

Animated CAPTCHAs and Games for Advertising

Suhas Aggarwal
suhasagg@gmail.com

Abstract

In this paper, we discuss animated captcha systems which can be very useful for advertising. They are hardly any Animated Advertisement Captchas, available these days which are more secure than single image based Captchas and more fun as well. Some solutions are available such as yo!Captcha, NLPcaptcha. Solve Media TYPE-IN Captchas. These Captchas are single image based Captchas which ask users to type in Brand message to solve Captcha for brand recall. In this paper, we discuss some more appealing media which can be used for Captcha advertising. We also present Interactive Environment/Game Captcha which provide a more powerful medium for advertising. Finally, we showcase a Game with a purpose, named 'Pick Brands' which promote advertising and can be used to obtain feedback/reviews, collect user questions concerning products/Advertisements.

Categories and Subject Descriptors

H.3.5 [Information Storage and Retrieval]: Online Information Services-Web-based services; J.4 [Computer Applications]: Social and Behavioral Sciences

Keywords

Advertisement Captchas, Animation, Visual effects, Random Captcha System, Brand Recall, Secure Captchas, Interactive Environments/Game Captchas, Game With a Purpose for advertisements

1. INTRODUCTION

Captcha advertising is becoming very popular these days. It is used extensively by advertisers to promote their brands on popular websites. It is less costly as compared to conventional advertising and advertisers are able to showcase their advertisements to larger audience. Current Captcha advertisement systems, display advertisements on a single image and ask users to type in some challenge text such as quoted/underlined/colored text which is the brand message. As users type in the brand message, it helps in brand recall on the principle of learning by doing.

1.1 Solutions Available

Some solutions available these days include yo!captcha[1], NLPcaptcha[2], Solve Media Type-in Captcha[3].



Figure 1. Captcha Advertising Solutions

Copyright is held by the International World Wide Web Conference Committee (IW3C2). IW3C2 reserves the right to provide a hyperlink to the author's site if the Material is used in electronic media.
WWW 2013 Companion, May 13–17, 2013, Rio de Janeiro, Brazil.
ACM 978-1-4503-2038-2/13/05.

These Captchas are secure and userfriendly but limits the advertising media to single image. In this paper, we discuss some advertising captcha solutions based on animation which are more visually appealing and hence make ads more appealing and engrossing. They also make Captcha solving more fun and interesting.

2. ANIMATION CAPTCHA SYSTEM

In this section, Animation Captcha system designs are discussed.

2.1 System Design

System consists of some animation puzzles. These animation puzzles come randomly per refresh.

2.1.1 Puzzle1

Random alphabets are splashed on random positions on a screen at different time instants. Alphabets will appear for an instance and then disappear. User will have to type alphabets in a sequence they appeared. Alphabets appear on an Advertisement Background. Also, background oscillates between Normal CAPTCHA background and Advertisement Background with stronger bias to Advertisement Background. Implementation makes use of animated gif with infinite loop. It makes use of three frames i.e 3 background images which loop infinitely in same order. So, user can see alphabet sequence again, if they miss. There is time gap of 3 second between 1st image and 2nd image and 1 second between 2nd image and 3rd image. Time gap is slightly larger in former case so that users can spot first alphabet in sequence easily.

Animation Sequence is given below.

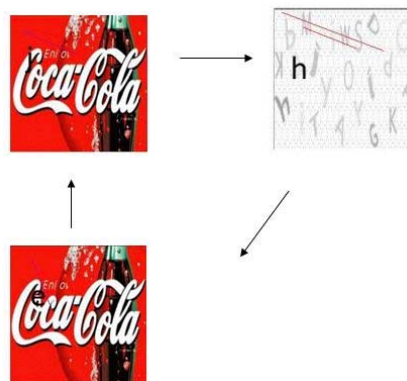


Figure 2. Puzzle 1: Type Sequence of characters

2.1.2 Puzzle2

Different Colored alphabets are splashed on random positions on a screen at different time instants. Alphabets will appear for an

see <https://sites.google.com/site/koolcaptcha/>

instance and then disappear. User will have to type alphabets of a particular color.

