Artificial Intelligence: A Creation of the Human Mind

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Abstract:- The purpose of this paper is to define artificial intelligence in terms of existing patterns of development and to iterate the applications and uses of such an intelligence in the future. The paper shall proceed to weigh in possibilities and failures of such design , and analyse whether a creation of artificial intelligence can be achieved using missing ingredients with which the mind's thinking is capable of, and which can be installed as patterns for achieving artificial intelligence for replicating the human mind.

I. INTRODUCTION

Technology, primarily a construct of the human mind , has vastly increased capabilities of human society in achieving exceptional tools and resources.

One of the most important creations by the human mind , is an artificial mind or intelligence termed artificial intelligence. It is defined, in essence, as the simulation of human intelligence .This raises questions of the obsoleteness of humankind itself.

If robots can perform superiorly than humans then would they take over the world in the future?

The term "Artificial Intelligence" was first coined in 1956 at the Dartmouth Conference at Dartmouth College in New Hampshire.

Furthermore, conscious awareness becomes a topic of intense debate , whether the mind is computable , or can be reduced to computable terms , or whether a human brain is part of a pattern that cannot be entirely evaluated in the form of an artificially computed entity.

II. TOP DOWN AND BOTTOM UP SYSTEMS

The inception of AI concepts began with top down and bottom up systems. The first appearance of AI in 1950 involved pure elementary top down procedures. A top down computational procedure is modelled from well defined and understood computational procedures, thus assigning premeditated knowledge.

On the other hand, a bottom up computational procedure is one in which such clearly defined rules and knowledge are not specified in advance and the system is provided guidelines on procedures to learn from experience and thus improve its performance .

A simple definition of computation is that it is the action of a Turing machine and what is a Turing machine?

Such a machine was designed by Alan Turing in 1940 and was the first mathematically idealized computer.

It became the theoretical forerunner of the modern computer, idealized, so that it never made a mistake and could run for unlimited time, possessing unlimited storage space.

Deep Thought is an example of a top down computer , whereas the Mars Rover and artificial neural networks are examples of bottom up devices. In bottom up systems , a memory of the previous performances is stored, and this memory can be utilized towards future actions.

According to the views of prominent mathematicians and scientists including Roger Penrose , a combination of top down and bottom up procedures is necessary for successful AI performance .This is inherent in computers which play chess. Searching for mineral deposits however, mostly involves the bottom up approach .

To enhance speed of computations , parallel architecture of computers as opposed to serial architecture has been implemented .A serial machine is one in which calculations are performed, in sequence, that is, one after another , step by step .A parallel machine performs multiple computations simultaneously. There are many problems which can be solved much efficiently by parallel computation than by serial procedures.

Appropriate physical actions of the brain bring about awareness .However, it is not established yet if such physical awareness can be simulated computationally.

Studying the behavior of chaotic systems, which are dynamically evolving physical systems , it is seen that in terms of artificial intelligence , the actual behavior may be simulated but may not produce the exact patterns of human behavior itself. It is possible that the brain, which may be considered a neural network, may not work with a single algorithm , but many algorithms which are constantly changing .

The question now arises as to whether such an environment is inherently impossible to compute. The brain, however, is far more sophisticated than its outside environment in its physical organization and its capacity and thus perhaps beyond the level of extant computation. Computational procedures may not have evolved to the extent of producing awareness.

We can assume then that there is an additional non computational ingredient to the brain, which in holistic

arrangement with the cerebrum and the cerebellum provides an important clue to the emergence of awareness.

Analyzing operations performed by chess playing computers such as Deep Thought , we find that a true understanding of the process of awareness is lacking .Arguments could be made that, evolving with time , expert systems can gradually have some understanding and the future may still produce generations of artificial intelligence which may simulate the human brain to a large extent.

III. GODEL'S ARGUMENT

According to Roger Penrose, the Czech born mathematician, Kurt Godel, presented a theorem which can reveal the non computational element of the human brain . Roger Penrose furthermore, uses the ideas of Alan Turing (Turing machines) to propose an element of non computability in the operations of the brain , which are not algorithmic.

Godell's results bring about the notion that human understanding cannot be reduced to any sort of computational rules. There is more to human thinking than can be approached by a computer.

Turing believed that if a computer is infallible , it can also be intelligent . This idea was an extension of Godel's Theorem.

The idea blossoms to the point where a classical Turing machine can be extended to a quantum one. Quantum computers in certain cases , are much faster than standard computers .Whether the brain performs akin to a quantum computer is subject to debate.However quantum mechanisms including entanglement , have been proposed in recent years as underlying much of brain function and may provide the missing non computable ingredient required for providing understanding to an artificial intelligence.

