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WHAT IS AI AND GENERATIVE AI?

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In Part 1 of RBS's AI & The Law: Legal Insights for the Digital Age series, we introduce terms such as AI, Generative AI, and the benefits and risks of using AI that clients should be aware of.

What is Artificial Intelligence?

Artificial intelligence (AI) is technology that enables computers and machines to simulate human intelligence and problem-solving capabilities. The goal of AI is to create computer models that exhibit "intelligent behaviors" like humans.[1]

AI systems function by processing large amounts of data to identify patterns and make predictions. AI systems learn from this data through algorithms allowing them to recognize patterns and improve their performance over time. This includes techniques such as machine learning and deep learning, which utilize neural networks to analyze complex data sets. Machine learning is a type of AI where algorithms learn patterns from data to make predictions or decisions. Deep learning is a subset of machine learning that uses complex neural networks with many layers to automatically extract features and patterns from large datasets, often requiring more data and computational power.

Types of artificial intelligence: weak AI vs. strong AI

- **Weak AI**—also known as narrow AI, is AI trained and focused to perform specific tasks, such as voice recognition or playing chess. Weak AI operates under a limited set of constraints and does not possess general intelligence. Examples of Weak AI include: Apple's Siri, Amazon's Alexa, and IBM's watsonx™.
- **Strong AI** is made up of artificial general intelligence (AGI) and artificial super intelligence (ASI). AGI, or general AI, is a theoretical form of AI where a machine would have an intelligence equal to humans; it would be self-aware with a consciousness that would have the ability to solve problems, learn, and plan for the future. ASI would surpass the intelligence and ability of the human brain. While strong AI is still entirely theoretical with no practical examples in use today, AI researchers continue to work towards the goal of AGI.[2]

What is Generative AI?

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Generative AI refers to deep-learning models that can generate high-quality text, images, and other content based on the data on which they were trained. A generative AI tool generates "output," typically in response to instructions, called the "input" or "prompt," from a user. The output is based on an algorithmic model trained on vast amounts of data, which could be text, images, music, computer code, or virtually any other type of content.

Generative AI has become highly popular after the launch of generative AI chatbots such as OpenAI's ChatGPT, Anthropic's Claude, and Google's Gemini. While the field of AI and the foundational technologies behind generative AI have been around for decades, growth in this field has accelerated in the last few years due to advancements in AI research techniques such as deep learning and neural networks and the greater availability of computing power.

Researchers have been able to improve model performance by increasing the number of parameters contained in these models.[3] Parameters are the variables in a machine learning model that adjust weights and biases as the algorithm is trained. GPT-3 has 175 billion parameters and GPT-4 has over a trillion parameters.[4] This demonstrates the exponential growth in the field of generative AI as these two models were released only two years apart.

Another reason for this exponential increase in model performance is due to the availability of cost-effective computing power allowing these models to be trained on large datasets so they can produce more realistic and diverse content. For example, the training data set for GPT-3, GPT-3.5, and GPT-4 was comprised of 45 terabytes of data, the equivalent of a Microsoft Word document that is over 3.7 billion pages long.[5] This highlights the need for large amounts of computing power required to train these generative AI models.

The exponential growth in model complexity, coupled with the availability of cost-effective computing power, has been pivotal in pushing the boundaries of what generative AI models can achieve. An "arms race" is underway in the technology sector, with many large tech companies launching competing generative AI models and investing heavily in the research and development of AI laying the groundwork for future innovations.

What are the benefits and risks of using AI?

Benefits of using AI

There are numerous potential benefits to applying AI, such as:

1. Increased efficiency and productivity: Since AI can process large amounts of data quickly, it has the potential to automate simple, repetitive tasks, freeing up humans for more complex work.

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2. Cost reduction: The successful application of AI has the potential to streamline processes and reduces labour costs for simple, repetitive tasks allowing organizations to handle more work with fewer resources.

3. Improve decision making: While all organizations need to use data to gain valuable insights and guide their decision-making process, many organizations struggle to effectively analyze their currently available data in an efficient and effective way. By identifying the patterns and trends that lie within these untouched and underutilized data sets, AI can help organizations better understand their data and help them make more informed decisions.[6]

Risks with using AI

Misuse of AI can bring about consequential legal, ethical, and operational risks. Some examples of risks associated with AI include:

1. Hallucinations/False Outputs: A well-known limitation of current AI models is that they can produce false outputs, known as "hallucinations". These hallucinations are especially problematic given how confident these model sound in their answers, even when the information produced is completely incorrect. It is essential that the output of AI models is verified by humans to check for false outputs. This need for human intervention could severely limit the effectiveness of these current models.

2. Intellectual Property and Data Security Concerns: Without explicit guidelines, employees might unintentionally input sensitive organization information into AI applications, leading to legal, financial, and reputational damage. Therefore, organizations must have clear policies on using AI in the workplace before using these models.

3. Lack of Transparency: AI systems, especially deep learning models, can be complex and difficult to interpret, making their decision-making processes opaque. Therefore, outputs by AI models can be difficult to verify.

4. Biased Outputs: The machine learning models that power many of the AI services we use every day contain sophisticated algorithms and are trained on specific data sets in order to accomplish a particular task. As a result, AI is profoundly impacted by the data sets on which it is trained and can potentially reflect the biases ingrained within that data itself. This can lead AI models to make decisions or generate content based on harmful stereotypes, prejudices, and outright fabrications rather than objective facts. Although researchers are working to reduce bias in AI training data sets, biased outputs continue to be an ongoing concern.[7]

Conclusion

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AI is a transformative technology that offers both vast opportunities and significant challenges. While the field of AI has been around for decades, it has become highly popular after the launch of generative AI chatbots such as OpenAI's ChatGPT, Anthropic's Claude, and Google's Gemini. Advancements in AI research techniques such as deep learning and neural networks and the greater availability of computing power have allowed the capabilities of AI to grow exponentially in recent years.

As AI continues to evolve, its potential to drive innovation, enhance productivity, and improve decision-making is clear. However, as organizations integrate AI into their operations, they must also remain vigilant about the risks it poses—particularly regarding data security, intellectual property, and the potential for biased outputs.

As billions of dollars continue to be invested in the research and development of AI, the field will continue to progress as AI researchers and tech companies continue to find ways to overcome the current limitations of AI systems. In the interim, organizations should take proactive approaches to adopting AI but be mindful of its risks and shortcomings.

If you have further questions about AI or the benefits and risks of using AI, please contact any member of our Technology and Innovation Group.

We would like to thank articled student Ajay Gill (2024/2025 year) for his contributions to this article.

[1], [2] IBM, "What is artificial intelligence (AI)?" (August 2024) <https://www.ibm.com/topics/artificial-intelligence>

[3], [4], [5] Complaint, *The New York Times Company v Microsoft Corporation, OpenAI, Inc. et al.* (Case 1:23-cv-11195) *(*December 27, 2023) <https://nytco assets.nytimes.com/2023/12/NYT_Complaint_Dec2023.pdf> [NYT Complaint].

[6] Coursera, "5 Benefits of AI to Know in 2024 (+ 3 Risks to Watch Out For)" (March 2024) <https://www.coursera.org/articles/benefits-of-ai>

[7] Forbes, "The 15 Biggest Risks Of Artificial Intelligence" (June 2023) <https://www.forbes.com/sites/bernardmarr/2023/06/02/the-15-biggest-risks-of-artificial-intelligence/>