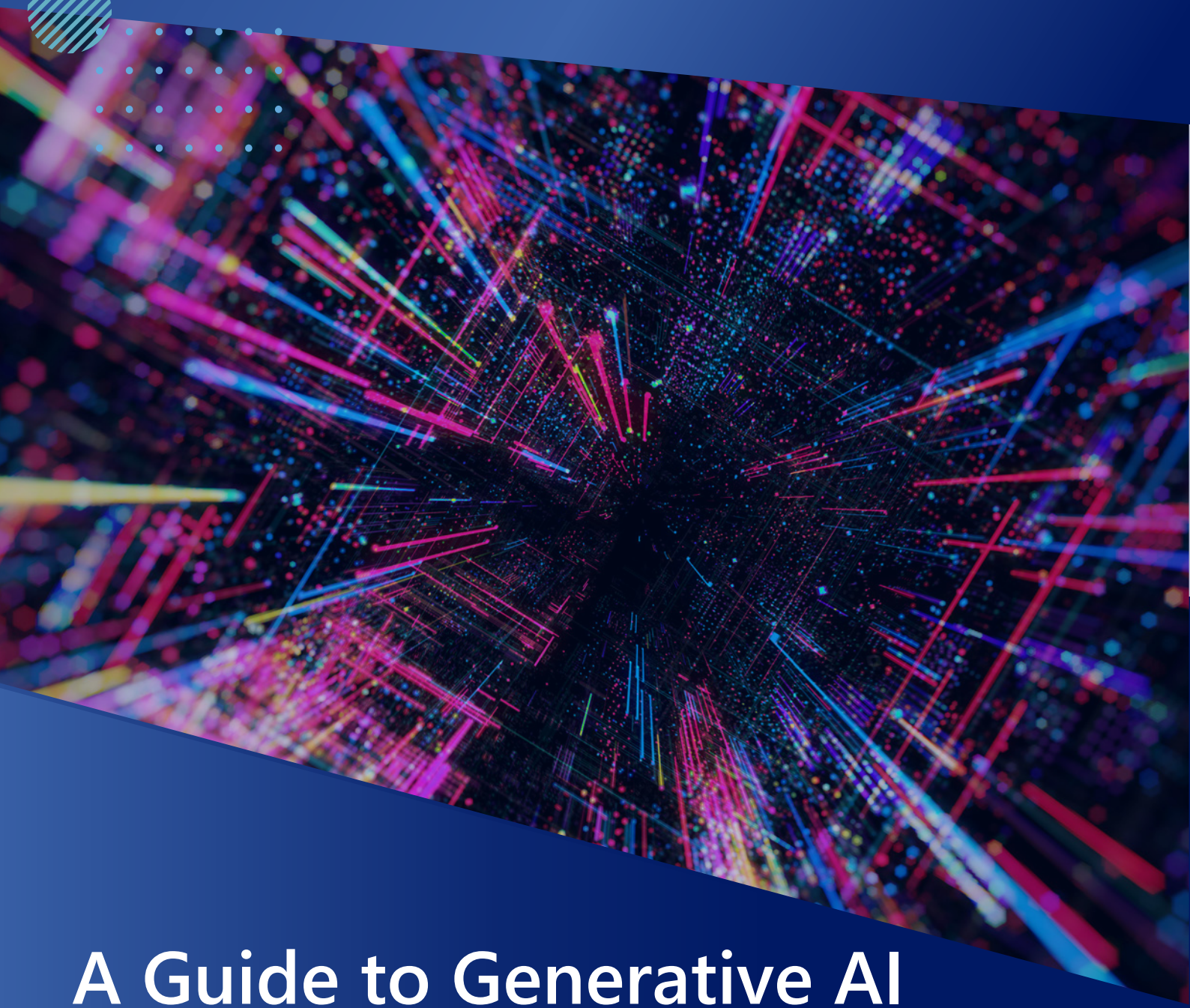

A Guide to Generative AI

Nomura Research Institute

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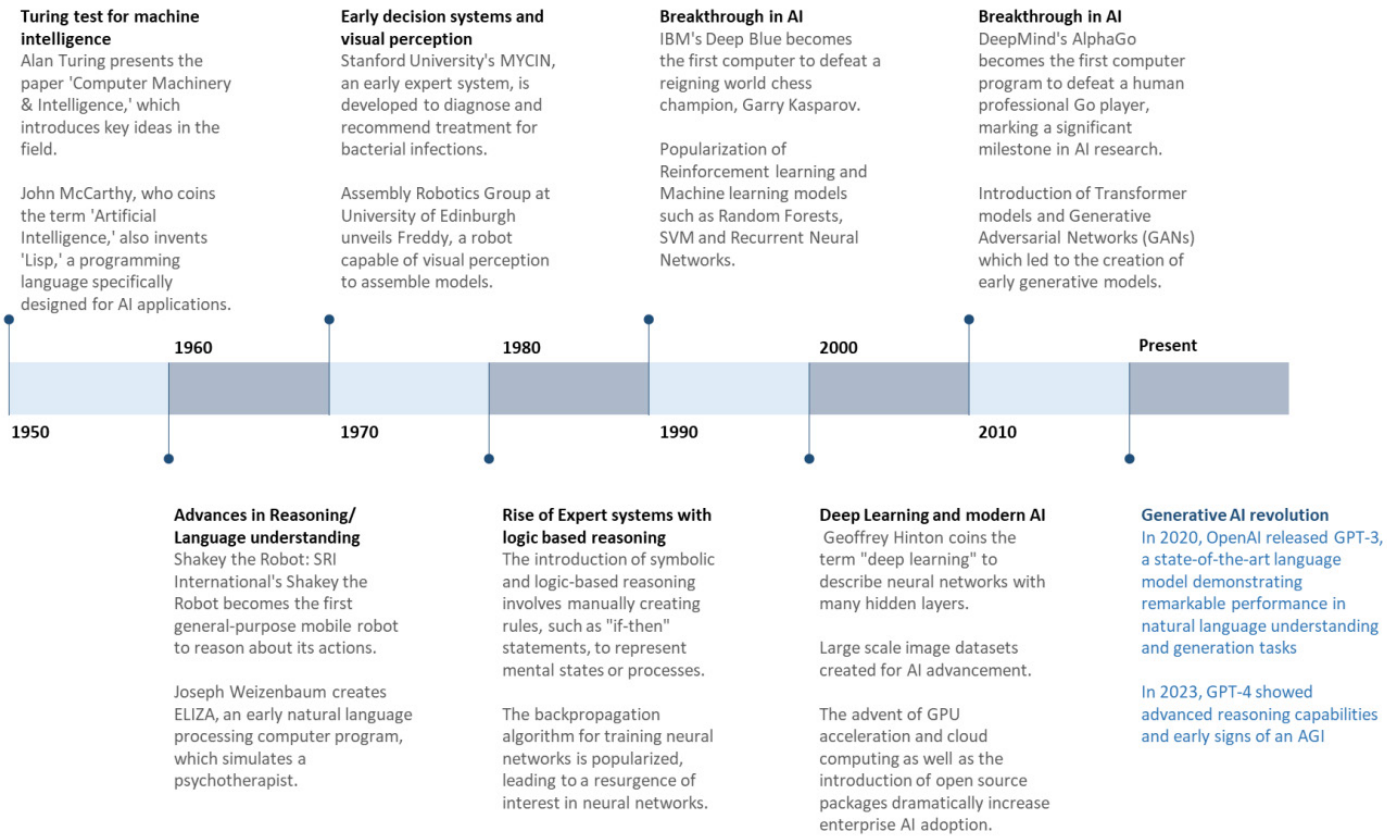
With the introduction of Auto GPT and Chat GPT and its relative success in capturing the imagination of common man, AI seems to have come of age. Furthermore, GPT-4, the newer model is also said to show early signs of Artificial General Intelligence, i.e. reasoning capabilities at/beyond human intelligence. This has also resulted in clients wanting to use the benefits of Generative AI in its day- to-day business in order to further improve and bring in efficiencies. Through our “Guide to Generative AI”, Strategy Design and Digital Transformation team of NRI India tries to explain the underlying concept, advances, usages and risks/concerns that surround it. This should equip us better to cater to our client needs in this space.

Evolution of AI

The evolution of AI began with simple rule-based systems and symbolic reasoning in the mid-20th century, progressing to the development of artificial neural networks and machine learning algorithms. The advent of deep learning in the early 21st century fuelled rapid advancements in computer vision, natural language processing, and reinforcement learning. These breakthroughs have paved the way for generative AI models, such as DALL-E and advanced language models such as GPT-4.

Figure 1:

The key moments in the evolution of AI that led to the Generative AI breakthrough (SUV category)



Source: NRI Research

Generative AI models such as ChatGPT and Midjourney have recently captured the attention of the world by making AI technology accessible and user-friendly for everyday users. ChatGPT-3, released on November 30, 2022, became the fastest-growing consumer internet app in history with 100 million users in just 2 months (For some perspective, it took Facebook(Meta) 4.5 years and TikTok 9 months for the same) and the newer model, GPT-4, is said to show early signs of AGI (Artificial General Intelligence), reasoning capabilities at a level equal to or beyond human

intelligence. [1]

Undoubtedly, the rapid expansion of these technologies holds the potential to revolutionize entire industries and society as a whole. To maintain a competitive edge in the future, businesses must understand the potential value of these technologies while comprehending and mitigating the associated risks.

Diverse Applications of Generative AI in Business

Generative AI has the potential to be valuable across multiple business functions and many are using it to create unique customer experiences and optimize their internal processes.

