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Article

Descartes and Turing

Naoki ARAKI*

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Abstract

René Descartes does not think that machines can speak like human beings because they do not have "reason." About three hundred years later, Alan Turing insists that if machines can speak like human beings, they can think. In other words, Turing stands Descartes's insistence on its head, as Roy Harris and Noam Chomsky point out. But Descartes insists that only human beings have "reason" so he never assumes that machines can speak. On the other hand, Turing insists that it is a matter of words whether machines can think or not. This means, as Turing claims, that the question, "Can machines think?" is not worth discussing. So Descartes's and Turing's arguments are not the same although Turing stands Descartes's argument on its head.

Key Words: Descartes, reason, Turing, machines, Turing test

Introduction

Roy Harris points out an interesting view on the relationship between Descartes and Turing:

> Descartes's argument, as Turing and others later realized, can in any case be stood on its head. Should not a machine that can handle words as well as a human being be reckoned as having the ability to think? (Harris 2003: 168)

Here "Descartes's argument" means that a machine cannot handle words like a human being because the former does not have the ability to think. On the other hand, according to Harris, what Turing later realized is that if a machine can handle words like a human being, then the former should be reckoned as having the ability to think. In this sense, Harris insists, "Descartes's argument" can be stood on its head by Turing. Whether Turing and others realized or not, Harris's view is very interesting indeed.

Chomsky also interprets the Turing test as a test of whether a machine has a mind like a human being's, contrasting it with Descartes:

> The Cartesian tests for the existence of other minds have been resurrected in a new guise in recent years, most notably by the British mathematician Alan Turing, who devised what is now called the Turing test, to determine whether a machine (for example, a programmed computer) exhibits intelligent behavior. We apply the Turing test to a device by submitting to it a series of questions and asking whether its responses can deceive a human observer who will conclude that the responses are being offered by another human being. In Cartesian terms this would be a test of whether the device has a mind like ours. (Chomsky 1988: 141)

In this paper, from this point of view above, we shall discuss Turing's question, "Can machines think?", focusing on Descartes's and Turing's arguments.

* Department of Information Systems and Management, Faculty of Applied Information Science, Hiroshima Institute of TecŠology, Hiroshima 731–5193, Japan. E-mail: araki@cc.it-hiroshima.ac.jp

1. Descartes's Argument

First of all, Descartes insists that there are two tests, which can distinguish a machine from a human being:

> […] if there were machines bearing the image of our bodies, and capable of imitating our actions as far as it is morally possible, there would still remain two most certain tests whereby to know that they were not therefore really men.
>
> (Descartes: *Discourse on the Method*, Part V)

As the first test, Descartes insists that a machine cannot use language in the same way as a human being can:

> Of these the first [test] is that they [the machines] could never use words or other signs arranged in such a manner as is competent to us in order to declare our thoughts to others: for we may easily conceive a machine to be so constructed that it emits vocables, and even that it emits some correspondent to the action upon it of external objects which cause a change in its organs; for example, if touched in a particular place it may demand what we wish to say to it; if in another it may cry out that it is hurt, and such like; but not that it should arrange them variously so as appositely to reply to what is said in its presence, as men of the lowest grade of intellect can do.
>
> (Descartes: *Discourse on the Method*, Part V)

Furthermore, Descartes insists on the second test to distinguish a machine from a human being:

> The second test is, that although such machines might execute many things with equal or perhaps greater perfection than any of us, they would, without doubt, fail in certain others from which it could be discovered that they did not act from knowledge, but solely from the disposition of their organs: for while reason is an universal instrument that is alike available on every occasion, these organs, on the contrary, need a particular arrangement for each particular action; whence it must be morally impossible that there should exist in any machine a diversity of organs sufficient to enable it to act in all the occurrences of life, in the way in which our reason enables us to act.
>
> (Descartes: *Discourse on the Method*, Part V)

Here Descartes asserts that human beings have "reason", but machines do not. It is this "reason" that enables human beings to act quite differently from machines. For example, thanks to "reason" human beings can speak language, which machines cannot speak like human beings.

Moreover Descartes maintains that not only machines but also animals cannot speak language because they do not have "reason" like machines either:

> […] we observe that magpies and parrots can utter words like ourselves, and are yet unable to speak as we do, that is, so as to show that they understand what they say;
>
> (Descartes: *Discourse on the Method*, Part V)

John Searle discusses the same point as Descartes does from a different viewpoint. He proposes a thought experiment called a "Chinese room." By this experiment, Searle shows that a person who never understands Chinese could answer questions asked in Chinese. So he insists that even if a machine can communicate with a human being, it does not mean that the machine understands the meanings of Chinese. The machine only manipulates the symbols of Chinese (Searle 1980: 417–457).

