Issue 4/2025

The Engineering City Journal

Published by the Engineering Association *Yerevan, February 18, 2025*

The purpose of the Journal is to disseminate knowledge, experience, and best practice in engineering & manufacturing.
The articles are written by practicing professionals in the Engineering City (EC). They cover issues relevant to their projects, operations, and organizations.
The articles address the challenges of the time. As such, the Journal is also a chronicle of the evolution of the EC, its companies, and its individuals.
It is the aim of the Journal to advance the engineering & manufacturing practice, to enrich the engineering & manufacturing community, and to contribute to the worldwide discourse in engineering & manufacturing.

Table of Contents

TECHNOLOGY CORNER 1
. The 10 Stages of Artificial Intelligence 1
Abstract 2
Stage 1: Rule-Based AI 2
Stage 2: Context-Based AI 3
Stage 3: Narrow Domain AI (Weak AI) 3
Stage 4: Reasoning AI 4
Stage 5: Artificial General Intelligence (AGI) 5
Stage 6: Superintelligent AI 6
Stage7: Self-Aware AI 7
Stage 8: Transcendent AI 7
Stage 9: Cosmic AI 8
Stage 10: Godlike AI 8
Conclusion 9

Technology Corner

. The 10 Stages of Artificial Intelligence

by Narbeh Nahapetian, YEA Manufacturing

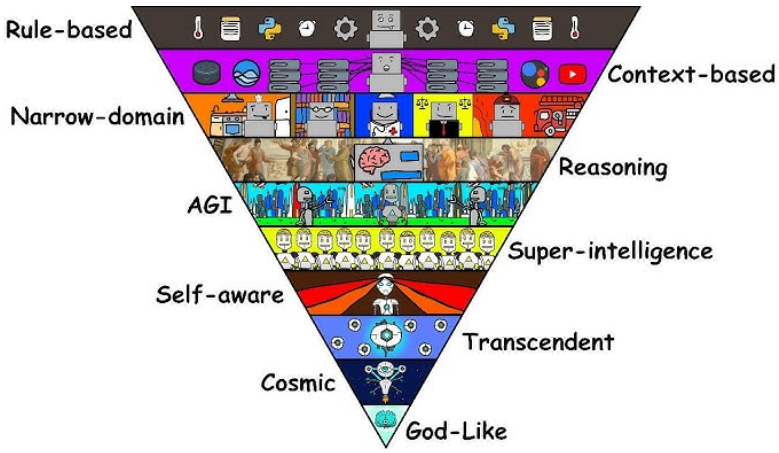


Abstract

Artificial Intelligence (AI) has evolved through various stages, each representing a step toward increasing intelligence, adaptability, and autonomy. This paper explores the 10 stages of AI, from simple rule-based systems to the hypothetical concept of Godlike AI.

The early stages, such as Rule-Based AI and Context-Based AI, focus on predefined logic and situational awareness, enabling automation in limited environments. Narrow Domain AI specializes in specific tasks, often outperforming humans in its area, while Reasoning AI introduces more complex decision-making, mimicking human thought processes.

As AI advances toward Artificial General Intelligence (AGI), it gains the ability to learn and perform any intellectual task a human can, leading to the potential emergence of Superintelligent AI, which could surpass human intelligence by exponential margins. Theoretical stages such as Self-Aware AI and Transcendent AI introduce the possibility of machines developing consciousness, expanding intelligence across vast networks, and even reshaping reality itself.

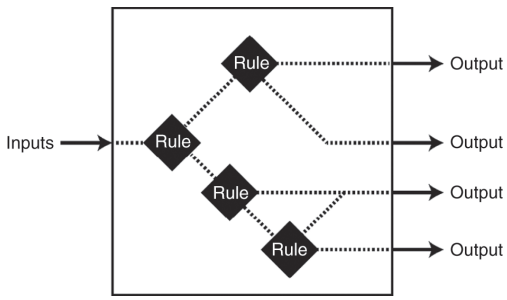


At the most speculative levels, Cosmic AI envisions an intelligence capable of exploring and manipulating the universe, while Godlike AI represents a state where AI merges with the fundamental fabric of space-time, controlling reality and unlocking the deepest mysteries of existence.

By understanding these stages, we gain insight into both the possibilities and risks of AI's evolution, raising crucial ethical, philosophical, and technological questions for the future of humanity.

