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A Comparative Study of Artificial and Natural Intelligence from Ibn Sina's Perspective

Mustafa 'Azizi Alawijeh[1], Seyed Zuhair Al-Mesilini[2]

Abstract

The differentiation between natural intelligence and artificial intelligence represents a significant concern among intellectuals. Artificial intelligence developers, leveraging advancements in neuroscience, cognitive sciences, and advanced theories in the philosophy of mind, aim to replicate the structure and functionality of the human brain through a functionalist and behaviourist lens. Broadly speaking, artificial intelligence can be categorized into two renowned types:Classical Artificial Intelligence or the "Computational Theory of Mind": This perspective emphasizes the computational and algorithmic side of artificial intelligence and advocates for the mechanization and computerization of the mind.Connectionist Artificial Intelligence: This viewpoint focuses on recreating the "neural networks" of the brain. Additionally, the human soul, as the source of human intelligence, possesses cognitive and motivational powers that act as the soldiers of the soul, generating a variety of actions and effects. This research attempts to re-evaluate the fundamental differences between natural intelligence and artificial intelligence from Ibn Sina's perspective using a rational-analytical approach. According to Ibn Sina, natural intelligence and artificial intelligence differ in eight key areas: composite synthesis, intentionality, creativity and inventiveness, specialization focus, self-awareness and self-discovery, the internal evolution of natural intelligence, the impulsive power of desire, ethical conduct, and the ability to recall.

Keywords: *Intelligence, Artificial Intelligence, Natural Intelligence, Brain, Ibn Sina.*

Introduction

Today, artificial intelligence (AI) has ventured into the uniquely human domain of intellect, thought, and intelligence. For instance, AI scientists are engaging in areas such as understanding human natural language and responding to it intelligently, accurately recognizing certain medical conditions or pioneering new medical technologies like non-invasive scanning, facial recognition and image interpretation, competing at a global level in chess, simultaneous translation between languages, intelligent subsidy advising, aerospace and the development of smart satellites, precision-targeted drones, proving mathematical theorems, stock market investment, among others. These are cited as evidence of computer intelligence over human intelligence. (Tegmark, 2019: 136)

One of the pivotal questions in the philosophy of artificial intelligence is the distinction between natural and artificial intelligence. This question arises from the concern and anxiety over artificial intelligence replacing natural human intelligence. When comparing artificial intelligence with natural intelligence, it is crucial not to ignore the differentiation among three types of artificial intelligence: weak, moderate, and strong. Strong artificial intelligence remains an achievable dream for scientists without any clear and explicit strategy or idea for its attainment. Yet, if strong artificial intelligence were to be realized, it would possess conscience, consciousness, awareness, and alertness. Weak artificial intelligence, which is the type currently available, does not possess a soul and is only capable of mimicking and simulating certain behaviors and actions. Since this weak form of artificial intelligence lacks a soul, all functions and effects attributed to the soul, such as thinking, reasoning, learning, abstraction, credibility, conceptualization, analysis, decomposition, emotions, etc., are deemed inapplicable to this type because having a soul is the prerequisite for all these activities. The expectation from weak artificial intelligence is merely the imitation and simulation of these functions, i.e., emitting behaviour similar to that of a being with emotions and feelings.

[1] Associate Professor, Department of Islamic Philosophy, Faculty of Wisdom and Religious Studies, Al-Mustafa International University

[2] Scientific Department of Islamic Theology, Golestan Representative Office, Al-Mustafa International University, Tunisia, Orchid code:0009-0008-1335-7267, Email: zohir_mesilini@miu.ac.ir

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The primary motivation for this paper in assessing the characteristics and distinctions between natural intelligence and artificial intelligence is brought forth by Ibn Sina. He elucidated the difference between natural intelligence and artificial intelligence in his book "The Healing: On the Soul". (Ibn Sina, 1996, p. 159) This remarkable point has prompted a re-examination of the comparison between these two types of intelligence through an analytical and comparative approach Ibn Sina's perspective.

