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Artificial Intelligence and the Limits of Epistemic Justification

Akande, Michael Aina, PhD

Abstract

The giant strides in the field of artificial intelligence in recent times cannot be wished away. Now machines are capable of deep learning, with better memory to learn complex patterns. There are some other things they can do now, but the most fascinating, to me, is meta-learning and the capacity to learn from users. In this way, the programmer is absent while the machine can engage in inductive projection through self-data-gathering. The contemporary display of such skill can be seen with sex dolls and consumer care robots. It means that some traditional challenges posed to AI such as Turing test, have been overcome. In spite of these developments, this paper attempts to argue that AI has not been able to meet the criterion of epistemic intelligence. The methodologies to be adopted in showing this are: firstly a conceptual clarification of the concepts of knowledge and intelligence to show that there is a mix-up in meaning between the two epistemic concepts. Secondly, to place justification within Aristotle's doctrine of the mean and to argue that it is the ability to recognize this mean that determines intelligence rather than making true claims or getting jobs done. It is in this vein that this paper concludes that the intelligence of machines is a future dream; until they can recognize Aristotelian mean that enhances capacity for counterfactual reasoning.

Keywords: artificial intelligence, aristotelian-mean, justification, virtue and knowledge

Introduction

The concept of artificial intelligence (AI) was introduced by Norbert Wiener around 1948. The concept was used to describe at that period, a new wave of seeing machines as human counterparts. Scholars assumed that if human possess natural intelligence then these machine counterparts must possess artificial intelligence. They are considered artificial because computers or machines are not natural or biological creatures. Artificial intelligence in this light is the science of digital machines doing the sorts of things that are done by human minds. Oladele Balogun describes it as an “ability to produce intelligent information within the shortest possible time” (1995:62). In this wise, intelligent robotic machine is a labour-saving device (Schick & Vaughn, 2003:103).

In this regard, the mental state of human beings is being compared with functional state of machines. What is not clear to intelligent machine

makers is that it is possible to have two different mental states that can perform the same duty or function. In other words, if two entities engaged in the same task, it is not necessarily from the same mental states. So, mental states differ in certain respect to functional states. For instance, different persons could save humanity from different mental states: fear and love, egoism and altruism depending on the context. One may fear to lose his life to anarchy and stand against injustice or one may love the life of fellow humans or family and stand against injustice. So, love and fear are both intellectual virtues that can serve as causes of acceptable social actions. The question here is that if human beings can on the basis of opposing mental states act intelligently depending on the context, can AI do so?

In response to the above question, this paper argues that it is a misuse or inappropriate classification of concepts that is epistemic in nature. When computers and machines provide true information, they are referred to as intelligent. This position is held because machines or robots lack the contextual motivation or virtue required for epistemic intelligence of their claims or actions. My position, therefore, is that machines are said to be intelligent not because they are self-motivated but because of the duration of time it takes them to deliver true information and get jobs done easily.

There is a need for some conceptual clarifications of such terms as knowledge, intelligence and truth as background to our position that machines are simply quick-truth-givers or fast-doers rather than intelligent. After this, the next section shall deal with role of virtue in determining intelligence. It will be complemented by the history of development in artificial intelligence which will help to show that in spite of the growth of AI, it is still far from human intelligence.

Clarification of Important Concepts

The word artificial is always juxtaposed with words such as natural, biological, genuine or common. When we say something is artificial, depending on the context, it could mean the thing is not genuine. It could also mean that it is an unnatural or synthetic thing. Intelligence itself is a word that describes the ability to use knowledge within a context to solve a problem. It is the ability to make a plan that is capable of solving either a mental or practical problem. Artificial intelligence therefore means intelligence displayed by non-biological entities, contrary to the opinion that it is an intelligence imputed from secondary sources. If it means secondary intelligence, there would be no need to ask whether machines are minded, whether or not they can think, or if machine intelligence surpasses that of humans, as philosophers have been probing.