Alphabets appear on an Advertisement Background. Also, background oscillates between Normal CAPTCHA background and Advertisement Background with stronger bias to Advertisement Background. Implementation makes use of animated gif with infinite loop. It makes use of three frames i.e 3 background images which loop infinitely in same order. So, user can see alphabets again, if they miss. Animation Sequence is given below.

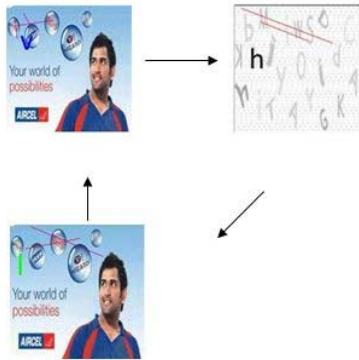


Figure 3. Puzzle 2: Type Alphabet of green color

Benefits of Puzzle 1 and Puzzle 2 are that advertisers can select three or four images that convey advertisement, i.e they can select multiple images to convey a story/advertisement and above puzzles can be embedded on those images. Thus, advertisements are more detailed, illustrative and fun.

2.1.3 Puzzle 3

Animated Math expression is displayed in form of images. User have to type answer to the math expression as answer. First image is Advertisement, after that animated math expression is displayed. There is time gap of 1 second after each image. Implementation makes use of animated gif with infinite loop. As loop is infinite, user can see math expression again, if they miss once. It makes use of five frames i.e 5 images which loop infinitely in same order.

Animation Sequence is given below

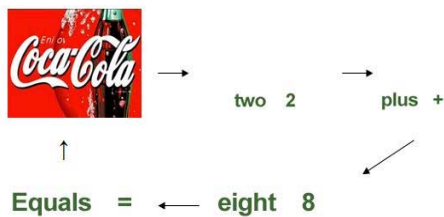


Figure 4. Puzzle 3: Type Answer to the Math Expression

These Animation puzzles come randomly per refresh.

2.2 Security Analysis

Animated Captchas are more secure and resistant to attacks than Image based Captchas. If attack is launched via a program which is able to extract frames from animated gif and recognize individual

alphabets. As alphabets are shown on Advertisement Background, which contains other text i.e other alphabets, it becomes difficult for the program to pick which is the alphabet which occurred in animation and is to be typed, where users can pick animated characters easily. Most important part of the design which makes the system secure is that there are multiple animation puzzles which comes randomly per refresh so, if a program tries to launch an attack, program will have to identify the animation puzzle, which makes launching attack more difficult.

2.3 Usability

Animated captchas are more fun and a more appealing medium for advertisements. Also, users spend more time on these puzzles, which they might not mind as well as puzzles are interesting and appealing, their is a higher tendency of brand recall than standard Image Based Captchas. Also, Advertisers can provide advertisements in form of animated gifs on which these puzzles can be embedded. A survey conducted showed that these 'story' Captchas were rated fun and easy by people from different age groups and domains and increased positive advertisement impressions.

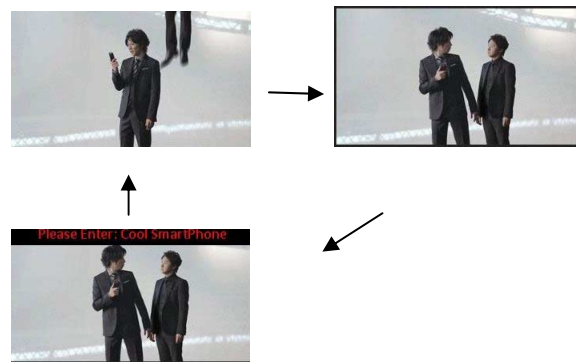


Figure 5. Puzzle Embedded on Animated gif analogous to [6].

3. VISUAL EFFECTS CAPTCHAS

In this section, Visual Effects Captcha system designs are discussed.

3.1 System Design

System consists of some visual effect puzzles.

3.1.1 Puzzle 1

Advertisement Images are rendered on a cube. One face contains Challenge Text, Brand Message which is to be typed. Users rotate the cube to see the challenge text. In this case, Adidas.