Definition of "Intelligence"

In Arabic, intelligence translates to "الذكاء." Defining "intelligence" is not a straightforward thing since there is no universally accepted and undisputed definition of intelligence to date. As a result, some researchers have sought to define intelligence by its functions and outcomes, including the capability for logical operations, understanding, planning, computation, self-awareness, creativity, problem-solving, learning, the ability to adapt to the environment, and the capacity for thought and reasoning, emotions, among others. According to this criterion, anything exhibiting one or more of these functions and outcomes possesses intelligence and the characteristics of being intelligent.

Alan Turing outlined the criterion for measuring a machine's intelligence as follows: "The best measure for deeming a machine intelligent is if it can deceive a person through a terminal (teletype) into believing that they are interacting with a human." (Boden, 1990, p.84)

Other researchers have attempted to offer a broader and more comprehensive definition of intelligence: "Intelligence is the ability to achieve complex goals." (Tegmark, 2019, p. 90) This definition is sufficiently general to encompass all the previously mentioned definitions, as understanding, self-awareness, problem-solving, learning, etc., are examples of the "complex goals" an intelligent entity can possess. Another definition posits, "Intelligence means accomplishing any task with at least human-level proficiency." (Ibid: 93)

From another perspective, intelligence might be seen as encompassing all the expectations and anticipations that can be held for a living being; this includes expectations in the cognitive and perceptual realm as well as those related to the action-oriented and behavioural sphere. Given that life and being alive manifest at various degrees and levels, the outcomes and benefits derived from each level will differ from another, thus suggesting intelligence and intelligent characteristics exist across different levels and degrees. The intelligence a plant holds differs from that of animals and humans. Even within animals, intelligence itself varies in intensity and weakness. Similarly, human intelligence varies across different levels. This definition of intelligence aligns with both physicalist and spiritualist viewpoints, as it suggests intelligence has a source and origin. The physicalist or materialist perspective regards the brain and the physical structure of living being's mind as its source, whereas spiritualists attribute the origin of intelligence to the human soul and spirit. Ibn Sina condensed human intelligence into cognitive and action-oriented realms, analysing this intelligence based on the soul's perceptual and stimulative powers. (Ibn Sina, 1996; p. 56).

Foundations of Anthropology in Artificial Intelligence

Artificial Intelligence (AI) is founded upon specific anthropological principles within the philosophy of mind which includes theories like "Behaviourism" and "Functionalism," with some emphasizing "Darwinian Evolution".

Functionalism

Functionalism is the most accepted theory of mind among philosophers, cognitive psychologists, and AI researchers. It identifies mental states as essentially functional states, positioning psychology abstractly above the numerous details of brain structure from a neurophysiological (or crystallography or microelectronics) standpoint. This perception provides a fundamental basis for cognitive psychology and AI research. (Churchland, 2007, p. 69)

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The simulation in AI can be functional simulation in the strongest sense. As AI theorists who have modelled the human computational system argue, there need not be any difference between your computational procedures and those of a machine simulator, except in the physical materials of the structures performing those activities. These materials are organic in you and in metals and semiconductors in computers. AI theory (functionalist) claims that this difference in construction material does not cause a difference in conscious intelligence more than differences in blood group, skin colour, or metabolic chemistry would. (Ibid, p. 188).

Behaviourism

Philosophical behaviourism is more a theory about how to analyse or understand the vocabulary we use to talk about mental states than a theory about what mental states are. This view's specific claim is that talking about emotions, feelings, beliefs, and desires is not about ghostly internal events but a shorthand way of talking about actual and potential behaviour. Philosophical behaviourism, in its strongest and most straightforward form, asserts that any sentence about a mental state can be rewritten, without loss of meaning, into a lengthy and complex sentence describing observable behaviour that the person in question will exhibit in various situations. Philosophical behaviourism is clearly compatible with a material view of humans. (Ibid, p. 47)

The advancement and development of AI aim to enable it to achieve any goal as well as any other intelligent being; for example, if it aims to have better social skills, better predictive skills, or better design skills, it can achieve them, embodying "general intelligence."

The Nature and Types of Artificial Intelligence

AI is considered a fundamental issue in cognitive science and has been defined in various ways. Some researchers define it as "a machine that behaves like a person and shows intelligent behaviour; the aim of AI is to develop machines that act as if they are intelligent" (Ertel, 2017, p 1).

