Is artificial intelligence capable of understanding? An analysis based on philosophical hermeneutics

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Abstract
From Deep Blue to AlphaGo, the rapid advance of artificial intelligence (AI) in the areas of problem solving and deep learning has lent credence to the prospect that it may one day develop an ability for understanding similar to that of humans or even surpass human intelligence. However, understanding is not a piece of knowledge, a method or an ability. Knowledge can be possessed as an impersonal and public resource. In a certain sense, it can be objectified by a group’s understanding, which is characterized by certainty, whereas understanding seems to be in a state of constant transformation and movement. Moreover, a method cannot be separated from the subject and is always subsumed by understanding and interpretation. For a method to be useful, it must be the product of understanding and interpretation. Understanding is not enabled by a method; rather, it is understanding that possesses the method. Finally, understanding cannot be described and defined simply as ability. As an important manifestation of human intelligence, understanding is not an empty shell of method filled by its objects, but an appreciation and extension of the meaning of the objects. Computers are good at dealing with simple and formalized activities that are not associated with a context, but the human activities of understanding are not formalized. From the perspective of philosophical hermeneutics, understanding is filled with elements of reflection and in itself is a form of self-understanding. Furthermore, AI lacks the fore-structure of human understanding. Therefore, whether understanding can be viewed from the perspective of historicity is an important difference between human intelligence and AI, and the missing historical connection of computational programs of AI may be an important reason why it cannot acquire understanding in a real sense.

Keywords
Artificial intelligence, hermeneutics, fore-structure, understanding

1. Introduction
Research in artificial intelligence (AI) has long sought to understand the essence of human intelligence so that computers can be designed to do anything that the human mind can and even surpass its capability. From Deep Blue to AlphaGo, designers have strived to elevate the capabilities of AI to the level of human intelligence. When an AI-based program, developed using deep learning, defeated a number of world champions of the strategic board game Go, the popular consensus was that...
computer intelligence had surpassed human intelligence. The updated AlphaGoZero program has departed from the prerequisite of human knowledge and trains itself through deep learning to further improve its performance. It has even discovered new strategies on its own to advance from being a rookie to a master. However, this raises the question of whether a computer that can independently determine the rules of a game really is capable of understanding.

From the perspective of philosophical hermeneutics, the key for AI to achieve the goal of reaching human intelligence lies in acquiring an ability of understanding that is distinct from causal reasoning. Understanding is the prerequisite for communication, which is an important manifestation of intelligence. A mere ‘cognitive simulation’ is not sufficient to establish intelligence, and only when AI has the ability to understand can we assume that it has acquired human intelligence.

This article argues, based on hermeneutics, that the computational power demonstrated by AI has nothing to do with understanding, and that no amount of computational power can yield the act and ability of understanding.

2. ‘Understanding’ and ‘interpretation’ in philosophical hermeneutics

Human life is a life of understanding. Understanding is a form of life that happens no matter whether we can understand it or not (Yin, 1988: 99). This is an important tenet of hermeneutics. As historical beings, humans have a constant appreciation of and concern for their historicity, which is manifested in the subject’s understanding and interpretation. However, the association between understanding and interpretation has different definitions in different stages of hermeneutics. While traditional hermeneutics sets understanding and interpretation in diametric opposition, philosophical hermeneutics does the opposite. It treats the two as a unified whole, in which understanding turns the wheel of interpretation.

Philosophical hermeneutics, represented by Martin Heidegger and Hans-Georg Gadamer, has resolved the opposition between understanding and interpretation created by Wilhelm Dilthey. It emphasizes that interpretation and understanding are inseparable and together make a unified whole. Heidegger thought that understanding is the basic form of existence for Dasein, and that interpretation and understanding constitute an important section in Dasein survival theory. Without interpretation, understanding is clouded with ambiguity, and what is understood is difficult to realize and be revealed. Interpretation ensures the clarity and certainty of understanding, and the light of the former is needed to dispel the darkness hanging over the latter.

2.1 Heidegger on human understanding and interpretation

‘All interpretations that contribute to understanding naturally have to understand what is being interpreted’ (Heidegger, 2012: 178). According to Heidegger, understanding is the means of survival for Dasein, and it creates various possibilities. Interpretation is not something unusual, but understanding itself. It is rooted in understanding and sorts out the possibilities that understanding creates. ‘Understanding takes shape in its possibilities and becomes interpretation’ (Heidegger, 2019: 127). True understanding exists in the manipulative activities of Dasein; that is, the causality of the apparatus, where ‘causality’ means pointing to other existences in the world, including Dasein. Thus, we can see that, in Heidegger’s view, understanding is always holistic, and things can be seen only in their own directive association. Understanding without direction is at a loss.