On the other hand, Yuval Noah Harari insists that we do not need "consciousness," which may be called "reason" in Descartes's term, in order to operate machines that function like human beings:

> The algorithms controlling the autonomous car make millions of calculations each second […] the autonomous car successfully stops at red lights, […] The car does all that without any problem—but without any consciousness either. […] Many other computer programs make allowances for their own actions, yet none of them has developed consciousness,
>
> (Harari 2015: 114)

So Harari thinks that the Turing test examines a

social and legal convention, which means that the test is a matter of the usage of a word "think":

> […] it [the Turing Test] examines only social conventions […] the computer has passed the Turing Test, and we should treat it as if it really has a mind ["reason" in Descartes's term]. However, that won't really be a proof, of course. Acknowledging the existence of other minds is merely a social and legal convention. […] It won't matter whether computers will actually be conscious or not. It will matter only what people think about it. (Harari 2015: 120)

Furthermore, Harari thinks that biochemical organisms, including human beings, are algorithms, so there are no differences between organisms and machines that are also algorithms. This means that human beings are machines, which idea Descartes never accepts (Harari 2015: 319). So Harari may be a physicalist. For Harari, consciousness (reason in Descartes's term) does not matter.

In any case, Descartes asserts that human beings can speak language because they have "reason", which machines and animals do not have. If Descartes's argument above is right, then what will happen when we stand it on its head? If machines or animals were to be able to speak like human beings, then they should have "reason", which human beings have. This is precisely what Turing's thought experiment, the Turing test insists on. The reason is that Turing asserts that if a machine can pass the Turing test (this means that it can speak like human beings), it will think like human beings. So, next we shall examine Turing's question, "Can machines think?" How does Turing stand Descartes's argument on its head?

2. Turing's Question

First of all, Turing insists that the answer to the question, "Can machines think?" is ambiguous if we begin with definitions of the meanings of the terms "machine" and "think" used here:

> I propose to consider the question, 'Can machines think?' This should begin with definitions of the meaning of the terms 'machine' and 'think'. The definitions might be framed so as to reflect so far as possible the normal use of the words, but this attitude is dangerous. If the meaning of the words 'machine' and 'think' are to be found by examining how they are commonly used it is difficult to escape the conclusion that the meaning and the answer to the question, 'Can machines think?' is to be sought in a statistical survey such as a Gallup poll. But this is absurd. (Turing 1950: 433)

In order to solve the problem above, Turing proposes the "imitation game." Then, what is the "imitation game"?:

> It [the imitation game] is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman. He knows them by labels X and Y, and at the end of the game he says either 'X is A and Y is B' or 'X is B and Y is A'. (Turing 1950: 433)

Then Turing replaces the part of A by a machine in the imitation game. This is what is called the Turing test, which Turing thinks replaces the question, "Can machines think?":

> We now ask the question, 'What will happen when a machine takes the part of A in this game?' Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman? These questions replace our original, 'Can machines think?' (Turing 1950: 434)

According to Turing, if a machine can replace the part of A, then we will be able to answer the question, "Can machines think?" by saying, "Yes, they can".

Furthermore, Turing predicts that computers will play the imitation game so well in about fifty years' time. Therefore, he thinks that the question, "Can machines think?" is too meaningless to deserve discussion, and that the use of words will have altered so much that we will be able to say, "Machines (or computers) can think (or think)":

> I believe that in about fifty years' time it will be

possible to programme computers, with a storage capacity of about 10^9, to make them play the imitation game so well that an average interrogator will not have more than 70 per cent. chance of making the right identification after five minutes of questioning. The original question, 'Can machines think?' I believe to be too meaningless to deserve discussion. Nevertheless I believe that at the end of the century the use of words and general educated opinion will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted.

(Turing 1950: 442)

But now even in 2018, despite Turing's prediction, we still do not say, "Machines can think" without expecting to be contradicted.

Chomsky takes up Turing's argument and thinks that Turing's question, "Can machines think?" is a matter of the usage of a word. This is what Harari insists on by "a social convention." Furthermore Chomsky claims that Turing proposes that we should build a machine model designed to speak like a human being and consider what human thinking is. But, as we have seen before, Searle is skeptical about how much such a model contributes to the question of what thinking is (Searle 1980: 417–457):

He [Turing] said, look, the question whether a machine can think is too meaningless to deserve discussion. It's like asking in 1900 whether an airplane flies. It's not a meaningful question. It flies if you want to call that flying. It doesn't fly if you don't want to call that flying. It's just like asking, "Does my brain think?" That's not the way we talk English. But if you want to change the language you could say it. The same is true about this breathing device or about machines thinking and so on. (Chomsky 1993: 91)

What Turing suggested is, let's drop the question of what thinking is, and let's try to create models of intelligence, computational models of intelligence. That's perfectly reasonable. […] Turing's point was maybe this will teach us something about thinking.

