Quest Journals
Journal of Software Engineering and Simulation
Volume 11 ~ Issue 6 (June 2025) pp: 75-78
ISSN(Online) :2321-3795 ISSN (Print):2321-3809
www.questjournals.org

Research Paper

Exploring the limits of AI: Does AI mimic understanding or truly simulate intelligence?

Nachiketh Velekkat Suraj

Abstract:
Artificial Intelligence or AI is the simulation of intelligent human behaviour like cognitive abilities such as learning, comprehension, problem solving, decision making, creativity and autonomy using computers. It is used to create machines that can mimic human intelligence to reason, discover meaning in data or information provided and learn from past experiences. They use different tools such as machine learning, deep learning computer vision, neural networks and natural language processing, to analyse data, recognize patterns, understand language, make decisions, and interpret visuals, allowing then to perform tasks that typically require human intelligence.

***R**eceived 14 June., 2025; **R**evised 24 June., 2025; **A**ccepted 29 June., 2025 © The author(s) 2025.*
P**ublished with open access at **www.questjournas.org

I. Introduction:

Artificial Intelligence also known as AI is becoming increasingly advanced, performing tasks that require intelligence, such as identifying objects, understand and respond to different languages andlearn from information. However, a key question arises: does AI truly simulate intelligence or just mimic understanding? This research paper aims to explore that question by examining how AI systems simulate intelligence, different types of AI, testing the AI systems intelligence and whether AI can understand abstract concepts.

What actually is intelligence and how does A.I become intelligent?

Human intelligence is said to be the mental quality that involves the abilities to learn from experiences, adapt to new situations, understand and handleabstract concepts (such as freedom, justice, love etc).Whereas artificial intelligence simulates intelligence through the help of data and different algorithms. Machine learning is one-way artificial intelligence systems simulate intelligence. Machine learning is a branch of artificial intelligence that focuses on developing machines that can learn from and make predictions or decisions based on input data, without human intervention.

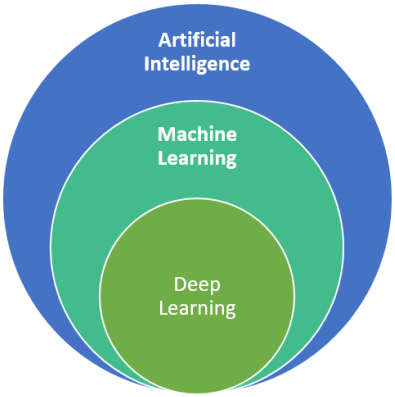


Figure 1: artificial intelligence, machine leaning and deep learning Source: Nadia BERCHANE (M2 IESCI, 2018)

Machine learning makes predictions or decisions by analysing large amounts of data through algorithms that automatically find patterns and relationships within that data. They are able to do this as they are trained using training data which can be supervised, unsupervised, Semi-Supervised or Reinforcement learning. In supervised learning the A.I system is trained on labelled data which includes an input and output. The

