How It Works

Version 25
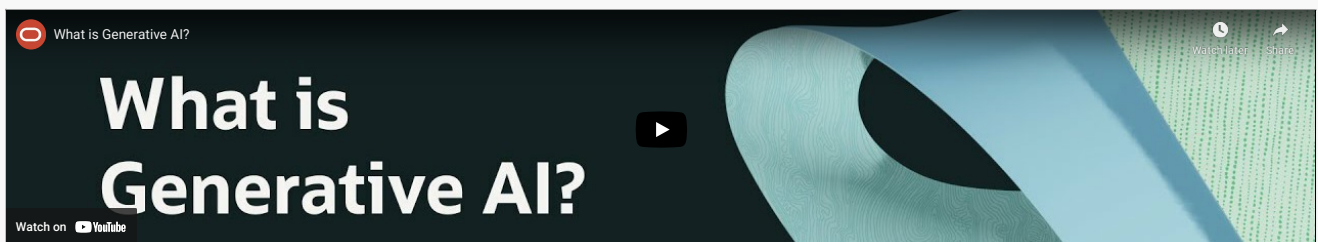
- Traditional AI

- How is Generative AI Different?

- How Does It Work?

Traditional AI

Check out this video on the basics of artificial intelligence (AI):

Check out this video to learn the basics of Generative AI and how it differs from Traditional AI:

How is Generative AI Different?

Although AI technologies have been around for some time, Generative AI is the newest evolution of this technology. Generative AI (GenAI) is an Artificial Intelligence (AI) technology that automatically generates content in response to prompts written in natural language conversational interfaces. Rather than simply curating existing webpages, by drawing on existing content, GenAI actually produces new content. GenAI is trained using data collected from webpages, social media conversations and other online media. It generates its content by statistically analysing the distributions of words, pixels or other elements in the data that it has ingested and identifying and repeating common patterns (for example, typical word order).

How Does It Work?

The specific technologies behind GenAI are part of the family of AI technologies called machine learning (ML) which uses algorithms to enable it to continuously and automatically improve its performance from data. The type of ML which has led to many of the advances in AI that we have seen in recent years, such as the use of AI for facial recognition, is known as artificial neural networks (ANNs), which are inspired by how the human brain works and its synaptic connections between neurons. There are many types of ANNs.

Text generative AI uses a type of ANN known as a general-purpose transformer, and a type of general-purpose transformer called a large language model. This is why AI Text GenAI systems are often referred to as large language models, or LLMs. The type of LLM used by text GenAI is known as a generative pre-trained transformer, or GPT (hence the 'GPT' in 'ChatGPT').

Click the red arrows below to reveal details about GPT functions.

Image GenAI and **music GenAI** typically use a different type of ANN known as generative adversarial networks (GANs) which can also be combined with variational auto encoders. Some image GenAI models like Dall·E and Stable Diffusion use Diffusion Models, a different generative ANN. Take GANs as an example to explain how image GenAI models work: GANs have two parts (two 'adversaries'), the 'generator' and the 'discriminator'. In the case of image GANs, the generator creates a random image in response to a prompt, and the discriminator tries to distinguish between this generated image and real images. The generator then uses the result of the discriminator to adjust its parameters, in order to create another image. The process is repeated, possibly thousands of times, with the generator making more and more realistic images that the discriminator is less and less able to distinguish from real images.

Miao, Fengchun & Holmes, Wayne. Guidance for generative AI in education and research. UNESCO, 2023,
https://unesdoc.unesco.org/ark:/48223/pf0000386693.locale=en

If you have any questions or concerns, please do not hesitate to reach out to us at teaching@senecapolytechnic.ca