



Artificial General Intelligence (AGI) Unleashing The Power of Artificial General Intelligence: OpenAI's Pursuit of Generative AI

Bahman Zohuri^{1*} and Farhang Mossavar Rahmani²

¹Adjunct Professor, Golden Gate University, Ageno School of Business, San Francisco, California, USA

²Professor of Finance School of Business and Economics National University, San Diego, California, USA

*Corresponding author: Bahman Zohuri, Adjunct Professor, Golden Gate University, Ageno School of Business, San Francisco, California, USA

Received: 📅 September 25, 2023

Published: 📅 October 13, 2023

Abstract

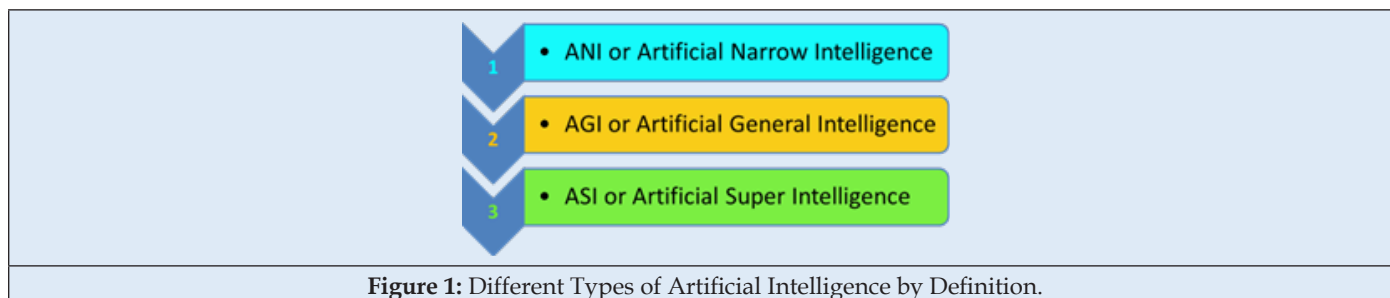
Artificial General Intelligence (AGI) represents a significant leap in artificial intelligence, aiming to create machines capable of human-like cognition and adaptability. This abstract provides a concise overview of AGI and its real-time interaction with humans. AGI, unlike narrow AI, possesses the ability to excel across diverse domains, making it a versatile and intelligent companion for various tasks. Its potential to engage in natural language conversations, solve complex problems, and exhibit creative thinking has vast implications for healthcare, customer service, and autonomous systems industries. Real-time interactions with AGI promise improved efficiency, decision-making, and problem-solving in numerous applications. However, ethical considerations, privacy concerns, and security issues must be addressed as AGI becomes integral to our daily lives. This article highlights the transformative potential of AGI and underscores the importance of responsible development and integration to ensure its beneficial impact on society.

Keywords: Artificial General Intelligence (AGI); Real-time Interaction; Human-AI Interaction; Versatility; Natural Language Conversations; Creative Thinking; Ethical Considerations; Privacy Concerns; Security Issues; Responsible Development.

Introduction

Artificial Intelligence (AI) is broadly defined as the simulation of human intelligence in computer systems. AI systems learn from data using machine learning algorithms. It encompasses the development of algorithms, software, and hardware that enable machines to perform tasks that typically require human intelligence. These tasks include problem-solving, learning from experience, understanding natural language, recognizing patterns, making decisions, and exhibiting creativity. AI is being utilized

in various fields, such as healthcare, finance, transportation, marketing, and many others. It has the potential to revolutionize many industries and has a wide range of applications, from virtual personal assistants to self-driving cars. It also can enhance productivity, improve decision-making, automate repetitive tasks, and revolutionize industries. Artificial Intelligence (AI) can generally be categorized into Three broad types as illustrated in Figure 1 and brief description of each three AI types: [1].