Viewed from a simplistic perspective, the act of attaching meaning to an individual subject is not understanding, and not even an interpretation. Interpretation is not the same as giving a ‘meaning’ to an existing subject or attaching a value to it (Heidegger, 2012: 175). Interpretation is not an act of mechanical labelling but aims to reveal the structure of a thing in manipulative activities (that is, for-the-sake-of-which). This is the original form of understanding advocated by Heidegger. Understanding is not a mere intellectual activity; its primary connotation is ‘apprehension’; that is, the ability to do a certain thing, to be competent at a certain thing and to be able to apprehend a certain
thing (Heidegger, 2019: 123). According to Dreyfus (1986), Heidegger’s concept of ‘original understanding’ refers to the ability to respond to the environment skilfully and fluently, and conceptual understanding and the interpretative act are based on our skilful understanding of the world. However, I think that Heidegger was seeking a formalized structure of general understanding that can accommodate various types of understanding, and that understanding is not a specific act.

Mark Wrathall points to the basic formal characteristics of Heidegger’s account of understanding and interpretation with three propositions:

Proposition 1: Understanding takes precedence over cognition.
Proposition 2: Interpretation articulates and possesses the part of understanding that which is understood.
Proposition 3: Interpretation is pervasive in the act of understanding. (Faulconer and Wrathall, 2013: 179–180)

In proposition 1, the priority of understanding over cognition lies in the fact that the former presents a means of survival in the world. Although thinking, believing and knowing are forms of understanding, not all its forms exist in cognition. Cognition is only a specific form of understanding. Understanding is not knowledge derived from cognition, but a means of existence in survival theory; it is the condition that makes cognition possible.

In proposition 2, interpretation occupies what is planned in understanding. Interpretation is the process in which understanding unfolds itself and ‘the activity by which understanding gives shape to itself’. It enriches and even changes understanding. ‘Understanding becomes not something else in interpretation, but itself’ (Heidegger, 2012: 173).

Proposition 3 can be seen as the unfolded version of the previous proposition. Interpretation is not an occasional addition to understanding. It is not like the interpretation of a text, sometimes focused and sometimes put aside. We, as Dasein, have some understanding of existence, and it has always been grounded in the interpretation of existence. This is prescribed by the survival theory of Dasein.

The above three propositions show that Heidegger refused to view understanding and interpretation in the context of epistemology. He believed that ‘interpretation is not about being cognizant of what is understood, but to sort out the possibilities planned in understanding’ (Heidegger, 2012: 173). Even planning itself is not necessarily cognitive; it is a position or attitude about the surroundings. It is important to note that Heidegger did not see understanding and interpretation as something at higher or lower cognitive levels, and his description is not hierarchical. Understanding is not a discrete cognitive activity, and interpretation is not an explicit expression of the content of understanding either. Interpretation is not a medium for transforming understanding into cognition.

2.2 Gadamer on understanding and interpretation

Following Heidegger, Gadamer was also dissatisfied with considering understanding merely as a means of cognition. Understanding is the means of existence for Dasein, which in turn is understanding its own existence all the time. However, unlike Heidegger’s, Gadamer’s concepts of understanding and interpretation are closely associated with language: All understandings are the understanding of language, all interpretations are the interpretation of language, all acts of understanding take place within the scope of language, and language builds connection between the subject and object of understanding. In this sense, Gadamer has provided language with the same unique ontological status as understanding, instead of simply treating it as an epistemological tool. He saw the purpose of language in dialogue and thought that ‘understanding in language’ is a process of dialogue between people. Understanding is not about the subject entering the heart of the object or reliving the experience of the object in order to arrive at a mysterious exchange and overlapping of the minds (Pan, 2016: 329). In the process of dialogue, meanings keep emerging. Moreover, Gadamer believed that dialogue presents a ‘question–answer’ structure. The interpretation of a text means that it is imposing a number of questions to the subject, and understanding is one of the answers to them. The question–answer structure occurs widely in the phenomenon and process of human understanding. By understanding the text, humans are actually answering questions
raised by it and unconsciously integrating themselves into their interaction with the text. The meaning of the text thus opens to humans in this process.

