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Is AI really Intelligence that is Artificial?

Group B.

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The term “Artificial Intelligence” was first conceived in a proposal for a summer research project in 1955 by a group of four scientists, engineers, and mathematicians, among them was the late cognitive and computer scientist, John McCarthy [6]. Artificial intelligence looks to use machines or computers to computationally achieve goals in the world. However, if this defines *artificial intelligence*, what would natural intelligence be? What does it mean to be *artificial*? Is artificial intelligence really Intelligence that is artificial in the same sense of an artificial heart? To answer these questions, besides understanding what intelligence is, it is important to know what it means for something to be natural or artificial. The team will use this essay as means to further explore and understand the fundamental topics of artificial intelligence from its conception to the edge of current research.

Collins dictionary defines the word natural as “of, existing in, or produced by nature”, nature meaning things in the world not made by people [8]. For example, iron ore extracted from a deposit was created by nature, humans had no influence in combining rocks and minerals to form what it currently is. However, if a human takes it, mixes it with graphite and heats it in a blast furnace, thus converting the ore into pig iron and slag, the pig iron cannot be considered natural, instead it is artificial since humans deliberately created it [2]. The current definition of something that’s artificial is, “Being humanly constructed, often using a natural model”.

The renowned psychologist Howard Gardner developed a theory in the early 80s and late 70s where he believes that individuals don’t have just one general intelligence, but eight being linguistic, logical-mathematical, spatial, musical, naturalist, bodily-kinesthetic, interpersonal, and intrapersonal [7]. We use these intelligences with varying efficiency to create problems and solve problems relevant to the society that we live in. Around the same time, another scientist developed a similar, yet different theory on intelligence. In 1985

Robert J Sternberg developed the triarchic theory of intelligence, saying that there's three distinct types of intelligence, those being practical, distinct, and analytical [3]. Although these definitions vary, their theories of intelligence share the thought that a human's intelligence can be developed and improved over time.

John McCarthy says that AI "is the science and engineering of making intelligent machines, especially intelligent computer programs." and that AI doesn't have to be biologically observable [6]. We are currently still trying to understand our natural intelligence, while we are also building intelligent entities with what we already know, focusing on making them as humanly or rationally as possible. AI that acts as humanly as possible looks to mimic and think/act like a typical person would in each situation while thinking rationally seeks to pick the best option whenever possible. AI is driven by its agent, which perceives and acts in an environment [1]. There are multiple types of agent programs that vary in terms of their capability and intelligence. Reflex agents respond directly to what they currently perceive, model-based reflex agents enhance their decision making by keeping track of previous percepts, goal-based agents are given a goal to try and achieve and utility agents try to maximize their utility, by achieving a goal in ways that the programmer decides is most appropriate. All these agent programs can even enhance themselves through learning, however, they are all originally made by humans to be good at narrowly completing one task intelligently, not being able to access other areas of Gardner's multiple intelligences if they weren't designed with them in mind.

These agents and their programs are humanly constructed, using a natural model of how we as humans act or think, or rationally making the best choice. Focusing on and going by the earlier strict definition of artificial, we can say that artificial intelligence is currently really intelligence that is artificial.

However, computational power is still increasing, and there is a surge in AI development. For example, the most recent creations in the field of Artificial Intelligence are ChatGPT and text-to-image generators like DALL·E 2, Midjourney, and Stable Diffusion. This brings the possibility of creating an artificial general intelligence with access to all of Gardner's intelligences and perform any task that a human can, and through learning and having access to larger datasets at a faster rate, become better than humans. A recent example of how larger datasets have accelerated the learning of artificial intelligence is OpenAI's GPT-3 [10]. Recently OpenAI has leveraged this model for the creation of a chatbot open to the general public named ChatGPT. This chatbot, using the capabilities of GPT-3, is able to answer queries in natural human language. What is also interesting about this language model is that it is capable of doing tasks which at first glance may not appear to be its main purpose i.e. programming. ChatGPT is capable of providing code snippets in different programming languages capable of providing functionality asked by a human. Another example lies in text-to-image generators like Stable Diffusion. When given a descriptive prompt of an image or text alongside an image as inputs, Stable Diffusion can attempt to either create the image from scratch or alter a given image according to what you entered in text []. These examples serve as evidence that the increasing amount of computing power and availability of bigger datasets are still contributing to the advancement of the field of artificial intelligence in the current time.

An approach currently used for the development of artificial intelligence is artificial neural networks. Neural networks are composed of nodes which take inputs and pass it on to other layers of nodes until a final layer is reached which gives an output. This architecture is somewhat similar to that of the human brain. Neural networks in human brains have such complicated structures that figuring out the correct configuration to perfectly mimic a

human may be impossible. Considering that an AI can be programmed to do tasks that a human can, in some cases it allows it to partially play the role of natural intelligence, but since natural intelligence has the ability to adapt to multiple situations AI is not a complete replacement for human intelligence.

Bearing in mind the evolution of AI and the idea of having neural networks such as a brain, comparing it to biological components can be a misleading topic. For instance, if we were to consider that comparing AI with intelligence was analogous with comparing a heart with an artificial heart, we might believe that having neural networks such as a brain can function equally and substitute a physical brain, yet that is not the case. An artificial heart was created to replace a biological heart with a temporary device that sustains enough time for the patient to receive a donor heart, while an AGI was meant to simulate that human intelligence, not substitute it.

In conclusion, AI is currently intelligence that is artificial, but in the future, the lines between natural and artificial could be blurred. For example, if an AGI gets developed for any purpose and its programmed by a human, it would still be considered as being artificial due to it being humanly constructed, but since an AGI has the same or better intelligent capabilities of a human, what if the AGI decides its best to develop an AI to complete a task? That AI would not be humanly constructed, therefore could we really say it's artificial?

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