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Research Paper

Science or Pseudoscience: A Popperian Analysis of Turing Test

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ABSTRACT
To be able to examine the rigidity of the Turing test, this paper will use Karl Popper's demarcation principle in delineating scientific theories from non-scientific ones. Simply put, the Turing test will be examined itself as to whether it passes the criterion presented by Popper for scientific theories. The paper will not delve into the philosophical debate between the theories of Popper and Kuhn in relation to what constitutes a scientific theory. In the mind of this researcher, the question has been settled in favor of Popper. For the purpose of this paper, the analysis will examine whether the test is open to falsifiability or whether it has become self-affirming as in the case of dogmatic theories, hence, unscientific. This paper has belaboured the point that TT seeks to present a viable test that Turing claims to be scientific enough to prove that machines are capable of what we can do as 'thinking entities' but he did so by doing away with the term 'think'. But the entire point of TT has been leading towards that. His attempt merely opened himself up to a Popperian criticism that his work was now rendered impervious to criticisms by ensuring that it was protected from any criticism that had any chance of breaking it down. If the man was willing to definitively settle the issue from a scientific and philosophical standpoint, he ought to have faced the issue head on by working within the confines of the immensely difficult issue of 'thinking' because this was his main intention in the first place. Working with 'thinking' as a human mental state would have created a test that would have clearly led to the issue of cognition. So to speak, by side stepping the difficulty brought about by the terminology, the man was actually wandering into the realm of pseudoscience.

KEYWORDS: Turing Test, Popperian Analysis

I. INTRODUCTION

In the six decades since Alan Turing presented the world with his question, "Are there imaginable digital computers which could do well in the imitation game?", the technology of digital computers have grown by leaps and bounds to the point that their computing powers have been known to equal or at times even surpass that of humans as in the case of IBM's Deep Blue besting Gary Kasparov in the game of chess. Tablets together with mobile phones dubbed as ' smartphones' have also became handy and indispensable partners in every urbanite's plethora of gadgets.

Consequently, if this exciting trend continues, futurists and pundits alike have been heralding the coming age of artificial intelligence.

As we inch nearer to the possible development of machines that can mimic its human makers, it is extremely crucial to re-evaluate the Turing test to determine once and for all if this passes muster as far as rigidity is concern. Is it scientific enough?

This is important because to date this is the most widely accepted test that definitively settles the question whether a machine is able to mimic humans.

To be able to examine the rigidity of the Turing test, this paper will use Karl Popper's demarcation principle in delineating scientific theories from non-scientific ones. Simply put, the Turing test will be examined itself as to whether it passes the criterion presented by Popper for scientific theories. The paper will not delve into the philosophical debate between the theories of Popper and Kuhn in relation to what constitutes a scientific theory. In the mind of this researcher, the question has been settled in favor of Popper. For the purpose of this paper, the analysis will examine whether the test is open to falsifiability or whether it has become self-affirming as in the case of dogmatic theories, hence, unscientific.

An Overview of the Turing Test:

Inasmuch as the goal of this paper is to examine the rigidity of the Turing Test (henceforth, TT) by examining through the means developed by Sir Karl Popper in relation to his demarcation principle, it is important to present what the said test involves first. Dubbed as the single most definitive test to prove if digital machines can mimic human intelligence, the Turing Test otherwise dubbed as the 'Imitation Game' continues to invite controversies and widespread discussion. This becomes all the more so in light of the fact that digital technology has advanced by leaps and bounds since the latter half of the last century. And it has been said that it would remain relevant and controversial way into the future . Before we proceed into the crux of this current undertaking, let us first recapitulate what the Turing Test involves. In the article, Computing Machinery and Intelligence, which was published in the philosophical journal *Mind* in 1950, Alan Mathison Turing gave birth to the test by describing a parlour game between a man, a woman and an interrogator. The man and the woman are each in a separate room and are able to communicate with the interrogator only by means of a 'teletype', the 1950s equivalent of an instant messaging device today. The interrogator may ask any question to each of the aforementioned two individuals and they on the other hand must only key in their response to the question. The point of the parlour game is for the man to convince the interrogator that he is a woman while the woman tells the interrogator about her real identity. At some point of the interrogation, a digital machine takes the place of the man without the interrogator knowing about the switch. And the parlour game continues. If the interrogator fails to notice that the place of the man was taken over by that of a machine, the said machine passes the test because it is able to imitate the man. Hence, it is said to be intelligent. Note that the original TT makes sure that the interrogator has no means by which either to neither hear the voice nor see the features of the machine. The point being that once any of these features becomes familiar to the interrogator, this would be to the disadvantage of the machine.