On the question of the relationship between interpretation and understanding, Gadamer argued that understanding can be revealed only through interpretation. The external expression of language is the symbol, and the object of human understanding is the meaning. The symbol is the carrier of meaning but does not itself have meaning. The task of interpretation is to remove the symbolic shell of meaning and convert it into the meaning that it expresses and carries. In Gadamer’s view, we must not take interpretation as a supplement to understanding and an occasional act of addition that is needed only when we have something incomprehensible at hand. In fact, interpretation is already included in understanding, and all understandings are interpretation (Pan, 2015: 121).

Gadamer explained the nature of understanding by using the concept of the ‘fusion of horizons’. Every individual has their own historical conditions that they cannot escape (just as we cannot be free from the constraints and limitations of our bodies). Understanding arises in the process of the constant fusion and interaction of horizons; in other words, the process of understanding is the process of fusion of horizons. Once understanding has been created and initiated, the subject’s horizon enters the horizon of the object and creates a new horizon. The end-product of understanding is the arrival at a new horizon marked by the fusion of horizons. It reflects the dynamic character of understanding in its fluidity. In the collision of horizons, certain things that had been acquired before understanding are strengthened or abandoned, and new things are added.

In summary, understanding and interpretation in the context of philosophical hermeneutics do not constitute a cognitive approach, but a concept with certain ontological features. For Dilthey, understanding was an activity to capture the minds of others and not a purely cognitive activity of the mind. He saw it as ‘a unique element in the understanding of life by life’ (Palmer, 2012: 149). The rift between understanding and interpretation has been bridged through the efforts of Heidegger and Gadamer. Interpretation and understanding are two sides of the same coin. Understanding is also interpretation, and the relationship between them is not causal. Understanding produces, accompanies and completes interpretation, and therefore embraces it. Interpretation in turn develops and advances understanding by way of analytical unfolding (Yin, 1988: 105). The central proposition is that understanding is an act of human existence, silently pervading many activities of humans. Understanding and interpretation are among the most important manifestations of intelligence; they are not methodological empty shells filled by objects of cognition, but constitute the appreciation and unfolding of meaning.

3. Understanding is not knowledge, a method or an ability

Understanding is complex. The processes of understanding are different among understanding a phenomenon, understanding a theory and understanding the words uttered by others, thus leading to problems with the definition of understanding. While De Regt and Dieks (2005) have argued that the understanding of a phenomenon is based on the existence of a theory about the object of understanding, Daniel Wilkenfeld argues that the key to understanding an object is not the existence of a scientific theory, but a mental representation of the object.

In order to understand some object x, a thinker must possess a mental representation of x.

Understanding as Representation Manipulability: A statement, attributed in context C, that thinker T understands object o, is true if and only if T possesses a mental representation R of o that T could modify in small ways to produce R’, where R’ is a representation of o and possession of R’ enables efficacious (according to standards relevant in C) inferences pertaining to, or manipulations, of o. (Wilkenfeld, 2013)

Understanding, therefore, becomes the ability to manipulate representations. The complexity of understanding makes it difficult to give a clear definition. We seem to be able to tell only what understanding is not, but not what it is. I think that
understanding does not consist purely of knowledge, methods or a particular ability, but rather is a complex of multiple elements.

3.1 Understanding is not knowledge

From an epistemological point of view, knowledge is a belief that has been proved to be true. That is, when one connects understanding with knowledge, the implied meaning is that both may be true and refer to facts. In other words, when we say that someone understands \( p \), the underlying requirement is that \( p \) is true. However, the concept of understanding is ambiguous in this context. Understanding does entail beliefs or propositions, but it does not necessarily require consistency with external conditions; it requires only logical self-consistency and coherence. Similarly, we can, in many cases, have little understanding of our acquired knowledge. For example, someone may know who George Washington is without understanding him (for example, his biography, religious beliefs, political positions and education). When only the search for knowledge is the aim, understanding is not required.