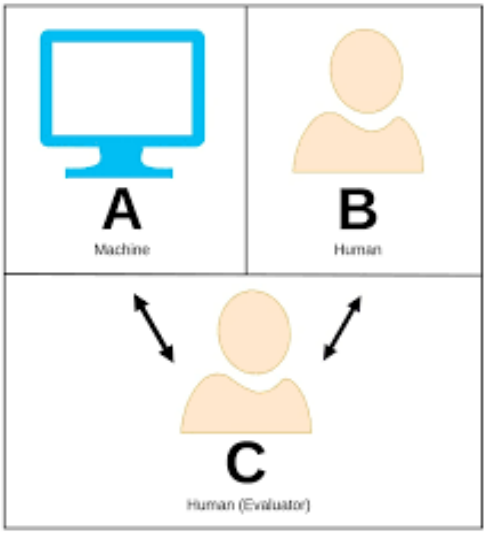
algorithm makes predictions or decisions based on the input data and compares its prediction to the correct answer and adjusts to minimize errors. In unsupervised learning the A.I system is given unlabelled data and tries to find patterns in the data. In semi-supervised learning the system uses a mix of labelled and unlabelled data—usually a small amount of labelled data and a large amount of unlabelled data. In reinforcement learning the A.I system learns by interacting with an environment and receives rewards or penalties based on its action. It aims to learn a strategy that maximizes long-term rewards and no penalties. This helps the A.I system learn from past experiences just like us and it also enables the A.I to adapt. A.I systems also use deep learning which is a subfield of machine learning, it uses neural networks which is a based on the structure and function of the human brain. They consist of layers of interconnected nodes called neurons, where each neuron processes input data and passes the result to the next layer. A typical neural network includes an input layer where data is entered, one or more hidden layers performs the actual computation, and an output layer which produces the final result. Each connection between neurons has a weight, which determines the strength or importance of the input, and during training, the network adjusts these weights to minimize errors in its predictions. It also has an activation function which decides whether a neuron should be activated or not and a bias which allows us to shift the activation function. Neural networks are capable of learning complex relationships and patterns from large datasets, making them powerful for tasks like image and speech recognition, language translation, and even game playing. So, it allows the A.I to handle human-like tasks—such as understanding speech, recognizing faces, analysing images, or generating text—with high accuracy and flexibility and simulate intelligence.

Weak A.I VS strong A.I:

Weak AI or narrow AI refers to artificial intelligence systems that are designed and trained to perform a specific or a limited range of tasks. These systems lack consciousness, self-awareness, or general intelligence. Instead, they simulate intelligent behaviour based on data and different algorithms. Weak AI cannot think or understand in the way we do—it only appears intelligent within the domain it was built for. It excels in solving specific problems but cannot transfer its knowledge to unrelated tasks or reason beyond its training or range. Strong AI or Artificial General Intelligence refers to a theoretical artificial intelligence that possesses the full cognitive abilities of a human being. Unlike weak AI, which is limited to specific tasks, strong AI would be capable of understanding, reasoning, learning, and applying its knowledge across a wide variety of range of fields—just like a person can. It would not just simulate intelligence or follow pre-programmed rules, but instead exhibit self-awareness, consciousness, and true understanding of its actions and decisions. Strong AI does not yet exist and remains a concept; this suggests how AI now only simulates intelligence and is not actually intelligent.

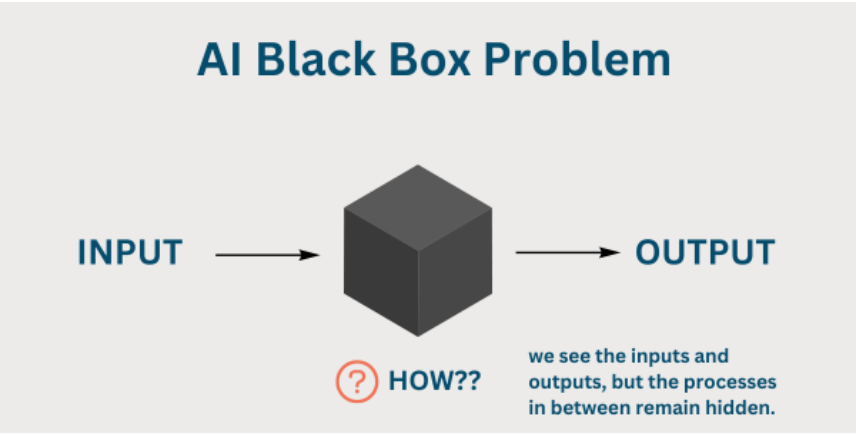
Is AI able to be as intelligent as Humans? :

