



Review on Generative AI

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ABSTRACT

The phrase "generative AI" describes computer methods that may produce seemingly original, meaningful material from training data, such as text, photos, or audio. Currently, this technology is revolutionizing how we work and interact with one another, with examples like Dall-E 2, GPT-4, and Copilot. This article discusses how generative artificial intelligence (AI) works and its advantages, limitations, and potential.

Keywords: data, Dall-E 2, GPT-4, Copilot

1. Introduction

The AI technology, called generative AI, is capable of producing a wide variety of content, including text, images, audio, and synthetic data. The ease with which modern user interfaces can produce high-quality text, images, and movies in seconds has contributed to the recent buzz around generative artificial intelligence. It is worth mentioning that the technology is not completely new. Chatbots first used generative AI in the 1960s. However, generative AI could not convincingly produce real photos, videos, or voices of real people until the invention of generative adversarial networks, or GANs, in 2014. GANs are a type of machine learning algorithm. Transformers and the disruptive language models they enable are two new recent developments that have been crucial to the adoption of generative AI and are discussed in more detail below. The researchers were able to train increasingly large models with transformers, a type of machine learning, without having to classify all the data beforehand. Thus, new models can be trained on trillions of pages of text, giving more comprehensive answers. A new concept known as attention was also made possible by transformers, which allowed models to track relationships between words in pages, chapters, and books instead of individual sentences. The rapid development of so-called large language models (LLM), i.e., models with billions or even trillions of parameters, ushered in a new era where generative AI models can write engaging text, paint realistic pictures, and even produce satisfying jokes. . . Comedies on the fly. Additionally, advances in multimodal AI allow teams to produce content in multiple media such as text, images, and video. Tools like Dall-E, which automatically generate images from text descriptions or captions, are built on this principle.

2. How is generative AI implemented

Generative AI can receive a signal in the form of text, image, video, design, musical notation or any other input that the AI system can understand. Different AI systems then respond to the recommendation by returning fresh content. Content may include essays, problem-solving techniques, and realistic simulations made from images or a human voice. Early iterations of generative AI required data to be passed through an API or other labour-intensive process. Developers must familiarize themselves with special tools and create applications in programming languages such as Python. Generative AI pioneers are currently creating better user interfaces that allow you to express requests in plain English. After the first answer, you can further customize the results by commenting on the content, style, and other aspects you want to describe in the automatically generated text.

3. Generative AI models

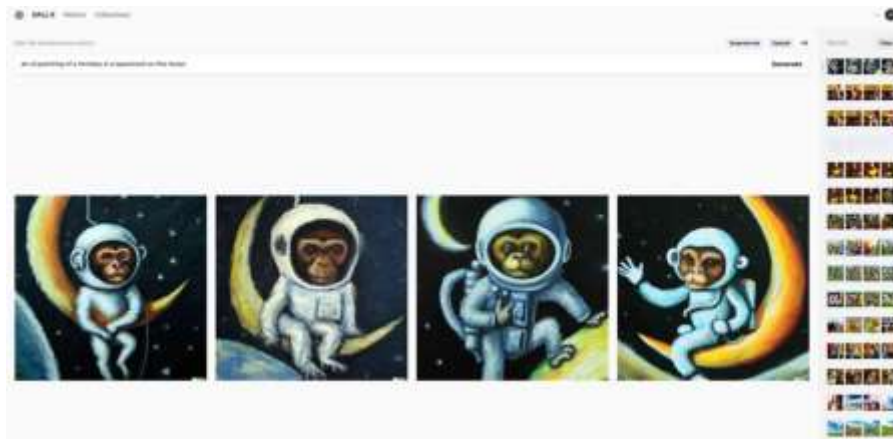
Generative AI models combine multiple AI techniques to represent and analyze content. For example, sentences, parts of speech, entities, and actions are created from raw characters (such as letters, punctuation, and words) using various natural language processing algorithms to generate text. Such transformed characters are then represented as vectors using various encoding techniques. Just as vectors are moved, photos are transformed into other visual elements. One word of caution: these methods can encode bias, racism, fraud, and bloat in the training data. After choosing a representation of the world, programmers use a specific neural network to generate new content in response to a question or prompt. GAN and variational autoencoder (VAE), which are neural networks with encoder and decoder, are methods that can create realistic human faces, artificial data for AI training, or even facsimiles of specific individuals. Recent developments in encoders such as Google Bidirectional Encoders (BERT), OpenAI GPT, and Google Alpha Fold have also led to neural networks capable of encoding language, images, and proteins, as well as creating original materials.

