

Artificial Intelligence and Machine Learning

Artificial Intelligence

Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind

Artificial Intelligence

- It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.
 - John McCarthy, 2004

Artificial Intelligence

- Alan Turing (father of computer science)
 - Computing Machinery and Intelligence
 - Published in 1950

Artificial Intelligence

- Four potential goals or definitions of AI, which differentiates computer systems on the basis of rationality and thinking vs. acting:
 - Human approach:
 - Systems that think like humans
 - Systems that act like humans
 - Ideal approach:
 - Systems that think rationally
 - Systems that act rationally
- Alan Turing's definition would have fallen under the category of “systems that act like humans.”

Artificial Intelligence

- Types of artificial intelligence—weak AI vs. strong AI
 - Weak AI—also called Narrow AI or Artificial Narrow Intelligence (ANI)
 - AI trained and focused to perform specific tasks
 - Weak AI drives most of the AI that surrounds us today
 - Apple's Siri
 - Amazon's Alexa
 - IBM Watson
 - Microsoft's Cortana
 - Google Assistant
 - Samsung's Bixby
 - Autonomous vehicles

Narrow might be a more accurate descriptor for this type of AI as it is anything but weak

Artificial Intelligence

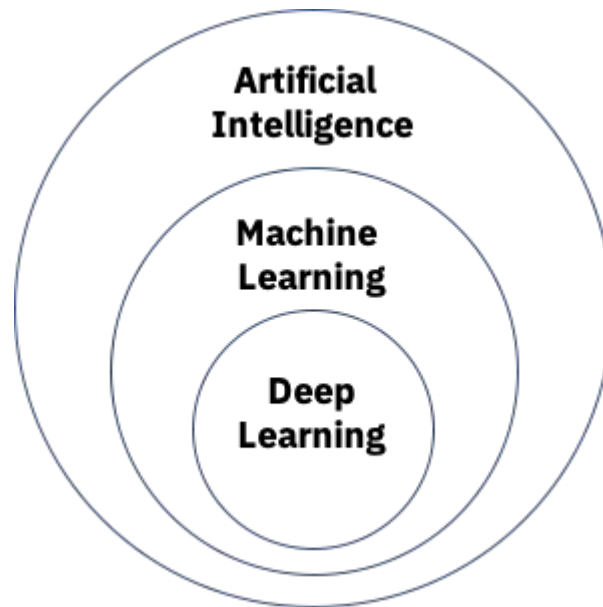
- Strong AI is made up of Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI)
 - Artificial general intelligence (AGI), or general AI, is a theoretical form of AI
 - A machine would have an intelligence equal to humans
 - Self-aware consciousness
 - Ability to solve problems
 - Ability to learn
 - Ability to plan for the future

Artificial Intelligence

- Artificial Super Intelligence (ASI)—also known as superintelligence—would surpass the intelligence and ability of the human brain. While strong AI is still entirely theoretical with no practical examples in use today, that doesn't mean AI researchers aren't also exploring its development. In the meantime, the best examples of ASI might be from science fiction, such as HAL, the superhuman, rogue computer assistant in 2001: A Space Odyssey.

Machine Learning

- Machine learning is a sub-field of AI
- Consists of deep learning vs. machine learning



Machine Learning

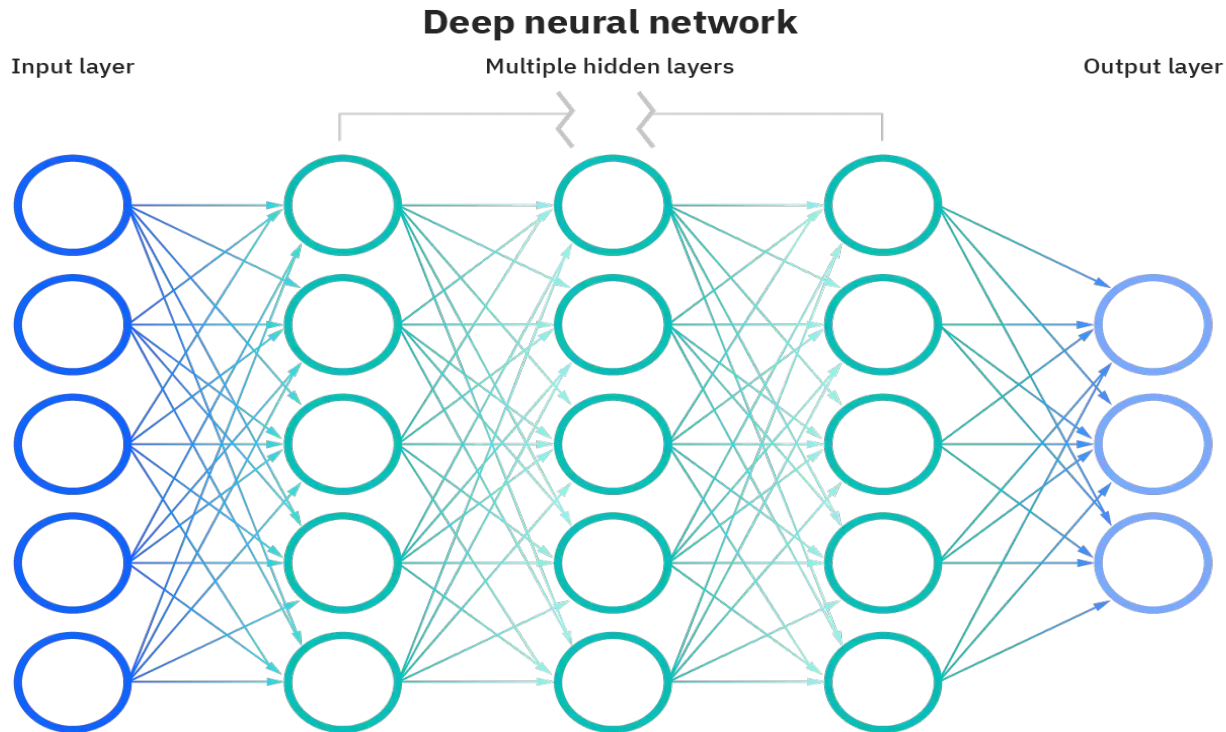
- Classical, or "non-deep", machine learning is more dependent on human intervention to learn
- Human experts determine the hierarchy of features to understand the differences between data inputs, usually requiring more structured data to learn.

Machine Learning

- Deep learning is actually comprised of neural networks
- “Deep” in deep learning refers to a neural network comprised of more than three layers—which would be inclusive of the inputs and the output—can be considered a deep learning algorithm

Machine Learning

- This is generally represented using the following diagram:



Artificial Intelligence

- There are numerous, real-world applications of AI systems today. Below are some of the most common examples:
 - Speech recognition
 - Also known as automatic speech recognition (ASR), computer speech recognition, or speech-to-text
 - Customer service
 - Online virtual agents replacing human agents
 - Computer vision
 - Enables computers and systems to derive meaningful information from digital images, videos and other visual inputs

Artificial Intelligence

- Recommendation engines
 - Using past consumption behavior data, AI algorithms can help to discover data trends that can be used to develop more effective cross-selling strategies. This is used to make relevant add-on recommendations to customers during the checkout process for online retailers.
- Automated stock trading
 - Designed to optimize stock portfolios, AI-driven high-frequency trading platforms make thousands or even millions of trades per day without human intervention.

Artificial Intelligence

- Future applications
 - Medical assistants
 - Psychological evaluations
 - Companion automatons

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