



Modern Finance brief

Generative AI Fundamentals

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Tags:

Artificial Intelligence,
Generative AI ,
Azure Open AI



Overview

This explores the fundamentals of Generative AI, an evolution of computer programming. It includes examples like word prediction and image generation, along with a case study on the application of AI by Microsoft's Audit, Risk, and Compliance team.

Finance use cases

The use cases for Generative AI in finance are endless, but here are a few examples of how it can be applied and help our finance teams:

1. **Fraud Detection:** Generative AI models can be trained to understand normal transaction patterns and then used to identify anomalies or potentially fraudulent activity.
2. **Credit Risk Modelling:** Generative AI can help in creating more nuanced and complex models to predict credit risk, helping in decision-making regarding loan approvals.
3. **Algorithmic Trading:** Generative AI can generate new trading algorithms or improve existing ones, which can lead to higher returns in high-frequency trading.
4. **Customer Service:** Chatbots powered by generative AI can handle customer queries, complaints, and even provide financial advice, providing more personalized customer experience.
5. **Forecasting:** Generative AI can be used for predicting stock prices, exchange rates, and other financial indicators by analyzing historical data and generating forecasts. You can learn more about forecasting with Copilot in Excel [here](#).
6. **Personalized Marketing:** Generative AI can generate personalized marketing campaigns tailored to individual customer's preferences, habits, and financial behaviors.
7. **Document Analysis:** AI can be used to analyze and understand complex financial documents, contracts, and reports, saving time and reducing errors.
8. **Portfolio Management:** Generative AI can be used in the creation of optimized investment portfolios based on investors' risk profiles and market conditions.

Generative AI

Generative AI is geared to generating new content. It's a type of AI that's designed to be creative, either by creating something new (like a piece of art, a piece of music, or a new design) or by modifying existing content in a way that's original and innovative. While AI involves a wide range of technologies designed to replicate human intelligence and automate tasks, generative AI specifically refers to AI technologies that create new, original content. Below we showcase two examples with text and image creation.

Example: Next word prediction

When using an AI chat platform like Microsoft Copilot (previously Bing Chat) your question or prompt is the input. The recipe is one of the most complex recipes the world has ever seen based on trillions of examples of text scraped and carefully curated from the internet with the goal of giving you the response you expect.

Generative AI chat predicts the most likely next word or phrase based on statistical patterns in the data it was trained on. When you provide a prompt, it looks at the context of the sentence, including the previous words and phrases, to come up with the most probable next word. It repeats this prediction process over and over, word by word, and phrase by phrase to generate a complete response.

User Prompt: What is the best way to learn a new language?

AI Response:

Immersing
Immersing yourself
Immersing yourself in
Immersing yourself in the
Immersing yourself in the language
Immersing yourself in the language by
Immersing yourself in the language by living
Immersing yourself in the language by living in
Immersing yourself in the language by living in a
Immersing yourself in the language by living in a country
Immersing yourself in the language by living in a country where
Immersing yourself in the language by living in a country where it's
Immersing yourself in the language by living in a country where it's spoken
Immersing yourself in the language by living in a country where it's spoken is
Immersing yourself in the language by living in a country where it's spoken is a
Immersing yourself in the language by living in a country where it's spoken is a great
Immersing yourself in the language by living in a country where it's spoken is a great way
Immersing yourself in the language by living in a country where it's spoken is a great way to
Immersing yourself in the language by living in a country where it's spoken is a great way to learn.



Many potential responses are generated using the word-by-word approach and then a most likely best answer is selected. This process repeats as many times as necessary to provide a simple answer to a question or draft a novel. The non-deterministic manner of these models is why when you run the exact same prompt twice with generative AI you may get different answers. While next word prediction is the heart of text based generative AI, many other layers help deliver a complete experience for users including pretraining for specific scenarios.