To be intelligent is predicated on the knowledge someone could muster to do things; while knowledge itself depends on the information and justification within ones' disposal. Knowledge is not simply true information rather it is true information appropriately justified, whereas intelligence is knowledge appropriately motivated by interest, goal or virtue as the case may be, to resolve problems. Knowledge claims therefore requires true information all the time. That is why Socrates defined it as justified true belief. Though, some scholars such as Ian Barton (2013) claimed that 'false knowledge' could exist given the fact that some scientific postulations or claims earlier considered as knowledge have changed due to new information on the subjects. This claim can only be true if epistemology is not seen as the search for knowledge about reality. My argument is that by implication, saying false knowledge exists is making a claim that what is not real, exist or what does not exist, exists. And this will be a contradiction in terms. Knowledge should be a true description or exposition of reality the way it is rather than the way it is not. Belief should not be confused with knowledge and Socrates made that clear in the *Meno*. Intelligence comes in when this information is appropriated to achieve required objectives.

Knowledge is not purely propositional, it can also be practical. When knowledge is of practical purposes the focus is not on its truth value but whether it works. This pragmatic consideration is perhaps the point at which the meaning of knowledge is mixed-up with that of intelligence in relation to machine, since machines serve more practical purposes than theoretical. Notwithstanding this, knowledge, either theoretical or practical requires logical or empirical justification whereas intelligence requires motivation because when actions are said to be intelligently done, the concern is not just the correctness of what is done but also the virtues behind them. Linda Zagzebski mentioned Aquinas as saying virtue is the perfection of a power. For her, "an effective epistemic agent is one who reliably reaches her epistemic end and who reaches it because of her, not by chance or because of something outside of her" (2001:155). So, virtue is the property that makes agents effective.

The problem is that many epistemological concepts are at times misused or confused with one another. For example, truth is at times confused with knowledge. When a statement or beliefs is true, it is assumed to be knowledge. For example when a student correctly chose a true answer in a multiple choice question, s/he is described as knowledgeable. A person's correct description of reality or event is taken to be knowledge. In this light, knowledge is described "as something that is the case" (Ojong, 2010:12-13).

Though knowledge claim must be true, knowledge is deeper than truth. In the same vein, intelligence and knowledge are similar in the arena of

fact-gathering, yet intelligence is deeper than knowledge in employing these facts to get things done within a context. Intelligence, according to Joshua Kennon (2010), is “the ability to go into the depth of the situation and come with a solution.” John Puddefoot (1996:63) though believes that freedom to engage in autonomous behaviour is very important in the display of intelligence, this condition may be too strong because even humans are not totally free from family, social and school influences in exercising intelligence. However, we believe the capacity to modify, apply and transcend what is learnt are the most important factors for intelligence.

Empirical knowledge depends on experience and the physical senses which operate through “a complex neuro-chemical process” (Hunt *et al*, 2005: 69). Machines operate through codes and symbols which are seemingly infallible as long as they contain the right chemicals. Human physical senses are not as reliable from the cradle unlike computer codes or chemicals. That is why humans are rewarded if they are rightly motivated or inspired through virtue to remember and apply any piece of knowledge to an existing or impending problem. But it does not require any effort on the part of the machine for information to be stored as suggested by Socrates in Plato’s *Meno*; it is simply there.

The introduction of truth and justification gives knowledge an objective and absolute status. However, justification has evaluative role and as such, it is often used synonymously with rationality. In other words, a justified belief is seen as a rational belief and vice versa. This synonymy with rationality makes naturalistic epistemology to focus on the relationship between belief forming mechanism and reality. Artificial intelligence makers capitalize on this to build formidable machines that hardly falter in their peculiar area of interpreting reality.

One of the criticisms given against the pragmatic theory of truth is that “many people are totally dissatisfied with viewing truth as tentative and changeable. They find no security or hope in a theory of truth that is not solidly grounded in the stable nature of things” (Hunt *et al*, 1999:63). This is quite instructive since firmness is a virtue that philosophers and scientists emphasize when they place premium on endure knowledge. That there are different ways of viewing truth and justification is not in dispute, the thought of malleable truth is what is not acceptable to many philosophers and non-philosophers. The attribute of firmness seems to make knowledge generally sought after by all human beings in every area of life. For this reason, machine’s knowledge which endures longer is viewed by many as superior to that of human.

It is good to note that an unintelligent person with knowledge can be

guided to perform task appropriately “without being able to transcend the scope of the skills...” (Ojong, 2010:13). It is intelligence that makes one to expand the scope of a learned skill. While knowledge requires truth at all times, intelligence does not. Since one can tell a lie to avert an impending danger or save humanity and still be labeled as intelligent. But can artificial intelligent machines transcend the scope of their skills? This shall be addressed next.