Understanding is not a type of knowledge; it pertains to providing evidence for the inner coherence of knowledge, and thus requires a grasp of interpretive and other coherence relations in a large body of information covering all fields. A person may know many items of fragmented and unrelated information, but understanding is achieved only when that information is pieced together by the relevant subject. Such an interpretation does not assume that truth values are less important for understanding; rather, understanding is characterized by the same facticity as knowledge, which makes it difficult to distinguish between ‘I understand \( x \)’ and ‘I know \( x \)’, as both contain beliefs and propositions about external factors. If we separate this feature from understanding and knowledge, it becomes critical for the nature of understanding to appreciate the connections between items of information. By contrast, when we take away the facticity of knowledge, the essential feature of knowledge lies in the non-random connection between the mind and the world (Kvanvig, 2003: 197).

We can also refute the idea that understanding is knowledge by using an example. Zhang San is a person who knows the entire history of the unification of the six kingdoms by Qin. If you ask him any question about this part of history, he always gives the correct answer. Let us also assume that Zhang San is honest enough to avoid making guesses or fabricating answers, and that he relies only on the information he has and the things of which he is certain in answering the questions. Given enough time, Zhang San’s performance will convince people that he understands the history of the unification of the six kingdoms by Qin. The question is one of whether we can conclude that Zhang San has acquired the relevant knowledge. In my opinion, the answer is no. Answering questions correctly does not imply understanding but merely provides some evidence reflecting understanding. The problem is that such evidence may be false in the first place (for instance, if Zhang San has acquired this knowledge through history books that are factually incorrect). Although knowledge consists of the subject’s own beliefs, most of the things we regard as knowledge concern not our subjective state but the way things exist in the objective world—the world of physical objects in space–time (Horner and Westacott, 2014: 61).

3.2 Understanding is not a method

Understanding is not knowledge, but does it belong to the category of methodology? People often say of things: ‘Try to understand it!’ Understanding seems to be a means of revealing hidden meanings, ‘or rather, a correct way of capturing the revealed meaning’ (Yin, 1988: 109). Method has always been a tool separate from and used by the cognitive subject, and whether a method is appropriate determines whether understanding can be achieved. In this sense, method is objective and separable from understanding. However, method cannot be separated from the subject; it is always subsumed by understanding and interpretation. For a method to be useful, it must be the product of understanding and interpretation. Humans do not attain understanding by means of method, but possess methods by means of understanding.

First, scientism has given rise to an almost fanatical fascination with the method, and science occupies a dominant position in
philosophical explanation and argumentation. Scientific methods are used to control not only nature but also humans. Gadamer argued that the phenomenon of understanding has never been an issue of methodology that can be explored by scientific methods, and he rejected any attempt to reduce understanding to a scientific method. Exploration of the phenomenon of understanding is not aimed at establishing a science of the art of understanding (Gadamer, 2017: 4–6), but at defining how human existence makes human understanding possible. Although people acknowledge that understanding is different from the scientific means of perception, they still describe it in ways based on natural science and seek to develop a set of universally valid guidelines for understanding similar to that of scientific research, as if only the laws of science can conquer understanding. Gadamer (2017: 14) pointed out that the inference of the spiritual sciences is an unconscious deduction, while the inference of the natural sciences is conscious and entirely dependent on the use of one’s own intellectual power. The world of human understanding does not recognize the absolute universality of scientific laws.

Second, method implies the split between the self and the object. Descartes’ philosophy of the subject begins with method, and it is precisely with method that humans wish to overcome the tension between the self and the world. In this sense, method again becomes something outside the subject, ready to be taken. And, as we have seen in the previous sections, method itself bears the imprint of subjectivity. The subject captures the method before using it to gain understanding. Thus, understanding precedes method.

3.3 Understanding is not an ability

People usually think that understanding is closely associated with ability and judge whether someone understands something based on their ability. However, this does not mean that the two are the same. We can judge a computer or a simulated robot by the same criteria without concluding that it understands. Of course, I may think I understand the object and have the ability to correct it if it is wrong, but, if I do understand it, the ability that originates from understanding is not the decisive factor in understanding. It goes without saying that competence is closely related to knowledge, but a definition that equates knowledge with competence is clearly not satisfactory.

In my opinion, the argument that sees understanding as an ability has given it an operational definition. Understanding is ultimately expressed as the ability to make certain predictions. However, there is also a risk associated with the definition; that is, whether perfect interpretation means complete understanding. For example, geocentrism has long dominated people’s view of the universe, and its practitioners have been able to make qualitative predictions that, to some extent, explain the movements of the planets. Likewise, I can assume that God is pushing the Sun to circle around the Earth every 24 h, and as long as I can make qualitative predictions with that assumption, I have an understanding of the phenomenon. In other words, people can successfully demonstrate their ability by applying a wrong theory. Understanding is thus clearly weakened, but we cannot overlook the beliefs harboured in understanding. Beliefs can be true or false, and understanding can be right or wrong because of this. To truly understand something means that beliefs regarding it are true, or at least close to the truth; otherwise, anyone can ‘understand’ anything provided that they are capable of making predictions based on a theory (even if the theory is fictitious and wrong). In this sense, the weight of ability in understanding is overestimated.