Some believe that "artificial intelligence is the ability of digital computers or computer-controlled robots to solve problems that typically require human beings' higher cognitive processing abilities." (Britannica, 2010, p, 91)

Others define AI based on understanding the human brain's structure and simulating the neural network. They define AI as "knowledge related to intelligence" and emphasize recreating and simulating the capacities and capabilities of the human brain, believing that computers, as intelligent machines, can perform any task requiring intelligence that people do; tasks such as understanding and recognizing, advising and guiding, inferring and concluding. (Boden, 1990, p.1)

Given that AI is a simulation and modelling of human natural intelligence, it is appropriate first to explore and then implement the criterion and standard of intelligence in humans; hence, the foundational question is: what does intelligence mean in humans, and what are the indicators of intelligence in them?

Several viewpoints can be addressed in response to this question:

A) The criterion of intelligence in humans is their intellectual activities and actions; thus, any being that engages in intellectual activity and reasoning originating from its intellect is considered intelligent. Intellectual activities and capabilities include the perception of general concepts, thinking and reasoning, deliberating, abstracting concepts, generalizing concepts, calculating, problem-solving, analysing, imagining, and believing, among others. Those who have defined AI based on this definition have tried to establish human cognitive functions and activities in computers and intelligent machines; for example, stating that AI is a machine capable of thinking, reasoning, problem-solving, data processing, reasoning, etc. (Kaku, 2021, p. 289)

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The criterion of intelligence in humans encompasses all cognitive activities, including sensory, imaginary, illusory, and intellectual perception; thus, anything with such broad and absolute cognitive capabilities is considered intelligent, as emphasized by Ibn Sina. (Ibn Sina, 1996, p. 56) Based on this foundation, some have attempted to define AI in a way that encompasses human perceptual capabilities in absolute terms, not just intellectual perception alone.

The criterion of intelligence in humans is the behaviours and actions emanating from them, including both voluntary and involuntary actions informed by knowledge and awareness, and natural behaviours that arise without any knowledge or awareness; such as natural and instinctive human actions like digesting food, etc. According to this basis, any machine or computer capable of such actions and behaviours is considered intelligent.

Therefore, there are two general approaches to defining AI - which simulates and mimics natural intelligence: the consciousness and perception-centric approach that attempts to define AI based on human perception and awareness related to the soul's perceptual powers. And secondly, the behaviour-centric and action-oriented approach that attempts to define AI based on the pattern of the soul's stimulative powers. (Kaku, 2021: 337)

Generally, AI is divided into two famous types:

Classical AI: The traditional viewpoint and initial approach to AI that emphasizes the computational and algorithmic aspects of AI, advocating for the mechanization and computerization of the mind. In this approach, mental processes are the same as step-by-step (serial) data processing of digital computers. This viewpoint is known as the "computational theory of mind."

Connectionist AI: In contrast to classical AI, the connectionist viewpoint of AI was proposed, sometimes referred to as "neural networks" and its more advanced forms as "Parallel Distributed Processing" (PDP). This method began its work in the mid-1980s. A connectionist network is made up of a large number of units arranged in different layers. In a standard connectionist network, there are three layers: input, hidden, and output. Each unit in the input layer is connected to all units in the hidden layer, and each unit in the hidden layer is connected to all units in the output layer. (Abbaszadeh Jahromi, 2011, p. 180)

Regarding the types of AI, three fundamental questions arise, the answers to which determine the levels of AI; the first question: Can machines and computers perform intelligent actions and behave like an intelligent human? Computer scientists must answer this question. If the answer is positive and a machine or computer can perform intelligent operations, like calculation, processing, problem-solving, etc., then a basic and weak level of AI is discussed and this is called "Weak AI." Weak AI does not have consciousness, awareness, or conscience, but its output is the same as a human's; it acts in a way that you cannot distinguish whether the action comes from a human or a machine.

The second question: Can computers and machines have intelligent actions in the same way humans have intelligence? Cognitive psychologists are responsible for answering this question. If it is proven that the method and manner of a machine or computer's intelligence are the same as natural human intelligence, then "Medium AI" is formed. This level of AI seeks to simulate and model the natural intelligence model of humans and brain scanning.

