

ARTIFICIAL INTELLIGENCE PERFORMING HUMAN FUNCTIONS: USE OF ARTIFICIAL NEURAL NETWORKS AND THEIR SUFFICIENCY

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ABSTRACT

Artificial Intelligence (AI) has been at the forefront of almost every event around the world in recent times. Attempts have been made all over the world to incorporate this wonder technology as a bridge to newer avenues and advancements. In an attempt to aid human functioning, the journey to create AIs that can mimic human thinking has come into being using the method of Artificial Neural Networks (ANN). Investment, social media, aerospace, and the healthcare industries have all undergone radical change as a result of ANN's sophisticated network that mimics the human brain. While AI has made great strides in activities requiring computational and logical-mathematical intelligence, it has fallen short in simulating emotional and interpersonal intelligence, making it unlikely that AIs will replace humans and their roles. AI has a unique set of limitations that make it incapable of performing certain tasks that humans can comfortably and naturally carry out. While AI computers have an edge over human brains in that they can process and retain massive volumes of data which can produce more informed and precise results, these benefits mostly apply to logical and mathematical intelligence. Achieving a completely humanoid AI is difficult due to AI's limits in emotional intelligence, lack of human instinct, and inability to mimic human intellect.

AI has been used to replace people in some contexts, primarily for repetitive work and everyday human activities. However, AI cannot totally replace human functions due to its lack of morality, compassion, and intuition, especially in jobs requiring social skills, empathy, and judgment based on subjective criteria. The richness and difficulty of human qualities like creativity, anticipation, and judgment make them difficult to program into robots.

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While there has been the employment of AI tools across fields such as the legal domain, physical labor, and problem-solving, it is unlikely that humans can be replaced. The ideas of sentient AIs do haunt the employment markets and humanity in general, the idea is too futuristic and far-fetched to certainly establish the threat of an AI takeover.

INTRODUCTION

The world of technology, especially that of Artificial Intelligence has seen constant and rapid progress in the last few decades. The motive that has remained unchanged over the years in the development of artificially intelligent machines is the attempt to mimic and recreate human thinking and behavior and eventually, perform human functions. What started as a thought experiment in the 1950s that merely explored the possibility of creating a machine that can be termed as ‘intelligent’ has now become an attempt to create machines that can, in one sense, replace humans by mimicking their thought and behavior.ⁱ The ‘Turing Test’ of the 1950s as proposed by Alan Turing to deal with the question of “Can machines think?”. While Turing’s aim was not to create a machine that is human-like, he did state the possibility of a machine that can pretend and convince the person at the other end that it is not a machine. In today’s date, machines can recognize human faces and voices or write articles and perform almost every mechanical or creative task that humans do. Using AI surely has proven to make life easier for a significant part by eliminating the need to work on tasks that can be outsourced to AIs, which reduces efforts and also long-term costs. Like all machines and technologies, AIs have become aids and replacements that enable the efficient functioning of humans by taking responsibility for mechanical tasks and in fact have also superseded them in computational speed and data processing at high rates. Through developments at unprecedented rates over the last decade, tests and experiments conducted have shown that AI systems have improved steadily and are now outperforming humansⁱⁱ, which is a double-edged sword given that the fear of being supplanted by futuristic sentient AIs, or even the loss of employment for the people performing mechanical tasks in the short run seems very real.

ARTIFICIAL NEURAL NETWORKS

The ground-breaking advancement that has brought AI to where it is today is probably the use of Artificial Neural Networks. Artificial Neural Networks or ANN is a form of machine learning that replicates the human nervous system in an attempt to reach as close to human functioning as possible. It employs the functioning of nerve cells in the human body which work by forming networks to process extraordinary amounts of data in very less time. The inception of ANN was through a computational model proposed in 1943 for a mathematical neuron based on the biological neuron by Warren McCulloch and Walter Pitts.ⁱⁱⁱ Their model sought to explain the method by which human brains learn and process information through constant reinforcements based on the environment. In terms of computer systems, ANN is a network of units called 'perceptron' which form the machine counterpart of human neurons. The perceptron, first created by Rosenblatt in the late 1950s was the foundation for current-day ANN systems and was originally a linear network, used for simple computations.^{iv} On prima facie understanding, ANN functions as a set of perceptrons that convert inputs into outputs based on the intended result. However, ANN, in reality, acts through multiple layers of networks that are also interlinked, forming extremely complex networks that process information in a manner as close to the human brain as possible given the current technology and human understanding.^v

Artificial Neural Networks which have led to the development of advanced AIs by leading to deep learning techniques have been extensively adopted across sectors for better performance and efficient operations. Since deep learning works best in processing large amounts of raw data easily, its use has been made to advance technology and enable speech recognition, pattern recognition and data structuring, computer vision, and also natural language processing.^{vi} Some prime uses have been in fields such as investment and stock markets, social media and entertainment, aerospace and defense, and health care.