In my view, ability is a sign or result of understanding, and an objective perception of understanding may take away its rich subjective meanings because it is always possible for ability to be quantified or even objectified. If understanding is an ability, it can also be objectively measured, which creates a contradiction between subjective understanding and objective criteria. Therefore, understanding cannot be described and defined simply by ability.

4. Cause-and-effect calculations of AI do not constitute understanding

Understanding is not knowledge or ability, and it has never been a method or realized by a method.
Ultimately, understanding is not a cognitive result obtained by a cognitive subject by using a method that is objective, neutral and free of any bias. However, the method itself is imbued with human understanding and is something that has been interpreted and understood. For human beings, things that have not been interpreted and understood do not contain meanings but just textual information. The subject cannot be separated from the method, and the possession of the method by the subject implies understanding. As far as AI is concerned, logical deduction is a method used to simulate human thinking, and its technical route is essentially a form of information processing for computation. Understanding is not only a structure of forms, but a complex phenomenon with semantic content that contains two layers of meaning: First, human understanding is not formalized, and, second, the cause-and-effect calculations of computers are not understanding.

### 4.1 Human understanding is a non-formalized activity

To answer the question of whether computers are capable of understanding, John Searle put forward the famous ‘Chinese room argument’ which notes that formalized systems do not generate understanding, programmed computers do not have a cognitive state, and programs are not reasonable interpretations of human cognition. Searle argues that humans are capable of understanding stories in such a way that they are able to answer questions about a story even if the information has never been directly mentioned in the story (Boden, 2001: 74). In other words, humans as cognitive subjects have the ability of deep association. Understanding is a concentrated expression of the discrete and leaping characteristics of cognitive ability, while the computer connects one set of formal symbols with another through a set of rules, and programmatic order is its characteristic.

Strong AI does not pay too much attention to the essential difference between the process of running a computational program and the process of human understanding. It presupposes in theory that purely formalized symbolic computation and manipulation can define, or even be equated with, human understanding, and argues that a computer capable of interpretation has the ability of understanding. Searle argues that this condition is not sufficient:

The computer and its programs do not provide sufficient conditions of understanding, since the computer and the program are functioning, and there is no understanding. (Boden, 2001: 76)

Understanding cannot be purely formalized. Computers can follow rules, but they cannot understand them. It is on the basis of understanding that humans make, adapt and improve rules. Understanding is not merely a matter of believing in or knowing the relevant facts and theoretical principles. Rather, it requires that we comprehend or grasp how those facts and principles fit together. For the understanding of a certain phenomenon, to correctly interpret the facts and principles of the phenomenon is not enough (Toon, 2015).

I agree with Searle’s claim that understanding contains many layers and types, not a simple binary predicate. When someone says ‘X is Y’, it does not mean that they fully understand X, but only that they have assigned some kind of interpretation to it. In my opinion, interpretation is the basis of understanding, and understanding is expressed as a coherent system of interpretation; interpretation does not necessarily produce understanding.

A computer is good at processing information, and its final output is presented in formalized rules and symbols. Thus, whatever it does and whatever problems it solves, the computer needs to formalize the problem; that is, ‘first establish a formal system that specifies the symbols used, the rules for creating legal strings of symbols (syntax), and the ways in which these legal strings of symbols represent meanings in the problem domain (interpretation)’ (Dreyfus, 1986: 4). However, understanding how a phenomenon is generated is not something that can be simulated on a computer program in the same way as constructing a mathematical model.

Consider an example: Kepler discovered the three laws of planetary motion from the motions of the planets, which is in essence the unification of related phenomena in a formalized system. AI does exactly the opposite. It intends to describe the mechanisms of human understanding in a predetermined and formalized system. However,
understanding is not a single phenomenon. It has a sensory dimension as well as a cognitive dimension. The former is the feeling that accompanies understanding in an emotional sense, like the ‘Aha!’ uttered when a puzzle is solved, while the latter defines understanding as a cognitive state that contains beliefs with truth values. Understanding is equivalent to the mind’s memory and imagination of a certain thing, which is accompanied by the strength and energy of the original feeling. AI, on the contrary, goes silent when it comes to the formalization of feelings, which happens to be an important dimension of understanding.

