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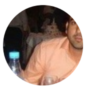

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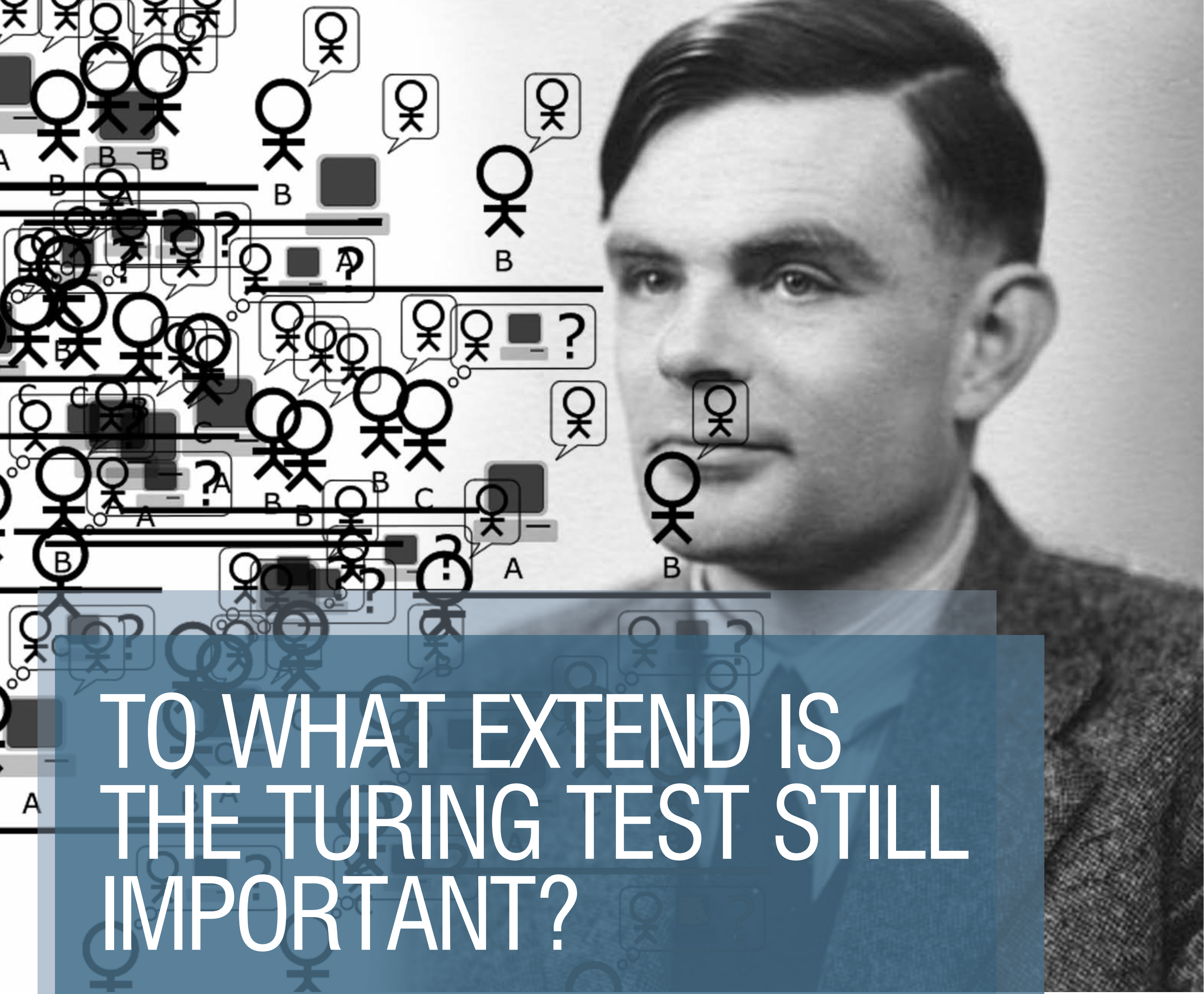

TO WHAT EXTEND IS THE TURING TEST STILL IMPORTANT?

