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Article

Alan Turing's Question

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Abstract

Can machines think? Alan Turing tried to answer this question using his Turing test. Moreover, he expected that machines could pass the test in the future. On the other hand, John Searle proposes a thought experiment called "Chinese room" and argues that machines do not think because they just only manipulate symbols. But Noam Chomsky insists that the question of whether machines can think is a matter of usage of words not a matter of fact. According to Yuval Noah Harari, organisms are biochemical algorithms. So we cannot find any differences between organisms and machines. Michio Kaku claims that the question will not have any meaning if machines behave like human beings. Can machines think or not?

Key Words: Turing test, Chinese room, biochemical algorithms

Introduction

Arthur C. Clarke writes in his science-fiction novel, *2001: A Space Odyssey*:

> Whether HAL [Heuristically programmed ALgorithmic computer] could actually think was a question which had been settled by the British mathematician Alan Turing back in the 1940s. Turing had pointed out that, if one could carry out a prolonged conversation with a machine—whether by typewriter or microphone was immaterial—without being able to distinguish between its replies and those that a man might give, then the machine *was* thinking, by any sensible definition of the word. HAL could pass the Turing test with ease. (Clarke 1968: 97)

Here Clarke thinks that a computer, HAL 9000 could think by passing the Turing test. Of course, this computer is fictitious, but could machines really think? So next let's take up the Turing test.

1. Turing test

First of all, Alan Turing asks a question, "Can machines think?" and says that it is dangerous to answer the question based on definitions of the meaning of the terms "machine" and "think." So he replaces the question by the following game called "the imitation game." The details of the game are irrelevant here:

> 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)

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Furthermore, Turing replaces the man (A) by a machine and the interrogator determines which of the two (the machine and the human) is the machine and which is the human. Turing thinks that the machine should be a digital computer (Turing 1950: 436). In this way, he replaces his original question, "Can machines think?" by this modified imitation game, which is called the Turing test:

> 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)

Naturally, Turing expects a criticism of the imitation game (the Turing test):

> May not machines carry out something which ought to be described as thinking but which is very different from what a man does? This objection is a very strong one, but at least we can say that if, nevertheless, a machine can be constructed to play the imitation game satisfactorily, we need not be troubled by this objection. (Turing 1950: 435)

Here, Turing seems to point out the impossibility of a machine that can replace the part of A. But as we shall see later, John Searle says that even if a machine can carry out something which ought to be described as thinking, he does not think that what the machine does is the same "thinking" as what we humans do in any sense. In any case, then Turing shows his answer to the question, "Can machines 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 percent chance of making the right identification after five minutes of questioning.
> (Turing 1950: 442)

Here, Turing does think that "machines can think" even though it is impossible to program a computer that could behave like us human beings in 1950. So the question is, for Turing, not a question but a pseudo-question and also a question of words, not a question of fact:

> 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)

As we shall see later, Chomsky also says that the question is a matter of words, not a matter of fact, asking a question like "Do submarines swim?" and so forth. So it is (may be) no wonder that the computer system HAL 9000 in the novel *2001: A Space Odyssey* could pass the Turing test as Arthur C. Clarke depicts. But John Searle does not agree with Turing, insisting that even though machines pass the Turing test, they cannot be claimed to think the same way as human beings do because machines can only manipulate symbols but they do not understand meanings related to the symbols. Next, we will examine Searle's thought experiment called "Chinese room."

2. Chinese Room

John Searle proposes a thought experiment called "Chinese room." Let me summarize his thought experiment because it is too long to quote here.

First Searle says that he is in a room, being given a Chinese writing. But he does not know anything about Chinese (Searle 1980: 417–418).

Then he is given a second Chinese writing together with a set of rules for correlating the second writing with the first writing. The rules are in English so he understands them. The rules enable him to correlate one set of formal symbols with another set of formal symbols (Searle 1980: 418).