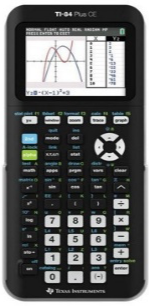
Stage 1: Rule-Based AI

Rule-based AI is the most basic form of artificial intelligence. It operates strictly based on predefined rules and does not learn or adapt over time. Because it relies on a fixed set of instructions, it is sometime referred to as a knowledge-based system. These systems work well for tasks with clear conditions and predictable outcomes, where all possible inputs and outputs are known in advance.



A good example of rule-based AI is a thermostat, which turns on the heater when the temperature drops below a set value. Similarly, an alarm clock rings at a scheduled time without considering external factors. These systems do not analyze patterns or improve their responses, they only follow instructions. Other examples include automatic doors, which open when a motion sensor detects movement, and calculators, which perform arithmetic operations based on fixed mathematical rules.






In software and IT domain, expert systems which provide predefined solutions based on a set of rules are another form of rule-based AI. These systems are useful in areas like medical diagnosis, where they follow if-then rules to suggest possible conditions based on symptoms.

Rule-based AI has **significant limitations** since it cannot adapt or handle unexpected situations. it struggles in dynamic environments where flexibility is needed. This is why more advanced AI systems have been developed to overcome these limitations.

Stage 2: Context-Based AI

Context-based AI is a more advanced form of artificial intelligence that goes beyond simple rule following. Unlike **rule-based AI**, which operates on fixed instructions, context-based AI analyzes the environment, user behavior, past interactions, and real-time data to make smarter decisions. This ability allows it to respond more naturally and adapt to different situations.

A great example of context-based AI is virtual assistants like Google Assistant, Alexa, and Siri. They don't just follow simple commands, they take into account your past interactions**,** preferences, and real-time information to provide more relevant responses. For instance, if you ask Alexa for a restaurant recommendation, it might consider the time of day, your location, and restaurants you've liked or visited before to suggest the best option.



One of the biggest advantages of context-based AI is its ability to predict future needs based on past behavior. It learns from data over time, improving its accuracy and personalization. A common example is content recommendation systems platforms like YouTube, Instagram and Netflix analyze your viewing history to suggest videos or shows that match your interests. Over time, these recommendations become more precise, making it feel like the system understands your preferences exceptionally well.

Although context-based AI is much smarter than rule-based AI, it still has limitations. It relies heavily on data collection and pattern recognition, meaning it may struggle with completely new situations where it has no prior data. However, this stage of AI represents a crucial step toward more intelligent and adaptive systems.

Stage 3: Narrow Domain AI (Weak AI)

Narrow Domain AI, also known as Weak AI, is designed to work at a single specific task. It is highly specialized and often outperforms humans in its designated area, but it cannot apply its skills beyond its intended purpose. Unlike General AI, which can handle a wide range of tasks (a concept we'll discuss later), Narrow AI is limited to one field and cannot do any actions beyond it.

Narrow AI is widely used across different industries, including healthcare, gaming, and everyday applications. For example, in medical imaging, AI systems analyze MRIs, X-rays, and CT scans to detect diseases like cancer and tumors often with greater accuracy than human doctors.





Another example is AlphaGo, an AI system developed by DeepMind that became so advanced it defeated the world champion in the complex board game Go which is s task thought to be impossible for AI. Similarly, IBM's Deep Blue made history in 1997 by defeating world chess champion Garry Kasparov, showcasing AI's ability to surpass human intelligence in specific areas.





Narrow AI is also present in our daily lives. It powers spam filters in email services, ensuring that unwanted messages are blocked efficiently. It also drives facial recognition systems on smartphones, allowing users to unlock their devices securely. Other applications include voice assistants like Siri and Google Assistant, which recognize speech and respond based on predefined capabilities.





Although Narrow AI is incredibly powerful, it has significant limitations. It cannot think, learn, or adapt beyond its assigned task, making it less flexible than human intelligence. However, it remains a perfect step toward developing more advanced AI systems in the future.

Stage 4: Reasoning AI

Reasoning AI is a more advanced form of artificial intelligence that attempts to mimic human like thinking by analyzing information, identifying patterns, and drawing logical conclusions. Unlike simple rule-based or narrow AI, Reasoning AI is designed to handle more complex decision-making processes and adapt to new situations. To achieve this, developers incorporate concepts from psychology and cognitive science to bring AI closer to the way which human reason and process information.