(Chomsky 1993: 92)

In any case, as we have seen, Turing stands Descartes's argument on its head, saying that if machines can communicate with human beings, then they can think. This turns over Descartes's argument that machines cannot talk with human beings because they do not have reason, or mind, in other words, because they cannot think.

Next, we shall see how Roy Harris deals with both Descartes's and Turing's arguments.

3. Roy Harris's Reference to Descartes and Turing

Roy Harris insists that Turing's test has its root in Descartes's idea that use of language distinguishes human beings from machines, quoting the same passage as ours from Descartes but the English translation is a little different from ours:

[…] the view expressed by Descartes in the *Discours de la méthode* [*Discourse on the Method*]: that even if there were machines physically indistinguishable from human bodies, it would always be possible to tell the difference, because of the linguistic limitations of the machines.

For we can conceive of a machine so constructed that it utters words, and even utters words which correspond to bodily actions causing a change in its organs (e.g. if you touch it in one spot it asks what you want of it, if you touch it in another it cries out that you are hurting it, and so on). But it is not conceivable that such a machine should produce different arrangements of words so as to give an appropriately meaningful answer to whatever is said in its presence, as the dullest of men can do.

(Descartes, *Discours de la méthode*, Part V)

Here in Descartes we find the source of Turing's much debated proposal three centuries later that a question-and-answer test would suffice to determine whether or not machines can think.

(Harris 1987: 27–28)

Then, what is the Turing's test? Harris explains it, quoting the same passage as ours from Turing:

In this test, the machine on trial has to take part in what Turing calls the 'imitation game'.

It is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman. He knows them by the labels X and Y, and at the end of the game he says either 'X is A and Y is B' or 'X is B and Y is A'. The interrogator is allowed to put questions to A and B thus:

C: Will X please tell me the length of his or her hair?

Now suppose X is actually A, then A must answer. It is A's object in the game to try to cause C to make the wrong identification. His answer might therefore be

'My hair is shingled, and the longest strands are about nine inches long.'

In order that tones of voice may not help the interrogator the answers should be written, or better still, typewritten. The ideal arrangement is to have a teleprinter communicating between the two rooms. Alternatively the questions and answers can be repeated by an intermediary. The object of the game for the third player (B) is to help the interrogator. The best strategy for her is to give truthful answers. She can add such things as 'I am the woman, don't listen to him!' to her answers, but it will avail nothing as the man can make similar remarks.

We now ask the question, 'What will happen when a machine takes the part of A in this game?' Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman? These questions replace our original, 'Can machines think?'

(Turing 1950: 433–434)

Turing's originality in devising this test is the originality of having taken Descartes' argument at face value and squared up to its challenge. Turing assumes, in other words, that if a machine can be built which passes the test of the 'imitation game', that will constitute an empirical disproof of Descartes' thesis [that machines cannot speak like human beings]. For in order to pass the test, Turing clearly assumes that the machine must possess a *linguistic* capacity: that of analyzing the interrogator's questions and returning appropriate answers. (Harris 1987: 28)

Here Roy Harris points out that Turing proposes that machines are supposed to think if they can communicate with human beings. In other words, Turing, unlike Descartes, thinks that it may be possible to make machines that can talk with people. However, according to Roy Harris, Descartes would deny that machines can pass the Turing test and would not think that the imitation game is acceptable:

But undoubtedly Descartes would have denied that any machine built by Turing, or by Turing's imagination, could produce answers to satisfy or confuse the interrogator in the 'imitation game'. Descartes, in short, would have refused to accept the imitation game as a legitimate 'ontological experiment': not because of any technical flaw in the experimental design, but because from a Cartesian point of view the question is already begged once the teleprinter text produced by the machine in the next room is construed as an 'answer' to the interrogator.