ANN: AN ATTEMPT TO MIMIC HUMAN BEHAVIOR

A primary overview would suggest that ANN has succeeded to mimic human behavior and are of a level to replace human workers in certain aspects.^{vii} While it is possible to create a machine that can outdo a human in mathematical calculations or language recognition or data analysis,

all of which are majorly the application of logical-mathematical intelligence or computational intelligence, a machine that can replicate emotional or interpersonal intelligence is almost unlikely. The notion of super-intelligent machines, as we envision today is yet again tied down to logical or computational forms of intelligence and ignores the emotional and interpersonal or intrapersonal aspects of intelligence. Emotional Intelligence, i.e., the ability to perceive and understand the emotions of not only the self but also of those around is an important aspect of human existence and functioning. Humans survive and use empathy and emotion-based decision-making in their daily functioning. AI on the other hand lacks such perception. It could recognize an emotion based on facial features but lacks the human touch and instinct of responding empathetically. Human interactions are much more complex and nuanced which have not been completely mapped and comprehended by scientists making it impossible to recreate in machines or algorithms. Humans rely on non-verbal cues and interpersonal intelligence to gauge situations that AIs cannot as they lack the capability to emote and thus the capacity to learn from their feelings or past emotions, unlike humans.

That is to say, while a computer could perform highly complex data analysis in a matter of seconds, it cannot analyze emotions or offer sympathy as such thinking arises from the human brain by virtue of being biologically coded in such a manner.^{viii} For example, AI models can probably not be psychotherapists for the same reasons and can work as a workbook or a positive reinforcement technique at best if not as a tool.^{ix} In another example of leadership roles, Emotional intelligence, interpersonal abilities, and the capacity to inspire and encourage people are all necessary for effective leadership. Even though AI can help with data analysis or decision-making in a leadership role, it cannot fully replicate human leadership attributes like the capacity to forge connections, comprehend individual motivations, and adapt leadership styles to various contexts.^x

Another disparity in ANN-enabled AI is that they are not capable of providing a comprehensive rationale to show their decision-making process. Humans can generally, in logical computations, trace back their thinking and give insight into how they deduced the result from a given set of inputs and the exact set of additional information from their experience or knowledge. An AI on the other is incapable of giving such insight as it amasses information and computes them mindlessly through the layers of the network to give the output. While a human brain would classify an object or animal into the nearest known class that it recognizes

based on its features, for eg., if a human classifies an object for sitting which has legs but is shaped like a bear as a bear-shaped chair, an AI would simply categorize it as unidentified in the absence of information about bear-shaped chairs in its data.^{xi} In simple terms, humans bear the capability of extrapolation which might be difficult to code into machines and has been termed as the ‘direct-fit problem’.^{xii}

On another note, one of the few advantages that ANN-AI machines hold is that they have the capacity to retain all pieces of information in their storage unlike humans, who could forget information if not used frequently. This might cause ANN machines to produce more ‘informed’ results, which in some cases could work out for the better. Additionally, once equipped with correct and adequate information, the machine will learn to improve on accuracy and will provide precise results with a low margin for error. However, the limitation of both these advantages being more relevant in the logical and arithmetic intelligence spheres does come up again.^{xiii}

The lack of emotional intelligence and the direct-fit problem indicate lower levels of cognition as compared to the intended levels needed for being ‘humanoid’. In addition, there also exists the problem that a machine would require coding training and testing with huge amounts of data.

EMPLOYING AI TO PERFORM HUMAN FUNCTIONS

AI Takeover: Threat or Myth

The use of AI has predominantly been to attempt to take over human tasks that can be delegated with the assurance that the result produced by the AI would be accurate and at least as good as, even if not better than human outputs. However, considering the shortcomings that exist, AIs can only be employed to a certain extent and cannot replace human functionality in their entirety. This is highlighted by identifying the issues in the current level of AIs which lack the humane quality of morality, emotion, and intuition which are the key factors in any human-played role.

While an AI seems to possess the capability to replace a human when looked at as a one-on-one, considering it from a social or community perspective will lead to a different conclusion.

An AI can probably write a more grammatically sound article with the latest information within seconds as compared to an individual who would probably require a few hours at the least, but it cannot probably make it relatable to the readers or add some witty opening line by its discretion and would require situation-specific programming and training. As a part of a corporate team, it probably cannot exhibit values such as leadership, social skills, or empathy.^{xiv} While machines are great for tasks that require repetition of a set of tasks and only require a recreation of the very basic human activities which can be interpreted through the patterns, human capabilities are more varied, and such capabilities might not be a task suitable for machines to perform. Humans have the capacity to imagine, anticipate, feel, and judge changing situations, which enables them to shift from short-term to long-term concerns, in contrast to AI abilities that are only responsive to the data available.^{xv} These capabilities cannot also be programmed into a machine for multifold reasons.