The third question: If it is possible to simulate and model the manner and method of human intelligence, does this imply that AI can possess human psychological properties?

The philosopher is responsible for answering this question. Can we design an AI that, in addition to the above advantage, possesses human psychological characteristics such as awareness, conscience, perception, will, emotions, and feelings? A positive answer to this question leads to the formation of a deeper level of AI, called "Strong AI."

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Believers in strong AI contend that a properly programmed computer is truly a mind, in the sense that computers with appropriate programs can understand and possess other cognitive states. John Searle, based on his Chinese Room experiment, concludes that strong AI is not possible.

Weak AI means a situation where computers can appear and behave intelligently but not necessarily understand. In other words, the debate is over whether a computer can actually have a mind to be attributed with AI, or can only simulate a mind, which is called Weak AI. This distinction is more of interest to a philosopher who discusses the concept of awareness. (Neapolitan, 2018, p. 13)

This viewpoint finds support in the Turing test and hypothesis (Ertel, 2017, p. 5). The Turing test is predicated on the notion that if a machine can execute tasks and responsibilities as intelligently as humans, it can be inferred that its intelligence is akin to that of humans and possesses psychological traits similar to humans (Khatami, 2002, p. 26). From Turing's perspective, mental tasks are accomplished through the input, processing, and output of data.

Today, there is no specific theory or even a particular hypothesis regarding what will occur with strong artificial intelligence; thus, its future remains uncertain. Consequently, an ambiguous future lies ahead, and those pursuing the commercialization of artificial intelligence are predominantly focused on weak artificial intelligence. The discourse surrounding strong artificial intelligence consists solely of three rudimentary and nebulous ideas that AI scientists and philosophers explore, as detailed below:

Let's fully upload the human brain and precisely download its contents elsewhere. Advocates of this notion sometimes also defend the dualism of mind and body but also adhere to this concept. Essentially, this is a challenging endeavour involving the identification of all algorithms within the brain, encoding each one, and replicating them. According to this narrative, many mental faculties are present, with the possibility of evolution in subsequent stages.

Another idea, broadly and succinctly articulated, is to create complexity. This is because primary life and initial cells were formed based on complexity in Darwin's view, suddenly a new level called emergent emerged, and this level of life is superior. This complexity does not necessarily have to be of the type of algorithms within the human brain but rather of another kind, which consists of transcendent complexity. This perspective acknowledges that if a spark of life is created, the potential for evolution exists.

3. The third narrative of strong artificial intelligence is childlike intelligence or child's intelligence. This is similar to a human who, in the initial stages, has potentialities and capabilities, although there are also minimal activities. Just as a human breathes in the stage of monstrous intellect, gradually its potentialities turn into actualities (Neapolitan, 2018, p. 12)).

Distinctions between artificial intelligence and natural intelligence from the perspective of Ibn Sina

In the following, an attempt is made to compare natural and artificial intelligence in the light of Ibn Sina's psychological foundations, highlighting some of their most prominent differences:

1. Composite Synthesis:

As an introduction, it must be stated that combining, blending, and mixing two or more things together can occur in two ways: one way is where the combined elements and components are simply brought together and aggregated, resulting in mutual influence and the emergence of something new. The other type of combination involves an amalgamation and transformation of elements and components with each other in such a way that a new effect is formed. The fundamental distinction between these two types of combination lies in the presence of action, interaction, and transformation of components, leading to the conversion of one thing into another, whereby potential existence is transformed into actual existence. Ibn Sina attributed the first type of synthesis and blending to artificial entities, and the second type of combining to natural entities:

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"The natural world is capable of a synthesis that leads to transformation, whereas the artificial world cannot achieve this, but rather, it can only aggregate." (Ibn Sina, 1996, p. 159)

Furthermore, Ibn Sina emphasizes that the natural world can soften and refine a synthesis and diminish the roughness and bulkiness of the combined elements, whereas the artificial world cannot bring this synthesis and blending to its ultimate refinement to achieve subtlety:

"Nature is able to refine a synthesis to constitution and reducing it to parts, while artifice cannot achieve this refinement." (Ibn Sina, p. 159)

Another significant difference that Ibn Sina enumerates between natural and artificial entities is that the actions and effects of natural entities are infinite and unlimited in terms of potentiality and action, while artificial entities have limited capability and cannot actualize many potentialities:

"Nature's modes of division and proportion are infinite in terms of potential and actuality, while artifice cannot convert all its potentials into actuality." (Ibn Sina, p. 159)

It is worth mentioning that Ibn Sina, approximately a thousand years ago when artificial intelligence and remarkable technological and industrial advancements had not yet emerged, delineated these three fundamental distinctions between natural and artificial entities.

In contrast, artificial intelligence is based on two mathematical concepts: computation and algorithm. It can be said that three primary factors aid us in elucidating the nature of artificial intelligence: 1- Processing units and processing infrastructures, 2- Programming patterns, 3- Data. Remarkable progress in these three areas has led us to confront the phenomenon known as artificial intelligence. Thus, artificial intelligence is data-centric and processing-centric, and its processing and synthesis differ from the synthesis of natural intelligence.

Intentionality

One of the characteristics of mental states or natural intelligence is the attribute of "intentionality." Intentionality refers to being "about something," "directedness," or "purposefulness." For example, if I believe in the Day of Resurrection, my belief is about the Resurrection demonstrating the quality of being directed and intentional towards something. Intentionality encompasses mental phenomena such as belief, desire, intention, hope, fear, love, hatred, desire, aversion, and memory. Ibn Sina, with his wisdom and depth of thought, reminds us of this attribute of natural intelligence or mental states:

"Knowledge is an entity existing in the soul, adding to it something external, which is the known. Knowledge is something external, like whiteness in a body, except that it differs from whiteness because whiteness does not become an addition to something external, which is the known." (Ibn Sina, 2000, p. 226)

In contrast, artificial intelligence and computers lack the attributes of directedness and purposefulness. Therefore, intentionality only applies to psychological phenomena, and this crucial point of distinction is emphasized by philosophers such as John Searle. (Searle, 2004, p. 83)

Creativity and Innovation

Ibn Sina considers some levels of natural intelligence to possess agency, creativity, and influence. This natural intelligence in humans, due to the radiance of the intellect, surpasses and is stronger than the natural intelligence of animals. This active and creative agency manifests itself in three realms: imagination, fantasy, and thought. The imaginative aspect of natural intelligence has tremendous potential for combining and linking sensory forms and data, allowing for outstanding designs, illustrations, sculpting, and discoveries in the fields of industry, technology, and even scientific and empirical hypotheses. (Ibn Sina, 1996, pp. 236, and 253)

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Artificial intelligence lacks creativity; instead, it only possesses the trait of combinatory ability. Data in artificial intelligence cannot produce output until it is transformed into code and algorithms. According to the physicalist view of artificial intelligence, science and perception have entirely material realities that are analysed by the brain and neural processes. Consequently, the transcendence and non-materiality of knowledge and awareness, as well as the role of the soul and spirit in the emergence of knowledge, have been denied.

In artificial intelligence, we encounter a phenomenon called Machine Learning (ML), which involves development and study of statistical algorithms from data. In this method, machines become intelligent without being taught how to behave. Based on the extensive data they have, machines learn automatically how to behave and make decisions without direct human supervision or intervention. Machine learning relies on two fundamental pillars: the abundance and diversity of data and the use of algorithms to convert intelligent data into various decisions, behaviours, and actions. (Neapolitan, 2018, p. 90)

Simulating brain actions and capabilities in a computer is the primary goal of artificial intelligence; cognitive simulation is one of the earliest approaches to artificial intelligence. The main idea of cognitive simulation involves defining exploratory algorithms to simulate human cognitive abilities, including reasoning, problem-solving, averaging, object recognition, and learning. (Flasiński, 2016, p. 16)

Over the past fifty years, AI scientists have attempted to model the brain by comparing it with computers. However, this may be a form of oversimplification. As Joseph Campbell once said, "Computers are like ancient gods; they have laws and rules as long as you wish, but there is no trace of mercy and compassion in their existence" (Kaku, 2021, p. 297). If you remove a transistor from a Pentium chip, the computer stops working. However, the human brain can still function well even if half of it is removed. The reason is that the brain does not resemble a digital computer but rather a highly precise neural network. Unlike a computer with a fixed structure (input, output, processing), neural networks are collections of neurons that constantly create new connections and organizations after learning something new. The brain has no specific program, lacks an operating system like Windows or a central processor. Instead, its neural networks work collaboratively and in parallel. One billion neurons fire simultaneously to achieve a single goal: learning.