ANI (Artificial Narrow Intelligence)

ANI, also known as “Weak” AI, is the first step to designing and applying Artificial Intelligence to our world! On the other hand, what we see today as the result of development by different companies worldwide is ANI. Every sort of Machine Intelligence that surrounds us today is Narrow AI. Google Assistant, Google Translator, Siri, and Factory Robots are all Narrow or weak AI. On the other hand, this type of AI is designed and trained for a specific task or a narrow range of tasks. It excels in performing these predefined tasks but can only generalize within its training. Examples of Narrow AI include virtual assistants, like Siri and Alexa, recommendation algorithms, and image recognition systems. Bear in mind that the scope of ANI is to perform only “Single Tasks” on a “Specific Data Set,” and this can be done offline or on a “Real-Time” or “Near-Real-Time” basis. Moreover, these systems do not perform outside of the single task they are designed to perform, which is why they are called Narrow AI. With that definition in mind; ANI can Analyze big data on weather maps for specifying weather patterns and coming up with predictions, creating a political report, creating a real time trend report based on stock patterns etc.

AGI (Artificial General Intelligence)

AGI, also known as “Strong” AI, is the “Second Phase” to design and apply Artificial Intelligence to our world. The best example of Artificial General Intelligence or “AGI” is what we see in Intelligent Robots who can “interact” with us and learn. “Sophia,” developed by Hansen Robotics, is the best example of AGI; you can see how far we are from human-like intelligent robots! Furthermore, AGI represents a higher level of AI, striving to create machines with human-like cognitive abilities. Unlike Narrow AI, AGI is not limited to specific tasks but can adapt and excel in various domains, demonstrating versatility and learning capabilities similar to human intelligence. AGI remains a goal for the future and is still in the realm of theoretical and research-based development. One must remember that when AGIs are fully developed, they can successfully perform any intellectual task that a human can. The best example of a developed AGI robot is the (iRobot Movie). However, Unlike ANI, Artificial General Intelligence allows human interaction with “Conscious Machines” that are “Self-Aware,” “Emotional,” and “Sentient”. Such machines are constantly learning and evolving way faster than us. However, before machines can achieve true human-like intelligence, they will need to understand “Consciousness”. Something that we don’t understand yet! By the

way this type of AI is the subject and focus of this article and it entanglement with Generative AI driven Open AI such as ChatGPT and others in present AI industry activities around the world with their advanced AI technologies.

ASI (Artificial Super Intelligence)

Artificial superintelligence (ASI) is the Ultimate level of Artificial Intelligence beyond the human brain’s capabilities! This is the “Third and last phase” of designing and applying Artificial Intelligence to our world. Oxford philosopher Nick Bostrom defines Super Intelligence as “any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest.” Furthermore, by definition, Artificial superintelligence (ASI) is a theoretical concept within the artificial intelligence (AI) field representing the highest level of machine intelligence. ASI is envisioned as an AI system that surpasses human intelligence and the collective intelligence of all humans combined. Unlike Artificial General Intelligence (AGI), which aims to replicate human-like cognitive abilities, ASI would possess unprecedented computational power, problem-solving capacity, and creative thinking. It philosophical, and existential questions about its impact on society and humanity as a whole. Currently, ASI remains a theoretical concept, and its realization, if achievable, is a topic of ongoing debate and speculation within the AI community. Understanding consciousness is a complex philosophical and scientific challenge. It involves deciphering the nature of self-awareness, subjective experiences, emotions, and the ability to perceive the world around us. To imbue machines with accurate human-like intelligence, we must first unravel the intricate mysteries of consciousness—a task that continues to elude us. However, as a reminder to readers pursuing the subject of Artificial Intelligence systems, the AI systems can be depicted in Figure 2 conceptually presented by these authors as schematic of Artificial Intelligence Levels. could autonomously improve its capabilities, potentially leading to rapid and exponential advancements in knowledge and technology. ASI is a subject of both fascination and concern, as its development and control raise profound ethical, these authors also recommend always call AI not as stand-alone terminology, but try utilize it as AI Systems that includes both Machine Learning (ML) and Deep Learning (DL) accordingly. [2] Going forward with topic of this article and before we delving to further exploration of subject, we need to describe few other topics by presenting them here, holistically as background knowledge. In summary, In the quest for

AGI, researchers are not only striving to replicate human cognitive abilities but also to unlock the secrets of consciousness. While we may not fully comprehend consciousness today, it remains a

tantalizing frontier in the journey toward creating machines that can truly think, learn, and evolve like humans.

