Human in the Age of Artificial Intelligence

Parisa Memarmoshrefi*

Institute of Computer Science, Georg-August-Universität Göttingen, Germany

*¹Corresponding author: Parisa Memarmoshrefi, Telematics Research Group, Institute of Computer Science, Georg-August-Universität Göttingen, Germany

Opinion

Today, we are witnessing the vast application and significant impact of Artificial Intelligence (AI) on human life. It has profound consequences on our society, even unnoticed and unconscious. In 1950, mathematician, computer scientist, and philosopher Alan Turing proposed to consider the question, "Can machines think?" [1]. The term Artificial Intelligence was coined in 1955 by McCarthy J et al [2]. As the field developed and diversified, no universally agreed upon AI definition exists. Various definitions of AI are related to different disciplinary approaches, such as computer science, electrical engineering, robotics, psychology, or philosophy [3]. Nilsson NJ [4] has provided a helpful definition: "Artificial intelligence is that activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment [4].

The technology behind AI is a standard Information and Communication Technology (ICT) based on different components [3]:

A.   Dynamic data,

B.   Prompt processing, and

C.   Decision-making.

AI systems are specialized to accomplish tasks in various applications such as Education, Healthcare, Information and communication system, Transportation system, Home, Cybersecurity, Industry and automation, and Pandemic situation. The current AI systems are performing specifically defined tasks with higher computational performance and more potential accuracy, which make them beneficial for the human being. As an example of AI-based systems, autonomous cars are capable of sensing their environments, communicating with each other and their environment, and moving with little or no human involvement. For this aim, an enormous amount of data needs to be gathered and processed and make the right decision at all times of driving and in any traffic situations.

Currently, regarding the advancement of AI technology, it is hard to say the main reason for its creation. For many centuries nature has been a source of inspiration for humans to solve problems. Nature works based on evolutionary/evolving processes in which varieties of new species appear and disappear regularly, based on their capacity to adapt to the environment [5] and find a niche where they can evolve and reproduce. Generally, survival and stability are desirable characteristics for biological and synthetic systems, called "Homeostasis". It describes a self-regulating process via that biological systems maintain stability by adjusting to changing external conditions. This concept explains how an organism can maintain constant internal conditions that allow it to adapt and survive in the face of a changing and

often hostile external environment [6]. By looking into nature, the flight and food-searching behavior of birds and eagles led to the development of algorithms for solving problems involving complex computations. Plants and flowers motivated researchers and scientists to design techniques to find and search for optimal solutions for hyper-heuristics problems [7].

Similarly, insects like ants, wasps, and bees have enabled the formulation of algorithms based on their foraging and preying mechanisms. Several algorithms recently got attention, such as Ant Colony, to solve optimization problems. Ants exhibit complex intelligent behaviour. They can communicate and find food, avoid predators, care for their young larva and navigate over long distances. Each ant uses the local information received from the environment. Based on simple rules and by communicating this information with other colony members, a global intelligence and complex behavior can emerge at the colony-wide level, unknown to every individual.

The human brain and its sophisticated decision-making capability using input from various sources, form the basis of artificial neural networks. Neural networks were developed around the 1970s and gained momentum five to six years ago. They are the underlying methods for machine learning and deep learning.

In recent years, AI methods based on neural network approaches in comparison to the other nature-inspired approaches remain the most used and researched. One reason could be that the human brain attracts more attention because of the unique characteristics of a human, such as language learning, thinking and reasoning, and consciousness. Intelligence is observed in nature in all creatures, but what makes the difference between these kinds of intelligence is the question that demands more investigation. The development of intelligent and autonomous systems leads to the design of social-based applications in which AI systems can interact with humans. One example is driver assistant systems to provide suitable warnings based on the driver's emotional situation, which improves the safety of the road [8].