4. Main model of Generative AI

1. Dall – E
2. Chat GPT
3. Bard

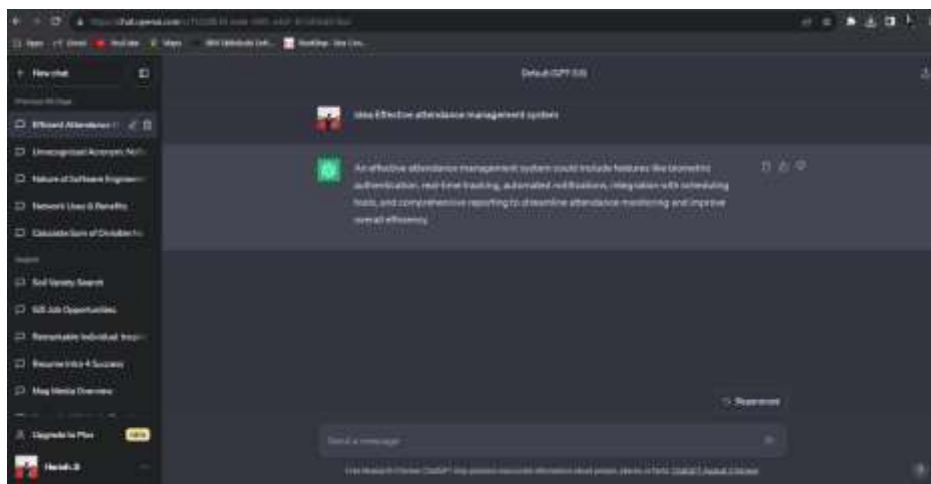
4.1 Dall - E

Dall-E is an example of a multimodal AI application that recognizes relationships between multiple media such as vision, text and audio. Dall-E was trained on a large number of photographs and associated written descriptions. In this case, it combines verbal meaning with visual components. In 2021, it was created using OpenAI's GPT implementation. In 2022, a newer, improved version of the Dall-E was released. It allows users to create images with different styles according to the user's wishes.



4.2 Chat GPT

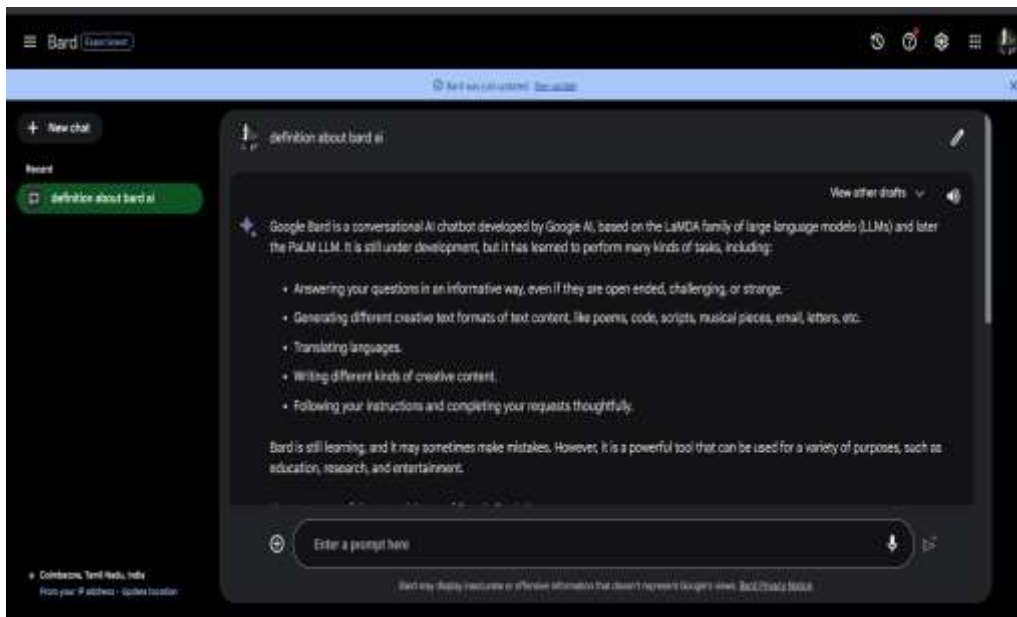
With the implementation of OpenAI GPT-3.5, the AI-based chat that took the world by storm in November 2022, OpenAI provided a way to engage and improve text responses through a chat interface with interactive suggestions. The only way to access previous iterations of GPT was through the API. The release date of GPT-4 was March 14, 2023. ChatGPT simulates a real conversation by including the history of the conversation with the user in its output. After the phenomenal success of the new GPT interface, Microsoft made a big investment in OpenAI and added the GPT version to its Bing search engine.