In the spirit on this article's topic, we asked GPT-4 to tell us some business use-cases across functions and industries, and here is some of the output it came up with: Implementing the above generative AI use cases can indeed offer significant value to businesses across various industries. However, considering the nascent stage of this technology, we must evaluate their feasibility carefully by understanding data privacy and regulations in each industry as well as the appropriate level of human oversight needed. We are already witnessing early adoption of Generative AI across business functions, especially to improve customer experience and increase productivity.

Figure 2: Diverse Applications of Generative AI in Business

Marketing and Advertising	Operations	IT	Finance	Retail	Healthcare
Copywriting Generative AI can create persuasive marketing copy, such as headlines, product descriptions, and social media posts.	**Generative route planning** AI can generate optimal routes for transportation and logistics to minimize costs and improve efficiency.	**Code generation** Generative AI can create code snippets, functions, or even entire applications, improving the software development process.	**Trading strategy generation** Generative AI can develop and optimize new trading strategies based on historical data and market trends.	**Product recommendations** Generative AI can analyze customer data to generate personalized product suggestions, enhancing the shopping experience and increasing sales.	**Drug discovery** AI can generate new drug candidates and optimize existing ones
Customer segmentation Generative AI can analyze customer data and create targeted segments for more personalized marketing campaigns.	**Workflow optimization** Generative AI can create and optimize complex workflows, increasing overall operational efficiency.	**Network optimization** Generative AI can design and optimize network topologies for improved performance and resilience.	**Stress testing** AI can create a range of scenarios to evaluate the resilience of financial institutions under different market conditions.	**Store layout optimization** Generative AI can design store layouts that maximize customer engagement and sales.	**Personalized medicine** AI can help develop tailored treatment plans based on patient data
Ad creative generation Generative AI can create various ad designs and formats to test and optimize for the best performance.	**Scenario generation** Generative AI can create multiple risk scenarios for organizations to prepare and strategize for potential challenges.	**Chatbot development** Generative AI can create natural language interfaces for chatbots, improving user experience and reducing support response times.	**Regulatory reporting** Generative AI can automate the generation of regulatory reports, streamlining the compliance process.	**Website optimization** Generative AI can design and optimize e-commerce websites to improve user experience and increase conversions.	**Image enhancement** Generative AI can improve image quality by filling in missing data or reducing noise, leading to more accurate diagnoses.

Current Risks and Concerns in The Use of Generative AI

Although the value created by Generative AI in the future will be exponential, we need to consider
the risks to society and organizations in using such technologies at scale.

- **Reliability**

  One of the key concerns of the enterprise use of such models is the lack of reliability of the outputs generated by these models. The current language models predict the next sequence of words based on its training data and user input, and often the next most likely words can be factually inaccurate, also known as

"hallucinations". Hallucinations refers to mistakes or extrapolations made by the generative model that sound factual or plausible but is in fact inaccurate. As these models become more convincing and believable in their answers, it could increase overreliance and lead to actions based on misinformation. However, the tools are improving at a rapid pace, GPT-4 is said to have 40% higher likelihood of producing factual responses than its previous iteration ChatGPT-3.5, mostly due to a longer period of human evaluation and alignment. Access to the Web, in a tool such as WebGPT[2], can also help improve factual accuracy and reduce overreliance by citing sources and letting humans evaluate the results.

- **Privacy and Safety**
  The public access of such powerful AI tools has raised a lot of ethical and safety concerns from its users, especially around the easy creation and dissemination of misinformation and the inherent bias in the training data which could lead to perpetuating harmful stereotypes or discrimination. The lack of information shared about the training data used to build these models causes an additional loss of trust. Italy has recently moved to temporarily ban ChatGPT following the Italian Regulator Gerante accusing OpenAI of failing to check the age of ChatGPT users and the "absence of any legal basis that justifies the massive collection and storage of personal data" to train" the chatbot [3]. Privacy regulators in Germany, France and Ireland are also looking to evaluate the safety concerns of the public use of ChatGPT.

- **Climate Impact**

As indicated by the Artificial Intelligence Index from Stanford [4], training ChatGPT-3 last year required a carbon dioxide emissions equivalent of 502 tons and nearly 1,300 megawatt hours of energy consumption, equivalent to the lifetime emissions of 8 cars — or 109

AI models are reshaping the world around us, offering an abundance of opportunities to innovate and improve various aspects of our lives. We are currently exploring these technologies to access the possibilities as well as the risks associated with its widespread adoption which is inevitable. However, it is important to note that Generative AI tools such as ChatGPT are a work in progress and this article just barely scratches the surface of its capabilities and or its potential applications. Like all tools they can be used to create value for society as well as cause harm. By striking the right balance between harnessing the power of generative AI and addressing its challenges, we can unlock a future full of new possibilities and transformative change.

Conclusion

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possibilities as well as the risks associated with its widespread adoption which is inevitable.
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