Christos Papademetriou

The Turing Test, originally proposed as a simple operational definition of intelligence, has now been around for more than half a century. This paper chronicles some comments on Turing's classic article from its publication to the present. Within this context, the alternative versions of the Turing Test that were proposed in order to assess machine intelligence are discussed.

zFinally, the question of whether the Turing Test is still important is considered. The conclusion reached is that the Turing Test has been, and will probably continue to be, a very influential, if controversial, mathematical model.

INTRODUCTION

The short and extraordinary life of the British mathematician Alan Turing identifies with the “beginning” of Artificial Intelligence (AI). In 1950 Alan Turing published his famous paper “Computing Machinery and Intelligence”. Since then, it has been a widely discussed topic. In that paper he described a method for humans to test AI programs. This project will examine to what extent the Turing Test (TT) is still important.

In the first section of the project, the TT and some comments on that test will be analysed and the alternative versions of the TT will be discussed. Then, the question of whether the TT is still important is considered. In the final section, a conclusion is reached. The purpose of this paper is to analyse and show why the TT is historically significant and to what extent it is still important today.

THE TURING TEST

The TT was suggested by Alan Turing in 1950 (Mauldin, 1994). Alan Turing proposed an interactive test to replace the question “Can machines think?” this test has become known as the Turing Test and its validity for determining intelligence or thinking is still in question (Bradford, and Wollowski, 1994). Turing’s aim was to provide a method to assess whether a machine can think or not. He states at the beginning of his paper that the question “Can machines think?” is a highly ambiguous one. He attempts to transform this into a more concrete form by proposing what is called the Imitation Game (IG) (Turing, 1950, p.5).

The game is played with a man (A), a woman (B) and an interrogator (C) whose gender is not important. The interrogator stays in the room apart from A and B. The main purpose of the interrogator is to determine which of the other two is the woman while the objective of both the man and the woman is to convince the interrogator that he/she is the woman and the other is not (Hodges, 1997).

According to Turing (1950) the new agenda to be discussed, instead of the equivocal “Can machines think”" was “What will happen when a machine takes the part of A in this game? Will the interrogator decides wrongly as often when the game is played like this as he does when the game is played between a man and a woman?” (Turing, 1950, p.p.4-5).

As is now generally understood, what the TT really tries to assess is the machine’s ability to imitate a human being, rather than its ability to simulate a woman. Most subsequent remarks on the TT ignore the gender issue and assume that the game is played between a machine (A), a human (B) and an interrogator (C). “In this version, C’s aim is to determine which one of the two entities he/she is conversing with is the human” (Saygin, et al., 2000, p.3). If the interrogator is consistently unable to distinguish the person from the machine, the machine will be said to have passed the Test and will be said to be intelligent.

SOME COMMENTS ON THE TURING TEST

Gunderson (1964) clearly believed that passing the TT would not necessarily be a proof of real machine intelligence. Because of this, the test is based on a behaviouristic construal of thinking. He proposed that thinking is a very broad concept and that a machine passing the Imitation Game is merely exhibiting a single skill, artificial intelligence which is not human but made by human than the all-purpose abilities defined by thinking.

Gunderson points out some important issues pertaining to Turing’s replacement question “Can machines think?”. He asks the question “Can rocks imitate?” and continues to describe the “toe-stepping-game” (Gunderson, 1964, p.62) in a way that is identical to the way Turing described his IG (Turing, 1950). Once again, the game is played between a man (A), a woman (B) and an interrogator (C). The interrogator’s aim is to distinguish between the man and the woman by the way his/her toe is stepped on. C stays in a room apart from the other two and cannot see or hear the toe-stepping counterparts. There is a small opening in the wall through which C can place his/her foot. The interrogator has to determine which one of the other two is the woman by the way his/her toe is stepped on. “Will the interrogator decide wrongly as often as when the game is played between a man and a woman?” (Gunderson, 1964, p.p.62-64). Further, Gunderson (Gunderson, 1964) claimed that playing the Imitation Game successfully could well be achieved in ways other than by thinking, without saying precisely what these other ways might be.

