



# Human Computer Visual Test

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## Abstract

With the development of abstract art movement and with the use of computer technologies since 1980's second half, visual arts are following a different path today as they have always been, and computer has already taken a place in art as a tool.

In this paper, a test which was prepared to search how much it can be differentiated whether abstract visuals are created by computer or human, is presented. 20 visuals were prepared according to the goal of this test and with the help of a chosen software using the same parameters and colours. 10 of them were made by the "Auto-Generate" facility of the software, by computer. The remaining 10 visuals were created by me using the same parameters and colours.

In the evaluation of the answers 43 people gave to the test, it was seen that correct predictions remained in the average of 51%.

## 1 Introduction

The people who are not engaged in making artworks, most of the time react to abstract visuals as "I can make them as well." This only remains as a thought and generally does not turn into creation. For the ones who rarely try to make it, failure is almost certain. But, maybe for these visuals which people cannot understand or even though they cannot find anything to understand when they think that they understand them, it might be necessary to evaluate the reaction of people in another way. Maybe they think that creation of these visuals is very easy or maybe that it is something ordinary and almost everyone can make them.

If this point of view is taken to be true even to a certain extent, why can't it be possible that these visuals can be produced by computer?

20-30 Years has passed since computer was given a place in art as a tool. As computers got more powerful hardware and softwares, they started to take the place of canvases and brushes more. Beyond painting, there has remained almost no photograph which is not digital. What is more to these are, films and games.

Then, can humans be given another chance? As the creation of abstract visuals are so easy, or if people think so, then it must be the time to present visuals which are made by computer.

But how much can it be possible to differentiate the visuals which are created by computer and human with the same qualities and are similar to a certain extent?

This test, having references to the computer/human test by Alan Turing [1], aims to search the answer of the question asked above.

The organization of the paper is as: In the second section, how the visuals which were used in this test were created and in the third section, how the test was applied is explained. In the fourth section of the paper, the analysis of the data results of the test are stated. The fifth section includes the conclusion.

## **2 Generation of the visuals used in the test**

### **2.1 Software**

Finding the software which was used for developing this test was the most crucial step. "Alchemy version beta 008" © 2007-2010 Karl DD Willis, Initiated by Karl DD Willis and Jacob Hino was used as the software of the test [2].

The brief information about the software which is stated in its own web site is as: "Alchemy is an open drawing project aimed at exploring how we can sketch, draw, and create on computers in new ways. Alchemy isn't software for creating finished artwork, but rather a sketching environment that focuses on the absolute initial stage of the creation process. Experimental in nature, Alchemy lets you brainstorm visually to explore an expanded range of ideas and possibilities in a serendipitous way."

### **2.2 Visuals**

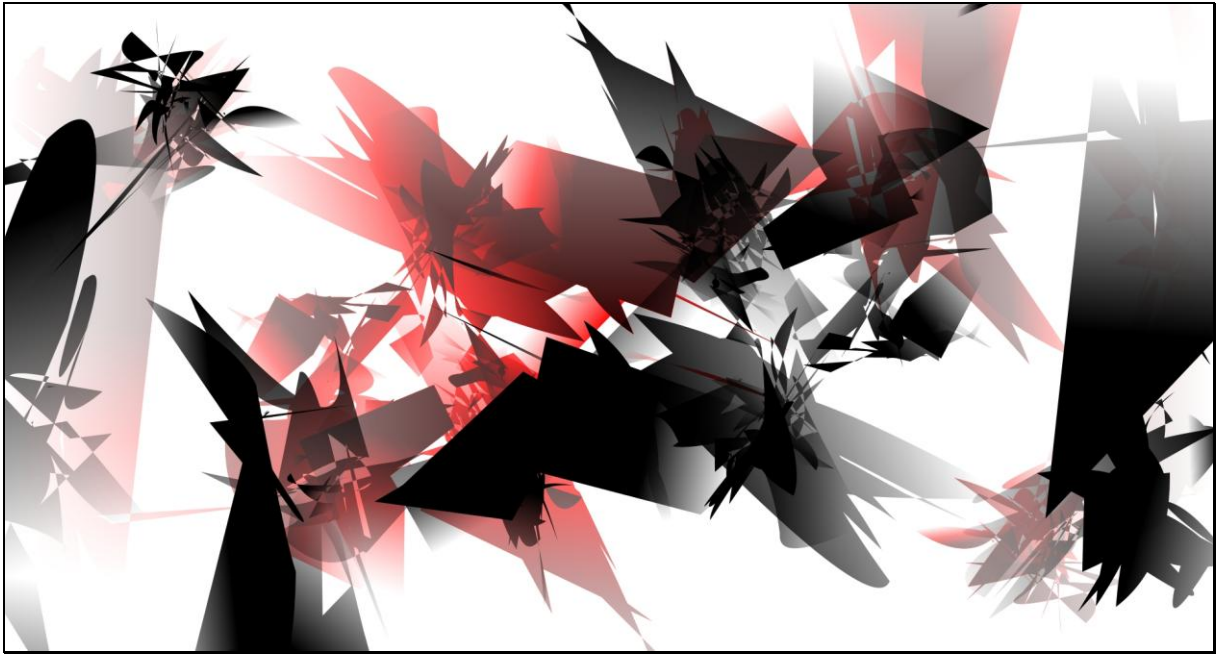
10 of 20 visuals were formed by the "Auto-Generate" facility of the used software (computer), remaining 10 was created by me with the same software. All other circumstances were the same while they were numbered randomly.

