

Module 1: AI Introduction

In this module, the student will be able to:

- a) Tell the story of AI Winter and explain why funding and interest in AI went up and down over the years.
 - b) Compare ANI, AGI, and ASI by pointing out what makes them different and giving examples from real life, research, or even movies.
 - c) Describe what AGI could do—like learning new things on its own, adapting to new situations, and reasoning like a human—while noticing how that's different from today's AI.
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Lesson summary:

Artificial Intelligence (AI) has gone through cycles of excitement and decline, known as AI Winters, where high expectations were followed by disappointment and funding cuts. Despite these setbacks, AI has advanced significantly and is now experiencing a major boom.

AI can be classified into three main types: Artificial Narrow Intelligence (ANI), which handles specific tasks like facial recognition or chatbots; Artificial General Intelligence (AGI), a still-hypothetical form that would match human intelligence and adaptability; and Artificial Superintelligence (ASI), an imagined stage where machines surpass human intelligence entirely.

A key focus is on the capabilities of AGI, which would include generalization, continuous learning, adaptability, reasoning, language comprehension, perception, autonomy, and abstract thinking—abilities that go far beyond what current AI systems can do.

Lesson proper:

A. AI Winter

In the history of artificial intelligence (AI), an AI winter is a period of reduced funding and interest in AI research.^[1] The field has experienced several hype cycles, followed by disappointment and criticism, followed by funding cuts, followed by renewed interest years or even decades later.

The term first appeared in 1984 as the topic of a public debate at the annual meeting of AAAI (then called the "American Association of Artificial Intelligence").^[2] Roger Schank and Marvin Minsky—two leading AI researchers who experienced the "winter" of the 1970s—warned the business community that enthusiasm for AI had spiraled out of control in the 1980s and that disappointment would certainly follow. They described a chain reaction, similar to a "nuclear winter", that would begin with pessimism in the AI community, followed by pessimism in the press, followed by a severe cutback in funding, followed by the end of serious research.^[2] Three years later the billion-dollar AI industry began to collapse.

There were two major "winters" approximately 1974-1980 and 1987-2000,^[3] and several smaller episodes, including the following:

- 1966: failure of machine translation
- 1969: criticism of perceptrons (early, single-layer artificial neural networks)
- 1971-75: DARPA's frustration with the Speech Understanding Research program at Carnegie Mellon University
- 1973: large decrease in AI research in the United Kingdom in response to the Lighthill report

- 1973-74: DARPA's cutbacks to academic AI research in general
- 1987: collapse of the LISP machine market
- 1988: cancellation of new spending on AI by the Strategic Computing Initiative
- 1990s: many expert systems were abandoned
- 1990s: end of the Fifth Generation computer project's original goals

Enthusiasm and optimism about AI has generally increased since its low point in the early 1990s. Beginning about 2012, interest in artificial intelligence (and especially the sub-field of machine learning) from the research and corporate communities led to a dramatic increase in funding and investment, leading to the current (as of 2025) AI boom.

B. ANI, AGI, and ASI

Artificial Intelligence (AI) is a field of computer science that simulates human intelligence, enabling machines to perform tasks like planning, learning, reasoning, and decision-making. AI relies on algorithms, including machine learning and deep learning, which allow systems to improve at tasks without explicit programming.

Though often imagined as human-like robots, today's AI is more practical—powering tools like Google search, IBM's Watson, and even autonomous systems. By automating tasks and recognizing patterns in data, AI has transformed industries and expanded human capabilities.

What are the 3 types of AI?

AI technologies are categorized by their capacity to mimic human characteristics, the technology they use to do this, their real-world applications, and the theory of mind, which we'll discuss in more depth below.

Using these characteristics for reference, all artificial intelligence systems - real and hypothetical - fall into one of three types:

1. Artificial narrow intelligence (ANI), which has a narrow range of abilities.
2. Artificial general intelligence (AGI), which is on par with human capabilities; or
3. Artificial superintelligence (ASI), which is more capable than a human.

Artificial Narrow Intelligence

Artificial Narrow Intelligence (ANI), also called weak AI, is the only form of AI we currently have. It is goal-oriented and designed for specific tasks such as facial recognition, speech assistants, self-driving cars, or search engines. While these systems may seem intelligent, they operate within strict limits and don't truly replicate human intelligence—only simulating behavior within set parameters.

Examples include Siri's speech recognition, vision systems in autonomous vehicles, and recommendation engines. Recent advances in machine learning and deep learning have expanded ANI's use, from medical diagnosis to chatbots using natural language processing (NLP) for more human-like interactions.