According to French’s (2000) article, Stevenson (1976) writing a decade later when the difficulties with AI research had become clearer, criticized Gunderson’s single-skill objection, insisting that to play the game would require “a very large range of other properties” (French, 2000, p.5). Whitby (1997) states that the TT has become a distraction and he sees the main source as a mistaken reading of “Computing Machinery and Intelligence” (Turing, 1950). He is of the opinion that “Turing’s paper [has been] interpreted as a closer to an operational test than he himself intended” (Whitby, 1997, p.54) and that “the last thing needed by AI qua science is an operational definition of intelligence involving some sort of comparison with human beings” (Whitby, 1997, p.62).

Taking a historical view, Whitby (1997, p.53) describe four phases in evolving interest in the TT:

"1950 - 1966: A source of inspiration to all concerned with AI.

1966 - 1973: A distraction from some more promising avenues of AI research.

1973 - 1990: By now a source of distraction mainly to philosophers, rather than AI workers.

1990 onwards: Consigned to history".

ALTERNATIVE VERSIONS OF TURING TEST

In this section, it is important to summarize some alternatives to the TT that were proposed in order to assess machine intelligence.

HARNAD AND THE TTT

Stevan Harnad's main contribution to the TT debate has been the proposal of the Total Turing Test (TTT) an indistinguishability test that requires the machines to respond to all of our inputs rather just verbal ones. Clearly the candidate machine for the TTT is a robot with sensorimotor capabilities (Harnad, 1989; Harnad, 1991).

Besides to the TTT, Harnad also mentions a Total Total Turing Test (TTTT) which requires neuromolecular indistinguishability. But, this more stringent version of the TT, will not be necessary, according to Harnad. If we know how to make a robot that can pass the TTT, he says, we will have solved all the problems pertaining to mind-modelling. However, neural data might be used as clues about how to pass the TTT (Harnad, 1991). Harnad, thinks TTTT much as a scientist can ask, for empirical story ends there (Harnad, 2000), but he does not think that we have to "go that far".

THE INVERTED TURING TEST

Recently, Stuart Watt has proposed the Inverted Turing Test (ITT) (Watt, 1996). Watts believes that the TT is inseparable from "naive psychology[1]" because in order to pass the TT, a machine must convince the interrogator of that which is in its mind. He calls naive psychology "the psychological solution to the philosophical problem" (Watt, 1996). Watt's ITT requires that machine be able to prove its human-ness by exercising naive psychology. In particular, should exhibits that its power discrimination is indistinguishable from that of the human judge in the TT. No doubt, the TT is literally inverted and a system passes [the ITT] if it is itself unable to differentiate between 2 person or among a human and an engine that can pass the standard TT, but which can separate between a human and an engine that can be told apart by a normal TT with a human observer (Watt, 1996).

French (1996) uses the technique of a "Human Subcognitive Profile" that, can show that a mindless program using the Profile could pass this variant of the TT. Ford and Hayes (1996) renew their appeal to reject particular test as any kind of meaningful yardstick for AI. Collins (1997) suggests his own type of test, the Editing Test based on the skilful way in which humans 'repair' deficiencies in speech, written texts and handwriting, for example, and the breakdown of computers to accomplish the same interpretative competence. Short passages of typed text are quite sensible to reveal interpretative asymmetry, and that's why a Turing-like test, turning on the differential ability to sub-edit such short passages, is enough to expose whether the profound problem of AI has been solved (Collins, 1997).

THE TRULY TOTAL TURING TEST

In their article "The Turing Test: 50 Years Later" Saygin, et al. (2000, p.26) mentioned that very recently, Schweizer (1998) proposed the "Truly Total Turing Test" (TRTTT). Schweizer (1998) believes even Hamad's TTT to be an insufficient test for intelligence. Before he proposes the TRTTT, Schweizer states his own opinions about the adequacy of behavioural criteria. He views such tests as "dealing with evidence for intelligence but not as constitutive or definitional" (Schweizer, 1998, p.264).

