

A glimpse into the Turing Test

by Florian Auer, June 8, 2012

Abstract

In this paper the Turing Test and its standard interpretation is briefly described. A method to reveal an artificial player is mentioned and finally a practical application is given.

1 Introduction

Alan Turing once tried to find a method to answer the question "Can machines think?". His first step was to replace this question by a closely related one which is free of ambiguous words: Whether machines can pass a certain test or not. Therefore he created the concept of the imitation game which would be later well-known as the Turing Test.

Overview At first in Section 2 the Turing Test and its nowadays common interpretation is described. Section 3 concerns a way to detect any artificial intelligence during such a test. Section 4 shows its practical usage on the basis of Yahoo's problem with bulk registrations. Finally, Section 5 gives the conclusions.

2 What is the Turing Test

Alan Turing described the "imitation game"[1] in his initial paper: Three players (an interrogator, a man, a woman) are separated from each other. They can only communicate via typed notes. The interrogator's job is to find out who's the woman. The best strategy for the woman, as Alan Turing mentioned [1], is to give truthful answers on all questions. On the other side, the task of the man is to fool the interrogator and imitate a woman.

"What will happen when a machine takes the part of A [the man] in this game?"[1]

Several variants of this game exist - even the reversed one which is separately mentioned later in section 4, which differs by gender and number of participants (not to mention the replacement of one by a machine). But I only want to mention the most common one - the so called standard interpretation[2]. The interrogator and the role of the woman are now played by a human (woman or man) and the man is replaced by a machine imitating a human. This version allows the machine to demonstrate its intelligence by making the interrogator believe that it is a human being. There are even opinions that this is the variance Alan Turing had originally in mind [2].

3 Revealing the machine

Imagine you take part in a Turing Test as interrogator. What would be the best question to reveal the machine? Maybe you now come up with one of these: What is it like to fall in love? Or how would you describe the taste of this and that? But these kind of questions are even difficult to answer for humans, and furthermore there isn't a response you could easily classify as false. Actually even the answer: "I can't describe it" would be correct.

Rather what we want is a question about that virtually any intelligent human [...] will be able to answer but that a computer absent intelligence is very unlikely to answer correctly [2]

It is similar to the definition given in an editorial of Linda J. Gottfredson [3], in which the meaning of intelligence is defined among others as the ability to reason, plan and solve problems. Therefore a good question involves these abilities. Now how would such a question look like? James H. Moor gave some examples which he grouped into three classes (Understanding, Reasoning and Learning).

What is the color of a blue truck? [Understanding]

What letter does the letter 'M' look like when turned upside down?

[Reasoning]

PLEASE IMITATE MY TYPING STYLE. [Learning]

These questions were posed to computer programs during the annual Loebner Turing Test contest. In which every year the standard Turing Test with several computer programs is performed. All human participants responded, as expected correctly to these questions, different from the programs. None of the programs gave a correct response. The result uncovers the apparent absence of intelligence in these programs, and provides the scientists with another puzzle to solve.

4 An Example of Practical Usage

The Internet portal Yahoo had an urgent problem concerning the user registration. Some computer programs (acting like humans) filled out their registration form and granted themselves access to Yahoo's chat rooms. They collected personal data about the users and promoted company products by pasting related links. They also gathered hundreds of free Yahoo email accounts for bulk spam mailings by exploiting the same lack of human recognition.

*"What we needed," said Dr. Manber [chief scientist of Yahoo] ,
"was a simple way of telling a human user from a computer program. "[4]*

Dr. Manber got help from a group of computer science researchers led by Dr. Manuel Blum at Carnegie Mellon University. After analyzing the situation they found out that their problem is similar to one described over fifty years earlier: the Turing Test. But this time the computer has to distinct the human from the machine. The researchers thought of a test *that would be simple for humans but would baffle sophisticated computer programs.*[4] The result was a collection of cognitive puzzles (based on challenging problems of artificial intelligence) called Captchas (Completely Automated Public Turing Test). One of these called Gimpy, is the recognition of a single distorted word written on a complicated background. Which became part of the registration process of Yahoo.

After some months Dr. Malik of Berkely and a student had explored a way to crack Gimpy using a computer program. This event raised even more

academic interest on this topic. Several researchers were spurred to create better Captchas or break existing ones. The ideas behind these efforts could even sometimes be used for new lines of research. For example, cracking the Gimpy puzzle improved the general technique of recognizing objects in a distorted background.

"Captchas are useful for companies like Yahoo, but if they're broken it's even more useful for researchers," Dr. Blum said [4]

5 Conclusions

I've tried to give a brief introduction into the topic by describing the standard interpretation. After this I've highlighted a problem of current human imitation programs at answering certain types of questions. Then I showed that the theoretical Turing Test has practical applications too. The example I gave to demonstrate this was Yahoo's registration problem. At which its nowadays scientific value is observable: Captchas were developed and scientists achieved progress in fields like computer vision because of them.

References

- [1] A. M. Turing. Computing machinery and intelligence. *Mind*, 59, 1950.
- [2] James H. Moor. The status and future of the turing test. *Minds Mach.*, 11(1):77–93, February 2001.
- [3] Linda S. Gottfredson and Anonymous. Mainstream science on intelligence. *Intelligence*, 24:13–23, 1997.
- [4] Sara Robinson. Human or computer? take this test. *New York Times*, 2002. <http://www.nytimes.com/2002/12/10/science/human-or-computer-take-this-test.html>.