Figure 6. Puzzle 1: Rotate the Cube to see the Text to Type

3.1.2 Puzzle 2

Users are shown a maze whose walls show advertisements. Users navigate through the maze to see the challenge text to type.

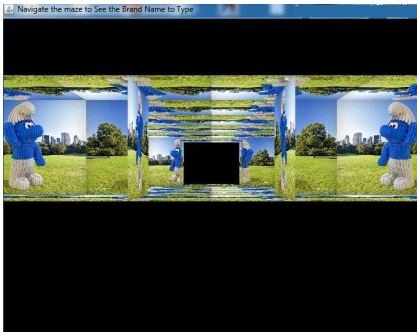


Figure 7. Puzzle 2: Navigate the Maze to figure out the Brand Name

3.1.3 Puzzle 3

Users are shown a Visual Effect depicting Advertisement. Effect consists of Advertisement rendered on a special shape and moving text on the screen. Users have to enter the moving text to solve the captcha challenge. In this case, Algae Lamps.

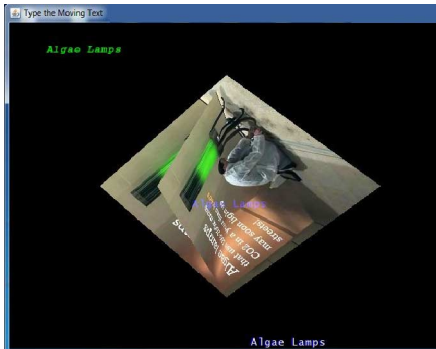


Figure 8. Puzzle 3: Type the Moving Text

3.1.4 Puzzle 4

Users are shown a Visual Effect depicting Advertisement. Effect consists of Advertisement. A special object such as a globe is rendered on the advertisement around which Captcha Challenge text rotates. Users have to type in challenge text. In this case, Recycle.

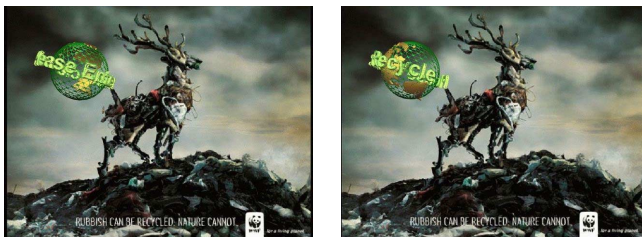


Figure 9. Puzzle 4: Type the Rotating Text

System can generate a visual effect as demanded by advertisers from above choices.

3.2 Security Analysis

These puzzles require some interactivity with the puzzle to solve, which makes it difficult for the program to solve.

3.3 Usability

Visual Effects tend to take lot of attention and hence make ads more engrossing and chances of brand recall are much higher. They are more fun and interesting puzzles than conventional Captchas. A survey conducted showed that this Captcha was rated easy and fun by people from different age groups and occupations and it resulted in more positive advertisement impressions.

4. INTERACTIVE GAME CAPTCHAS

Interactive game Captchas utilize players interest in a game environment to draw their attention in advertisement as well as solve Captcha.

4.1 System Design

System is modeled analogous to flight simulator game scene. An Advertisement road is displayed at the bottom to showcase advertisement. An object related to the advertisement, for example here a coke balloon is modeled as a target, rotating in the sky. Environment can be customized according to the advertisement. For example if advertisement is of telecom company showcasing a new mobile phone, road can be modeled as image based advertisement for mobile phone and object rotating in the sky can be a mobile phone. Thus, it uses shooting gaming mechanism as compared to [4],[5] which use associating objects, sliding to fit, respectively.

4.1.1 Challenge

Challenge is to shoot three targets. Target can be shot by clicking on it. After one target is clicked, it starts glowing to indicate, it has been clicked and score increases by one.



Figure 10. Coke advertisement modeled as flight simulator scene, coke balloon can be seen in the sky



Figure 11. Coke balloon starts glowing after clicking on it and score increase by it

As one move ahead on the road, more targets start appearing in the sky. For example in, figure 12 two coke balloons appear, after moving ahead on the road.