Another example is social assistive robots which are designed to interact with older adults living in senior care facilities or younger people in social isolation situations like in the COVID-19 pandemic, with the potential impact of increasing wellbeing [9,10]. In [10], the system utilizes a multimodal emotion recognition algorithm, such as facial expression and speech sentiment. The empathic-intelligent system then detects users' emotional states and utilizes these inputs to generate a response. The research in the field of Emotional AI and sentient AI is growing more and more. However, understanding the differences between human emotions and AI-perceived emotion and empathy is in infancy. Like "intelligence," there are other concepts that researchers worked hard to define them, such as "emotion," "feeling," "though," "mind," "sound reason," "psyche," "consciousness," and the "self." Besides the definition, how to quantify them is the consequent question.

There are different theories of consciousness. Higher-order theories of consciousness explain that consciousness is the perception or thoughts about first-order mental states. It attempts to reduce consciousness to "mental representations" rather than directly to neural or other physical states [11]. The Quantum mind theory of consciousness states that consciousness cannot be explained by normal physics but is part of quantum mechanics [12].

Damasio A [13], author of the book "Feeling & Knowing" and the book "Self Comes to Mind: Constructing the Conscious Brain," explains that consciousness is a hierarchy of stages ranging from the proto self to the core self and the biographical self. The latter accommodates extended memory, reasoning, imagination, creativity, and language. In his theory, human brain is a tool for representing consciousness and not the origin of consciousness [13]. He explains that bacteria have intelligence, but as they do not have a neural system, they are not self-aware and do not know that they are intelligent, so they do not have consciousness. In [14], it is shown that animals with different neural systems demonstrate different levels of consciousness. Consequently, this question arises: As artificial neural networks have already been designed in AI-system, could we create some sort of artificial consciousness?

The reasons and intentions for creating AI are evolving, owned to the progress in different scientific domains. Artificial intelligence can help us demonstrate intelligence and consciousness, where we will better define what human intelligence and consciousness consist of. However, this is an interdisciplinary endeavor where mutual collaboration and support of biologists, psychologists, philosophers, computer scientists, neuroscience, medicine, humanities, physicist, music and arts, religion and theology, etc., is needed. That would be a new journey to shed light on and unlock the human consciousness and our true "Self."

References

1. Turing AM (1950) I-computing machinery and intelligence. Mind LIX (236): 433-460.

2. McCarthy J, Minsky ML, Rocheste N, Shannon CE (2006) A proposal for the Dartmouth summer research project on Artificial Intelligence. AI Magazine 27(4): 12.

3. UNESCO (2019) Preliminary study on the ethics of artificial intelligence. The World Commission on the Ethics of Scientific Knowledge and Technology, Paris, Italy.

4. Nilsson NJ (2010) The quest for artificial intelligence: A history of ideas and achievements, Cambridge University Press, Cambridge, UK.

5. Camara D (2015) Bio-inspired networking. (1st edn), ISTE Press and Elsevier, London, UK.

6. Billman GE (2020) Homeostasis: The underappreciated and far too often ignored central organizing principle of physiology. Front Physiol 11: 200.

7. Kar AK (2016) Bio inspired computing-A review of algorithms and scope of applications. Expert Systems with Applications 59: 20-32.

8. Xiao H, Li W, Zeng G, Wu Y, Xue J, et al. (2022) On-road driver emotion recognition using facial expression. Applied Sciences 12(2): 807.

9. Ghafurian M, Ellard C, Dautenhahn K (2021) Social companion robots to reduce isolation: A perception change due to covid-19. Human-Computer Interaction-Interact 2021: 18th IFIP TC 13 International Conference, Bari, Italy.

10. Abdollahi H, Mahoor M, Zandie R, Sewierski J, Qualls S (2022) Artificial emotional intelligence in socially assistive robots for older adults: A pilot study. IEEE Transactions on Affective Computing.

11. Peter C, Gennaro R (2020) Higher order theories of consciousness. In: Zalta EN (Ed.), The Stanford Encyclopedia of Philosophy, USA.

12. Atmanspacher H (2020) Quantum approaches to consciousness. In: Zalta EN (Ed.), The Stanford Encyclopedia of Philosophy, USA.

13. Damasio A (2021) Mind matters news.

14. Mumford D (2019) Can an artificial intelligence machine be conscious?