

TechREPORT

Generative AI

APRIL 2023

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1.

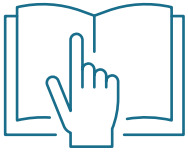
Executive Summary

Generative AI is an emerging sub-domain of AI that is revolutionizing the use of technology as we know it. Its ability to generate new and unique content has great potential as a knowledge assistant, although it is still in the exploration phase.

Instead of simply classifying, analyzing, or processing existing data, Generative AI attempts to generate new data that resembles the original and is indistinguishable from that created by humans. To achieve this, Generative AI models use deep learning techniques, neural networks, and other advanced AI techniques to develop models that can learn and replicate patterns in large datasets.

What is interesting about the technology behind Generative AI is that we cannot predict the content it generates. It is entirely original and unique content, with a reasoning that is becoming increasingly close to that of a human. Despite these technological advances and their usefulness in our day-to-day lives, it is crucial to consider them as knowledge assistants. It assists us in creating content, but it cannot make decisions for us, nor should we base our decisions solely on what engines generate, like ChatGPT. It is also relevant to consider that not all generated content is correct; the technology can sometimes provide inadequate responses.

The IDB Technology Department, the Emerging Technology Lab, and the Ethics Department have analyzed both the use and risks of this technology and trends in the Latin America and Caribbean ecosystem.



2.

Definition

Generative AI is a type of Artificial Intelligence (AI) that uses machine learning (ML) to produce new content from an extensive training dataset. The format of the result can be text, images, video, code, 3D renderings, or audio. Nowadays, when we interact with a search engine like Google or use a traditional question-answer chatbot, we request existing information. In contrast, when using generative AI-based tools, the model uses existing data to generate original content, such as songs, poems, articles, etc.

Two flagship models that have put generative AI in the general public conversation are ChatGPT and DALL-E. ChatGPT is a chatbot that generates original text, and DALL-E can create unique images from a text input or "prompt." According to Gartner, by 2025, generative AI will produce 10% of the data, compared to less than 1% currently ¹.

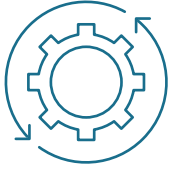
The organization behind these two models is OpenAI, a research and development company based in San Francisco, California. Due to the high popularity of ChatGPT, the company has already launched a paid subscription pilot called ChatGPT+ 2 and closed a deal with Microsoft to license and commercialize the model within its suite of corporate products.

Other models similar to OpenAI's GPT include:

- Bloom: a text generation model in 46 languages and 13 programming languages with 176 trillion parameters, created by the BigScience project, a collective of more than 1,000 researchers from 60 countries.
- LLaMA, a "smaller" text generation model with between 7 and 65 trillion parameters, from MetaAI that requires less computational power than larger models.

¹ https://www.technova-cpi.org/images/Documenti-pdf/Top%20Strategic%20Technology%20Trends%20for%202022_Gartner_31gen2022.pdf

² <https://openai.com/blog/chatgpt-plus>



3.

Applications

Generative AI has many applications. The content created can be different depending on the platform used and the goals to obtain:

- a. Image generation:** the model can generate a collection of original images based on a detailed description such as environment, subject, style, or location. Some available tools include OpenAI's DALL-E³ and Stable Diffusion⁴. In another case of image generation, the Generative Adversarial Networks (GANs) method can take a semantic image and convert it into a high-resolution image⁵. This application can be useful in the healthcare sector for patient diagnosis, and for security and surveillance purposes.

- b. Text generation:** the model can generate original text based on a description, for example, an article, an essay, a script, a summary of a specific topic, etc. One of the most well-known examples is ChatGPT, where the model can hold a conversation and generate relevant content based on the search context. However, these models still need to be developed and present multiple challenges to create reliable information to be used without prior verification.

- c. Audio generation:** the model can generate original audio based on text or even from another piece of audio. For example, it could create audio training based on notes for the education sector and generate narration using the same voice as the reference audio. Lastly, the model can generate musical pieces based on an extensive data set. However, this application will have to overcome the copyright obstacle to use other musical artists' training data.

³ Source: <https://openai.com/product/dall-e-2>

⁴ <https://stability.ai/blog/stable-diffusion-v2-release>

⁵ <https://research.aimultiple.com/generative-ai-applications/>

- d. **Video generation:** the model can detect time and space in videos to generate a new sequence. This model could be used to identify anomalies in security and surveillance videos as it can identify the probability of new sequences. Meta's Make-A-Video ⁶ and Runway Research's Gen-1 ⁷ are publicly available applications showing technological advances.

- e. **Synthetic data generation:** the model can generate a type of data called "synthetic," which is artificially generated and not derived from direct observations in the real world. This application is particularly interesting as it preserves the privacy of the data owners used to train the model. This application could be used in the healthcare sector to generate and analyze data for disease research while preserving patient privacy.

- f. **3D modeling generation:** the model can generate 3D versions based on 2D images or text. With this method, a "digital twin" can be built in the metaverse as part of the creation of virtual worlds. Some applications could include training for the construction, manufacturing, or healthcare sectors and city and physical product design.