Intelligence and the Requirement of Virtue

When a child is said to be intelligent among other things it means s/he is doing or saying something beyond his/her age. It is a way of labeling an effort or character behind a skill or knowledge. Virtues, like humility, patience, firmness, courage, open-mindedness serve as springboards to the acquisition and dissemination of knowledge (Lehrer, 2001:211). In other words, there is a virtue necessary in achieving every goal. Simon Blackburn summed it up when he writes:

Fair-mindedness, courage, judgment and experience can be involved in the cognitive domain just as they are in the practical domain. We might reflect as well that faults in the cognitive domain...would directly reflect, or indeed be part of wider moral faults. And on some accounts of ethics, all moral faults are at bottom not only analogous to cognitive faults, but are actually identical with them (2001:15).

In other words, every practical engagement also is done on the basis of certain virtues. The issue here is: do machines have such virtues behind their actions or information? If they do, can such virtues be seen as a motivation for engaging in an act? While the first question may be answered in the affirmative, the second question is answered in the negative. These questions should not generate any confusion because the contemporary discussions in Western epistemology vis-à-vis virtue or social epistemology tend to separate justification of true belief from the justification of the believer or the agent (Fairweather and Zagzebski, 2001:1-2). The separation of the justification of a belief from that of the believer is occasioned by Edmund Gettier's (1963) critique of traditional conditions of knowledge. In the views of virtue epistemologists, justification condition does not guarantee truth since a false belief can be justified according to Gettier. So, virtue epistemologists aver that the condition of justification should be substituted with appropriate motivations for agent's belief. For me, being appropriately motivated means employing virtue as the basis of knowledge as espoused in Aristotelian ethics, which argued against extreme of virtues. In this wise, I see intelligence as the individual capacity to discern the mean of virtue within a given context or course of action to get work done.

One of the reasons why computers and robots are loved by people is their possession of virtues like firmness, courage and their unbiased approach especially in the way they relate to their audience. A warfare machine is supposed to be courageous, a sex doll machine is expected to be loyal and a customer service robot should be humble. This suggests that artificial intelligence machine makers recognize the role of virtue in knowledge dissemination.

Aristotle identifies two types of virtue: “those that pertain to the part of the soul that engages in reasoning and those that pertain to the part of the soul that cannot itself reason, but it is nonetheless capable of following reason” (Kraut, 2001). Since they are used in intelligent activities, these virtues are referred to as intellectual virtues. Intellectual virtues are motivators that help human beings to attain knowledge and they help serve as justifiers of actions. Though, Aristotle takes the second form of virtue, that is, those that cannot themselves “reason nonetheless are capable of following reason” as ethical virtues, yet he opines that they are not separated from intellectual matters because they also conform to reason. This means that ethical matters are also intellectual matters.

In this regard, justification/motivation of knowledge either practical or theoretical cannot be done outside virtue since virtues also provide platform for an agent to be focused and interested in epistemic and practical issues. The epistemological implication one can deduce from this is that justification of competence and success lies greatly with individual character or virtue. An attack on mechanistic justification of belief, closed under a logico-deductive system without the consideration of virtue of the epistemic agent is what one can infer from Gettier’s counterexamples in his analysis of knowledge as justified true belief (Gettier, 1963:121-123).

It follows that logico-deductive or externalist justification of knowledge known with machines and robots should not be overrated as intelligence. But before the argument in this direction is expanded there is a need to explain what intelligent machines do.

Development in Artificial Intelligence

Development in artificial intelligence started with calculating analogue machines that were invented to perform simple addition, multiplication and subtraction of numbers. The Abacus, Napier’s Banes and the Pascal’s machine are examples of these devices (Owolabi, 2000:2-3). The situation of these inventions improved with Sir Charles Babbage who is normally referred to as the father of computer. Babbage’s device, aside the act of calcula-

tion can “retain information for controlling the sequence” of the task at hand (Owolabi, 2000:5).

This stride by Babbage soon led to electronic computers as we know them today. However, it takes the efforts of a Nigerian, Philip Emeagwali to develop the fastest computer in the late twentieth century. So, according to Gil Press (2017), between 500BC, when Abacus was invented, to the contemporary period, one can make a guess that there are about 10 generations in AI development. Now, artificial intelligence has gone beyond doing mathematical calculations to natural language generation, speech recognition, virtual agents, machine learning platforms, decision management engines, deep learning platforms, biometrics, robotic process automation and text analytics and natural language processing (Gil Press, 2017).