Figure 12. Two coke balloons appear as one move ahead on the road

After, Clicking on two coke balloons above, game Captcha will be considered as solved.

4.2 Security Analysis

Game playing require some interactivity with the puzzle to solve such as moving along the road and clicking/shooting at certain places in the image, which makes it difficult for the program to solve. Problem such as image recognition and simple associations need to be tackled.

4.3 Usability

Games tend to take lot of attention and hence make ads more engrossing and chances of brand recall are much higher. They are much more fun and interesting than conventional Captchas and a better experience. A survey conducted showed that game Captcha described above increased form submission by 38%. Also, people from different occupation and age groups found it easy to solve and it resulted in more positive advertisement impressions. Gaming Captcha was rated most fun and interesting as compared to above designs.

5. A GAME WITH A PURPOSE NAMED ‘PICK BRANDS’ USED TO PROMOTE ADVERTISEMENTS

A game named ‘Pick Brands’ has been designed to promote advertisements. It is a multiplayer game.

5.1 System Design

User and his/her partner are given an image based advertisement. They have to identify the brands, shown in the advertisement, if they agree they get points and move on to the next advertisement. Game can also be used to get feedback by obtaining responses/reactions such as cool, okay, excellent corresponding to Products/Advertisements. It can also be used to collect suggestions/questions regarding the product and other information such as features they like in the product and things they would like to be improved and thus, can act as comprehensive feedback system. It is difficult to obtain such feature by banner and Captcha advertising on the websites. Moreover, game can be used to obtain keywords corresponding to advertisement images. Keywords obtained are very useful as they can be used to map webpages such as from news portals, telecom providers, car portals, where

Advertisement Captcha images will be placed by Advertisement Captcha systems such as for example, yo!Captcha , Solve Media’s Captcha. Keywords can also be entered by advertisers while setting up their campaign. Keywords generated by game can be used to provide keyword recommendations useful in campaign analytics as are provided in Google AdWords.

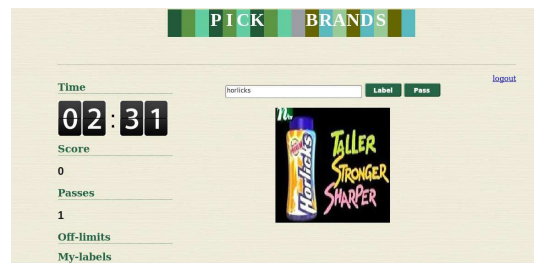


Figure 13. An Advertisement getting displayed to Label

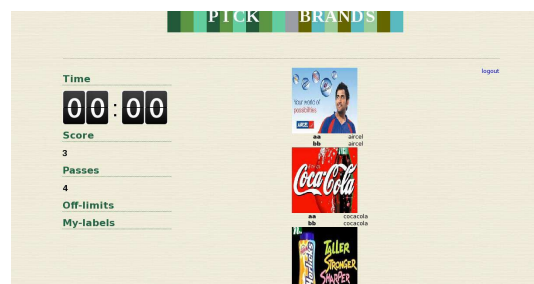


Figure 14. Advertisements with their Brand Labels

Thus, game can be utilized for ranking/rating products/advertisements and can be used to calculate popularity score, comparison of same genre products belonging to different brands. Also, medium of advertising can be a stronger media such as a video making the game more interesting and advertising more powerful.

6. SINGLE IMAGE BASED ADVERTISEMENT CAPTCHA SYSTEM

A Single Image based Advertisement Captcha system has also been implemented. System will be beneficial to advertisers/publishers who may want to automate converting Advertisement Images to Captcha Images.

6.1 API Descriptions

- 1)Quoted Text Generation API
- l) a)Places Blue Coloured Quoted Brand Message in the Top right API places Ad keyword Zovi in Top right.



Figure 15. Place Quoted Text in Top Right

b) Places Red colored Quoted Brand Message in the Top right

API places Ad keyword Zovi in Top right but in different color.



Figure 16. Place Quoted Text in Top Right

II) Places Multiple Word Brand Message in Top right space in the Ad image.

API places multiple words Ad message in Top right corner.



