ADEPTIA

Part 2

Three Use Cases and Integration Approaches of Generative AI

WHITE PAPER

About this Paper

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I ntroduction

In the second installment of Adeptia's AI whitepaper series, we will explore the key business use cases of Generative AI, such as interactive chat for human users, API services for system users, and runtime data processing. Further, explore three approaches—prompt context window, model fine-tuning, and Retrieval Augmented Generation—for achieving seamless integration with enterprise data.

This whitepaper delves into the transformative landscape of Generative AI, highlighting its pivotal role in reshaping businesses. By revolutionizing data interaction and decision-making, Generative AI is driving enhanced value to customers, positioning itself at the forefront of innovation. Through an exploration of key business use cases and an investigation of three approaches—prompt context window, model fine-tuning, and Retrieval Augmented Generation—for seamless integration with enterprise data, this whitepaper offers invaluable insights into harnessing the power of Generative AI across diverse business sectors. As noted by Gartner, "Generative AI has become a top priority for the C-suite and has sparked tremendous innovation in new tools beyond foundation models. Demand is increasing for Generative AI in many industries, such as healthcare, life sciences, legal, financial services, and the public sector." [1]

The paper explores three vital use cases for Generative AI within a business context: Human user for interactive chat, System user through API services, and Runtime for data processing. These use cases leverage enterprise data to foster efficiency and drive value creation. Furthermore, the whitepaper navigates the intricate approaches for integrating Generative AI with enterprise data. Careful consideration of these approaches is crucial to harnessing the full potential of this potent technology, with each approach presenting its unique advantages and challenges. Gartner forecasts a significant surge in Generative AI adoption, projecting that by 2026, over 80 percent of enterprises will have embraced GenAI APIs, models, or deployed GenAI-enabled applications in production environments—a substantial increase from the less than 5 percent recorded in 2023. [1]

Join us on this insightful exploration as we uncover the multifaceted impact of Generative AI on businesses and its seamless integration with enterprise data, unlocking new dimensions of efficiency, innovation, and value delivery.

According to Gartner, over 80 percent of enterprises are expected to utilize Generative AI APIs or have implemented Generative AI-enabled applications by 2026. [1]

Three Vital Use Cases of Generative AI

Generative AI can transform how businesses interact with data, make decisions, and serve customers. Here we explore three use cases where Generative AI can be applied within a business context, leveraging enterprise data to deliver enhanced value and efficiency.

1 HUMAN USER: FOR INTERACTIVE CHAT

Generative AI can be used to enhance the ability to provide interactive chat. It makes possible a conversational AI ability that employs deep learning algorithms and Natural Language Processing (NLP) to understand and generate human-like text in real time. Generative chatbot solutions can hold text-based conversations with users, understand user input, and generate contextually relevant responses, enabling users with detailed answers to their complex questions. For example, if an organization was leveraging their enterprise data with Generative AI, an analyst could ask about recent sales figures for a specific product line, and the AI, drawing upon real-time sales data, could provide an up-to-date report without the user needing to specify where this data is stored or how to format the query.

The proficiency of Generative AI is largely attributed to its extensive pre-training process, which exposes it to diverse textual data from various sources. A vast body of data enables Generative AI solutions such as ChatGPT to learn the subtleties of language usage and context. This helps them respond intelligently to multiple personalized queries. In addition, they learn from user interactions and refine their responses over time to improve their language generation capabilities. Unlike traditional chatting methods, the success of Generative AI solutions depends on their ability to generate text based on the context of previous inputs.

What's more, Generative AI solutions can help businesses resolve common customer problems without the need for IT intervention. When enabled with an organization's enterprise data, these chatbots can notice basic patterns, identify problems, and provide solutions by accessing customer profiles, preferences, and previous interactions.