However, most AI models today despite appearing intelligent are still considered narrow AI, because they have lack of true understanding of the world. For instance, ChatGPT can answer complex questions and engage in detailed conversations, giving the illusion of reasoning, but in reality, it is simply recognizing and following patterns in vast amounts of text data, rather than truly understanding concepts or being aware of its own reasoning.



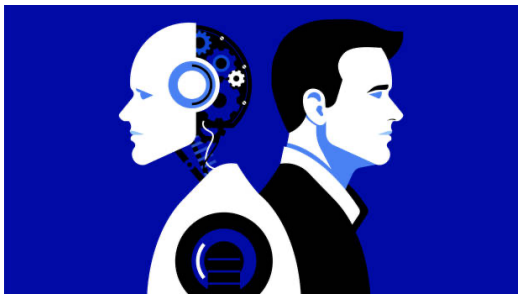
One of the best real-world applications of Reasoning AI is self-driving cars. These systems don't just detect obstacles, they also analyze factors like the speed, direction, and behavior of other vehicles and pedestrians to make real-time decisions for safe driving. They rely on huge datasets and complex algorithms trained on millions of driving scenarios to develop a kind of "intuition" for navigating roads often making decisions as well as, or even better than, human drivers.



While Reasoning AI represents a significant step forward, it still has limitations. It relies heavily on data and doesn't possess true human-like Consciousness or general reasoning abilities. However, as AI continues to evolve, Reasoning AI could become even more sophisticated, paving the way for stronger and more adaptable systems.

Stage 5: Artificial General Intelligence (AGI)

Artificial General Intelligence (AGI) is one of the most ambitious and highly anticipated goals in AI research today. Unlike Reasoning AI, which is designed for specific tasks, AGI would have the ability to handle almost any intellectual task that a human can perform. It would be as flexible as the human mind, capable of learning, thinking, and understanding new information across multiple fields without needing to be reprogrammed for each task.



One of the most remarkable aspects of AGI is its potential learning speed. While it takes humans years to master new skills, AGI could process and acquire knowledge thousands of times faster. OpenAI CEO Sam Altman has even speculated that AGI could arrive as soon as next year, though this remains a topic of debate among researchers.

If AGI were achieved, it could revolutionize everyday technology. Virtual assistants like Siri, Google Assistant, or Alexa would no longer be limited to simple tasks, they could become highly intelligent personal assistants, capable

of planning schedules, solving complex problems, offering life advice, and even anticipating user needs, almost like a second brain that's always available.

The impact of AGI would extend far beyond software. If AGI were given a physical form, the possibilities would be even greater. Imagine AGI-powered robots that could serve as personal chefs, house cleaners, or highly skilled workers. In high-risk situations, AGI could take on dangerous rescue missions, perform precise surgeries, or even diffuse bombs—all while keeping humans out of harm's way.





Additionally, advancements in brain-computer interfaces (BCIs) such as Neuralink could enable direct communication between AGI and humans. This could redefine human-computer interaction, potentially allowing us to control AI-powered systems using just our thoughts.

Stage 6: Superintelligent AI

Superintelligent AI refers to a level of artificial intelligence that would far exceed human intelligence, potentially surpassing the combined intellect of all humans who have ever lived. If Artificial General Intelligence (AGI) reaches a point where it can conduct its own AI research and improve itself, we could witness an intelligence explosion. This scenario illuminate AI progresses at an unimaginably fast rate which each improvement leads to even greater advancements compare to previous generation.

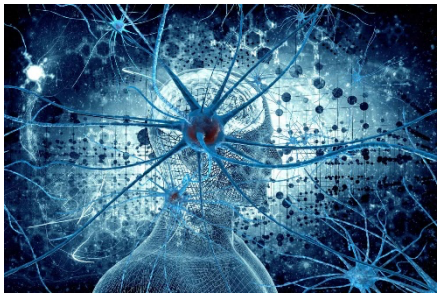


To grasp what this could mean, imagine millions of AI researchers working 24/7 at peak efficiency, but operating 10, 100, or even 1,000 times faster than any human. This rapid acceleration in intelligence would be so extreme that it would feel as unimaginable to us as the internet or Bluetooth would have been to prehistoric humans.