(Harris 1987: 29)

According to Roy Harris, however, Descartes's criterion for distinguishing between human beings and machines becomes meaningless:

The point is of some importance since Descartes' linguistic criterion for distinguishing between human beings and machines becomes meaningless once we start envisaging communication situations which are quite beyond the capacity of the communication system. To put the same point slightly differently, there is no universal Turing test valid science-fictionally across 'all possible worlds'. The reason for this is simply that it soon becomes radically unclear by what criteria the answers to Turing-test questions are to be judged appropriate or inappropriate once the basic assumptions of our familiar everyday world are abandoned or suspended. The further we venture from those basic assumptions the more difficult it will become to distinguish reliably between 'intelligent' responses and 'unintelligent' ones; or indeed between intelligible responses and unintelligible ones. All Descartes seems to have had in mind was that it is quite easy to detect a speaking automaton, however cunningly disguised as a human, by asking it a straightforward question it

has not been programmed to answer ('What day of the week is it?', 'What colour is grass?', 'What do you use a knife for?', etc.). The assumption, clearly, is that automata cannot be built which provide appropriate answers to a general range of such questions. But what becomes of Descartes' criterion if advances in technology prove that assumption unsound? Turing's answer is plain enough: we then have to stop claiming that machines (or monkeys, if monkeys can be trained to pass the Turing test) cannot think.

(Harris 1987: 34–35)

According to Roy Harris, Turing stands Descartes's language-machine argument on its head, taking a behaviourist position:

Turing's position is in all essentials a radical behaviourist position, which treats 'thinking' as being simply speech minus vocalization. The only evidence that the Turing test accepts or requires about thought is verbal evidence. The implication is that provided this verbal evidence convinces the human investigator as being appropriate to the questions asked, there is nothing more that can be demanded as evidence of thinking. Turing's behaviourist strategy of taking Descartes' language-machine argument seriously thus stands the traditional view of language [by Descartes?] on its head. The irony is that Descartes himself had opened the way for this move by so strenuously denying any connexion between having reason and having a voice. His assimilation of animals to machines, his acknowledgement that animals can vocalize, and his insistence on language as the hallmark of rationality jointly obliged Descartes to distinguish sharply in human speech between a mechanical and a non-mechanical component. The legacy of that dualism survived into nineteenth-century linguistics, which still accepted a distinction between purely mechanical, physiological processes (as evidenced in phonology) and non-mechanical 'intellectual' processes (as evidenced in semantics and the workings of analogy). However, the Cartesian concept of *la bête machine* had already prepared the ground for the anti-Cartesian concept of *l'homme machine*. Given the theory of *l'homme machine*, Descartes' mysterious non-mechanical component of human speech had in the end either to be dismissed as a mere figment of Cartesian mentalism, or else reinterpreted by reference to a second cerebral mechanism, distinct from but interacting with the mechanism of vocalization. By the end of the nineteenth century, many people—including many linguists—believed that the exact location of this second mechanism in the brain had at last been identified. Thus in spite of the fact that Descartes was a committed anti-mechanist where language was concerned, the Cartesian contribution to the modern myth of the language machine is in its way no less crucial than the contribution which was to be made by Saussure. For Saussure, however, the distribution of 'mechanical' explanations is almost the opposite of Descartes': it was to be *parole* over which individuals could exercise rational control in the Cartesian sense, whereas over *langue* they had none. (Harris 1987: 35–36)

Furthermore, according to Roy Harris, Turing thinks that if a machine produces translations which are indistinguishable from those of a human translator, then it has understood what the texts mean:

Could a machine understand the meaning of a text? Turing's answer, clearly, would have been that if a machine produces translations which are indistinguishable from those of a human translator, then it *has* understood what the texts mean (at least to the extent that such an understanding is necessary for purposes of translation, which is all that we demand of a human translator).

Turing's view would not have been shared by those who regarded research in automatic translation as aiming at

> a machine which, while remaining an object devoid of intelligence and of judgment, and performing a series of strictly predetermined operations, is capable of respecting certain of the original and individual characteristics of discourse and of reproducing them faithfully in another language.

But even theorists who took this more cautious view were sometimes prepared to admit that the analyses which mechanization programmes required had

the effect of

> *drawing attention to the purely mechanical character of various operations formerly performed by a human being and accepted as mental operations.*

Concessions even of this order would have attracted the critical attention of Descartes.

(Harris 1987: 79)

Conclusion

As Chomsky and Harris point out, it is safe to say that Turing stands Descartes on his head. Descartes insists that machines never speak like human beings because they do not have "reason." On the other hand, Turing insists that if machines speak like us, then it means that they think. In this case, Turing's words can be interpreted as the following: if machines think, then they have "reason." So if this interpretation is accepted, then this leads to the conclusion that Descartes and Turing insist on the same thing in different ways as Chomsky and Harris comment on this matter.

However, Descartes does not think at all that machines can speak like human beings because they do not have "reason." For Descartes, "reason" belongs to mind, which is existent only in us and quite distinct from "body," of which machines are made. So never can machines made of "body," which is quite different from "mind," speak like us.