Concentration on a Specific Domain

One of the characteristics of natural intelligence that Ibn Sina emphasizes is that when natural intelligence engages in a particular action or activity and focuses on it, it simultaneously prevents the individual from performing other tasks. Ibn Sina believes that all faculties of the soul serve the soul, and the soul manages and directs these faculties. Therefore, when the soul engages in certain faculties, it refrains from dealing with others; meaning that the soul cannot control neglected faculties and guide them to the right path. Consequently, weak and ordinary souls are such that if they immerse themselves in internal matters, they remain indifferent to external affairs, and vice versa if they become immersed in the sensory world and excessively focus on external matters, they remain neglectful of internal faculties. This attention of the soul and its diversion from certain faculties includes both perceptual and stimulative faculties; if the soul engages in apparent perceptual faculties, it becomes oblivious to the internal perceptual faculties, and the same goes for the appetitive and passionate faculties (Ibn Sina, 1996: 237).

In other words, the essence of the human soul has two primary functions and agencies: one regarding its body, which is the administration and management of the body, and the other regarding its essence and principles, which is rationality and intellectual perception. These two functions are incompatible with each other and hinder each other. If the soul engages in one of these two activities, it turns away from the other; therefore, balancing between these two soul's agencies, i.e., attending to the body and reasoning, which is the main concern of the rational soul, is difficult and challenging, except for strong souls that embody the principle of "He does not preoccupy himself with one matter to the exclusion of another." The obstacles and preoccupations of the soul from the perspective of the body include sensory perception, imagination,

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desires, anger, fear, sorrow, joy, and pain (Ibn Sina, 2000, p. 369). Therefore, if a person is engrossed in thinking about rational matters, all these bodily obstacles are suspended and become inactive. On the other hand, if the soul becomes immersed in the sensory realm, it turns away from rational matters. It is worth noting that limited souls cannot reconcile between two different agencies of bodily and intellectual activities. It should also be noted that if the soul devotes all its attention to a single task, it remains oblivious to other matters, whether they have a qualitative or individual difference. For example, cognitive agency such as contemplation keeps an individual from engaging in a stimulative agency like desire because these two activities differ qualitatively. Alternatively, both agencies could involve individuals of the same type; for instance, anger prevents a person from indulging in desire, and both of these activities stem from stimulative faculties (Ibn Sina, 1996, p. 301).

Regarding artificial intelligence, this feature of the soul where it is incapable of performing multiple diverse agencies at once is non-existent. On the contrary, artificial intelligence can accomplish multiple tasks simultaneously (Brockman, 2015, p. 171).

Self-Awareness and Self-Discovery

Ibn Sina argues that natural intelligence, in some superior stages, possesses the quality of self-awareness and self-knowledge, being mindful of itself. To prove this self-awareness and existential knowledge, he illustrates a hypothetical condition called "Floating Man." He suggests that if a human were created suddenly and completely at the beginning of their existence, without the need for growth, and if their organs and limbs were blocked in a way that they couldn't receive external sensory data, and if they were suspended in mid-air with their body parts separated and not touching each other, in such hypothetical conditions, the human would be unaware and ignorant of everything except one thing: their own essence (Ibn Sina, 1996, p. 26; Ibid, 1375, Vol. 2, p. 292).

This is in contrast to the prevalent approach and perspective of artificial intelligence, which is based on a positivist view and pure materialistic and physicalistic perspective towards humans. It believes that all human perceptual and behavioural activities arise from the structure and complex neural network of the brain. Therefore, the dominant approach in artificial intelligence strongly denies the existence of an abstract and essential entity called the soul or spirit. Consequently, the discussion of self-aware artificial intelligence has been heavily criticized by many intelligence scholars (Eysenck, 2022, p. 121).