Firstly, human behavior can be said to majorly be based on instinct, intuition, and rationality. These thoughts cannot be easily accessed as such data cannot be quantified and is not extractable from the human brain in numerical forms for the system to understand. Secondly, human behavior, while predictable in a generic sense, cannot be formulated to fit a general standard and is very subjective to the environment and preferences which lead to choices specific to each human, which makes it difficult to train an ANN-AI given the extremely varied data. Thirdly, human cognition has not been completely decoded by neuro-scientists and psychologists to date, making parts of such data unavailable and a blind spot in machine learning advancements. Fourthly, assuming that such data could be collected and accessed, it would require high levels of training and testing to make a machine capable of such thinking, which even then, cannot be assured to perfectly mimic human thought and behavior.

AI in Physical Job Roles

There is also the avenue of physical job roles such as plumbers, electricians, and cleaners which cannot be performed by independent software unless they are integrated into hardware. There are smart robots that perform such tasks but they are currently AI-controlled and not AI-enabled. Yet again, for complete hardware performance, humanoids would be the solution, which might be a possibility in the future. Currently, AI in such fields could perform tasks such as leak detection or predictive maintenance. Although, this has not been commercialized and does not seem to be viable for commercialization in the short term given the costs and

widespread use that would be necessary.^{xvi} Additionally, tasks such as electricians and plumbers require skills that involve hand-eye coordination and are termed “handyman jobs” for a reason. Thus, it is not a major concern unless humanoid and sentient robots start taking over the world.^{xvii}

Use in the Legal Domain and Issues That May Arise

The use of AI enabled by ANN has already spread to all fields of work and the legal sector is no exception. The use of AI tools for contract review and legal research has been prevalent ever since the inception of the technology in the late 1900s. The IBM Watson-powered robot 'ROSS' was the first major player to attempt to use AI for legal purposes, and it used a novel approach by data mining and analyzing trends and patterns in the law to answer research questions. The legal field has seen multiple newer technologies that have been employed over the years, expanding into judgment analysis and case guidance systems and this has made way for multiple studies comparing and concluding on the accuracy and sufficiency of the AI used as compared to the human counterpart.

In one sense, the use of AI tools can prove to be very beneficial by automating cumbersome and mundane tasks such as collecting precedents as it could easily score through multiple sources and databases to present accurate cases that are relevant in a much shorter span of time. It could also be useful to review and redline documents which take up a major part of the time in legal matters. However, larger applications such as evidence analysis and case retrieval for judgments might not be as easy given the complex legal systems that countries follow which might require higher levels of ANN to be able to rise beyond the basic search optimization and profiling functions to produce the intended result of apt and relevant material for specific demands.^{xviii} There is also a scope for crime predictions as discussed in some studies. They propose that AI can be used to analyze data sets that include crime records and demographics to predict the type of crime given the time and place using advanced models and targeted training.^{xix}

Given the current level in the process and development of ANN and AI, they can only be used or adopted in those spheres that are solely data or text based. They could be used as an aid to supplement human functioning in the legal domain and in roles such as data filters, database management, search and basic research. Citing the lack of human-level cognition and

interpersonal skills, it is far fetched to say that AI can successfully replace human functioning in the legal domain in matters such as negotiations or client counseling as these require a human-touch, an empathetic or interpersonal and spatial outlook.^{xx}

It can not be said however that humans are irreplaceable. It is already commonplace that companies are slowly investing in AI tools to carry out the basic and mechanical tasks that were once performed by humans. Employees who had tasks such as copywriting, basic data analysis, document proofing and editing, etc. are being replaced by AI tools that are much faster and more efficient compared to their human ancestors. While the notion of sentient AIs that could supplant the human race is obviously too futuristic, the idea that AIs could cause at least a part of the human race to be replaced and left unemployed if they do not up their skills is very real.

CONCLUSION

The use of AI across multiple sectors has proven to be beneficial so far, with AI tools being used as an aid to human functions. The debate of whether or not AI can replace humans by successfully performing human functions has existed for long, and the reconciliation that some authors provide is that ANN is not developed or probably cannot also be developed to make AI capable of human emotion or cognition. However, there is also the perspective that, even when used as tools, AIs are replacing some amount of the human workforce who were previously employed for such aiding tasks, like clerical employees who would have been in charge of data collection or basic drafting. Thus, while, AI cannot replace humanity, it surely possesses the capacity to replace humans in certain aspects by performing human-like functions.

While it may seem to be a far-fetched ideology, taking into consideration the strides in development in the last few decades and the need for humans to simplify their own tasks, it is safe to say that there would be attempts to bring AIs to function as closely similar to humans as possible. While they are currently tools and software that replicate human tasks, the possibility of a humanoid AI is very existent and there are also some instances such as Sophia^{xxi}. This is however met with additional concerns, such as legal implications of AI that assume human roles and the complexities that would arise in trying to regulate the use and

functioning of such AIs which could prove to be demanding. The implausible, however, is still a matter that requires attention and consideration. AI, even in boosting human performance, does perform some human-like functions which need regulation.

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