The speed and the accuracy with which measurements are done now are fascinating and intriguing. It became a project to develop more sophisticated machines that will surpass human intelligence. The pursuit of this goal gave rise to cybernetics and robotic technology that go beyond calculation to mimicking human behaviours in the area of manufacturing, dancing, entertainment, space travel and exploration.

Computers and robots are now being used in customer service relations, they are used to generate and summarize business intelligence insights. This developed into interactive voice response where machines are able to recognize human speeches then respond to needs and requests. The invention of biometrics now “enables more natural interactions between humans and machines; including but not limited to image and touch recognition, speech and body language” (Gil Press, 2017). This recently is displayed in a “human robot” named Sophia. Sophia is able to hold eye contact, recognize faces and understand human speech. Sophia is the handwork of a former sculptor and filmmaker, David Hansen who became an AI developer at Hansen Robotics.

What is fascinating about Sophia is that she can express feelings, wisdom, kindness and compassion (Stone, 2017). The accuracy with which she mimics human intelligence and behaviour earned her a citizenship of Saudi Arabia. Aside Sophia, sex dolls are trending as human companions in sex and love-making.

With the technique of reinforcement learning, machines can learn without instruction. This has made AI to overcome a previous challenge of being labeled as “can only obey command or act according to instructions given” (Balogun, 1995). Ian Goodfellow, has also saved AI from the challenge of being labeled as “garbage-in-garbage-out.” He developed what is called generative adversarial networks which allows “machine to generate new data after

learning from a training set, coupled with the ability to discriminate between real and fake data" (Knight, 2017). In this wise, robots are able to learn from unlabeled data.

Communicating in a particular language is no more a problem to AI because of the techniques developed in voice and image recognition. The future task now is for robots to be able to generate natural language on their own effectively. The question then is: if machines have overcome the charge or label of "garbage-in-garbage-out" can they be said to be intelligent? This is our focus in the following section.

Aristotle's Doctrine of the Mean as a Measure of Intelligence

In the history of artificial intelligence, there have been different proposals to determine whether machines or robots can think or solve problems like humans. Descartes opines that computers can make short responses and ask questions if touched but for him, computers cannot compose essays or answer questions appropriately in various context (Descartes, 1996:34–35). Also, Alan Turing in 1950, proposed an experiment to test machine intelligence in comparison to that of man. Turing test requires a machine to play a deceptive game as perfectly as a man when both are locked up in a room with an interrogator outside the enclosed room. The aim of the game is to make it difficult for the interrogator to differentiate machine's answers from the human's answers. This game is referred to as the imitation game (Schick and Vaughn, 109-110). There is recently what is referred to as Tokyo test; which expects machines to write essays and pass school examinations in different fields (Basulto, 2013).

Searle using "Chinese room" experiments argues that what Turing test and others entail is for computers to be able to manipulate symbols for which they have no understanding of; and without understanding, it is difficult to see them as intelligent like humans (Searle, 1980:417-457). Other critique of this test is the naivety of the interrogator which could affect the outcome of the test. The interrogator may not be smart enough to ask tricky questions that can expose the computer. These tests are also particular such that they do not address the general concern of intelligence but a way to see how well machines could mimic or imitate humans. It is for this reason this paper considers another criterion of intelligence which Aristotle mentioned in his book on ethics.

The essence of the doctrine of the mean as espoused by Aristotle is to promote excellence of character. However, the provision of the excellence is predicated in recognizing virtue that is fit for a particular context. In this wise, the main thrust of the doctrine is the development of human intellect

to recognize appropriate behavior or virtue within a given context. For Aristotle, the appropriate life for a human being will involve “the active exercise of his psyche’s capacities in accordance with excellence” (See Ross & Brown, 2009, 1098a:18).

Aristotle, in the course of writing, believes that what separates human beings from other occupants of the physical world is the possession of a rational nature. In using rationality to distinguish humans from animals, Aristotle argues that being able to recognize and adopt the mean of virtue especially the virtues that are in accordance with reason is the distinguishing factor between humans and animals. For him, emotions are shared with other beings, so they cannot be the basis of distinction. In like manner, emotion cannot be the basis of distinguishing humans from machines, not because machines do possess it, but because we should not expect machines to possess emotion since their body is made up of material that is radically different from that of man. The attempt to compare human emotion with that of machine is not a fair assessment. The creators of artificial intelligence too are only trying to make machines to be able to express emotions. Such attempt, in my opinion, is taking functionalism too far since it is known that these machines only express the emotions they do not possess. It is like saying any man who expresses happiness is actually happy. A sex doll machine can moan pain or pleasure during sex just to arouse her/his partner but such moaning is not as a result of what s/he feels. This is one of the reasons why logical behaviourism is greatly flawed.

