

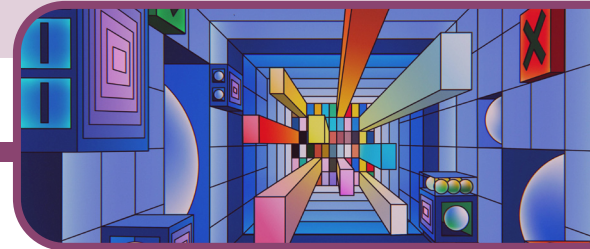
**CONCEPT** Artificial intelligence (AI) or “machine learning” is a wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence.

## BACKGROUND

Mathematician Alan Turing changed history again after cracking the Enigma machine and helping end WWII by pursuing the question, “Can machines think,” in his paper “Computing Machinery and Intelligence.”

At its core, AI is the branch of computer science that aims to answer Turing’s question. The objective of AI research is to simulate human intelligence in machines. AI is an interdisciplinary science with multiple approaches, but advancements in machine learning and deep learning are creating a paradigm shift in virtually every sector of the tech industry.

In their groundbreaking textbook *Artificial Intelligence: A Modern Approach*, authors Stuart Russell and Peter Norvig approach the question by unifying their work around the theme of layered intelligent aspects in machines. According to these authors, AI is “the study of agents that receive percepts from the environment and perform actions.”



## FORMULAS

**REACTIVE MACHINES:** The most simplified robot. They cannot create memories or use information learned to influence future decisions – they can only react to the conditions in front of them. An example is IBM’s Deep Blue, a machine designed to play chess against a human.

**LIMITED MEMORY:** A type of AI that can use information they have learned from experience. Self-driving cars, for example, learn from and share the experiences of other cars around them, monitoring hazards, speed and steering controls.

**THEORY OF MIND:** Enables something to realize the difference in consciousness, thought and perception between one’s self and another. This quality would allow a computer to understand that humans have a mind of their own, including needs, emotions, thinking and beliefs. This is where machines are programmed with judgment-based, decision-making abilities. The theory of mind problem is where our current technology is breaking through.

**SELF-AWARENESS:** Systems that can form representations of themselves. These would be machines that are aware of themselves, know and can communicate their thoughts and emotions. Current technology has not reached this level yet.