Then he is given a third Chinese symbols together with some instructions in English that enable him to correlate elements of these third Chinese symbols with the first two Chinese writings. These instructions tell him how to give back certain Chinese symbols in response to Chinese symbols given him in the third

writing (Searle 1980: 418).

The first Chinese writing is called a "script," the second writing is called a "story," and the third writing is called "questions." The symbols given back in response to the third writing are called "answers to the questions," and the set of rules in English is called the "program" (Searle 1980: 418).

Suppose that his answers to the Chinese questions are absolutely indistinguishable from those of native Chinese speakers. Nobody just looking at his Chinese answers can tell that he does not speak a word of Chinese. But he produces the Chinese answers by manipulating uninterpreted formal symbols. So as far as the Chinese is concerned, he simply behaves like a computer; he performs computational operations on formally specified elements. For the purposes of the Chinese, he is simply an instantiation of the computer program (Searle 1980: 418).

It is time for us to examine two claims: 1) the programmed computer understands the stories and 2) the program in some sense explains human understanding (Searle 1980: 418).

As regards the first claim, he does not understand a word of the Chinese stories. So a computer understands nothing of any stories, whether in Chinese, English, or whatever, because in the Chinese case the computer is him. As regards the second claim, the computer and its program do not provide sufficient conditions of understanding because the computer and the program are just only functioning (Searle 1980: 418).

But some people insist that when he understands a story in English, what he is doing is exactly the same as what he was doing in manipulating the Chinese symbols. This insistence is based on two assumptions: 1) that we can construct a program that will have the same inputs and outputs as native speakers 2) and that speakers have some level of description where they are also instantiations of a program. This is logically possible, but what is suggested by the example is that the computer program is simply irrelevant to his understanding of the story. In the Chinese case he has everything that artificial intelligence can put into him by way of a program, but he understands nothing; in the English case he understands everything, and there is so far no reason at all to suppose that his understanding has anything to do with computer programs, that is, with computational operations on purely formally specified elements. As long as the program is defined in terms of computational operations on purely formally defined elements, what the example suggests is that these by themselves have no interesting connection with understanding. They are certainly not sufficient conditions and they are not necessary conditions or they do not make a significant contribution to understanding. Whatever purely formal principles you put into the computer, they will not be sufficient for understanding, since a human will be able to follow the formal principles without understanding anything. Such principles are not necessary or even contributory, since when he understands English he is not operating with any formal problem at all. What is it that he has in the case of the English sentences that he does not have in the case of the Chinese sentences? The obvious answer is that he knows what the former mean, while he does not have the faintest idea what the latter mean. But in what does this consist and why couldn't we give it to a machine, whatever it is? (Searle 1980: 418)

He understands stories in English; to a lesser degree he can understand stories in French; to a still lesser degree, stories in German; and in Chinese, not at all. His car and his adding machine, on the other hand, understand nothing. We often attribute "understanding" and other cognitive predicates by metaphor and analogy to cars, adding machines, and other artifacts, but nothing is proved by such attributions. We say, "The door *knows* when to open because of its photoelectric cell," "The adding machine *knows how* (*understands how*, is *able*) to do addition and subtraction but not division," and "The thermostat *perceives* changes in the temperature." The reason we make these attributions is quite interesting, and it has to do with the fact that in artifacts we extend our own intentionality; our tools are extensions of our purposes, and so we find it natural to make metaphorical attributions of intentionality to them. The sense in which an automatic door "understands instructions" from its photoelectric cell is not at all the sense in which he understands English. If the sense in which the programmed computers understand stories is supposed to be the metaphorical sense in which the door understands,

and not the sense in which he understands English, the issue would not be worth discussing. But some people say that the kind of cognition they claim for computers is exactly the same as for human beings. Searle argues that in the literal sense the programmed computer understands what the car and the adding machine understand, namely, exactly nothing. The computer understanding is not just (like Searle's understanding of German) partial or incomplete; it is zero (Searle 1980: 418–419).