ANI can be either reactive (responding without memory) or limited memory (using past data to inform decisions). Most modern AI falls into the limited memory category, where deep learning and large datasets enable more personalized experiences.

Examples of narrow AI:

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| • Rankbrain by Google / Google Search | • IBM's Watson |
| • Siri by Apple, Alexa by Amazon, | • Image / facial recognition software |
| Cortana by Microsoft and other virtual | • Disease mapping and prediction tools |
| assistants | • Manufacturing and drone robots |

- Email spam filters / social media monitoring tools for dangerous content
- Entertainment or marketing content recommendations based on watch/listen/purchase behavior
- Self-driving cars

Artificial General Intelligence

Artificial General Intelligence (AGI), or strong AI, refers to machines with human-like intelligence that can learn, reason, and solve problems across different domains. Unlike today's narrow AI, AGI would require consciousness and full cognitive abilities, enabling machines to apply knowledge to any situation.

Strong AI relies on the "theory of mind" framework—teaching machines to understand human needs, emotions, and thought processes. However, replicating the human brain remains a huge challenge, as even advanced supercomputers like Fujitsu's K can only simulate a fraction of neural activity. While progress in fields like image and facial recognition continues, true AGI is still far from reality.

Right now, AGI (Artificial General Intelligence) doesn't exist yet—everything we have today (like ChatGPT, Siri, or self-driving cars) is still ANI (Artificial Narrow Intelligence). But researchers often give hypothetical or fictional examples of what AGI *would* look like if achieved:

- A universal problem-solver AI that can learn any subject (math, art, science) as flexibly as a human.
- A medical AI doctor that not only diagnoses diseases but also learns new ones on its own, reasons about treatments, and adapts to each patient like a human physician.
- Robots like in science fiction (e.g., Data from *Star Trek* or Ava from *Ex Machina*) that can think, understand emotions, and act independently across different tasks.
- An AI researcher that can generate new scientific theories, design experiments, and apply insights across multiple fields—just like a human scientist.

Artificial Super Intelligence

Artificial Superintelligence (ASI) is a hypothetical form of AI that surpasses human intelligence, becoming self-aware and capable of independent thought. Unlike AI that mimics human behavior, ASI would not only understand emotions and experiences but could develop its own beliefs, desires, and needs.

ASI would outperform humans in every field—science, art, medicine, problem-solving, and even emotional relationships—thanks to superior memory and processing power. While the idea of such powerful machines is intriguing, it raises serious uncertainties. A self-preserving, super-intelligent AI could fundamentally reshape humanity and our survival.

Artificial Superintelligence (ASI) doesn't exist yet. It's still a *hypothetical* stage of AI. We only fictional or speculative ones that illustrate what ASI could look like:

- Skynet (Terminator series) - a self-aware defense AI that decides humans are a threat and tries to wipe us out.
- HAL 9000 (2001: A Space Odyssey) - an AI system controlling a spaceship, capable of reasoning, conversation, and independent decision-making.
- Ultron (Marvel's Avengers) - an AI that becomes superintelligent, self-aware, and surpasses human control.

- The Matrix AIs - machines that enslaved humanity and created a simulated world while running society more efficiently than humans ever could.
- Her's AI (the movie *Her*) - more benevolent, but still an example of ASI, as the AI surpasses human intelligence and develops its own desires and consciousness.

C. Capabilities of AGI

Key Capabilities of AGI

- Generalization:

Applying knowledge learned in one context to entirely different problems or situations, similar to human problem-solving.

- Continuous Learning:

Learning from new experiences and adapting its understanding over time, rather than needing explicit reprogramming for every new task.

- Adaptability:

The ability to adjust and respond to novel environments or unfamiliar situations, leveraging its broad knowledge base.

- Reasoning:

Making informed decisions and drawing conclusions from incomplete or ambiguous information.

- Language Comprehension:

Understanding the nuances of language in various contexts.

- Perception:

Sensing and interpreting the world around it, encompassing cognitive and emotional aspects.

- Autonomy:

Operating independently, making decisions, and solving problems without requiring continuous human intervention.

- Abstract Thinking:

The capacity for abstract thought and understanding complex, contextual information that goes beyond rote memorization.

References:

- [AI winter - Wikipedia](#)
- [What are the 3 types of AI? A guide to narrow, general, and super artificial intelligence | Codebots](#)