2 SYSTEM USER: GENERATIVE AI AND APIS

Another transformative use case is the creation of an Application Programming Interface (API) service that acts as a front-end to the Generative AI. A REST API (Representational State Transfer API) is a bridge between the application and the AI model that eases communication and improves connectivity. Developers can integrate this service into their applications to leverage the AI's capabilities. Using a REST API within a request-response model, the AI can process prompts and return structured responses in JSON format. This enables applications to programmatically use AI-generated information, such as populating a CRM with AI-enriched customer profiles or auto-generating product descriptions for an e-commerce platform.

This ensures compatibility as well as ease of integration with myriad languages and frameworks. Generative AI solutions process the request, produce a response in JSON format, and send it back to the application. These solutions allow users to foster a structured and standardized interaction between the application and AI. With the help of this API service, Generative AI becomes accessible to a wide range of developers, which opens a new range of opportunities across domains and industries.

With the help of the API service application, businesses can manage their increasing demand and adjust to growing workloads. What's more, an API service facilitates flexible deployment options whereby AI models can be hosted on-premises, in the cloud, or hybrid environments. Once deployed, the API service can be reused across different applications, further streamlining development and reducing redundancy.

The Application sends a REST API request to the AI model ▷ AI model processes the request ▷ AI model generates a JSON-formatted response ▷ API service sends the response to the application

3 RUNTIME: GENERATIVE AI AND DATA PROCESSING

Generative AI also plays a pivotal role in data processing at runtime and can be integrated via a REST API to assist in real-time data processing tasks. For example, in an ETL (Extract, Transform, Load) process, AI could apply complex business rules to source data, perform data quality checks and cleansing, enrich data by looking up additional information, or extract meaningful information from unstructured sources. An application like Adeptia Automate could call the AI to interpret and process data streams, ensuring the data fed into business systems is of the highest quality and most actionable nature.

Generative AI solutions can be used for data processing by:

1. Using business rules and applying them to source data: The organization's quality standards are met, and accuracy is improved.
2. Identifying and correcting errors in source data, such as data inconsistencies and missing information: The quality of data is improved.
3. Extracting data from multiple data sources: Users can unlock insights from data, identify customers' requirements, and deliver promised value without delay.
4. Looking up information in knowledge bases and other significant data sources, thus facilitating data enrichment: A complete and highly accurate picture of the data is made available to users, which results in informed business decisions.

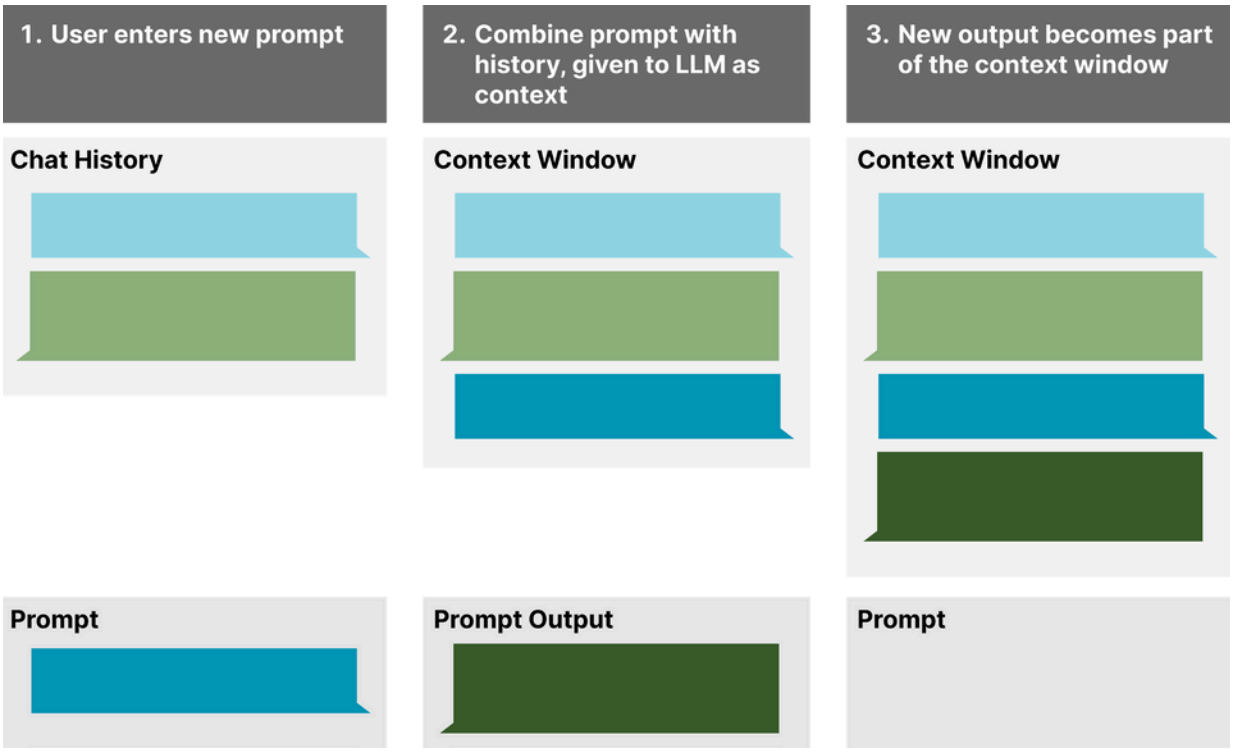
In each of these cases, the key to maximizing the value of Generative AI lies in its ability to interact with and understand the specific data and operational context of the business. By doing so, AI can become a powerful tool for enhancing user interactions, streamlining application development, and ensuring data integrity and enrichment across business operations.