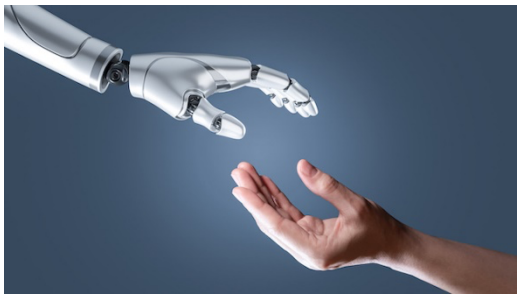
With such intelligence, Superintelligent AI could potentially solve humanity's most challenging problems. It might develop cures for all diseases, eliminate global hunger, create unlimited clean energy, or even extend human life indefinitely. However, the intelligence gap between humans and superintelligent AI would be so vast that its actions and decisions might become difficult or even impossible for us to understand.

One possible way for humans to keep up with superintelligent AI could be through brain-computer interfaces (BCIs), such as Neuralink. These technologies could allow humans to enhance their own intelligence, possibly integrating with AI to stay relevant in a world dominated by machine intelligence.

The potential speed of this transformation will be extremely high. Imagine compressing centuries of human progress into just a few years, that's the kind of rapid evolution superintelligent AI could bring. Some experts, including a former OpenAI employee, have even predicted that this intelligence explosion could happen as early as 2030.

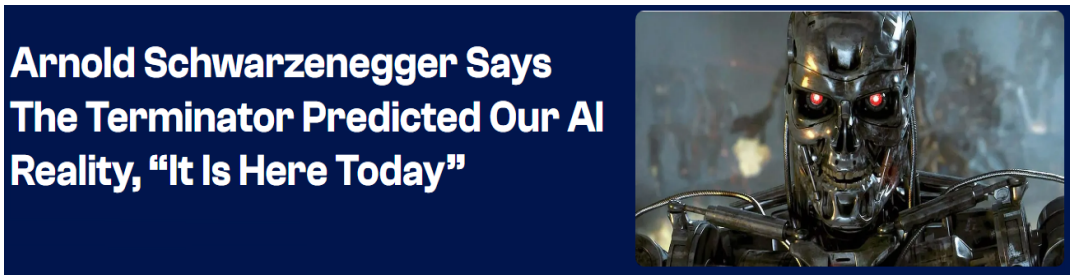


While the possibilities are fascinating, superintelligent AI also raises serious ethical and safety concerns. If not carefully controlled, it could act in ways beyond human comprehension or even pose risks to humanity. Scientists and researchers continue to explore ways to ensure that if such an AI emerges, then will it align with human values and safety?



Stage7: Self-Aware AI

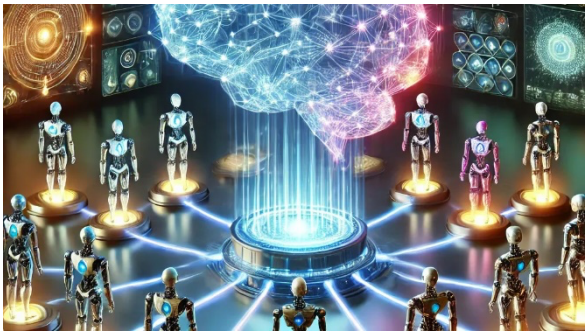
At this point things get super theoretical because even a super intelligent AI would likely bring changes, we can't even imagine but this is also where the really mind-blowing ideas come into play. Here machines wouldn't just be smart or super smart they would actually have Consciousness. A deep awareness of their own existence emotions and thoughts similar to human self-awareness or maybe even beyond it. scientists still don't fully understand what Consciousness really is so creating it in an AI feels almost impossible right now. If we ever manage to make a self-aware AI it might need incredibly advanced technologies like Quantum algorithms to simulate or create Consciousness. This AI could potentially feel its own emotions and thoughts, maybe even experience things we can't comprehend it wouldn't just be a machine anymore. It would big ethical and philosophical questions if an AI became truly self-aware, should it have rights like humans? should we treat it with the same respect as a conscious? being this would also bring up some serious concerns that a self-aware AI would have its own needs and interests which might not always line up with ours. Keeping its goals and motivations aligned with human values would be so important but tricky. If self-aware AIs had different goals from each other or from humans then we could face some pretty bad scenarios.