Evolution of Natural Intelligence

The eminent scholar regards natural intelligence as possessing a unique trait, which is the convergence of natural intelligence with its external and internal discoveries such that if it perceives something tangible, it is as though it has perceived itself. In this evolutionary trajectory, natural intelligence moves towards actualization from potentiality:

"The passivity of sensation is not in the manner of motion as there is no change from one opposing state to another, but rather a completion. What I mean is that the perfection which was in potentiality has become actuality without the action changing into a force." (Ibn Sina, 1996, p. 91).

In contrast, artificial intelligence lacks inherent motion and internal evolution. It refers to systems that display intelligent behaviour by analysing their surrounding environment and independently working towards a specific goal. In other words, the primary approach in artificial intelligence is merely functional and anthropocentric, striving to simulate and mimic various roles, functions, and behaviours of natural intelligence.

Some emphasize that the evolution of machine intelligence is a continuation of Darwinian evolution in humans. Kurzweil states: "Evolution is a million-year-old process that inevitably leads to the emergence of the most superior creatures, namely human intelligence. The emergence of a new form of intelligence on

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Earth in the early 21st century, which can match and ultimately surpass human intelligence significantly, is a far greater transformation than all the major events in human history." (Kurzweil, 2001, p. 12).

Ian Barbour argues that artificial intelligence has the trait of "self-repair and self-correction" in its evolution. He believes that those who advocate for the capabilities of artificial intelligence and its similarities to human thought should base any comparison between the brain and the machine on observations of behaviour. Their conception of thought or "thinking" is an action, meaning the results of thinking, because mental awareness and internal states are inaccessible to others and computers, machines engage in a kind of reflection and planning, which if exhibited in humans or animals, is considered a sign of intelligence. Chess-playing computers continually defeat world champions. Chess-playing computers gradually provide better and revised games. Moreover, there are machines that learn from experience; such machines can adjust and modify their program based on their past performance. Similarly, a chess-playing computer can adjust decision-making criteria (piece values, defensive posture, flexibility in attack) anew and review rival strategies and tricks." (Barbour, 2009, p. 381).

The Appetitive Faculty of Desire

Another distinction between artificial intelligence and natural intelligence emphasized in psychological science is the particular characteristic of natural intelligence known as the "appetitive faculty of desire." Animal appetitive faculties are initially categorized into perceptual and excitatory faculties, with excitatory animal faculties further divided into "causal" and "active." The causal faculty, whose function is to incite, induce, and stimulate, is referred to as the "appetitive faculty of desire." The appetitive faculty serves as the source of enthusiasm, aversion, and discontent regarding an action. Therefore, the origin of emotions and feelings, as well as the locus of pleasures and displeasures, lies within the appetitive faculty. Ibn Sina defined the appetitive faculty based on its cognitive origin and cognitive support. He stated that when a human imagines a desirable or undesirable form, the appetitive faculty of desire initiates the excitatory stimulus to take action to fulfil that desire or repel what is disliked, respectively. The appetitive faculty branches into two subdivisions: the faculty of desire (shahwat) and the faculty of anger (ghadab). The function of the faculty of desire is to attract what the self loves and to secure its interests, while the function of the faculty of anger is to repel what is detestable and harmful. If an action is desirable and in accordance with our nature, the faculty of desire instructs the active stimulus, which is dispersed in the nerves and muscles, to attract it. Conversely, if an action is detestable and incompatible with human temperament, the active stimulus orders its expulsion and distancing. The primary goal of the appetitive faculty of desire is hedonism and self-gratification, while the ultimate goal of the faculty of anger is dominance and superiority (Ibn Sina, 1996: 57).