4.2 The cause-and-effect calculations of computers are not understanding

Gallagher (2004) argues that computers are good at handling simple, formal activities that are not associated with any particular context, or complex formal activities such as playing chess. Both simple and complex formal processes are decontextualized and are a form of theoretical knowledge (knowing that) rather than practical knowledge (knowing how). The latter requires the use of imaginative or intuitive means to find answers to questions arising from the uncertain circumstances of human life. In most cases, we do not need to respond to events that occur in our daily lives with too much precision, still less decide the next steps we need to take through a purely rational computational procedure.

First, understanding cannot be represented by computation or symbolic manipulation. Roger Penrose argues that human intelligence does embody a computational power, but, in addition to that, it is better reflected as the ability of understanding (Meng, 2009: 30). Perhaps, in his view, computational power has an objective scale that can be followed, and it is difficult for formalized computation to explain and describe the subjective qualities of cognitive and conscious activities. How, then, is it possible for computation, which provides definitive descriptions based on logical rules, to accurately portray the obscure, uncertainty-ridden understanding activities within the subject?

The artificial language of computational models is not confined to contexts when setting rules, but rule-based descriptions still seem to be able to reach the structural elements of objects, as logical positivism attempted. Understanding, on the contrary, is open to contexts. The open spirit of hermeneutics makes openness an inherent feature of understanding because the original meaning of understanding is the ‘dialogue’ between the interpreter and the author, which is mediated by the author’s work. Dialogue implies that there is no limit between the parties, and there are no unified and strict rules to bind the activity of understanding. In other words, understanding itself does not seem to have a definite norm. The subjective creativity of the interpreter gives understanding a pluralistic character. By contrast, computational models are somewhat overwhelmed when dealing with problems featuring open relationships and structures, and computations that are subject to linear formal rules struggle with the generation of multiple possible meanings.

In the process of understanding, because historicity has been internalized as a universal principle, the subject, whether to understand the text itself or its author, must always put itself in a larger historical context. The historicity of understanding determines, to a large extent, that it is contextualized. Moreover, as an open process, understanding keeps attracting new elements and generating new meanings. All this makes the problem of framing unavoidable when handling issues involving open relations or structures through a purely formalized computational approach.

Second, computation cannot adequately describe an intentional mental state and produce meaning. In Searle’s view, a computational system or model simply processes information (see Boden, 2001: 75–77). For example, if I say ‘two burgers plus one order of French fries’ and type the phrase into a computer at the same time, the difference is that when I utter the phrase, I may associate it with a particular scene or image. I may imagine myself ordering at a fast-food restaurant, or I may be ordering takeaway. I might even imagine that I am thus going to gain weight and decide to change my diet. Searle argues that the computer does not recognize anything similar to this at all; it is only in possession of symbols (see Boden, 2001: 76). A properly programmed computer may be able to think but not understand. In other words, understanding cannot be described by computation. Humans can
understand because their minds can interconnect literal symbols with meaning. If computation is the formalized manipulation of symbols based on syntax, understanding is the integration of meanings.

Finally, in terms of definitive and non-definitive categories, both computation and understanding express the interrelationship between humans and the external world. The difference is that the cognitive experience gained through computation is definitive and enduring. Computation has a definitive character, whereas understanding seems to be in a state of constant transformation and fluidity. One reason for this is that understanding itself is the experience of meaning, and meaning is fluid. Another reason is that understanding is not only influenced by the personal conditions of the subject but is also confined by the context in which it takes place; hence, the features of conditionality and particularity. Understanding has always been historical and situational and is always individual for the subject who thinks and moves in context and history.

In the activity of understanding, the subjects of understanding and meaning are not causally related through calculation. The correspondent relations between information input and output that are established by computation cannot generate understanding because the mental or intentional state of the subject in the activity of understanding cannot be obtained through the input or output of information. Even if it could be obtained, such an experiential result of cognition would be difficult to symbolize. Formalized computation alone is inadequate for dealing with the uncertainty of understanding because ‘mental abilities are actually beyond the scope of computation’ (Jia, 2019).