Quantum computations are expected to deal with all of life's most complex problems and mysteries as those of the environment , aging , war, poverty, famine ,disease, origins of the universe and deep space exploration , to name a few, and are also expected to power all of humankind's AI systems. They are, however, equally dangerous when in the wrong hands..

Applications of Artificial Intelligence in use today

Today's AI systems are advanced machine learning software with extensive behavioral algorithms that adapt themselves to our likes and dislikes. While extremely useful, they cannot be deemed as getting smarter   in the existential sense, but are certainly improving their skills and usefulness based on a large dataset.

IV. SOME OF THE SALIENT APPLICATIONS OF AI ARE PROVIDED BELOW

- Siri, an artificial personal assistant of Apple, is a voice activated computer, which can help with providing information, giving directions   and events to our calendars, and assist in sending messages. It was developed from a project by SRI International Artificial Intelligence Center. Nuance Communication developed its speech recognition system. Siri uses machine learning technology to function and to better understand our natural language enquiries.

- Alexa: Alexa was developed by Amazon and is a virtual assistant AI technology. Its amazing abilities include deciphering speech from anywhere in the room, scanning the web for information and scheduling appointments. It can control several smart devices

- Tesla: Tesla is one of the superior cars ever made. Tesla's new AIs, processing the "thinking" algorithms for the company's autopilot software, has given Tesla vehicles full autonomous driving capability .It has predictive abilities, and sheer technology smartness.. Tesla type cars shall get even smarter and shall be the vehicle of the future.

- COGITO: is one of the most powerful examples of a fusion of machine learning and behavioral science to improve customer interactions for phone professionals .The company was founded by CEO Joshua Feast and Dr. Sandy Pentland .COGITO augments the emotional intelligence of pure professionals . It measures the health of a conversation while it is occurring and subsequently provides real-time, AI induced coaching to pure professionals

- BOXEVER: is a company founded by Dave O Flannagan and one which predominantly uses machine learning to improve the customer 's experience in the travel industry, a delight for the customer. Customer data obtained by BOXEVER has assisted marketing teams in building smarter digital products and experiences .In March, 2031, BOXEVER was acquired by SITECORE,the leader in digital experiences platform.

- John Paul is an example of a highly powerful AI with predictive algorithms for interacting with current clients. It is a well known luxury travel concierge company founded by David Amsellem . The company controls the attendant services for millions of customers through some of the world's largest companies such as VISA, Orange and Air France and has been recently taken over by Accor Hotels.

- Amazon.com A transactional AI has been in operation for quite some time with Amazon , allowing it to make incredible amounts of money online. Every year, its algorithms are refined, further enabling the company to predict the demands of the customer with much precision .

- NETFLIX accommodates highly accurate predictive technology based on the reaction of customers to films. The NETFLIX algorithms learn as data is collected. By analyzing the data using sophisticated algorithms NETFLIX is able to make the right recommendations .Based on prior reactions for billions of records the likes of customers is predicted . The more time one spends on NETFLIX the more recommendations shall be made.With the growth of its enormous database, the tech has progressively become smarter every year. The drawback is that small labelled services go unnoticed whereas big labelled services soar very high

- Pandora's AI, based on music, is without question one of the most revolutionary techs extant today. It has been dubbed as the musical DNA .Based on 400 musical characteristics, each soiree is analyzed by a team of

professional musicians .Pandora's AI listens to and analyzes the listening habits of 65 million listeners and places songs according to their interests.

- NEST is a learning thermostat that was acquired by Google in 2014 for $3.2 billion . The NEST learning thermostat , which can now be controlled by Alexa , uses behavioral algorithms to learn the customer 's heating and cooling needs, thus adjusting the office or house temperature based on the customer's personal needs NEST now includes many other features such as NEST cameras .

V. USE OF ARTIFICIAL INTELLIGENCE BY NASA

An intelligent navigation system using AI has been established by NASA together with INTEL and is in use for planet exploration since 2018 . The model was constructed from millions of photographs obtained from various missions and created a virtual Moon Map.

The status of AI in the last decade and the present

AI has now penetrated into multiple fields which include Marketing , Banking Finance, Health Care, Gaming , Space Exploration, AI in Chatbots, AI in autonomous or smart vehicles and AI in artificial creativity.

There is a phenomenal shift in the very way we live and work and relate to one another, with the advent of Cyber Physical systems, Internet of Things and Internet of Systems.

With self-aware systems, human-like intelligence has been developed. With artificial super intelligence and AI algorithms, the machines are capable of outperforming the smartest of humans in every single domain.

Machine Learning and Deep Learning

Machine Learning is a subset of AI and primarily focuses on procedures to enable a computer to learn on it's own without the necessity of hand coded instructions . Machine Learning systems analyze vast quantities of data and learn from previous mistakes. The results are obtained from algorithms that complete the task efficiently.

