

# WHY HYBRID AI IS THE NEXT BIG THING IN MAINFRAME TRANSFORMATION



Artificial intelligence (AI) has come a long way from being a futuristic concept to becoming a driving force in modern business. It powers everything from personalized shopping recommendations to advanced medical diagnostics. But as industries rely more on AI, the limitations of individual AI models become clear. Enter hybrid AI—the next evolution in artificial intelligence that used multiple types of the technology. This strategy seamlessly integrates diverse AI techniques, harnessing their combined strengths to deliver outcomes that surpass what any single method could achieve on its own. And for mainframe environments, hybrid AI isn't just a game-changer; it's the future of transformation.

## The power of generative AI and LLMs in mainframe transformation

Generative AI (GenAI) and large language models (LLMs) have captured the spotlight in recent years. These technologies can generate natural-sounding text, summarize complex documents, and even write code. For mainframe transformation, they open doors to simplifying complex tasks such as:

- Explaining intricate legacy code in human-readable terms
- Assisting developers with debugging and modernization efforts
- Generating documentation for systems that have remained undocumented for decades

However, LLMs aren't without their flaws. GenAI can suffer from "hallucinations," confidently

generating inaccurate information. This lack of reliability poses challenges, especially in high-stakes environments like mainframe operations, where accuracy and precision are critical. This is where a hybrid AI truly shines!

## What is hybrid AI?

Hybrid AI represents a powerful approach that leverages the unique strengths of various AI techniques, fusing them into a unified, powerful solution capable of addressing complex challenges. This integrative method not only harnesses the benefits of each technique, but also compensates for their respective limitations, resulting in a robust and adaptable strategy.

- **Machine learning (ML)** algorithms improve their performance by learning from data to identify patterns and make predictions or decisions without being explicitly programmed for every scenario. As these algorithms process more data, their accuracy and efficiency typically increase, making them essential for applications that require continuous adaptation and improvement.
- **Deep learning** is a specialized ML subset that employs multi-layered artificial neural networks to analyze data. This layered approach allows for the automatic extraction of complex features from raw input, making it particularly effective for tasks such as image and speech recognition, natural language processing (NLP), and other applications where understanding high-level abstractions is key.
- **GenAI** focuses on creating new, original content by learning from existing data. This capability is not only useful for creative industries but also for simulating scenarios, augmenting datasets, and exploring innovative solutions in various domains.
- **Rules-based systems** excel in situations where clarity, consistency, and transparency are crucial. While they may lack the adaptability of ML models, rules-based systems provide predictable and explainable outputs, making them indispensable in environments that demand strict compliance and control.

By integrating these diverse approaches, hybrid AI mitigates the weaknesses of individual techniques while amplifying their strengths. The result? A flexible, adaptable AI system tailored to the unique challenges of mainframe environments.

## Why hybrid AI is perfect for mainframe transformation

Mainframe systems are the backbone of many industries, handling critical applications and vast amounts of data. However, modernizing these systems is no easy feat. Hybrid AI offers solutions for both operations and development teams, addressing the complexities head-on.

### Benefits for operations teams

- **Root cause analysis and remediation:** Hybrid AI can identify the probable cause of performance issues or outages by analyzing system behaviors through multiple layers of AI. It not only pinpoints the issue but also provides actionable next steps for remediation.
- **Reduce MTTD and MTTR:** Mean time to detect (MTTD) and mean time to resolve (MTTR) are critical metrics for operational efficiency. Hybrid AI automates these processes, drastically reducing downtime and improving system reliability.
- **Agentic AI for automation:** AI agents act as virtual team members, executing tasks

autonomously. They can carry out the entire remediation process, ensuring accuracy and freeing up operators to focus on strategic priorities.

## Benefits for development teams

- **Code assistance:** Hybrid AI provides real-time support for developers, offering intelligent suggestions and recommendations tailored to mainframe environments. It flags potential errors, optimizes code, and guides developers step by step.
- **Understanding legacy code:** Many mainframe systems are decades old, with little to no documentation. Hybrid AI helps developers decode complex, undocumented legacy code by generating natural-language explanations and mapping dependencies.
- **Accelerating refactoring and modernization:** By providing insights into how code changes impact other systems, hybrid AI mitigates risks during modernization. It also automates documentation and dependency mapping, speeding up transformation efforts.
- **Knowledge transfer for next-generation developers:** As senior mainframe experts retire, they take decades of knowledge with them. Hybrid AI preserves this tribal knowledge and makes it accessible to newer developers. It empowers junior teams to confidently work on mainframe systems by breaking down complex code into digestible insights.
- **Support for GenAI-driven COBOL-to-Java conversion efforts:** Transitioning legacy COBOL code to modern languages like Java is a daunting task. Hybrid AI simplifies this process with automated translations and clear explanations, ensuring consistency and accuracy.

## Real-world applications of hybrid AI in mainframe transformation

The potential of hybrid AI is best understood through real-world scenarios:

- **Operations:** Imagine a mainframe system experiencing performance bottlenecks due to unexpected workload spikes. A hybrid AI system analyzes system logs, identifies the root cause, and recommends reallocating resources. AI agents execute these recommendations in real time, restoring performance with minimal human intervention.
- **Development:** A team tasked with modernizing a legacy application discovers undocumented dependencies. Hybrid AI maps these dependencies, explains their functionality in plain language, and provides guidance on how to refactor the application. It also generates test data for validation, ensuring that changes do not introduce new issues. The result is an accelerated modernization process with fewer bugs and errors, reducing the risk of disrupting other systems.

## AI agents: How digital assistants autonomously interact with the world

Hybrid AI unlocks new possibilities when powering AI agents, or agentic AI—autonomous digital assistants that perceive their environment, make decisions, and take actions to achieve predefined goals. In mainframe environments, AI agents will have the ability to:

- Automate repetitive tasks
- Proactively monitor and detect anomalies
- Self-heal and automate remediation

- Predictively apply maintenance and perform capacity planning tasks
- Intelligently respond to incidents and automate troubleshooting

With AI agents utilizing hybrid AI techniques, organizations can achieve a level of autonomy that transforms mainframe management from a reactive process to a proactive strategy.

## The strategic importance of hybrid AI for IT transformation

Industries like finance and healthcare depend on mainframes to handle critical data and applications. However, as these industries face increasing pressure to transform, hybrid AI becomes a vital tool in that quest.

## The future of hybrid AI in mainframe management

The possibilities for hybrid AI in mainframe transformation are endless. Future advancements may include:

- **Specialized language models (SLMs):** Tailored AI models for domain-specific challenges, offering precision where broad LLMs fall short.
- **LLM libraries and BYOLLM:** Organizations can integrate custom-trained LLMs, selecting the right AI models for their unique use cases.
- **Predictive and prescriptive analytics:** Expanding hybrid AI's capabilities in identifying and resolving issues before they impact operations.

## Conclusion

Hybrid AI isn't just the next big thing in AI—it's the key to unlocking the full potential of mainframe systems. By combining diverse AI techniques and harnessing their combined strengths, we can deliver outcomes that surpass what any single AI method could achieve on its own and offer unparalleled innovation opportunities.

The time to embrace this transformative approach is now. Hybrid AI is not just reshaping how we transform the mainframe—it's shaping the future of mainframe management.