In short, Turing seeks to definitively settle whether there are machines that are capable of human cognition. French goes on to say that "there would be no reason to deny intelligence to a machine that could flawlessly imitate a human's unrestricted conversation".

Outlining the Framework of the Analysis

At this point after the fundamentals of the test have been presented, it is best to introduce the demarcation principle of Popper into the equation for it is this principle which would serve as the framework through which TT would be examined. The said demarcation principle seeks to present a line that separates what Popper considers to be scientific from that which he considers to be unscientific (Popper, 1963). For Popper what constitutes as the dividing line between scientific theories from non-scientific is not so much the method nor the amount of evidence presented but the ability of a theory of paradigm to be able to withstand falsification . To be able to do so, the theory must be outlined not so much as to make it impervious to tests by shrouding it in dogmatic language that would amount to nothing more than self-validation . Popper presents seven considerations that serves as the backdrop of his demarcation principle. First, he says that it is "quite easy" to search for instances that would verify a theory. Any apologist for a theory can easily scour for verifying instances that would support his claim. Second, a confirmation only counts if it involved a form of 'risky predictions', that is, there must have been a possible event that would have negated the main tenet of the theory. This is important simply because theories can be subjected to just about any test but only a test that stands a chance of falsifying its claim can truly count as a real test. Any test that has been designed in such a way that the theory is able to withstand it is simply not worthy to be called a test. Third, a 'good theory' has to have some form of prohibition. For Popper, "the more that a theory prohibits, the better for the theory". Fourth, a scientific theory has to be refutable by what he calls a conceivable event. The theory must not be rendered as impervious to a test. So to speak, a theory that is truly testable is not drafted in a language that makes it impossible or any real test to falsify it. To do so would be to the detriment to the theory's claims of being scientific. Fifth, every genuine test is an attempt to falsify the theory. Sixth, "confirming evidence should not count *except when it is the result of a genuine test of the theory"(*italics are those of Karl Popper). And finally, "some genuinely testable theories, when found to be false, are still upheld by their admirers — for example by introducing *ad hoc* some auxiliary assumption, or by reinterpreting the theory *ad hoc* in such a way that it escapes refutation" (Popper, 1963).

All in all, in the mind of Popper, an authentic scientific theory is one that is able to withstand "refutation, or refutability, or testability".

At this point we can commence with the goal of this paper by evaluating whether TT which seeks to provide a viable examination for artificial intelligence can truly be considered scientific.

Turing's Project: Science or Pseudoscience?

It is crucial to ask offhand if Turing was carrying out a scientific project or not before we can even examine the TT because for all we know we might be misappropriating the man's work into an area that he did not deem in the first place. So, was the man carrying a work of science?

The history of the man both before and after penning his famous article where the TT is taken ought to be checked. That is, a thorough look of his intellectual project should be undertaken. Alan Turing gained fame not only for his work in breaking the cipher code of the German war machine during the Second World War, but he is also acknowledged as being highly influential in the development of the field of computer science by developing the formal concepts of algorithm and computation with his Turing machine. The said machine is able to simulate the logic of any computer algorithm and is significantly helpful in showing how a central processing unit (CPU) works inside a computer . Without doubt, the man has made Mathematics as his life's work as shown by his contributions to a wide ranging fields of studies. In light of his contributions in the field of mathematics and cryptoanalysis, among others, supporters and apologists readily canonize the man as a saint in service of science. In light of the man's numerous works that have made their mark in different scientific areas, it would be quite easy to say that the man's total body of work is scientific. Hence, the same thing can rub off on the nature of the TT. Then again, that is easier said than done and might even be guilty of a hasty generalization. In our case, however, we would have to subject the work that has been associated with the man's name to the most rigid test imaginable, that of Popper's demarcation principle. Does the TT pass muster as a scientific test? Or is it a simple attempt of Turing to present a clear and simple defense of what he considers the possibility of settling the question as to whether there are machines that can imitate man? Meaning to say, was the man trying to make sure that his test or artificial intelligence be able to hurdle the difficult test of 'thinking' or cognition as a mental state by substituting a philosophically difficult term to define with that which would be an easier one? These questions are crucial if we are to definitely settle once and for all the status of TT in the current debate on artificial intelligence. If it is to be proven scientific enough then it is to remain as the preeminent test for artificial intelligence. However, if it is to fail in this regard, then it ought to be relegated as another historical attempt on the said scientific and philosophical question.