AI generated image using the prompt:
"People in Latin America and the Caribbean using virtual reality technology"

⁶ <https://makeavideo.studio>

⁷ <https://research.runwayml.com/gen1>



AI generated image using the prompt:
"A woman assembling a robot digital modern art"

4.

Generative AI in The Media

1.

A legal case was solved in Colombia with the help of ChatGPT – Deutsche Welle, Feb 2023

[Read the full article.](#)

3.

The use of Generative AI for the music industry – TIME, Feb 2020

[Read the full article.](#)

5.

Italy bans the use of ChatGPT over privacy concerns – CNN Business, Mar 2023

[Read the full article.](#)

7.

Microsoft to Invest \$10 Billion in OpenAI, the Creator of ChatGPT – The New York Times, Jan 2023

[Read the full article.](#)

2.

Five Reasons to Use Generative AI to Automate Building Designs – Spiceworks, April 2023

[Read the full article.](#)

4.

Gartner explores AI trends and future use in businesses – Gartner, Jan 2023

[Read the full article.](#)

6.

ChatGPT: Mayor starts legal bid over false bribery claim – BBC News, April 2023

[Read the full article.](#)

8.

Notion releases Alpha of generative AI Copywriting Tool – Forbes, Nov 2022

[Read the full article.](#)

AI generated image using the prompt:
 "Kids playing soccer in Brazil with a robot"



5.

Generative AI at The IDB:

The IDB has encouraged and supported projects across the Region. The following are featured projects that showcase different use cases. For a complete list, please contact the [TechLab](#) or visit our [Observatory of Emerging Technology](#) and Innovation.

Description	Link	Team	Type
ChatGPT: la herramienta del momento habla por si misma.	Read more	KIC/DCC	External publication
ChatGPT is taking over the world, but is it safe to use?	Read more	IPP/ITE	Internal publication
ChatGPT and education: opportunity, threat, or challenge?	Read more	EDU/EDU	External publication
ChatGPT and the future of work	Read more	LMK/LMK	External publication

Description	Link	Team	Type
<p>InfraGenius: A content generator tool for INE projects that uses the GPT3.5 model to generate the required text</p>	<p>Watch demo video</p>	<p>INE/INE</p>	<p>Prototype</p>
<p>TechLab used Generative AI tools to choose its image. Through the use of the Midjourney tool, they designed the image of their lab</p>	<p>TechLab's new image</p>	<p>ITE/TechLab</p>	<p>Project</p>
<p>MapaInversiones: ICS is exploring the development of a PoC to test the performance of a bot that can consult the platform's databases and respond with segments of information, and that synthesize or summarize texts based both on the data of investment projects as well as associated documents</p>	<p>Read more</p>	<p>IFD/ICS</p>	<p>PoC</p>
<p>The power of ChatGPT to develop innovative public policies</p>	<p>Watch video</p>	<p>INE/INE</p>	<p>Event</p>



6.

Requirements and Observations on The Use of Generative AI

It is always important to have a human supervising the content generated by a tool like ChatGPT, known as "human in the loop." Generative AI can assist in content generation, but a human must always be involved in generating the prompt and reviewing the content. Therefore, it is essential to indicate in the prompt that if ChatGPT does not know the answer, it should say, "I don't know." If not, the tool will generate a new response that may be unreliable.

One of the aspects that can determine the quality of the result, in addition to the quality of the model, is the design of prompts to use. This is where we can see humans' role in technology interaction. The popularity of models like ChatGPT and DALL-E has inspired experts in creative industries to create and share collections of prompts for generating content relevant to their industries. Training content is also being developed, such as "The Art of ChatGPT Prompting: A Guide to Crafting Clear and Effective Prompts⁸".

In this sense, the TechLab team describes that the big difference in ChatGPT is that the model uses context to generate content. So, starting with a prompt, ChatGPT can follow a conversation and respond according to the context.

Finally, as a reference, the Association for the Advancement of Artificial Intelligence (AAAI) establishes that generative models do not meet the criteria for articles published by AAAI and cannot be used as a citable reference. Attribution of authorship carries responsibility for the work, which cannot be effectively applied to AI systems.⁹

⁸ <https://fka.gumroad.com/l/art-of-chatgpt-prompting?a=705657043>

⁹ <https://aaai.org/about-aaai/ethics-and-diversity/>



7.

Ethical Considerations

The ethical and responsible use of tools such as ChatGPT must be treated with the utmost attention. As employees of the IDB Group, we must be aware of our expected behavior under the Code of Ethics and Professional Conduct (the "Code"). Firstly, we must consider that under section 16.3 of the Code, we must protect confidential information not available to the public and only share it outside the Bank with prior authorization. Furthermore, since AI models are trained with data, including what users share, and such data becomes part of the AI models' database, we must be careful about what information we share with these AI models.

Secondly, we must be aware of the risks related to the use of the intellectual property. The ChatGPT algorithm has been trained through a large volume of information. We must bear in mind that in this tool and others that may emerge in the future, the data used to train the model was not impartial or that such information is protected by intellectual property. Under section 17.2 of the Code, we must respect and responsibly use others' intellectual property, which means recognizing the work of others and, when appropriate, obtaining the necessary permissions to avoid plagiarism or copyright infringement, which can be considered as Misconduct under the Code. It is also possible that the model takes information and misinterprets it, thus resulting in an answer that promotes discrimination against, for example, a minority.