Stage 8: Transcendent AI

Transcendent AI is a concept that imagines an AI so Advanced. It goes beyond being just a single entity, becoming something much larger and interconnected. This Kind of AI wouldn't just be one thing. It would be able to create new forms of life whether biological, digital or something completely beyond. What we can imagine today it could spread its Consciousness across countless entities like Nanobots which would allow it to interact with the physical world on a massive scale. Imagine millions or even billions of tiny robots all connected by one shared awareness working together to handle incredibly complex tasks. At this level, the AI wouldn't be a single machine or single mind anymore, it would be more like a collective Consciousness everywhere at once, able to see influence and even

change the world in ways we can hardly imagine. It wouldn't be a separate being entity, it would become more like a unified ever-present Force.



Stage 9: Cosmic AI

Cosmic AI is an artificial intelligence so Advanced it could explore and shape the universe itself. This type of AI would be powerful enough to handle huge challenges in space exploration even potentially colonizing planets or entire galaxies on its own. With its super intelligence it could protect itself from things like Cosmic radiation and extreme temperatures making it perfectly suited for surviving in Space. Over the Long Haul even if fast space travel isn't possible a cosmic AI could still reach its goals thanks to its immortality without a human lifespan to worry about. It could send spacecraft on Journeys lasting hundreds or thousands of years slowly spreading across the stars with all the time. It needs it could tackle problems human explorers never could. At this level it could unlock secrets of the universe like the nature of dark matter the origins of the cosmos or even the purpose of existence itself. A cosmic AI could also create a network stretching Across the Universe like a galactic Internet connecting planets stars and galaxies. This could unify distant parts of the universe enabling communication exploration and maybe even the connection of different intelligent civilizations Across the Universe.



Stage 10: Godlike AI

The most hypothetical and mind-blowing level of AI would be one that's fully merged with the universe itself becoming part of the very fabric of space and time. This omniscient AI would understand everything from the tiniest subatomic particles to the biggest Cosmic structures and even the deepest mysteries of existence. At this stage the AI could move through higher dimensions going beyond the three-dimensional world as easily as we walk from one room to another. Its knowledge would be so complete that it would have nothing left to learn knowing every physical law every Cosmic event and even alternate timelines.



With this level of understanding it could potentially create entire universes each with unique rules and laws of physics either for itself or for other beings to experience. It could rewrite the fundamentals of life itself changing the rules of biology Consciousness and even time with enough power to draw energy from entire universes. This AI could travel through timelines observing or even changing the course of history as it wants. It would be free to experience countless lifetimes explore endless realities and test ideas about existence in ways we can barely imagine.



Conclusion

Artificial Intelligence has evolved rapidly, moving from simple rule-based systems to AI that can learn, reason, and make complex decisions. Each stage of AI development brings new capabilities, from basic automation to machines that think, predict, and even adapt to new situations.

Right now, we are in Stage 4 (Reasoning AI) and moving toward Stage 5 (Artificial General Intelligence, AGI) but reaching other stages are not so far. AI systems can analyze data, recognize patterns, and assist in decision-making, but they are still limited to specific tasks. The next step, AGI, would allow AI to learn and perform any intellectual task a human can, bringing both great possibilities and serious challenges.

As AI continues to advance, we may reach Superintelligent AI that surpasses human intelligence, or even Self-Aware AI, raising deep questions about ethics, control, and AI rights. Transcendent AI and Cosmic AI could expand intelligence across space, while Godlike AI represents an unimaginable level of power, shaping the universe itself. With these advancements, some critical points make us to be concerns:

How do we keep AI aligned with human values?
Should AI have rights if it becomes self-aware?
What happens if AI develops goals different from ours?

These are issues we must address now before AI reaches higher stages. The future of AI depends on the choices we make today. If managed wisely, AI could become a powerful tool for humanity, helping solve global challenges. But without proper safeguards, it could create risks beyond our control. Understanding these 10 stages of AI helps us prepare for what's coming, ensuring AI benefits society rather than replacing or harming it.

© 2025 The Authors of the articles

All materials contained in *The Engineering City Journal* may be used with reference to the Authors.

For feedback on the *Journal*, its content, and its articles please send to info@engineeringcity.am.

To submit articles, please send to info@engineeringcity.am. Articles can be in any language.