In the Truly Total Turing Test, robots as a race should be able to invent languages, build a society and achieve results in science, for example, similar to the human race (Schweizer, 1998).

LOEBNER PRIZE

Will machines ever be able to think of their own will? And will we be able to tell if and when they do? Pondering these questions in 1950, the British mathematician Alan Turing came up with a simple solution of settling the matter. Every year since 1991, computer programmers have competed for the Loebner's prize of $100,000[2] and a gold medal. The winner will be the first program that will pass an unrestricted TT (Shieber, 1994).

One of the aims of the Loebner competition, as Loebner states, is to advance the field of artificial intelligence (http://www.loebner.net). Few serious scholars of the TT take this competition seriously and Minsky has even publicly offered $100

1. Basically the term given to the natural human tendency and ability to ascribe mental states to others and to themselves. (Watt, 1996)
2. Now Loebner requires that this program should also be able to process audio/visual input.

for anyone who can convince Loebner to put an end to the competition (Shieber, 1994).

RAY KURZWEIL VERSUS MITCHELL D. KAPOR

The Long Bets Foundation, a non-profit group founded by two long-time Silicon Valley gadflies, Stewart Brand and Kevin Kelly, started an online forum in year 2002 for those willing to put their money, and reputations, behind their speculation. (Zipern, 2002).

Ray Kurzweil, an artificial intelligence expert, bet Mitchell D. Kapor, the founder of Lotus Development that by 2029 (a computer) - or (machine intelligence) will pass the TT, which states that artificial intelligence will be proved when a machine's conversation can be mistaken for a person's. Each man wagered $10,000 of his own money (Wired Magazine, 2002).

IS TURING TEST STILL IMPORTANT?

It is obvious that 60 years after the original paper about TT, this test is still important even now. Asseveration of that, are the Loebner competition and the bet between Ray Kurzweil and Mitchell D. Kapor. Furthermore, in almost all the articles about TT that were written between 1950 and 2003, there is the assertion that over the coming years, the researchers will try to produce a machine capable of in order to passing the TT.

We are in the year 2011 but what has really been done of passing the TT? According to Saygin, et al. (2000, p.34) "over the years, many natural language systems have been developed with different purposes, including that of carrying out conversations with human users[3]. These systems chat with people on the WWW, play MUDs[4], give information about specific topics, tell stories, and enter TT competitions. However, none has been able to pass the TT so far".

French (2000, p.3) believes that in 300 years' time people will still be discussing the point of view raised by Turing in his paper. It could even be argued that the TT will take on an even greater importance several centuries in the future when it might provide a moral yardstick in a world where machinery will move around much as we do, will use normal language, and will act together with humans in ways that are almost beyond belief today. In short, one of the questions in front of future generations may well be, -To what extent do machines have to act like humans before it becomes immoral to damage or destroy them?- And the very real meaning of the TT is our decision of how well machines act like humans. French's thesis suggests convincingly why the TT is still valid today.

CONCLUSION

Alan Turing was a remarkable man. His ideas in computing and machinery have helped developed the world into what it is today. He did much influential break through work in getting people to think about Artificial Intelligence. As a result of the above discussion the general conclusion can be made that after 60 years of the original paper about the TT it is still important. It is possible that the TT will remain important until the time that somebody creates a machine which will pass the TT. A machine that must have the ability to think and react as the human brain does. As a final remark, it is better to agree with the words of French that "The TT will remain important, not only as a landmark in a history of the development of intelligent machines, but also with real relevance of future generations of people living in a world in which the cognitive capacities of machines will be vastly greater than they are now" (French 2000, p.l).

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3. Such systems are usually called language understanding/generation systems, conversation agents, or simply chatbots.
4. Multi-User-Dungeons. These are games played interactively on the Internet by multiple players.

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