On the other hand, Turing thinks that if machines speak like human beings, they think. So if we take Turing's words at face value, this leads to the conclusion that machines have "reason" in Descartes's sense. But Turing also thinks that this is a matter of words. So probably Turing does not think that even if machines speak like us, it means that they have "reason" like human beings. If this line of reasoning is correct, it means that Descartes and Turing insist on the same thing from different perspectives as Chomsky and Harris point out.

Or would it be possible that Turing might have been thought to have a different story? It is as follows:

> But we may have a totally different story about this matter [Turing's question]. If what is happening in our brain when we are thinking is quite the same thing as what is happening in a computer when it is functioning, we may be able to say that "computers are thinking." Although Searle denies such an argument and Chomsky says that it is not computers but humans that think, Harari may agree to this, saying that we do not need the mind in understanding humans and Kaku [2014: 240] may also accept this, saying that the question [Turing's question] will cease to have any importance when machines will come to know language better than humans as HAL 9000 in *2001: a Space Odyssey* does. (Araki 2018: 40)

Harari says about this matter:

> Current orthodoxy holds that consciousness is created by electrochemical reactions in the brain, and that mental experiences fulfil some essential data-processing function. […]
>
> […] scientists have certainly identified correlations and even causal links between electrical currents in the brain and various subjective experiences. […]
>
> […] When billions of neurons send billions of electric signals back and forth, subjective experiences emerge. Even though the sending and receiving of each electric signal is a simple biochemical phenomenon, the interaction among all these signals creates something far more complex—the stream of consciousness. (Harari 2015: 107–108)

Here Harari points out that our consciousness (probably including thinking) emerges as the result of biochemical algorithms (phenomena) in the brain. This is just what physicalists insist on.

On the other hand, Harari also says about three possibilities concerning the relationship between "consciousness" and "biochemical algorithms":

1. Consciousness is somehow linked to organic biochemistry in such a way that it will never be possible to create consciousness in non-organic systems.
2. Consciousness is not linked to organic biochemistry, but it is linked to intelligence in such a way that computers could develop consciousness, and computers will *have to* develop consciousness if they are to pass a certain

threshold of intelligence.

3. There are no essential links between consciousness and either organic biochemistry or high intelligence. Hence computers might develop consciousness—but not necessarily. They could become super-intelligent while still having zero consciousness.

(Harari 2018: 69–70)

The third possibility above, which Harari proposes, could be very close to Descartes's insistence, to which Chomsky could not agree more:

Chomsky accepts Descartes's idea and refers to his own theory of language as "Cartesian Linguistics." So he, like Descartes, will insists that machines do not speak because he thinks that speaking is what human beings do. In fact, thinking is what human beings do. […]

[…] As we have already seen, Chomsky thinks the same way as Descartes. According to Chomsky, thinking is what human beings do but not what machines do. (Araki 2018: 41)

On the other hand, Roy Harris says the same thing as Harari, quoting Chomsky's words:

Suppose we have a machine that can be in any one of a finite number of different internal states, and suppose that this machine switches from one state to another by producing a certain symbol (let us say, an English word). One of these states is an initial states; another is a final states. Suppose that the machine begins in the initial state, runs through a sequence of states (producing a word with each transition), and ends in the final states. Then we call the sequence of words that has been produced a 'sentence'. Each such machine thus defines a certain language; namely the set of sentences that can be produced in this way.

(Chomsky 1957: 18–19)

Here it is evident that Chomsky compares a human being to a machine. As Turing might have thought, Chomsky may be thought to be dealing with a human being as a machine without mind although he does not consciously intend to do so. In fact, Roy Harris insists that Chomsky is a physicalist, who denies mind, which is distinct from body:

The syntax machine [a human being] of 1957 [of Chomsky] has no other function than to generate 'sentences', and the 'sentences' have no other status than that of 'products' of an otherwise purposeless machine. […]

Even more remarkable was the warm welcome this [Chomsky's idea in 1957] received from those philosophers who hastened to congratulate linguists on having dispensed altogether with the assumption 'that the corpus of utterances studied by the linguist was produced by a conscious organism [a human being]. (Putnam 1960: 95)'. The reason why they were so pleased is clear. They saw this great 'advance' in linguistics [Chomsky's idea in 1957] at last letting them off the painful hook of the 'mind-body' problem altogether. (Harris 1987: 75)

According to Harris, some philosophers interpreted that Chomsky drove 'mind' away from 'body' just as a behaviorist, Gilbert Ryle expelled "the ghost of the machine."

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