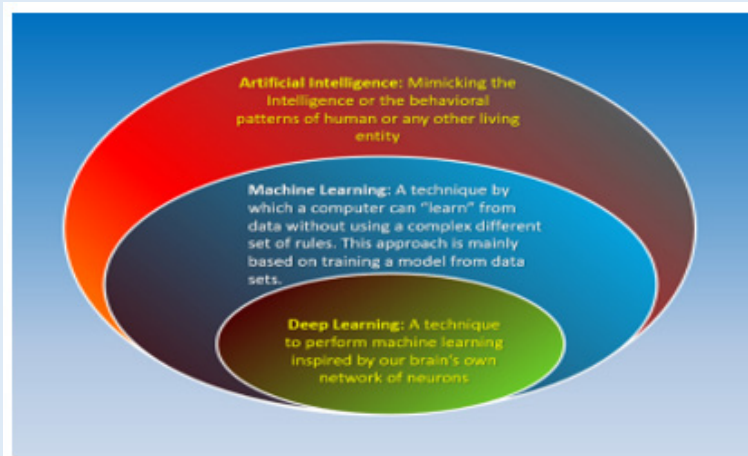


Figure 2: Schematic of Artificial Intelligence Levels.

Generative AI and What Is It?

Generative Artificial Intelligence, or for short, Generative AI, refers to a subset of artificial intelligence techniques and models designed to generate new, original content or data that resembles human-created content. These models are capable of producing text, images, audio, or other types of media autonomously. Generative AI relies on deep learning algorithms, particularly neural networks like Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), to generate content by learning patterns and structures from large datasets. One of the notable characteristics of generative AI is its ability to create novel content that was not explicitly programmed or provided as input. This makes it valuable in various applications, such as natural language generation, image synthesis, artistic creativity, and even generating realistic human-like chat responses like the one that can be seen now. Generative AI has found applications in art, content creation, healthcare, and more, showcasing its versatility and potential to augment human creativity and productivity. In order to create new, realistic artifacts (at scale) that accurately represent the features of the training data while avoiding duplication, generative AI can learn from preexisting artifacts. It can produce a wide range of original content, including text, speech, video, music, photos, software code, and product designs. See figure presented as Figure 1 and produced by gartner.com. Many of the techniques used in generative AI are still being developed. The first is AI foundation models, which require further fine-tuning and are trained on many unlabeled data that may be utilized for various applications. These trained models are prediction algorithms, but they need much mathematical computation and processing capacity to produce. Nowadays, generative AI is mainly used to generate information in response

to natural language queries; it does not need to know how to write code. However, there are many enterprise use cases for generative AI, including material science and drug and chip design advances.

Furthermore, Generative Artificial Intelligence is an exciting new opportunity for business. Thus, there is a huge buzz of excitement around this technology as an Open AI approach, and it is an impressive leap forward in AI technology, offering exciting new and innovative ways to engage with users and generate content. It can open up entirely new avenues for improving the user experience and creating business advantages. It promises to change how many people work, from how software is developed to how text is written and summarized. See Figure 2 where the top three emerging technologies leaders believe will have the biggest impact on their business over a very short period. However, the same talking barriers to adoption when asked among the business leaders that believe in Generative AI, while it is disruptive, will add value. When asked, respondents ranked their most significant barriers as depicted in Figure 3 where 1 is the biggest barrier, two is the second biggest, and three is the third biggest. However, the same business leaders in responses to Generative AI technology being disruptive but adding value from Return on Investment (ROI) are presented in Figure 4. However, as rapidly as it is changing the field, the fundamentals required to help make your implementation successful are what has yet to change. However, developing a solid plan and convincing business case is still necessary for generative AI implementation. Professionals with industry and domain expertise, software engineers, and seasoned data scientists are among the specialist experts still needed. Data quality is still crucial. Risks must be identified and managed, compliance must be guaranteed, and security must still be implemented.

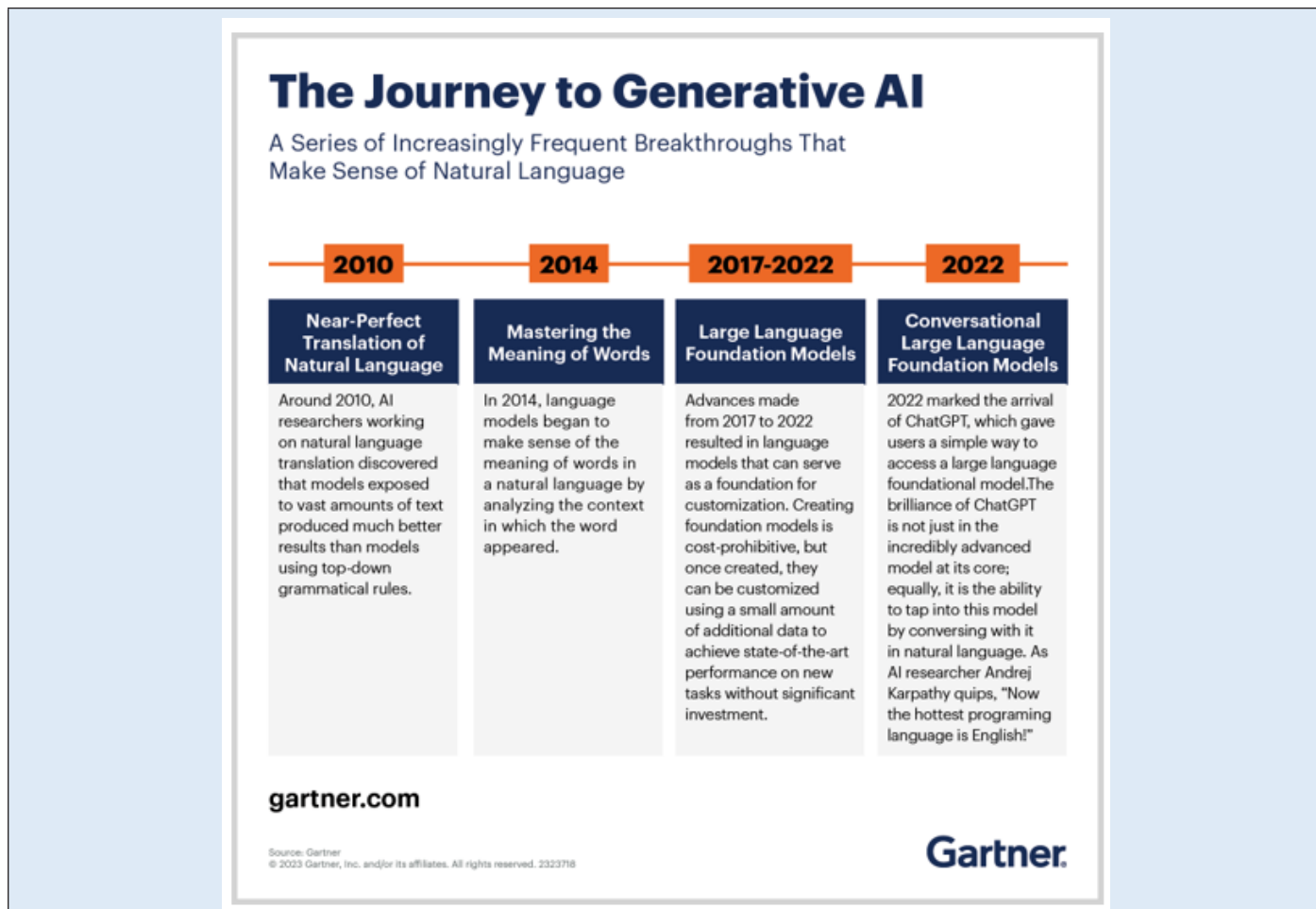
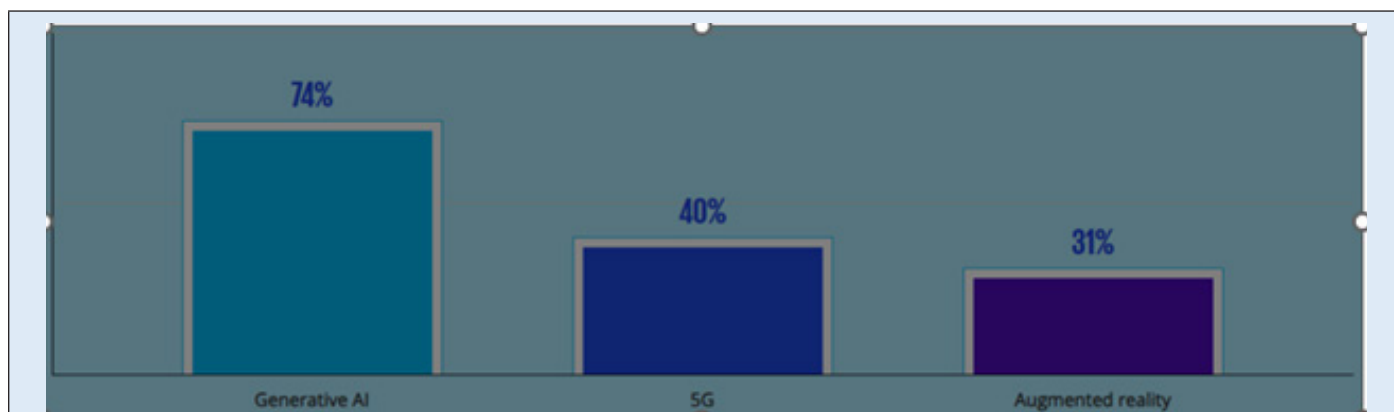


Figure-1 The Journey to Generative AI (Source: Courtesy of Gartner.com).



The Top Three Emerging Technologies in Business (Source: Courtesy of KPMG.com)

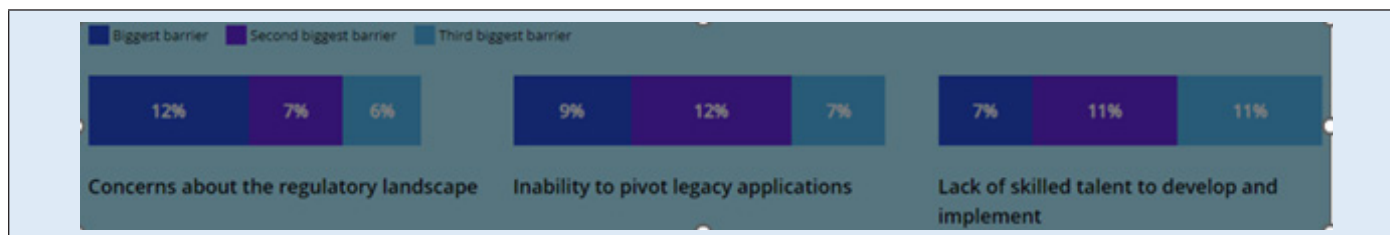


Figure 3: Barriers to Adoption (Source: Courtesy of KPMG.com)

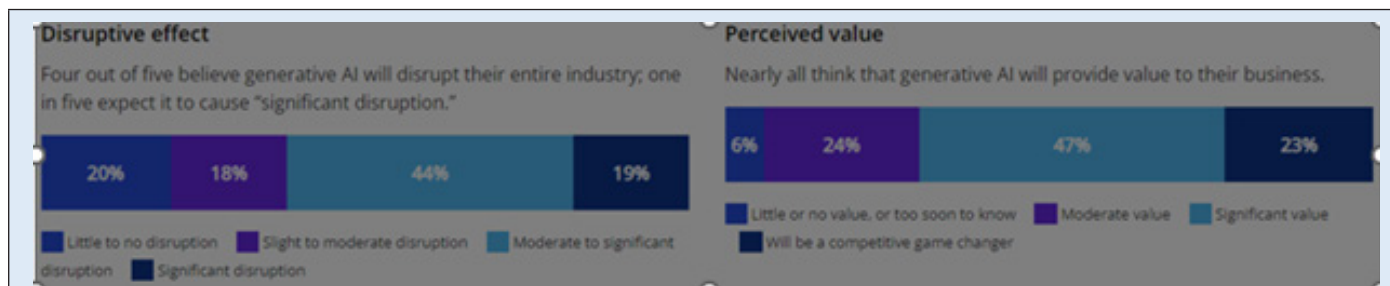


Figure 4: Generative AI but Will Add Value (Source: Courtesy of KPMG.com)

The Sudden Hype Behind Generative AI

Now the question comes up that "What is behind the sudden hype about Generative AI?" "Gartner has tracked generative AI on its Hype Cycle™ for Artificial Intelligence since 2020 (also, generative AI was among our Top Strategic Technology Trends for 2022), and the technology has moved from the Innovation Trigger phase to the Peak of Inflated Expectations. But generative AI only hit mainstream headlines in late 2022 with the launch of ChatGPT, a chatbot capable of very human-seeming interactions. ChatGPT, launched by OpenAI, became wildly popular overnight and galvanized public attention. (OpenAI's DALL-E 2 tool similarly generates images from text in a related generative AI innovation.) Gartner sees generative AI becoming a general-purpose technology with an impact similar to that of the steam engine, electricity and the internet. The hype will subside as the reality of implementation sets in. However, the impact of generative AI will grow as people and enterprises discover more innovative applications for the technology in daily work and life." However, we can look at the uses cases of the benefits and application of Generative AI and the primary focus of Generative AI initiatives as presented in Figure-5 by Gartner.com. One of the AI architecture advances that may be utilized to automate, augment, and autonomously execute business and IT processes is generative pre trained transformers, which is the model that powers ChatGPT. Though the specifics vary depending on the use case, generative AI offers advantages such as expedited product development, greater customer experience, and increased employee productivity. End users should be reasonable about the value they want to obtain, mainly if they are using a service that has significant limitations in its current state. Because generative AI produces potentially biased or erroneous artifacts, human validation is necessary and may even reduce the time workers can save. To make sure that every project either increases operational efficiency or generates net new

income or better experiences, Gartner advises linking use cases to Key Performance Indicators (KPIs). More than 2,500 executives participated in a recent Gartner webinar survey, and 38% of them said that the primary goal of their generative AI investments is to improve customer experience and retention. Revenue growth (26%), cost optimization (17%), and business continuity (7%), in that order, came next.

What is OpenAI and How Does It Impact the World?

OpenAI is an artificial intelligence research organization that develops advanced AI technologies and promotes their responsible and ethical use. It was founded in December 2015 and has since gained prominence for its groundbreaking work in artificial intelligence. Artificial Intelligence (AI) has transformed several industries and still influences technology today. One well-known company leading the way in AI deployment and research is OpenAI. Open AI, an artificial intelligence research and deployment firm, aims to ensure that artificial general intelligence (AGI) serves the interests of all people. A group of eminent specialists in machine learning focused on artificial intelligence comprise Open AI. Sam Altman and Elon Musk joined the founding board, joining Ilya Sutskever, Greg Brockman, Trevor Blackwell, Viki Cheung, Andrej Karpathy, Durk Kingma, Jessica Livingston, John Schulman, Pamela Vagata, and Wojciech Zaremba. See Figure-6 OpenAI carries out a lot of AI research to advance and create friendly AI. Open AI is a nonprofit research group, unlike many others, based in San Francisco, California. Due to its financial stability, the business can concentrate only on using cutting-edge AI to improve human lives. With its range of offerings, OpenAI has significantly advanced the field of artificial intelligence. OpenAI Gym, an Open-Source toolkit that lets programmers design and test reinforcement learning algorithms, is one of its noteworthy accomplishments. A vast

array of environments and tools are available through OpenAI Gym to aid in the creation of AI models that can interact with their environment to learn and adapt. One of OpenAI's most innovative AI products is ChatGPT, which is genuinely groundbreaking. A prototype AI chatbot named ChatGPT has gained much attention due to its insightful knowledge and human-like responses. Driven by the remarkable potential of OpenAI's language model, ChatGPT is intended to hold discussions and offer comprehensive responses to various questions. The public has taken notice of ChatGPT because of its capacity to comprehend and react contextually. This has made it a potent tool for a range of uses, such as customer service, content creation, and interactive user experiences.

The Creative Potential of AGI-Driven Generative AI

OpenAI's Generative AI models are not just about producing human-like text. They can also create art, generate code, and assist in various creative endeavors. This ability to harness the creative potential of AI is a crucial step towards AGI. For instance, artists can collaborate with AI to develop new styles and concepts, while developers can leverage AI to streamline the coding process. The possibilities are limitless. [3] OpenAI's ChatGPT is an impressive example of Generative AI, demonstrating the progress that has been made in the field of natural language processing. It showcases the potential for AI models to generate coherent and contextually relevant text, making it a valuable tool for various applications. ChatGPT's ability to engage in conversations and provide informative responses is remarkable. It can be utilized in customer support, chatbots, content generation, and more. Its versatility and adaptability allow it to be fine-tuned for specific tasks, making it a valuable asset for developers and businesses. However, like all AI systems, ChatGPT is not without limitations. It may occasionally produce inaccurate or biased content, highlighting the importance of responsible usage and continuous improvement in AI ethics. Additionally, its understanding of context and nuanced conversations is not yet perfect, and it may struggle with highly complex or ambiguous queries.

Ethical Considerations

As we journey towards AGI, ethical concerns become increasingly important. OpenAI is acutely aware of the need to ensure that Generative AI is used responsibly. This involves addressing issues such as bias in AI, ensuring transparency, and promoting AI education. OpenAI's commitment to ethical AI aligns with the vision of AGI benefiting all of humanity.

Moreover, we should look at pros and cons of Generative AI as Open AI by asking:

- a) What are the risks of Generative AI?
- b) What are some practical uses of Generative AI today?

The threats posed by generative AI are substantial and changing quickly. Threat actors from a wide range of backgrounds

have already utilized the technology to produce artifacts to support increasingly intricate schemes and "deep fakes," or duplicates of things. ChatGPT of Generation-4 and similar programs are trained on vast volumes of openly accessible data. You must closely monitor how your businesses utilize the platforms because they are not intended to comply with copyright rules and the General Data Protection Regulation (GDPR).

Oversight risks to monitor include: [4]

- a) Lack of transparency: Generative AI and ChatGPT models are unpredictable, and not even the companies behind them always understand everything about how they work.
- b) Accuracy: Generative AI systems sometimes produce inaccurate and fabricated answers. Assess all outputs for accuracy, appropriateness, and actual usefulness before relying on or publicly distributing information.
- c) Bias: You need policies or controls in place to detect biased outputs and deal with them in a manner consistent with company policy and any relevant legal requirements.
- d) Intellectual property (IP) and copyright: There are currently no verifiable data governance and protection assurances regarding confidential enterprise information. Users should assume that any data or queries they enter into the ChatGPT, and its competitors will become public information, and we advise enterprises to put in place controls to avoid inadvertently exposing IP.
- e) Cybersecurity and fraud: Enterprises must prepare for malicious actors' use of generative AI systems for cyber and fraud attacks, such as those that use deep fakes for social engineering of personnel, and ensure mitigating controls are put in place. Confer with your cyber-insurance provider to verify the degree to which your existing policy covers AI-related breaches.
- f) Sustainability: Generative AI uses significant amounts of electricity. Choose vendors that reduce power consumption and leverage high-quality renewable energy to mitigate the impact on your sustainability goals.

Gartner also recommends considering the following questions:

- a) Who defines responsible use of generative AI, especially as cultural norms evolve and social engineering approaches vary across geographies? Who ensures compliance? What are the consequences for irresponsible use?
- b) In the event something goes wrong, how can individuals take action?
- c) How do users give and remove consent (opt in or opt out)? What can be learned from the privacy debate?
- d) Will using generative AI help or hurt trust in your organization — and institutions overall?

e) How can we ensure that content creators and owners keep control of their IP and are compensated fairly? What should new economic models look like?

f) Who will ensure proper functioning throughout the entire life cycle, and how will they do so? Do boards need an AI ethics lead, for example?

Finally, it is important to continually monitor regulatory developments and litigation regarding generative AI. China and Singapore have already put in place new regulations regarding the use of generative AI, while Italy temporarily. The U.S., Canada, India, the U.K. and the EU are currently shaping their regulatory environments.

The field of generative AI will progress rapidly in both scientific discovery and technology commercialization, but use cases are emerging quickly in creative content, content improvement, synthetic data, generative engineering and generative design.

In-use, high-level practical applications today include the following. [4]

Written content augmentation and creation: Producing a “draft” output of text in a desired style and length

- a) Question answering and discovery: Enabling users to locate answers to input, based on data and prompt information
- b) Tone: Text manipulation, to soften language or professionalize text
- c) Summarization: Offering shortened versions of conversations, articles, emails and webpages
- d) Simplification: Breaking down titles, creating outlines and extracting key content
- e) Classification of content for specific use cases: Sorting by sentiment, topic, etc.
- f) Chatbot performance improvement: Bettering “senticity” extraction, whole-conversation sentiment classification and generation of journey flows from general descriptions.
- g) Software coding: Code generation, translation, explanation and verification

Emerging use cases with long-term impacts include: [4]

- a) Creating medical images that show the future development of a disease.
- b) Synthetic data helping augment scarce data, mitigate bias, preserve data privacy, and simulate future scenarios.

c) Applications proactively suggesting additional actions to users and providing them with information.

d) Legacy code modernization

Generative AI provides new and disruptive opportunities to increase revenue, reduce costs, improve productivity, and better manage risk. In the near future, it will become a competitive advantage and differentiator. [4]

The Road Ahead

OpenAI’s ongoing research into Generative AI with its present Generation-4 version (i.e., ChatGPT4), continues to push the boundaries of what’s possible in AI-driven content generation. The organization’s dedication to open-source principles means that these advancements are accessible to the broader AI community. This collaborative approach is essential for the development of AGI, as it fosters innovation and knowledge sharing.

Conclusion

Artificial General Intelligence driven Generative AI is a significant step towards achieving the dream of AGI. OpenAI’s pioneering work in this field, particularly with its Generative AI models like GPT-3, is a testament to the organization’s commitment to pushing the boundaries of AI research. As we move forward, it’s essential to embrace the creative potential of AI while addressing ethical concerns, all while keeping the ultimate goal of AGI in sight. The future of AI is undoubtedly exciting, and OpenAI is leading the way towards a more intelligent and creative world. In conclusion, ChatGPT is a noteworthy example of Generative AI, offering a glimpse into the capabilities of AI-driven text generation. While it has room for improvement, it represents a significant step toward harnessing the power of AI for natural language understanding and generation. As AI technologies like ChatGPT continue to evolve, they have the potential to transform various industries and enhance human-AI interactions.

References

1. Farhang Mossavar Rahmani, Bahman Zohuri (2023) The Evolution of Artificial Intelligence: From Supervised to Semi-Supervised and Ultimately Unsupervised Technology Trends: Current Trends in Engineering Science (CTES) 3(5).
2. Bahman Zohuri, Siamak Zadeh (2020) Artificial Intelligence Driven by Machine Learning and Deep Learning 1st Edition Nova Science Pub Inc.
3. Bahman Zohuri, Farhang Mossavar-Rahmani (2020) Artificial General Intelligence (AGI and Its Real-Time Interaction with Humans” To Be Published.
4. Generative AI: What Is It Tools Models Applications and Use Cases (gartner.com).



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here: [Submit Article](#)

DOI: [10.32474/MAMS.2023.05.000217](https://doi.org/10.32474/MAMS.2023.05.000217)



Modern Approaches on Material Science Assets of Publishing with us

- Global archiving of articles
- Immediate, unrestricted online access
- Rigorous Peer Review Process
- Authors Retain Copyrights
- Unique DOI for all articles