Figure 17. Place Multiple Words

2) Underlined Brand Message API

API places underlined Ad keyword in Top right.



Figure 18. Place Underlined Word

Underlined Brand Message in the top right space of the image is placed.

3) Colored Brand Message API

API places a particular colored brand message in Top Right.



Figure 19. Place Colored Word

Brand Message in Blue Color in the Top right corner of the Ad image is placed.

4) Italicized Brand Message API



Figure 20. Place Italicized Word

Italicized Ad keyword is placed in top right.

5) Quoted Text Generated in the Left side of Advertisement Image



Figure 21. Place Quoted Text in Left

“Smart Casuals” which is Ad keyword is placed in Left.

6)TYPE-IN Captcha API Analogous to Solve Media’s Captcha



Figure 22. TYPE-IN Example

TYPE-IN Captchas can handle long brand messages as ad message to be entered is placed at bottom of the image.

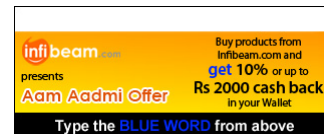
7) Custom Question Captcha API



Figure 23. Custom Question Captcha

Custom Question entered by Advertiser gets displayed at the bottom of the image. This gives Advertiser freedom to focus the attention of users at a particular portion of advertisement.

8) API works by writing Ad keyword in Bottom right corner in the image, assigning a random color to random/selected words. For example – ‘get’ is in blue, ‘2000’ is in red as well as green, 10% is in purple.



(i) A random is selected in right and is colored blue. In this case “get”.



(ii) A random word is selected in right and is colored red. In this case “2000”.

Figure 24a. Select a random word and assign it a color



(i) A random word is selected in right and is colored green



(ii) A random word is selected in right and is colored purple

Figure 24b. Select a random word and assign it a color

Words selected should have some significance to the advertisement. In a case, it can be random, to ensure randomness of Captcha. For example, “get” is selected in Figure 23a.(i)

9) API works by writing Ad message in Bottom Left corner in the image. Similarly, color analogies as in API ‘8’ can be applied to Brand message, For example – A random word from Work, Harder, Play, Smarter can be selected and random color such as red, blue or green is assigned to it. Challenge can be to enter red, green or blue text.



Figure 25. Write Ad Keyword in bottom left

10) This API presents a very detailed advertisement Captcha. Image depicting brand or product is kept in the left and Advertisement message is in the right. Thus, Advertisement can be detailed and can convey more information, also Captcha is more clear and easy to solve. Main advertisement information/Caption starts from top left to increase visibility.



Please Enter RED Text

Figure 26. Friendly and Detailed API

7. SHARING AND ANALYTICS

Advertisements can also be shared via social networks like Facebook. If a user likes the Ad and want to share, he/she can simply press Facebook ‘Like’ button to share the Advertisement and it will also solve Captcha. ‘Like’ Feature can also be added in ‘Pick Brands’ game. It is very useful in context of online shopping as discounts and other offers can reach large number of people easily. Also, advertisement can be about any event. Feature can also aid in sentiment analysis of the advertisement by counting likes corresponding to the advertisement.



If you Like the Ad, Click the Like Button Above to Solve Captcha.

You can also post if you Type the challenge described in the image in the Box.



Figure 27. Sharing Ads via AdCaptcha/’Pick Brands’ Game

As can be observed in the Demo figure above, likes corresponding to Zovi Advertisement is displayed. This, gives a impression of ad to users as well and increase their interest in the advertisement.

Captcha can serve as a multipurpose system and can be used in Analytics in different domains, for example Advertisements, Places, Art. Some APIs have been developed which utilize Emotion Based Captcha[23][17].

7.1 Example of Advertisement Analytics

By asking users to enter emotions belonging to different categories corresponding to the advertisement, one can determine whether users really liked the ad, or found it boring or not quite interesting or advertisement/ product promotion could be better.



Figure 28. Advertisement Analytic Captcha

7.2 Example of Art Analytics

By asking users to enter emotions belonging to different categories corresponding to the Art/Painting, one can determine whether users really liked the art, or found it boring or not quite interesting, and hence can generate user reviews for the art.