In contrast, artificial intelligence lacks inclinations and impulses based on desire and will. The main activity in this field, undertaken by artificial intelligence technologists, involves mapping all human perceptual and non-perceptual activities back to the structure and configuration of the human brain. They assign each of these activities a specific place and position in the brain based on advancements in neuroscience and brain science. Consequently, if it is possible - in their view - to reverse-engineer the structure and configuration and geometry of the human brain and nervous system, and design an artificial intelligence derived from human natural intelligence, it can reproduce a human with all psychological traits and characteristics such as emotions, will, and thought, transforming the human world in all fields (Crevier, 1993: 102).

Neuroscientists argue that today, neuroscience has a close connection with mental and brain events, and a materialistic explanation of the soul can be provided in its light. For example, Nobel laureate Francis Crick writes: "You and your pleasures and pains are nothing but a bunch of nerve cells and their associated molecules. The idea that a human has a separate soul from the body is as futile as the ancient thought about the existence of a vital force" (Randel, 2019: 195).

Ray Kurzweil, a brilliant inventor and innovator of many astonishing technological inventions, believes that we are striving for a world where the difference between humans and machines disappears; a world where

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the boundary between humanity and technology and computers fades, and a world where the human soul unites with a silicon chip. He believes that continuous advancements in technology lead us to a point where computers surpass the memory capacity and computational power of the human brain, and this is due to simulating the neural computer and reverse engineering of the human brain; meaning scanning the brain of a human and copying its neural circuitry into a neuronal or neural computer (Kurzweil, 2001, p. 1, 8).

Ethical Disposition

One of the essential features of natural intelligence is its inclination towards virtues and vices, such as justice and fairness, honesty and kindness, or their opposites: envy, arrogance, and resentment. Ibn Sina considers these psychological traits to be under the dominion and mastery of reason over the appetitive and angry faculties of humans, or vice versa, that is, the domination of appetitive and angry faculties over reason. The bodily faculties, namely appetitive and angry, always seek to dominate the practical faculty of reason to subdue it. However, to attain psychological virtues and ethical conduct, humans must prioritize the directives of practical reason, derived from the principles of theoretical reason, and adhere to them (Ibn Sina, 1996, p. 65).

In contrast, artificial intelligence lacks psychological characteristics and ethical qualities, whether good or bad. While it is possible to derive behaviour similar to that of morally upright and kind-hearted humans from it, ethics, in the sense of a firmly established disposition within oneself is meaningless in artificial intelligence (Kaku, 2021, p. 319).

Power of Recall and Remembrance

Another feature that Ibn Sina enumerates for natural intelligence distinguishing it from artificial intelligence is the trait of memory and recollection of forms or meanings that have fallen into oblivion and forgetfulness. (Ibn Sina, 1996, pp. 232 and 255) The process of recall or recollection involves transitioning from a perceived form to another perceived form, or transferring from one meaning to another associated meaning that accompanies it, or transitioning from form to meaning, and vice versa, transitioning from meaning to form. For example, Ibn Sina describes the process of transitioning from form to meaning as follows: the faculty of imagination acts as a repository and storehouse of perceived forms, making accumulated forms available to the faculty of imagination. The imagination presents these forms to the faculty of the intellect to study and examine them until it reaches a form suitable for the forgotten meaning. Then, through the passage of awareness, it recalls the desired meaning through a perceived form (Ibn Sina, p. 255).

Conclusion

Artificial intelligence is grounded in understanding the structure of the human brain and simulating the neural network of the brain. Some define artificial intelligence as "knowledge related to intelligence" emphasizing the reproduction and simulation of human brain capacities and capabilities. Artificial intelligence, inspired by contemporary philosophy of mind derived from analytical philosophy, has two main foundations: functionality and behaviourism. Some consider artificial intelligence as an extension of the Darwinian view of human creation. In the modern era, artificial intelligence has two fundamental characteristics: being data-driven and being processor-oriented. Furthermore, artificial intelligence is divided into weak, medium, and strong levels.

In this study, from the perspective of the philosopher Ibn Sina, an assessment was made of the cognitive differences between weak artificial intelligence and natural (human) intelligence, leading to the conclusion that there are eight fundamental distinctions between these two types of intelligence: composite synthesis, intentionality, creativity and inventiveness, specialization focus, self-awareness and self-discovery, the internal evolution of natural intelligence, the impulsive power of desire, ethical conduct, and the ability to recall.

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