCHA's Background. This precaution should be taken while selection of images.



Figure 3.2: Image selection

#### 3.3 Distortion Selection

This is important step while generating CAPTCHA. If Distortion applied to CAPTCHA, it can significantly impact on human & automated attack success rates. There are no. of distortion types are available to yield the best performance. We can use any distortion type for the noise in the images.



Figure 3.3: After distortion

Distortion Type	Applied	Parameter Adjusted
Erosion	Globally	Pixel radius
increase brightness	Globally	scale histogram rang
peridic noise	Globally	image remove
speckel noise	locally	variance
resolution modifica	locally	scale factor
width scaling	locally	
height scaling	locally	scale factor

Table 3.1: Types of Distortion

### 4. Working of Face Captcha

As shown in figure Face, non Face images and some operations are used to generate the Face CAPTCHA. Some steps for working of CAPTCHA :

- [1] Collect the Face & non Face images randomly; there should be at least 2 non faces and at least 1 Face image required.
- [2] Process these images through the distortion operation. Distortion should be any from type of distortion.
- [3] Each face image is placed at randomly selected position (x , y) on the Background 'B' of CAPTCHA. The Background images are then created using following 2 approaches.

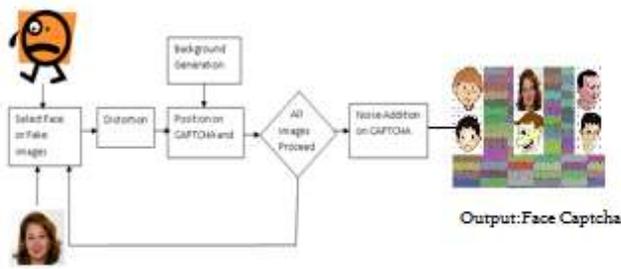
#### Random colors

Using random shapes like circles, square, any shape with randomly chosen sizes & colors. These shapes are pasted on the canvas at random co-ordinates to generate the final background image.

#### Random portion

In this approach Background is created using the face images which is used for creating CAPTCHA. Here some parts of Face images are selected randomly and stored. These parts are used along with color algorithm for background image. After that we

have include some skin color patches on the background that can increase the complexity.



**Figure 4.1:** Working of Face CAPTCHA

## 5. Conclusion

Now a day's user uses the touch screen technology like mobile phone, tablets, etc. user uses more application in this technology. Face Captcha provide additional security level with this application. User gets more friendly and secure connection with application. Face Captcha helpful to prevent attacks from bots. It reduces the attacks from bots up to 0 percent. Hence Face Captcha is very effective technology for user.

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