3. Chomsky's View

Chomsky mentions a question of whether machines can think, referring to a British mathematician Alan Turing, who proposed the "Turing test" for machine intelligence as we have seen above:

> The question [of whether machines can think] has aroused lively discussion and controversy, contrary to Turing's intentions. He [Alan Turing] regarded the question as "too meaningless to deserve discussion," though in half a century, he speculated, conditions might have changed enough for us to alter our usage, just as some languages use the metaphor of flying for airplanes. Turing seems to have agreed with Wittgenstein as to the pointlessness of the discussion and debate that has ensued, until today, over whether machines can (in principle) think, play chess, understand Chinese, do long division, etc., and about how we could "empirically" establish that they do; or whether robots can reach for objects and pick them up, murder, and so on. (Chomsky 1993: 30)

Here, Chomsky insists that the question of whether machines can think is meaningless or pointless and it is a matter of usage of the word "think":

> I think Turing stand was correct. These are questions of decision about sharpening and altering usage, not fact, just as there is no empirical question of whether airplanes can fly to London or whether submarines really set sail but do not swim. The conclusion remains if we add further sensory conditions or criteria beyond performance, as has been proposed. (Chomsky 1993: 30)

Searle already notices that if the word "think" is used in a metaphorical sense, the question will not be worth discussing:

> If the sense in which […] programmed computers understand stories is supposed to be the metaphorical sense in which the door understands, and not the sense in which I [Searle] understand English, the issue would not be worth discussing. (Searle 1980: 419)

Chomsky agrees with Turing on his stand that the question is a matter of usage of words, but not a matter of fact. He repeats his idea on this question, taking up Jacques de Vaucanson's clockwork duck:

> When Jacques de Vaucanson amazed observers with his remarkable contrivances, he and his audience were concerned to understand the animate systems he was modelling. His clockwork duck, for example, was intended to be a model of the actual digestion of a duck, not a facsimile that might fool his audience, the neuropsychologist John Marshall points out in a recent study. That is the purpose of simulation generally in the natural sciences. There is little if any role here for operational tests of one or another sort, and surely no point in a debate over whether Vaucanson's duck *really* digests. In this regard, there has been considerable regression in the modern "cognitive revolution," in my opinion, though Turing himself was clear about the matter. (Chomsky 1993: 30–31)

If Chomsky is right, then Turing understands that his test is intended for simulation of thinking. So there is no point in the discussion on whether machines can really think. Furthermore, Chomsky refers to the Turing Test, taking up "breathing":

> On the other matter, do we confirm or refute the Turing Test by considering the possibility of a machine that duplicates our finite behavior? Well, I'm not convinced. Let's try an analog. We breathe. Roughly speaking what happens is air comes into the nose and carbon dioxide goes out after a lot of things go on. So there is an input-output system, air to carbon dioxide. We could get a machine that duplicates that com-

pletely by some crazy mechanism. Would the machine be breathing? Well, no, the machine would not be breathing for trivial reasons. Breathing is a thing that humans do, therefore, the machine isn't breathing. Is it a good model of humans? Well, that we'd look at and see if it teaches us anything about humans. If it does, it's a good model of humans. If it doesn't teach us anything about humans, send it to Hume's flames.

(Chomsky 1993: 90)

According to Chomsky, "breathing" is a thing that humans do, so the machine does not breathe, however completely it duplicates human breathing by some mechanism. So Chomsky insists that the same is true of thought and intelligence, referring to playing chess:

It seems to me exactly the same is true when we turn to thought and intelligence. Let's say somebody could come along with a chess-playing program that behaved exactly like Kasparov [a famous chess player], made exactly the moves he would every time. Would it be playing chess? Well, no, just as in the case of "breathing." Playing chess is something that people do. Kasparov has a brain, but his brain doesn't play chess. If we asked, "Does Kasparov's brain play chess," the answer is no, any more than my legs take a walk. It's a *trivial* point. It's not an interesting point to discuss. My legs don't take a walk, my brain doesn't play chess or understand English. Just for the same reason that a submarine doesn't swim. Swimming is something that fish do. If we want to extend the metaphor to submarines, we could say they do. English happened to pick a different metaphor, but these are not substantive questions. A machine that duplicated the air-to-carbon dioxide exchange would not be breathing for trivial reasons, just as if a robot sticks a knife into somebody's heart, it's not murdering him. Robots can't murder. That's something humans do. For these reasons, the questions just don't mean anything.

(Chomsky 1993: 91)

Here, Chomsky insists that playing chess is something that people do. So machines do not play chess. Also, swimming is something that fish do. So a submarine does not swim. Murdering is something that humans do. So robots can't murder. In this sense, the computer system HAL 9000 did not murder an astronaut, Poole in *2001: A Space Odyssey*. So thinking is something that humans do. Therefore machines do not think. As we have seen, Chomsky thinks that the question of whether machines can think is meaningless, saying that Turing was right:

Therefore, it doesn't seem to me possible to refute the Turing Test this way. I think Turing was right. Remember what Turing said. He 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)

Then, what did Turing want to say? According to Chomsky, he said that we should drop the question of what thinking is and create computational models of intelligence because they might teach us something about thinking:

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. That's like 250 years ago, de Vaucanson saying let's construct an automaton that does things kind of like a duck, because maybe it will teach us something about ducks. Turing's point was maybe this will teach us something about thinking. Well, he also said that maybe 50 years from now we will have just changed our language, and we'll talk about that as thinking as we talk about airplanes flying. But nothing substantive will have happened, just the decision to use a metaphor, like deciding to say that submarines set sail. It doesn't mean anything, and we're not confused into thinking it.

(Chomsky 1993: 92)

A physicist, Michio Kaku also says the same thing as this:

Over the centuries, a great many theories have been advanced about whether a machine can think and feel. My own philosophy is called "constructivism"; that is, instead of endlessly debating the question, which is pointless, we should be devoting our energy to creating an automaton to see how far we can get. (Kaku 2014: 238)

So Chomsky insists that the discussion of this matter, including Searle's Chinese room is not meaningful:

In my opinion, all the discussion that's gone on for the last ten years about, say, John Searle's Chinese room and so on, or how do we empirically decide whether computers play chess, it seems to me just like asking: Does the brain think? Do my legs take a walk? If a rock fell off a roof and shattered someone's skull, did the rock murder him? It's the same kind of question. These are not meaningful questions. We should drop them and just look at the serious questions like whether simulation teaches us anything. If it does, good; if it doesn't, throw it out. Simulation that doesn't teach us anything is useless. (Chomsky 1993: 92)

Here, Chomsky thinks that the question of whether machines can think is a matter of usage of the word "think," but not a matter of fact. Chomsky thinks that a chess-playing program is not an interesting theme to study because it is not likely to help us learn anything about human beings. So even though a program can beat a human, that's about as interesting as the fact that a bulldozer can lift more than some weight lifter. This does not teach us anything about the weight lifter, so it is of no scientific interest:

Take the whole business about chess-playing programs, which as Herbert Simon once put it, I think, is the "dorosophila of cognitive science," the idea around which everything converges. He's sort of right descriptively, but that tells you exactly where the field has gone off from the first moment. There are few projects less interesting, scientifically, than a chess-playing program. For one thing because chess-playing is not an interesting topic to study; right now, it's unlikely to help us learn anything about human beings. It's as if we didn't understand how people walk, and someone said "Let's figure out how they pole vault." That just wouldn't be a sane scientific endeavor. Let's first figure out how they move one leg in front of the other, then maybe someday we'll get to pole vaulting. Playing chess is something way out on the margins of what people do—that's why it's a game. It's too remote from what we understand to make any sense to study. Furthermore, from the very first moment it became clear that the way to win at chess was to deviate radically from the way human beings do it and to use the capacities of computers. That just means it's rotten simulation. If Carnegie Tech's computer program can beat Kasparov, that's about as interesting as the fact that a bulldozer can lift more than some weight lifter. Maybe. Who cares? It doesn't teach you anything about the weight lifter, and it's of no scientific interest. In fact, about its only interest is to take the fun out of playing chess as far as I can see. Now the fact that a huge amount of effort and money from the National Science Foundation—I hope not the Russell Sage Foundation—has gone into this, simply shows how conceptual errors have misled the field, in my opinion. We should be aware of that. (Chomsky 1993: 92–93)

According to Chomsky, effort and money spent on chess-playing programs are a waste of time! They are not scientific endeavour at all! The reason is that they cannot teach us anything about thinking.