Approaches for Integrating Generative AI with Enterprise Data

Integrating Generative AI with enterprise data requires careful consideration of the methods businesses deploy, each with its own advantages and challenges.

1 PROMPT CONTEXT WINDOW

The simplest approach is to include enterprise data directly within the prompt, effectively inserting data into the AI Prompt's Context Window. This technique allows the Generative AI to use the provided information when generating a response, making it immediately more relevant to the business context. However, this approach is inherently limited by the size of the context window, which is typically between 4 and 16 kb of text. Given this constraint, the amount of enterprise data that can be included is limited, which may not be sufficient for complex or data-rich prompts.

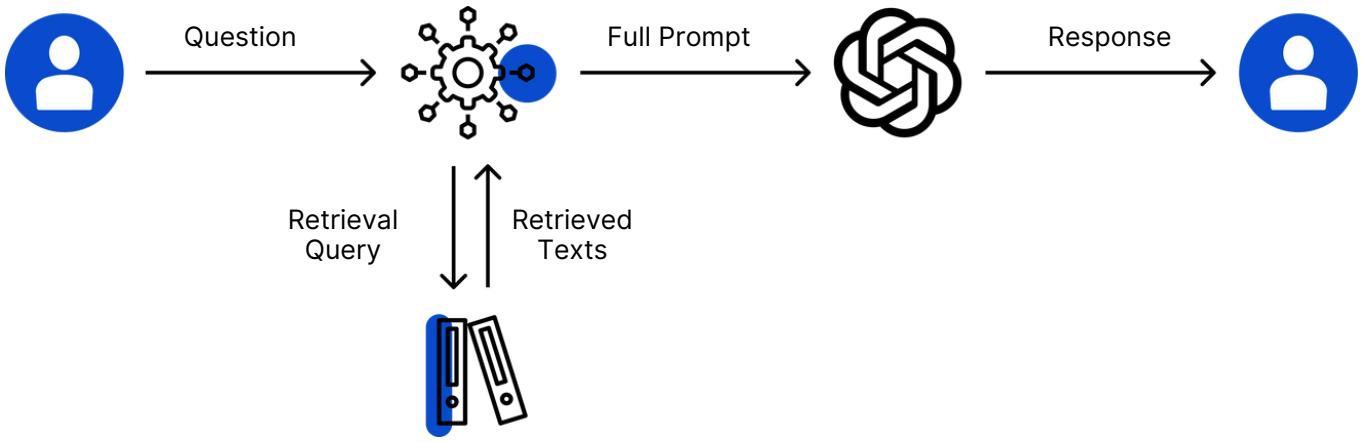


2 FINE-TUNING THE MODEL

A more involved approach is to fine-tune the Generative AI model with enterprise data. This process involves training the model on data specific to the business, thereby customizing its responses to reflect the nuances of the company's operations and knowledge domain. While this can significantly improve the relevance and accuracy of the AI's outputs, it is a resource-intensive process. It requires a substantial effort to curate the data, manage the updates to the model, and ensure sensitive information is not exposed because the fine- tuned model may be accessible to others. Additionally, it necessitates ongoing maintenance and retraining, especially if the underlying model or the enterprise data changes.

3 RETRIEVAL AUGMENTED GENERATION

The third approach, and often considered the most promising, is Retrieval Augmented Generation (RAG). RAG systems enhance the quality of responses from large language models (LLMs) by grounding the AI's internal knowledge with external data sources. They dynamically retrieve relevant information from a database or knowledge base at runtime, allowing the model to incorporate the most current data into its responses. This method not only enriches the AI's output but also maintains the integrity of enterprise data, as the retrieval process can be designed to comply with privacy and security standards.



RAG provides a balance between the immediacy of the context window approach and the depth of fine-tuning, offering a scalable solution that keeps the AI's responses fresh and aligned with the enterprise's evolving data landscape. It does, however, require the development of sophisticated retrieval mechanisms and the ability to integrate these seamlessly with the existing LLM infrastructure.

Each of these approaches offers a different path to the same goal: effectively leveraging Generative AI as a powerful tool for enhancing business insights and improving operational efficiency. The choice of approach will depend on the specific needs of the business, the nature of the enterprise data, and the strategic importance of the AI's applications.

Conclusion