Figure 29. Art Analytic Captcha

7.3 Example of Place Analytics

By asking users to enter emotions belonging to different categories corresponding to a Place/Spot, one can determine whether users really liked the Place, or found it boring or not quite interesting, and hence can generate user reviews/ratings for the place.



Kollam, Kerala
Please Choose from below emotions for above Place -
Nice, Magnificent, Okay

Figure 30. Place Analytic Captcha

Users are given an Analysis Domain, for example Advertisement and they have to type in the Emotion they feel for the Advertisement. As Reaction can be positive and Negative, three random words depicting positive and negative emotions are picked from the database and displayed. Various words depicting emotions in three different category, extremely positive, positive and negative are kept in database and are picked randomly. For example - Cool, Magnificent, Boring. Distortion effect is applied to Emotion Words to make them difficult to read by a program. Emotion words at the bottom of the image are blurred and in some cases twisted to decrease reading ability of program. All the answers entered by the users are accepted from among the three emotions given to ensure freedom to the user.

Apart from this Captcha API have been developed for Poll/Situation Analysis

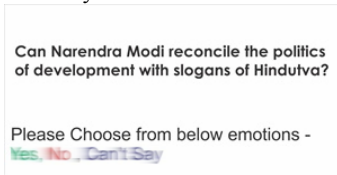


Figure 31. Poll Captcha

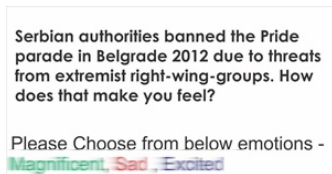


Figure 32. Situation Analysis Captcha

8. SYSTEM IMPLEMENTATION

Currently, Animation Captcha systems have been implemented as Animated gifs and Visual Effects/Game Captcha have been implemented as Java applets and use OpenGL. Pick Brands Game has been implemented in PHP. API for Single Image Based Advertisement Captcha and Analytics Captcha have been developed using Java 2D. Please visit <https://sites.google.com/site/koolcaptcha/> to see about Captcha Service.

9. ANALYSIS

A study by Wharton claims that if we consider advertisements in traditional banner versus Captcha advertisement, the brand recall increases by 111 percent and message recall by 1200 per cent[9].

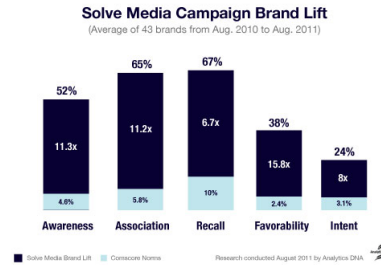


Figure 33. How Ad Captcha increases Brand Lift

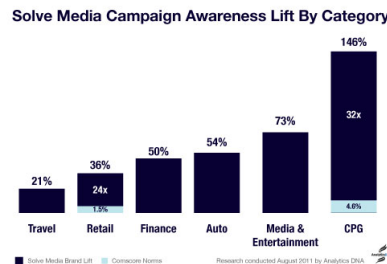


Figure 34. Different Sectors Placing Ads

Solve Media's survey shows[10] campaigns generated 65% for Association, 67% for ad Recall, 38% for Favorability, and 24% for Intent. The type-in ads also produced significant results by industry, with consumer product goods (CPGs) companies benefiting maximum with 146% in brand awareness. Other categories include: Entertainment and Media, 73%, Auto, 54%, Finance, 50%, Technology, 44%, Recall, 35%, and Travel, 22%. Some surveys conducted show, Gaming Captcha PlayThru[4] has been shown to increase form submissions by up to 40 percent compared to products like reCAPTCHA. Further, Gaming Captchas such as The STF-SLIDE TO FIT™[5] click-through rate is ten times greater than regular CAPTCHAs, users have fun and enjoy message from start to finish, when a person is actively involved in a marketing message, they are ten times more likely to remember it. 'Pick Brands' Game as discussed above belong to category of Advergaming, it is practice of using games to advertise a product, organization or viewpoint. Some examples include - Leviathan's game for Fox Sports in 2001 used telemetry data transmitted by radio waves from actual pitches in the Series and allowed visitors to try to connect with virtual versions of the same balls. For Korean carmaker Hyundai, Leviathan created a road-rally game online to promote its new Tiberion model. More examples have been discussed in [11]. Pick Brands support advertising from multiple brands. It can be also be used to collect data/questions regarding product/advertisement from users. Also. Augmented reality support will make the game more interesting and will give real product experience[13][14]. Moreover, apart from advertising, Captchas and games can be used to promote other social media such as news, quotes and for event notifications. Some examples have also been discussed above.