4.3 Bard

Another early inventor of transformative AI systems for analyzing language, proteins, and other-content was Google. Some of these models have been made available to researchers for free. Nevertheless, it never provided public interfaces for these models. Microsoft's plan to integrate GPT with Bing prompted Google to launch Google Bard, a chat room for the general public based on a scaled-down version of their large LaMDA family of language models. After Bard's quick introduction, Google's stock price dropped significantly after the language model mistakenly claimed that the Webb telescope

was the first to find a planet in another solar system. Microsoft and ChatGPT implementations were also confused in initial tests due to inconsistent behavior and incorrect detections.



5. Benefits of Generative AI

Existing content can be more easily perceived and understood, and new content can be created automatically. Developers are exploring how generative AI can improve current workflows with the goal of completely rewriting workflows to take advantage of the technology. Here are some potential benefits of implementing generative AI:

- Automate the labor-intensive production process.
- Reduce the effort required to respond to emails.
- Increasing responsiveness to certain technical questions.
- Create accurate portraits of people.
- Create a logical story from complex facts.
- To simplify the production of material in a certain style benefit of Generative AI

6. Limitations of Generative AI

The many shortcomings of generative AI are clearly illustrated by early implementations. The precise methods used to achieve different use cases are the cause of some of the difficulties associated with generative AI. For example, a summary of a complex topic is easier to read than an explanation with multiple sources supporting the main idea. However, the readability of the summary weakens the user's ability to verify the source of the information.

Here are some limitations to consider when building or using a generative AI application.

- It is not always written where the content comes from.
- Identifying bias from primary sources can be difficult
- Detecting fake information is more difficult if the content sounds realistic
- Understanding how to adapt to new circumstances can be difficult.
- The results may hide bias, prejudice and xenophobia

7. Future of Generative AI

The extraordinary scope and simplicity of ChatGPT showed great potential for the adoption of generative AI. Undoubtedly, it also showed some of the challenges involved in the safe and responsible deployment of this technology. However, these early adoption challenges have prompted research into more effective techniques for recognizing AI-generated text, photos, and videos. To produce more reliable AI, companies and society are also developing

better means of tracking the source of information. With the development of AI development platforms, future research, and development on stronger AI functions related to text, photos, videos, 3D content, 3D content, pharmaceuticals, supply chains, logistics, and business processes will also accelerate. While these new standalone tools are great, generative AI will have its greatest impact when these capabilities are integrated into existing solutions.

8. Conclusion

In conclusion, generative AI is a powerful technology capable of completely transforming several sectors. The future of content production and consumption can be changed by generative artificial intelligence, which can produce new material based on already existing data.

References

- 1) <https://ai.google/discover/generativeai/>
- 2) <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai>
- 3) https://www.techrxiv.org/articles/preprint/A_Review_of_Generative_AI_from_Historical_Perspectives/22097942
- 4) <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai>