



ARTIFICIAL INTELLIGENCE (AI) & GENERATIVE AI

What is Artificial Intelligence?

Artificial Intelligence (AI) is a field of science concerned with building machines that can reason, learn, and act in such a way that would normally require human intelligence or that involves data whose scale exceeds what humans can analyze.¹

What is Generative Artificial Intelligence?

AI has been around for decades, but the field has recently garnered significant attention due to advancements in the subfield of *generative AI*, and the subsequent release of generative AI chatbots – like ChatGPT and Bard – for public use.

Until recently, AI was largely used for categorization and pattern recognition to understand and recommend information. Now, recent advancements in the field of AI enable us to use AI as a tool to create novel content.²

Generative Artificial Intelligence (Gen AI), a subset of the field of artificial intelligence, uses AI to create new content, including text, images, music, audio, video, and even computer code.³ Generative AI builds on existing foundation models, which are models trained on massive generalized datasets that provide a starting point to develop specialized applications more quickly and cost-effectively.⁴

AI in Our Daily Lives

Although we are interacting with it in new ways, AI has been a part of our technological landscape for many years – often working behind the scenes to enhance the tools we use in our daily lives.

- *Predictive Text* – Predictive text helps users type faster and more efficiently by suggesting words and correcting spelling mistakes. For example, as you start typing "I want to go to the," the keyboard might predict "store" or "park." Predictive text is a standard feature on smartphones and tablets, in email, word processing, and search engines.
- *Navigation Apps* – GPS navigation uses AI to calculate the fastest route, provide real-time traffic updates, and even suggest nearby places of interest.
- *Filtering & Categorizing* – AI can help filter content such as spam and categorize data like expenses and images to allow users to find what they need quickly.

Figure 1: Apple iPhone Predictive Text

- *Language Translation* – AI-powered translation services can translate text and even spoken language in real time.
- *Virtual Assistants* – Virtual assistants use AI to understand and respond to voice commands or text prompts. They can set reminders, answer questions, control smart home devices, and more.
- *Improved Cybersecurity* – AI is empowering improved cybersecurity services, helping analysts spot an attack faster, then better assess its scale and potential impact.

The History of AI

AI's origins go back decades, and are often traced back to British mathematician and World War II code breaker Alan Turing.⁵



Figure 2: Google Translate

A TIMELINE: BRIEF HISTORY OF AI

- 1950 – Alan Turing published a paper entitled “Computing Machinery and Intelligence.”⁶
- 1956 – John McCarthy is credited for coining the phrase “artificial intelligence” and solidifying the orientation of the field.⁷
- 1966 – Joseph Weizenbaum of MIT designed a computer program, ELIZA, one of the first chatbots, as a tool for emotional connection.⁸
- 1997 – IBM computer Deep Blue beat the world chess champion.
- 2011 – Apple announces Siri – the intelligent assistant. IBM’s Watson beats human contestants on Jeopardy!
- 2017 – Google Research publishes “Attention is All You Need” – paving the way for the emergence of generative AI.⁹
Google announces AI division – Google AI.
- 2022 – OpenAI releases ChatGPT.
- 2023 – Google releases Bard.
Meta releases LLaMA.

Generative AI is simply the newest major development in the field of artificial intelligence that has been powering our lives for years.

¹ “What Is Artificial Intelligence (AI)?,” Google Cloud, accessed September 19, 2023, <https://cloud.google.com/learn/what-is-artificial-intelligence>.

² “What Is Generative AI and What Are Its Applications?,” Google Cloud, accessed September 19, 2023, <https://cloud.google.com/use-cases/generative-ai>.

³ “What Is Generative AI and What Are Its Applications?”

⁴ “What are Foundation Models?,” AWS, accessed January 15, 2024, <https://aws.amazon.com/what-is/foundation-models/>.

⁵ “Overlooked No More: Alan Turing, Condemned Code Breaker and Computer Visionary,” The New York Times, June 5, 2019, sec. Obituaries, <https://www.nytimes.com/2019/06/05/obituaries/alan-turing-overlooked.html>.

⁶ SITNFlash, “The History of Artificial Intelligence,” Science in the News (blog), August 28, 2017, <https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/>.

⁷ James Moor, “The Dartmouth College Artificial Intelligence Conference: The Next Fifty Years,” AI Magazine 27, no. 4 (December 15, 2006): 87–87, <https://doi.org/10.1609/aimag.v27i4.1911>.

⁸ “ELIZA Wins Peabody Award | MIT CSAIL,” accessed September 20, 2023, <https://www.csail.mit.edu/news/eliza-wins-peabody-award>.

⁹ Ashish Vaswani et al., “Attention Is All You Need,” 2017, <https://arxiv.org/pdf/1706.03762.pdf>.