5. A hermeneutic reflection on AI’s ability of understanding

Proponents of strong AI, represented by Herbert Simon and others, maintain that digital computers have an ability to understand that is comparable to that of humans. Some argue that even thermostats have some simple cognitive beliefs. The three pathways for advances in AI—symbolism, connectionism and behaviourism—are all essentially related to the processing of information and data. Having witnessed the massive success of AI, Simon proudly claims that:

[T]he simplest way I can summarize the situation is to say that there are now in the world machines that think, that learn, and that create. Moreover, their ability to do these things is going to increase rapidly until in a visible future the range of problems they can handle will be coextensive with the range to which the human mind has been applied … Intuition, insight, and learning are no longer exclusive possessions of humans: Any large high-speed computer can be programmed to exhibit them also. (Boden, 2001: 335)

To their disappointment, however, the subsequent difficulties encountered by AI indicate that the process of human cognition and understanding cannot be described simply by manipulating and processing information. I think that the general way of describing understanding needs to be revised, and the hermeneutics of Heidegger and Gadamer offer a valuable source of inspirations.

5.1 Understanding is self-conscious self-reflection

Understanding is complex, as people are able to describe it in different ways. For Heidegger, the cognition of the world cannot be separated from existence in the world; the subject and object are inseparable, and both live in the world, which is the basic fact of Dasein. It is a condition, not a burden, of cognition. Gadamer (2017: 264) also argued that:

Understanding … is the original form of the realization of Dasein, which is being-in-the-world. Before any differentiation of understanding into the various directions of pragmatic or theoretical interest, understanding is Dasein’s mode of being, insofar as it is potentiality-for-being and ‘possibility’.

The important difference between humans (Dasein) and AI lies in the fact that the former are always planning and designing towards their own possibilities, which reflects a certain type of creativity and autonomy. There is a concern that AI may gain the ability to understand and reflect and thus
create new rules. However, symbolism aside, even artificial neural networks that mimic the neuronal networks of the human brain lack human-like creativity and understanding. In other words, artificial neural networks can respond only to fixed features in fixed contexts but cannot creatively respond to new features and contexts (Xia, 2020).

It is difficult to imagine AI lamenting at the mighty rivers with powerful and emotional poetic words like ‘the Great River eastward flows, with its waves are gone all those gallant heroes of bygone years’ and ‘time passes by like this, flowing away day and night’. Understanding is not just creative interpretation but, in a sense, the self-understanding of the subject. It is critical and cognitively transparent; that is, someone is conscious of their understanding and can understand what they understand. Understanding has had an element of reflection since its inception. ‘Understanding is not a mere reconstruction of knowledge, that is, it is not purely the activity of repeating the same thing. Rather, understanding is the awareness of the fact that it is in fact an activity of recapitulation’ (Gadamer, 2016: 46).

By this logic, computations and deductions made by AI strictly according to rules do not constitute understanding. For example, it can calculate the decimal places of π indefinitely if memory allows. However, humans understand that the ratio of a circle’s circumference to its diameter is an infinite non-recurring decimal, and therefore refer to it by π. If someone were to calculate the decimal places of π endlessly, we would simply consider them a fool. The program of AI is provided by humans in advance and is a programmed copy of the human conceptual system. Repeatedly following established rules is not an act of creativity.

Understanding is a prerequisite for creativity, and it is possible for humans to escape the pitfalls in thinking, such as philosophical paradoxes and Kantian ‘dichotomies’, with the help of understanding, whereas AI may only follow the rules and seek solutions through deductions within the preset limits of the program. By contrast, humans can understand the rules and apply them flexibly to problems, modifying or even discarding them at some point. Understanding is not a fill-in-the-blank expansion of data but is generated and enriched by dialogues. Any form of interaction can be seen as a dialogue in a broad sense, and the medium of the dialogue is language. In a dialogue, people use language to reach out to each other, attract each other and ask and answer questions. Formalized, programmed symbolic presentations do not constitute understanding.

5.2 AI lacks the fore-structure of understanding

According to Gadamer (2017: 265), ‘all understanding is ultimately self-understanding … Thus it is true in every case that a person who understands, understands himself, projecting himself upon his possibilities.’ The possibility of oneself exists in the fore-having, fore-sight and fore-conception that humans (Dasein) have always had. Fore-having, fore-sight and fore-conception embody the human ability of self-reflection and provide the preconditions and foundations for us to understand and think about ourselves.