Therefore, it is crucial to be aware that technology must be considered its possible errors and exercise caution when relying on it. Another consideration is that AI models are trained with data, and it is important to evaluate the reliability and trustworthiness of the data sources, in addition to noting that the model was trained with information up to the year 2021, so it does not have updated information as of today. Using unreliable data sources can lead the model to generate misinformation or make decisions that are not in line with ethical or legal considerations. In this regard, you can ask ChatGPT itself what data it used, and it returns the links to the sources, which facilitates verifying the information. However, if the source is not verified, it is best to disregard the provided data. Additionally, the training only goes up to 2021, so there will be outdated information. Moreover, many of these sources may no longer be active.

OpenAI was created in 2015 as a nonprofit innovation laboratory with the mission of creating inclusive technology for all sectors of society. However, in 2019, it transitioned to a for-profit structure and recently accepted a \$10 billion investment from Microsoft to license and commercialize part of the technology being developed. Starting in 2015 with the mission of preventing large technology companies from obtaining a monopoly on the benefits of AI, the change in structure and Microsoft's leadership in commercializing the advances achieved is worrying. However, the development of this technology indeed requires a considerable investment that only some companies can make, and the working model with Microsoft is based on licensing the technology, which allows OpenAI to retain control of the technology.



AI generated image using the prompt:
"Latin America and the Caribbean, future, development, technology, people"



8.

Privacy and Security

The security division of the IDB technology department establishes as the first consideration to consider is data classification when using Generative AI platforms since AI experts can review conversations to improve systems. This implies that everything that enters the system will be used to "train" the model and could eventually become part of a response/content provided to other users. During the free experimentation phase of ChatGPT, there are no options to establish a contractual agreement with OpenAI that ensures the protection and confidentiality of the bank's information or its privileges and immunities.

In this sense, after the interview with Microsoft, they ensured that Azure would never use the data inserted in the platform to retrain the platform or for other purposes. Microsoft argues that OpenAI was born in a research context, but the Azure model is a business solution with private connection points and data confidentiality.

On the other hand, it is important to highlight that, like all new systems developed for the internet, new methods of scams and deception to users are emerging, which, under the pretext of using Generative AI platforms, install malicious software with the aim of stealing confidential information and/or defrauding. For this reason, it is recommended to take usual precautions when acquiring, installing, or using new Generative AI applications.



9.

Potential Uses of Generative AI at IDB

After an interview with the Open AI team at Microsoft and asking them about future use cases in an organization or company, they express the following:

- a. Synthesis: extracting information from documents and summarizing content.
- b. Content generation: generating mass emails, writing job offers, generating text for policy draft documents, and legal contract drafts, among others.
- c. Semantic searches: combining with prioritization and extraction capabilities, ChatGPT can help in information analysis such as analyzing price risk, and database classification, among others.
- d. Computer code generation (Java, etc.)



You can read more about Microsoft's tool called Copilot [here](#).



10.

Considerations for The Use in The IDB:

a. Tool training:

The ability to create data that adapts to the Bank's specific needs and objectives is one of this technology's key features.

- The system must have a large amount of data to train on. One of the challenges of content generation is ensuring that the appropriate data is available to learn and improve. This involves creating a dataset that includes examples and experiences that are relevant to the specific tasks and objectives. For example, if the tool is being trained to assist with customer service inquiries, the dataset should include a wide range of examples of customer service inquiries and responses.
- Training Generative AI tools to generate relevant and appropriate training data is a complex process that requires a deep understanding of the specific tasks and objectives of the tool, as well as experience in creating a diverse and varied dataset that covers a wide range of scenarios and situations.
- This data must be relevant to the tool's domain and must include a variety of input cues and corresponding responses.
- This training data can be created manually by human experts or can be collected from existing conversations.

Once the training data has been collected, the tool can be trained and adjusted through a process called reinforcement learning. This involves providing the system with information about the quality of its responses and adjusting its algorithms accordingly. Through this process, the tool will develop an understanding of the language and content of the training data and will be able to generate responses

¹² <https://consensys.net/knowledge-base/a-blockchain-glossary-for-beginners/>

that are relevant and appropriate for the input cues.

It is important to understand that the data required to implement this tool is an effort that must be supported by different teams between the IT Department (ITE) and the business units of the IDB. Although the EDW has most of the information produced by the bank, that information is not yet grouped by domains and datasets that help train the models.

b. Use in the IDB:

The bank uses Azure as one of its main public clouds that provides different services. As of the date of this report, March 2023, ChatGPT and its different models are only available as a preview version on the Microsoft Azure Open AI service.

Currently, in preview mode, access to the Azure OpenAI service is restricted to customers and partners managed by Microsoft. The internal use bank account must be requested to use it, as registration is required.

11.

Report Collaborators:

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People Interviewed for This Report:

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Taisha Ferguson, Sr Cloud Solution Architect at Microsoft

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