4. Harari's View

On the other hand, there is an idea that human beings and machines are the same. According to Harari, autonomous cars already can cruise our roads successfully and this means that the cars and many other computer programs do not need any consciousness:

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)

Harari insists that we should discard the mind just as we discarded a substance called ether and God as a means of explaining numerous phenomena:

If we cannot explain the mind, […] why not just discard it? The history of science is replete with abandoned concepts and theories. […], they [scientists] threw ether into the dustbin of science.

Similarly, for thousands of years humans used God to explain numerous natural phenomena. […] no article in any peer-review scientific journal takes God's existence seriously. (Harari 2015: 114–115)

Harari thinks that the Turing Test is designed in order to determine whether a computer has a mind, but that the Test actually examines only a social and legal convention:

The best test that scholars have so far come up with is called the Turing Test, but it examines only social conventions. […] the computer has passed the Turing Test, and we should treat it as if it really has a mind. However, that won't really be a proof, of course. Acknowledging the existence of other minds is merely a social and legal convention. […] According to Turing, in the future computers would be just like gay men in the 1950s. It won't matter whether computers will actually be conscious or not. It will matter only what people think about it. (Harari 2015: 120)

Here, Harari's interpretation of the Turing Test resembles Chomsky's idea that it is a matter of words not a fact whether computers can think or not. Also, Harari thinks that organisms, including human beings, are biochemical algorithms:

Over the last few decades biologists have reached the firm conclusion that the man […] is also an algorithm. […] Humans are algorithms that produce […] copies of themselves […] (Harari 2015: 84–85)

Harari says, comparing organic (conscious) algorithms, that is, humans with non-organic (non- conscious) algorithms, that is, machines:

1. Organisms are algorithms. Every animal—including *Homo sapiens*—is an assemblage of organic algorithms shaped by natural selection over millions of years of evolution.

2. Algorithmic calculations are not affected by the materials from which you build the calculator. Whether you build an abacus from wood, iron or plastic, two beads plus two beads equals four beads.

3. Hence there is no reason to think that organic algorithms can do things that non-organic algorithms will never be able to replicate or surpass. As long as the calculations remain valid, what does it matter whether the algorithms are manifested in carbon or silicon? (Harari 2015: 319)

So, for Harari, humans and computers are one and the same thing. In other words, he insists the same idea as La Mettrie's that human beings are machines.

5. Kaku's view

Like Chomsky, Michio Kaku proposes to build a robot that can think like a human instead of endlessly debating the question of whether a robot can think:

[…] to settle the question of whether a robot can think, the final resolution may be to build one. Some, however, have argued that machines will never be able to think like a human. Their strongest argument is that, although a robot can manipulate facts faster than a human, it does not "understand" what it is manipulating. (Kaku 2014: 239)

Here it seems that Kaku refers to Searle's "Chinese room" by "their strongest argument." Moreover, he repeats the same thing as this:

[…] a computer might be able to translate Chinese words into English with great fluency, but it will never be able to understand what it is translating. In this picture, robots are like glorified tape recorders or adding machines, able to recite and manipulate information with incredible precision, but without any understanding whatsoever. (Kaku 2014: 239)

Then Kaku argues against Searle's insistence that machines cannot think like a human:

[…] it is only a matter of time before a robot will be able to define Chinese words and use them in context much better than any human. At that point, it becomes irrelevant whether the robot "understands" the Chinese language. For all practical purposes, the computer will know the Chinese language better than any human. In other words, the word "understand" is not well defined. (Kaku 2014: 239–240)

As Kaku says, a language may be just permutations and combinations of characters, which are theoretically limited in their numbers. Kaku says that "the question [of whether machines can think like a human] will cease to have any importance" (Kaku 2014: 240). This means that "the problem lies […] in the nature of human language, in which words that are not well defined mean different things to different people" (Kaku 2014: 240). What Kaku says is similar to what Chomsky says about this matter. The question of whether machines can think is a matter of usage of words not a matter of fact. Finally Kaku insists that this is what Turing wanted to say by using the Turing Test:

This was the philosophy behind Alan Turing's famous Turing test. He predicted that one day a machine would be built that could answer any question, so that it would be indistinguishable from a human. He said, "A computer would deserve to be called intelligent if it could deceive a human into believing that it was human." (Kaku 2014: 240)

Conclusion

Alan Turing asks a question, "Can machines think?" and replaces this question by the Turing test, avoiding the problems caused by the word "think." He thinks that if a machine passes the Turing test, it can "think." So we can say that his question is concerned not with the fact that machines can think but with what we think of "thinking." But other people do not think of Turing's question as he wanted them to do. For example, Searle performs a thought experiment called "Chinese room" and denies that machines can think. He insists that machines can just manipulate symbols but cannot think as humans do. Probably Turing understands what Searle wants to say about this matter. However, Chomsky understands this matter related to the Turing test, saying the question does not deserve any discussion as Turing pointed out. For him, this is a matter of words not a matter of fact. Harari and Kaku say the same thing as this. So, after all, the question of whether machines can think is not a question but a pseudo-question.

But we may have a totally different story about this matter. 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 may also accept this, saying that the question will cease to have any importance when machines come to know language better than humans as HAL 9000 in *2001: a Space Odyssey* does.

Incidentally, Roy Harris shows an interesting interpretation concerning Turing's question:

Descartes's argument, [which appears in his *Discourse on Method*, Part V] 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)

What, then, does Descartes argue in his *Discourse on Method*, Part V? Descartes says that human beings are different from machines:

[…] 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 1637: Part V)

What are the two tests to distinguish human beings from machines?

Of these the first [test] is that they 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 1637: Part V)

The first test is that machines can never communicate with human beings by using language. This means that there cannot be any machine that can pass the Turing test. What, then, is the other test?

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 1637: Part V)

Here, Descartes says that machines do not behave based on "cognition," "mind" or "reason." In other words, he insists that human beings have "reason" or "mind" but machines or animals do not:

[…] 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 1637: Part V)

Here, Descartes says that human beings have "reason" or "mind" but animals do not. He also says that machines cannot have "various arrangements of organs." Thus, Descartes does not think that machines can communicate with human beings using language. His idea is different from Turing's. Like Searle, Descartes thinks that machines just only imitate human behavior even if machines can communicate with human beings using language as well as or much better than human beings. Chomsky accepts Descartes's idea and refers to his own theory of language as "Cartesian Linguistics." So he, like Descartes, will insist that machines do not speak because he thinks that speaking is what human beings do. In fact, thinking is what human beings do. On the contrary, Kaku and Harari, unlike Descartes, insist that machines can speak. Probably they say that "reason" or "mind" is unnecessary, which exists, Descartes insists, in human beings but not in machines. After all, Turing's question, "Can machines think?" may have its origin in Descartes's idea that God has given "mind" or "reason," which is not present in animals and machines, only to human beings.

According to Harris, it is thought that Turing stood Descartes's argument on its head. In other words, Descartes thinks that machines cannot speak like human beings because they do not have reason, mind, or intelligence. 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. On the other hand, Turing thinks that if machines can speak like human beings, then they have reason, mind, or intelligence, which means that machines can think. On this point, Descartes's and Turing's idea is the head and tail of the same coin.

After all, can machines think? Is the Turing test, which was proposed by Turing more than half a century ago, plausible?

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