Given that Turing's article in the philosophical journal, Mind, began by clarifying the operational setting of his question, we might begin as well in the same manner.

Turing begins by asking the question, "Can machines think?" He immediately sets the question aside because of the difficulty in defining the major term of his question, namely; 'think'. It is at this point that he presents the imitation game. Thinking as a mental state involves processes that have yet to be fully understood from the human perspective; hence, to use the said mental state to be to examine whether machines possess the same capability would be quite difficult to fully provide any parallelism to. At this point, it would be proper to state that Turing was obviously rendering his TT impervious to criticisms and rigid tests. Hence, casting doubt on the 'scientificity' of his test. In the mind of this writer, this is a simplistic yet unsuccessful attempt to deflect critics from his project. It is quite obvious that the general aim of the TT was to prove whether there are digital machines that are capable of human cognition or intelligence. And verbal communication is one certain manifestation of the said capability. However, sensing that arguing within the ambit of the term 'think' he would be unable to fully satisfy his critics because the term itself resists any clear definition; he sought to take the short cut. That is, take away the term 'think' from the discussion while at the same time still seeking to create an imitation game that proves exactly that. The TT seeks to prove digital machines that imitate human cognition, thus, 'think' but without getting bogged down in the paralyzing debate brought about by the difficulty of defining the term. At the very least, the man can be accused of ensuring that his TT progresses by side stepping the ability that he seeks to prove that machines are capable of doing in the first place. Admittedly, he would not be the first to do as there are no interested thinkers who would craft theories for the sake of them being demolished by critics. However, the fact that he side stepped the issue by re-crafting the terms of the debate/ issue opens his TT to question. Bear in mind, that he simply took out the problematic 'think' and still went about trying to devise a test that seeks to prove exactly that.

Steven Harnad (2006) notes that from the original question, "Can machines think", the question has now morphed into "Can machines do what we (as thinking entities) can do?". In short, Turing does not ask anymore whether machines can 'think', but can a machine act in a way that is indistinguishable from the way a human entity think? Two things need to be gleaned over this defense of the TT. First, the overall project of the TT *indeed* is to prove that machines think despite successfully side stepping the philosophical and scientifically problematic issue of pre-defining the term 'think'. Second, Turing's Cartesian streak breaks out into the fore by unwittingly suggesting that our thinking capabilities are what separates us from machines.

Let us delve into these two implications further, the second more than the first.

The first point lends credence to my argument that by side stepping the problem brought about by the term 'think', the man was simply ensuring that his TT was made impervious to criticisms that would have been difficult to defend. In this regard, I would say that TT failed to subject itself to one of the criteria of Popper as far as 'scientificity' is considered, namely, that any scientific claims should be subjected to risky and real refutability.

II. CONCLUSION

This paper has belaboured the point that TT seeks to present a viable test that Turing claims to be scientific enough to prove that machines are capable of what we can do as 'thinking entities' but he did so by doing away with the term 'think'. But the entire point of TT has been leading towards that. His attempt merely opened himself up to a Popperian criticism that his work was now rendered impervious to criticisms by ensuring that it was protected from any criticism that had any chance of breaking it down. If the man was willing to definitively settle the issue from a scientific and philosophical standpoint, he ought to have faced the issue head on by working within the confines of the immensely difficult issue of 'thinking' because this was his main intention in the first place. Working with 'thinking' as a human mental state would have created a test that would have clearly led to the issue of cognition. So to speak, by side stepping the difficulty brought about by the terminology, the man was actually wandering into the realm of pseudoscience.

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