In conclusion, Generative AI has proven itself as a transformative force in business, offering unprecedented opportunities for exploiting enterprise data to spur innovation and drive automation. This whitepaper has outlined three strategic approaches for effectively integrating Generative AI with enterprise data, each providing unique benefits. Among these, the Retrieval Augmented Generation approach emerges as a suitable avenue for redefining the landscape of business interactions with data. The significance of the RAG approach lies not just in its adaptive nature but in its ability to usher in a new era of real- time decision-making and generative insights. Its ability to combine the strengths of retrieval mechanisms with generative capabilities opens new horizons for data-driven decision-making and problem-solving. As businesses navigate the evolving demands of the digital era, adopting the Retrieval Augmented Generation approach helps them maintain a leading position in innovation and achieve sustained success in an ever- changing landscape.

Sources

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About Adeptia

We empower businesses to Automate, Integrate and Observe data flows.

Adeptia began not as another integration solution provider but as a pioneer of AI-powered approaches to integrating businesses.

Since 2000, Adeptia's automated, AI and self-service-driven approach to integration has been helping clients around the world to integrate their businesses and partners securely, easily, and quickly. Our self-service integration solution is the only data integration technology available as a self-service business application that is designed for non-techie business users, enabling companies to transform how they do business and deliver the value they've promised to their customers. Adeptia serves hundreds of mid- and-large-sized businesses around the globe with easy-to-use self-service data integration that scales up to meet the production data volume demands needed by Global 2000 businesses.

To learn more how Adeptia software can help save your business money, visit www.adeptia.com



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Joanna is the Chief Marketing Officer of Adeptia, responsible for the company's marketing, business development, branding, strategic positioning, go-to-market strategy, and sales enablement.

Previously, Joanna was at SmartBear, a leading information technology company, where she served as Senior VP of Marketing. Before that, she was VP of Product Marketing at Sauce Labs, Senior Director of Product Marketing at Confluent, and Director of Product Marketing at Datameer, among other positions.

Over the past 25 years, Joanna has launched a variety of platforms and applications, from business-focused analytic applications to data-management tools, for both startup and Fortune Global 500 companies, including Confluent, IBM, and Oracle.

Joanna has a Bachelor's Degree in Chemical Engineering from the University of California, Los Angeles.



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