Deep Learning is a part and subset of Machine Learning and attempts to replicate the human brain using matrix multiplication. This arrangement is termed a Neural Network. The concept of neural nets emerged in 1957 and was first attempted in 1980 but was not proven useful. Deep Learning becomes applicable with two features - an increase in computing powers and a vast amount of data. This became possible in 2012 with the appearance of Big Data and presently neural nets have become a powerful tool in the implementation of Artificial Intelligence.

The success of Deep Learning has led to the development of particular systems of which the best examples are Alpha Zero and GPT3. Alpha Zero, created by Deep Learning, could achieve superhuman levels.

Besides achieving mastery of chess, AI systems such as Shogi and Go have defeated world championship programs such as Stockfish, Elmo and the 3 day version of Alpha Go Zero. Similarly , GPT-3 uses transfer AI

algorithms by advancement in Natural Language Processing and it can now spew out long texts very similar to the way humans write (probably even like Shakespeare or Dickens), compose music or even perform decoding.

VI. EMULATING THE HUMAN BRAIN

The human brain has about 100 trillion synapses. The really big models like GPT-3 have only 175 billion, that is, thousands of times smaller than the human brain. Brain organoids are clumps of stem cells made to grow into neurons and develop connections .Some of them have electrical activity and are being used by labs worldwide to get to the genesis of consciousness.

Alan Turing had envisaged the machines of the future to be not only logical but also infinitive, intact to enable human consciousness and emotion.

The brain as a computer with non computational action

It may be generally assumed that the brain is a computer of sorts, built of random ingredients. This, however, does not provide a comprehensible model for human understanding. However, if these synaptic connections which signify a neural computer, are object to continuous change , the latter being governed by non-computational action, then such an enhanced model may be able to simulate conscious attributes of the brain

The non computational behavior (components) leads to the emergence and operation of consciousness or at least some non computational actions that involve understanding are inherently linked to consciousness.

Again, since consciousness is a global occurrence this must be part of a collective phenomenon involving large numbers of cytoskeletons or microtubules contained in the neurons .

Such consciousness which developed in eukaryotic cells and finally evolved in human brains is possible with some subtle interplay between quantum level and classical level processes . Extending the concept to artificial intelligence , it is possible that, with the interaction between quantum entanglement and classical processes, the missing non computational ingredient may be found. In the future , with fusion of biological entities within the AI, it is possible that consciousness can emerge in a human-like form.

VII. THE FUTURE OF ARTIFICIAL INTELLIGENCE

In the immediate future, we can envisage interaction with expert systems in fluid conversations, or having conversations in two different languages with translations in real time .Driverless cars can also be expected. For long term prospects, the goal is general intelligence, that is, creating a machine that surpasses human cognitive abilities in all tasks.Reminiscences of HAL (in the movie 2001: A Space Odyssey) linger vividly , as well as Winston, the intelligence in Dan Brown's Origins , which progresses closer to the human brain.

VIII. THE UNIVERSE AS A VAST NEURAL NETWORK

The Universe may be considered a Big Neural Network , as studies have shown . The universe may be a giant neural net, many scientists feel. This novel concept uses neural net theory to unify concepts of quantum and classical mechanics.

Vitaly Vanchurin, a professor of Physics at the University of Minnesota , Duluth, has proposed that we are living inside a massive neural network that governs all phenomena around us.

The quest for unification of quantum mechanics and general relativity has been ongoing for a few decades. Quantum mechanics conceptualizes time as universal and absolute whereas relativity argues that time is relative.

Vanchurin postulates that artificial neural networks can manifest approximate behaviors of both quantum and relativity theories. . He has also proposed the idea that quantum mechanics governs the entire universe at the most fundamental level and even gravity should somehow emerge from it.

It is just not saying that artificial neural networks can be instrumental in analyzing physical systems for discovering physical laws, the paper surmises that this is how the world around us actually works.

The brain comprises 69 billion neurons, whereas the observable universe consists of a cosmic web of 100 billion galaxies here as water makes up 70% of the mass of our brain, only 30% of the universe is visible, and the rest is dark matter and dark energy.

IX. CONCLUSION

Artificial intelligence is essentially a simulation of the human brain .Beginning from the 1950s and evolving from the Dartmouth Conference to the present era, AI has evolved with intricacies such as Deep Learning that have developed to emulate the brain in computational and non computational characteristics. The human brain, in its quantum aspects, may involve a missing non computational ingredient .Much further research is required to incorporate this non computational factor in Artificial Intelligent devices. Furthermore, the Universe, as well as the reality around us may be part of a vast neural network involving a simulation.

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