Another group of visuals were created by me with the same software prior to the preparation of this test and were added to my personal visual web gallery's [3] section number 184 [4]. An example of the visuals of this section is shown in Figure 1. For the visuals of this section, all parameters and colours were used freely by me.

For the creation of the visuals which were used in the test, instead of using parameters and colours freely, fixed parameters and colour limitations were applied so that participants could be objective between computers and human.

20 visuals which were the subject of this test and the related information could be reached also from section number 184 [5].

One of the visuals which were placed in the test is shown in Figure 2. Whether this visual is created by human or computer is not stated in order not to interfere with the test.



**Figure 1 :** One of the visuals presented in section number 184.

## 2.3 Colours used

In all the visuals same colours were used on the same white background in the same order and same amount (twice) :

| # | Colours | HEX    | Red | Green | Blue |
|---|---------|--------|-----|-------|------|
| 1 | Red     | FF0000 | 255 | 0     | 0    |
| 2 | Green   | 00FF00 | 0   | 255   | 0    |
| 3 | Blue    | 0000FF | 0   | 0     | 255  |
| 4 | Yellow  | FFFF00 | 255 | 255   | 0    |
| 5 | Black   | 000000 | 0   | 0     | 0    |
| 6 | White   | FFFFFF | 255 | 255   | 255  |

**Table 1 :** The colours used in the generation of visuals which were used in the test.

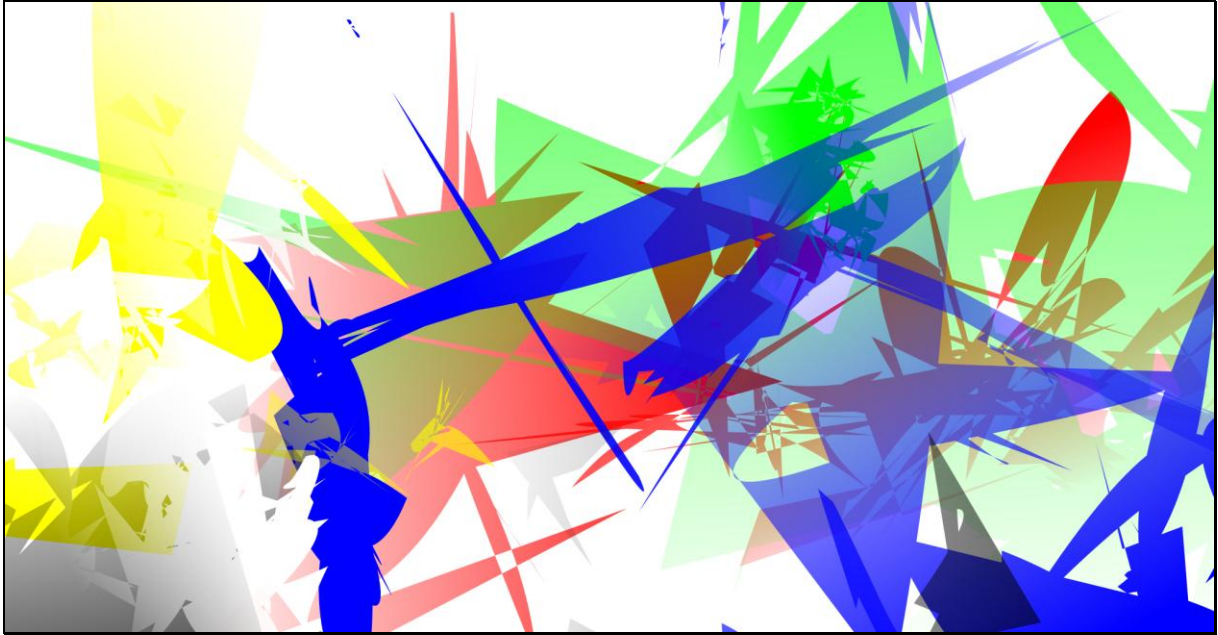
The colours which were used in the test were especially chosen out of the basic colours so that personal view and evaluation of the participants could be less.