Emotions, in contemporary epistemology as put forward by feminist epistemologists can serve as motivation for knowledge. Susan Bordo argues that “sympathetic understanding of the object is that which understands it through union with it” (Bordo, 1987:102). Knowledge in turn can be used in controlling emotions like anger, fear and appetites (Sommers & Sommers, 1996:215). So, there is what one can call inter-causal relationship between knowledge and emotions which in turn produces intelligence.

For instance, when reason is applied to the event of facing death, it can choose the right amount of fear or courage to exercise, such that the fear of death becomes insignificant or it serves as a good solution to live a non-materialistic life. When reason is applied to giving money out, it can then choose between ‘prodigality and meanness’. When faced with a situation of social interaction, it can choose between the act of ‘sulkiness and obsequiousness’ (Sommers & Sommers, 1996:216).

However, Aristotle cautions that “the choice of a mean is not possible in every action or every feeling” (see Sommers & Sommers, 1996:219). He believes that negative emotions or bad actions are evil in themselves and

as such there is no middle point of tolerating them. What can be deciphered in Aristotle's submission is that when actions are absolute without a mean, then, the performer of such action is irrational; finding a mean between excess and deficit of bad or certain absolute actions is unintelligible and morally repugnant. Actions such as adultery, theft and murder are categorized under it. One reason that can be adduced for this is because no matter how little or how much these actions and emotions are, they almost produce the same results. In other words, a little of adultery or murder just like a greater amount of them, makes no differences in terms of their consequences on those whom they are performed.

Intelligent actions therefore are the ones whose consequences can diminish or increase if the degree of the virtue is varied. So, being able to vary degrees of virtue to achieve a set goal is what Aristotle considers as intelligent. It is in the light of the above that one can doubt the claim about intelligence of machines and robots. Can machines perform any action or make a claim in varying degrees? Can they within a context determine which mean is required for an action or claim? Is it possible for example, for sex doll machines to avoid adultery or say: "No! I am not interested?" Or customer service machines to take a break when annoyed by a customer instead of apologizing? These questions have only one answer: NO!

A courageous warfare machines is not intelligent if it exercises courage all the time because there are times such courage can lead to the death of innocent human beings. There are stories of how drones killed innocent children and women in civilian areas because weapons or a resemblance of weapons was sighted (Zenco & Wolf, 2016). An intelligent human being will be careful or exercise restraint under such situation. An open-minded money dispensing machine will always dispense money to anyone with the right code including a thief, whereas an open-minded human being will be suspicious even with the right code given certain insight. Such machines will be justified in doing so because it is like fulfilling an agreement that I will only dispense when I see this code. A human being who dispenses under such circumstance will also be justified but the one who refused to dispense to a thief because of his/her insight is the one that will be seen as intelligent. The absolute virtues machines possess in Aristotle's sense thus stripped them of intelligence. So, intelligence is not what we all do normally but what we do abnormally. In other words, it is something that sets some humans apart from the others.

Conclusion

Every rational insight has an accompanied virtue or moral underpinning such that when we ask the question how best this task can be carried out; it also addresses the effects on us and others. It addresses moral issues whether obedience to rules is important, should humility or pride be applied under this circumstance, should courage or restraint be applied? Transcending the scope of a particular skill which intelligence requires, forces on us the justification or motivation of our choices. When the operations of machines were basically deductive, the allegation of garbage-in-garbage out may apply but with inductive generation of data by machines without human control as exhibited by Sophia, such negative charge is not applicable. However, machines are not able to engage in counterfactual inductive reasoning and such they are limited in displaying different virtues under different circumstances.

That computers run on programmes is no more a denigrating charge because humans can also be accused of such since home and school trainings are also forms of programmes. As against the claim of Professor Balogun O. (1995:40), machines now are capable of extracting their own knowledge from the world, and then exploit it for successful actions within the scope of their individual skills. However, labeling machines as intelligent is a misuse of the word since they cannot justify their actions by making different choices of virtues under different situations as expected of intelligent creatures. So, a task-performing machine can at best be described as 'Artificial Knower' rather than Artificial Intelligent.

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