10. REFERENCES

- [1] <http://yocaptcha.com/>
- [2] <http://nlpcaptcha.in/>
- [3] <http://www.solvemedia.com/>
- [4] <http://areyouahuman.com/>
- [5] <http://www.adscaptcha.com/>
- [6] <http://www.nucaptcha.com/advertisers>
- [7] <http://www.gwap.com/gwap/>
- [8] <http://www.atelier.net/en/trends/articles/gamified-captchas-can-benefit-both-brands-and-users>
- [9] <http://www.indiadigitalreview.com/features/catching-tg-through-captcha>
- [10] <http://thenextweb.com/media/2011/10/06/solve-medias-smart-captcha-ads-improve-brand-recall-by-67/>
- [11] http://www.brandchannel.com/features_effect.asp?pf_id=145
- [12] <http://sweetcaptcha.com>
- [13] Smith, J. H., & Just, S. N. (2009). Playful Persuasion. *Nordicom Review*, 30(2), 53-68.
- [14] Winkler, T., & Buckner, K. (2006). Receptiveness of gamers to embedded brand messages in advergames: Attitudes towards product placement. *Journal of Interactive Advertising*, 7(1), 37-46.
- [15] Svahn, M. (2005, November). Future-proofing advergamming: a systematisation for the media buyer. In *Proceedings of the second Australasian conference on Interactive entertainment* (pp. 187-191). Creativity & Cognition Studios Press. <http://dl.acm.org/citation.cfm?id=1109180.1109210>
- [16] Diakopoulos, N., Luther, K., & Essa, I. (2008, October). Audio Puzzler: piecing together time-stamped speech transcripts with a puzzle game. In *Proceedings of the 16th ACM international conference on Multimedia* (pp. 865-868). ACM. <http://dl.acm.org/citation.cfm?id=1459507>
- [17] <http://captcha.civilrightsdefenders.org/>
- [18] Cauberghe, V., & De Pelsmacker, P. (2010). Advergames. *Journal of Advertising*, 39(1), 5-18.
- [19] Wise, K., Bolls, P. D., Kim, H., Venkataraman, A., & Meyer, R. (2008). Enjoyment of advergames and brand attitudes: The impact of thematic relevance. *Journal of Interactive Advertising*, 9(1), 27-36.
- [20] msamai, M., & Phimoltares, S. (2010, April). 3D CAPTCHA: A next generation of the CAPTCHA. In *Information Science and Applications (ICISA), 2010 International Conference on* (pp. 1-8). IEEE.
- [21] Cui, J. S., Mei, J. T., Wang, X., Zhang, D., & Zhang, W. Z. (2009, November). A captcha implementation based on 3d animation. In *Multimedia Information Networking and Security, 2009. MINES'09. International Conference on* (Vol. 2, pp. 179-182). IEEE.
- [22] Ince, I. F., Salman, Y. B., Yildirim, M. E., & Yang, T. C. (2009, November). Execution time prediction for 3d interactive captcha by keystroke level model. In *Computer Sciences and Convergence Information Technology, 2009. ICCIT'09. Fourth International Conference on* (pp. 1057-1061). IEEE.
- [23] Aggarwal, S. (2012, July). CAPTCHAs with a Purpose. In *Workshops at the Twenty-Sixth AAAI Conference on Artificial Intelligence*.
- [24] Athanasopoulos, E., & Antonatos, S. (2006, January). Enhanced captchas: Using animation to tell humans and computers apart. In *Communications and Multimedia Security* (pp. 97-108). Springer Berlin Heidelberg.