## 2.4 Parameter adjustments used

After the choice of the software was done, the aesthetic which came to be the result of section number 184 can be said to be the basic determining factor in the preparation of this test. I used the experience I gained when preparing the visuals of this exhibition related to understanding which parameter makes what kind of effect on the result for the adjustment of the parameter values. In all the visuals, same software adjustments were used:

| Parameter           | Adjustment          |
|---------------------|---------------------|
| Create              | Type shapes         |
| Affect              | Gradients           |
| Style               | Solid shapes (over) |
| Line weight         | 1                   |
| Colour transparency | None                |
| Distortion          | Max                 |
| Size                | Max                 |

**Table 2 :** Parameter adjustments used in the generation of visuals which were used in the test.



**Figure 2 :** One of the visuals which were presented in the test.

### **3 Procedure for the application of the test and data collection**

Participants of the test were primarily asked to look at these 20 visuals presented in the web site and afterwards asked to guess which of the visuals were formed by computer, or created by human. In order to collect data, a form was attached to the web page [6]. After the form was downloaded and filled in, it had to be sent to me by e-mail.

### **4 Analysis of Results**

#### **Participants**

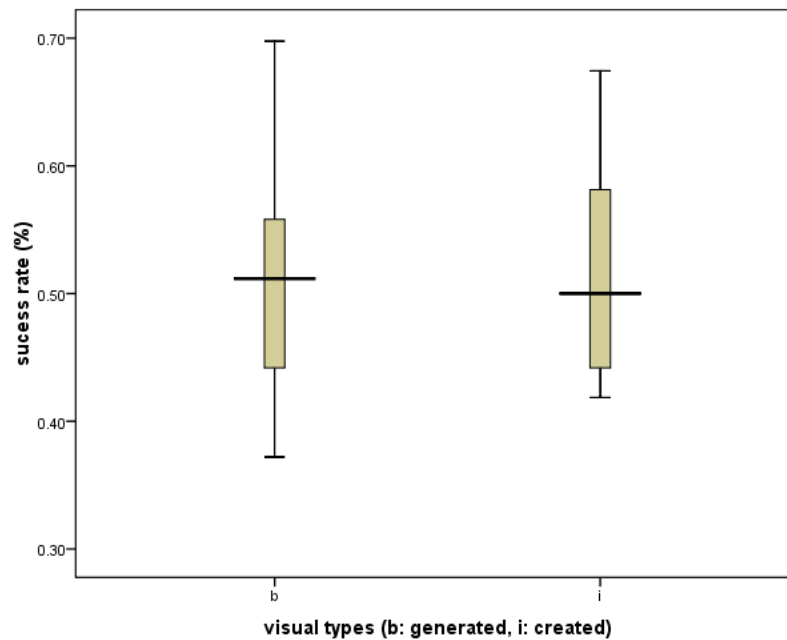
43 Turkish people (21 female and 22 male) participated by December 27, 2010. The ages changed between 18 and 70 (average age = 28, SD=13). Min 2 (10%) and max 20 (100%) correct answers were given. Average success of 43 participants was 51%. There was no participation criterion; whoever aware of the test was free to participate.