There is a circular relation between the subject and object of understanding, and the result of the interaction between one’s fore-structure and the object of understanding is understanding itself. In Heidegger’s view, the process of understanding has always been guided by the pre-existing fore-structure, which lays the foundation of our cognitive framework and patterns. Conversely, the advance of the process of understanding constantly modifies our existing system of beliefs. It is on the basis of the existing framework that humans come to know and understand. ‘We have already understood what we want to understand’, meaning that people always know before they understand. The knowledge gives people something that can be understood and clearly expressed (Pan, 2016: 309). Thus, there is no process of understanding without precondition. The mind is never a blank space of cognition but has its own cognitive state.

According to hermeneutics, circularity is a basic feature of understanding. After Heidegger’s transformation, the hermeneutic circulation is no longer assigned the label of malignity but becomes something that is necessarily involved in the activity of human understanding. This circular structure is manifested in the fact that humans as Dasein have been placed in a situation and background constituted by the fore-structure of understanding (such as cultural...
traditions and moral norms) from the beginning of understanding, and it is through this fore-structure of understanding that the subject of understanding enters the circle of understanding. Therefore, no understanding of events and things follows a linear model that goes only in one direction.

The fore-structure of understanding includes fore-having, fore-sight and fore-conception. Fore-having is the prior possession of our history, culture and tradition. Fore-sight refers to the language and concepts we use in cognition and understanding. All understanding requires the participation of language and concepts. Fore-conception consists of the premises and assumptions we have before understanding. It is the knowledge reserve necessary for our understanding and cognition and the scaffolding and frame of reference for moving from the known to the unknown. We cannot start the activity of understanding from a blank mental state. Even if there may be incorrect ideas and assumptions in the fore-structure, they can be corrected only through the process of understanding, and the process of understanding and cognition of something is, to some extent, a reshaping of one’s own fore-structure of understanding.

I think that AI does not have the ability to automatically correct and change certain loopholes and errors in programs or algorithms during operation. Moreover, reinforcement learning creates data through practice and then uses it to create algorithms. This process is similar to how humans observe planetary orbits to obtain empirical data and then fit the data to obtain the gravity formula. The symbolic AI also relies on prior implanted knowledge and rules; the traditional good old-fashioned AI is always pre-programmed or supposed to have a complete reserve of knowledge in the program system that can handle problems by any means. However, unlike the pre-existing cognitive framework and belief system of humans, the knowledge framework implanted in the program system of AI cannot be easily revised and expanded. An important reason why AI is not capable of understanding lies in its lack of an appreciation and conception of historicity. The circular structure of understanding suggests that:

In the circle, the fore-structure and Dasein (the subject of understanding) have a historical connection. By connecting what has happened in the past with what is happening now and what will happen in the future, Dasein becomes existent in this historical connection; being existent in the historical connection makes Dasein a historical existence. (Pan, 2016: 317)

Understanding, therefore, acquires the feature of historicity. Whether understanding can be viewed from a historical perspective is an important difference between humans and AI. Without a circular structure concerning understanding itself, AI may never acquire the ability of understanding in a real sense.

6. Conclusion

The development of AI has given rise to hopes and hypotheses about its acquisition of human-like understanding. However, the philosophical–hermeneutical analysis here has shown that human understanding is a reflective activity based on fore-sight and has had a remarkable element of reflection since its inception. In this regard, prevalent AI does not have human-like understanding because it does not have a fore-structure of understanding, as humans do. As a crucial link in the circular process of understanding, fore-sight is a concept that needs to be emphasized when dealing with humans, who are finite and rational beings with historicity. Human understanding cannot be freed from the immediate entanglement with history and the fore-sight that accompanies that entanglement; thus, it has an obvious historicity, which happens to be the missing dimension of AI. Any discussion of understanding in AI should seriously consider the historical dimension inherent in understanding, which is an a priori condition for human understanding itself. The designers of AI have tried to give it a ‘mind of understanding’ but have cut off its connection to history. To understand something, one needs to know both what it is and why it is the way that it is. However, currently available paths of technological progress cannot help AI understand the causal connections between events. In this sense, it is impossible for current AI to acquire human-like understanding.

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Note

1. In the author’s view, many behaviours by AI are results oriented and are guided by the criterion of the optimal solution. In the case of Go, for example, AI focuses only on the immediate goal of defeating the opponent and winning, yet it does not necessarily understand the meaning of the game itself.

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