Example: Image generation

Just as Generative AI can predict the next word in a sentence, it can also generate entirely new images from textual prompts. An example of this is OpenAI's DALL-E models (which is the engine behind the scenes of Bing Image Creator). When you give DALL-E a description, such as "Nashville at dusk with a programmer in his home on the outskirts of town in the Green Hills neighborhood working on an article about AI," it doesn't search the internet for images that match this description. Instead, it creates a new image from scratch that fits your description. Or in this case a description of me, except I left off the amateur adjective in front of the noun programmer. The recipe comes from training on a dataset containing a vast number of images paired with textual descriptions. Through this training, DALL-E learned to understand the relationship between text and corresponding visual content. When you give DALL-E a prompt, it uses this understanding to generate a completely new image. It's like asking a chef to create a new dish based on a description, and the chef uses their understanding of ingredients and cooking techniques to make it.





Generative AI

Within Microsoft's Finance Audit, Risk, and Compliance (ARC) organization, we're using generative AI to transform how we work. Within ARC's Business Conduct Investigations (BCI) team, we have successfully deployed several AI assistants. Let me introduce you to one of them today (and preview one from our Internal Audit colleagues to be revealed in an upcoming Modern Finance Brief), but first some context about the team. BCI provides internal investigation support to attorney colleagues in Corporate External and Legal Affairs (CELA). BCI serves as independent fact gatherers primarily focused on investigations with direct financial implications including allegations of corruption, kickbacks, or side agreements in the sales process, conflicts of interest with partners and vendors, and misuse of company assets. To support our richly complex and diverse company, BCI maintains an extremely large library of information on tools, reports, databases, and processes spanning across many Microsoft business functions and teams. This knowledge base, which we maintain in OneNote, exceeds 1,700 pages, and continues to grow as Microsoft evolves. Despite organization efforts and use of keywords and search, the team faces challenges while searching for valuable information in the OneNote.

Using the Azure Open AI Studio, the team quickly developed and deployed an AI Assistant named K.I.R.A. (for Knowledge and Investigations Research Assistant and perhaps a homage to a beloved Star Trek character). K.I.R.A supports the investigators on the BCI team through a simple chat interface and quickly responds to questions about the OneNote knowledge base. Using natural language, investigators get directed to the right tools based on the nature of their investigation, along with citations from the OneNote.

What is particularly beautiful about this solution and the Azure Open AI Studio is that any team in Finance (or just any team), can quickly take an existing knowledge base and multiply their impact by using generative AI as a modern user interface.

Within ARC's Internal Audit function, we are also dramatically transforming the world of audit and transaction review. Imagine an audit or business process that requires human review of a business justification or transaction description and the related information like a company name, amount, and categorization. In audits and compliance monitoring, these review efforts are frequently prone to human error, take a sampling approach, and happen days, weeks, or quarters after the fact. Within ARC, AI is moving us toward 100% review of transactions with reduced risk of human error, massive time savings, and far closer to when the transaction occurred.

Want to get the details on how we are approaching AI Augmented Continuous Auditing? Be sure to read our upcoming Modern Finance Brief on Creating a Generative AI Roadmap for your team.

Conclusion

As Generative AI continues to evolve, capabilities will be added unlocking new opportunities for users. Generative AI is not just the future of artificial intelligence—it's the present. It's already here, transforming finance and redefining what's possible. Its capabilities are vast, its potential is enormous, and its benefits are undeniable. With responsible use and the right safeguards, generative AI holds the promise of a more efficient, creative, and personalized future.

References

Learning resources

Getting started with Generative AI

- [Get ready for Generative AI](#)
- [How Generative AI is different than other types of AI](#)
- [How Generative AI works](#)

Generative AI tools

- [What processes and products can be transformed by AI?](#)
- [What is prompt engineering?](#)
- [ChatGPT text generation](#)

Build with Generative AI

- [What are transformer models and how do they work?](#)
- [Azure OpenAI service – Advanced language models](#)
- [ChatGPT prompt engineering for Developers](#)
- [Microsoft/semantic-kernel: Integrate cutting-edge LLM technology quickly and easily into your apps](#)
- [Forecasting with Copilot in Excel](#)