#### **Results**

The data collected from participants to examine the success in the identification of visuals automatically generated (=b) and created by a human (=i). The data collected form a normal distribution according to the tests of normality ( $p > .05$ ), which shows the soundness of the population participated in the task. Normal distributions are preferred for statistical analysis as many of the tests has the initial assumption of a normally distributed data. When the data form a non-normal distribution, it is forced to shape a normal distribution by applying log or z transformation. If the normal distribution cannot be obtained even via transformations, then, non-parametric tests are used for statistical analysis. In addition, the two groups of the visuals do not have different variances according to the test of homogeneity of variances, Levene's test ( $p > .05$ ), which is another assumption of many statistical test such as t-test, ANOVA.

The characteristics of distributions are given in Figure 3. The quartiles, smallest and largest observations, and medians of the distributions are given in the box plots presented in Figure

3. There are no outliers in the distributions, which mean that none of the participants performed in a different way form the others.



**Figure 3** : The characteristics of distributions.

The success in the identification of the visuals automatically generated and created by me was examined with an independent t-test. Accordingly, there is no significant difference between the identification rates of automatically generated ( $M = .51$ ,  $SE = .03$ ) and created ( $M = .52$ ,  $SE = .03$ ) visuals ( $t(18) = -.23$ ,  $p > .05$ ,  $r = .05$ ).

## 5 Conclusions

Half of the 20 visuals of the test were made by computer and remaining rest of them was created by me. This division in half might have affected the result of the test. However, that the average of correct predictions were 51% might be surprising. By 27<sup>TH</sup> December 2010, the average of correct predictions of the 43 participants of the test was 51%. The result was almost in half. So, it might be possible to say that people were neutral in the dilemma of deciding between computer and human. It might be hard to argue that the visuals created by me are artworks; however, they were at least created by a human, even though computer was used as a tool in their creation. If it is possible to say that art is an interest of humans, it might not be possible to say positive things for the part of art or human when evaluating the result of the test. However, it is easier to say positive things for the part of computer. Of course, it must not be forgotten that the visuals which were created by computer were also a result of computer and software produced by human and parameters and colours arranged by human as well. But, when the subject is the Turing test, it is certain that computer and softwares will be present.

According to my point of view, art is formed by things in which most ideas are included or maybe in this respect, art is a way of thinking. For the people who create artworks, art might be something that they live in or something that they cannot get out of. Beyond the use of computer as a tool in art, it is –at least for the time being- impossible for computers to make artworks. That it was not understood whether the visuals were created by human or computer might be related to perception. This might not have necessarily changed the meaning of art. But with this test, computer might have won a place in art beyond just being a tool.

## Acknowledgements

This test and further related things are all dedicated to my identical twin daughters, whose appearances in my opinion, might be good subject to similar tests. They are my all time inspirations.

If Prof. Ugur Halici (Department of Electrical and Electronics Engineering, Middle East Technical University, Ankara, Turkiye) did not support me during the test, I think it would have never realized. I want to express my deepest thanks to Ugur Halici.

It might not have been possible to do this test without the software which was used in the preparation of the test; Alchemy version beta 008 [© 2007-2010 Karl DD Willis, Initiated by Karl DD Willis and Jacob Hino]. I thank Karl DD Willis and Jacob Hino.

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I also thank to my daughter Cigdem Kayihan (School of Foreign Languages, Hacettepe University, Ankara, Turkiye) for the English translation and interpretation of this paper.

## References

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## **Yaman KAYIHAN in brief**

He was born in 1956 in Ankara, Turkiye. He works for an international company. He has twin daughters.

He started painting when he was in the primary school. He opened his first 2 personal painting exhibitions in his high school years, and the other 2 in his university years. He painted works with designs/patterns specific to himself. In the first years, he used gouache, pastel crayons and oil paints. Later, he made his paintings by using computer as a tool. Recently he has been interested also in photography. Despite his use of photography as photograph, he sees photography more as form and colour, and he tends to experiment in photography. His visuals have been presented in the internet for 10 years. The first painting he made with his own patterns dates back to 1971 and for this reason he is celebrating his 40<sup>TH</sup> year in 2011.

He founded the visual arts group named ">format D" (<http://www.formatd.net/index.html>) in 2004 with Ugur HALICI. 77 screenings were prepared with the visuals made by the members of the group. In these screenings, 31,346 visuals were presented and the total length of them was 1,277 minutes (2010). These screenings were presented many times in Turkiye and other countries.

His visuals, either drawing or photograph, are placed in his Web site in the address: <http://www.formatd.net/yaman/kayihan.html>. In his personal Web site, he has 9,253 visual works in 187 sections (2010).

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