The Turing Test, created by Alan Turing in 1950, tests a machine or AI's ability to show intelligent behaviour indistinguishable from that of a human. In this test, a human evaluator talks to both a machine and a human without knowing which is which; if the evaluator cannot distinguish the systems machine from the human consistently, then the machinehas passed the test. However, the Turing test is not fully reliable, the Turing Test has several flaws when evaluatingAI. People argue that passing the test does not prove true understanding or consciousness, only that the AI can mimic human responses convincingly. Philosopher John Searle's "Chinese Room Argument" claims that a machine could appear to understand language without genuinely comprehending it—similar to someone following instructions in Chinese without knowing the language. Others argue the test is too focused on deception and human-like communication rather than deeper forms of intelligence or reasoning. Additionally, AI now can pass limited versions of the test, but they do so by analysing patterns in data, not by thinking or understanding. Thus, passing the Turing Test may demonstrate the ability to only simulate intelligence, but it does not confirm true intelligence or understanding.



Explainability and the black box problem:

The black box problem refers to the challenge of understanding how complex AI systems, especially those based on deep learning make decisions, since their internal workings are hidden and remain a mystery, even to the people who built them. Deep learning models rely on neural networks with many layers, each performing many calculations to transform input data into an output. However, as these networks grow in size and complexity, it becomes nearly impossible to trace exactly how a specific decision or prediction was made. The user using the AI system can see the data they input into the system and they can also see the output decided by the AI, but they don't know exactly how the AI reached this decision. This lack of transparency raises many concerns as sometimes understanding why a decision was made is just as important as the decision itself if the AI system is being used in important fields, like healthcare- if an AI system reaches a diagnosis, but it can't explain why it made that decision the doctors and patients are left in the dark. The black box nature of these models highlights a major limitation of these AI systems, that AI does not understand what it does in the human sense—it only simulates intelligence by identifying patterns in data, it cannot explain its reasoning or intentions. This emphasises the idea that current AI only mimics human intelligence without genuine comprehension, relying on statistical correlations rather than true cognitive understanding.



Can AI systems feel emotions? :

Artificial Intelligence cannot truly feel or understand emotions; AI systems can only simulate emotions by identifying patterns in large datasets and generating responses that statistically correlate with emotional cues. AI systems are trained to analyse facial expressions, body language, and even the tone of your voice to identify patterns associated with emotion. This allows to it detect sadness in a person's voice or text and respond with an empathetic text, but this response is not actually driven by empathy or emotional awareness, it is the result of learning from large datasets-not from genuine understanding or emotional intuition. Complex AI models that use sentiment analysis which is used to identify and categorize emotions in pieces of text or affective computing techniqueswhich is used to recognize, simulate and respond to human emotions. They still are limited to only replicating emotion, not experiencing it. So, when AI creates music, art, or conversation with emotional

undertones, it is not creating it in the human sense- its onlycreating outputs based on patterns from training data to mimic human-like behaviour. This emphasises that AI does not possess true understanding or emotional depth.

II. Conclusion:

To sum it up, while artificial intelligence has made massive progress in simulating aspects of human intelligence since its development through techniques like machine learning and deep learning, it still primarily mimics understanding rather than truly replicating it. AI can recognize patterns, make decisions, but it does so without genuine awareness, consciousness, or emotional depth, unlike human intelligence, where we can learn from previous experiences, adapt and understand and handle abstract concepts like emotions. Despite appearing intelligent, current AI systems ultimately replicate or simulate the behaviour of understanding and intelligence without actually experiencing it.

References:

[1]. https://www.britannica.com
[2]. https://online.maryville.edu
[3]. https://botpenguin.com
[4]. http://nexlogica.com
[5]. https://en.wikipedia.org
[6]. https://www.lakesidesoftware.com
[7]. https://imdb.com
https://medium.com
[8]. https://www.lunduniversity.lu.se/
[9]. https://www.rws.com/
[10]. https://www.oracle.com/
[11]. https://theconversation.com/
[12]. https://www.hindustantimes.com/
[13]. https://www.geeksforgeeks.org/
[14]. https://www.psychologytoday.com/
[15]. https://idiotdeveloper.com/