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AI in Heavy Industrial Applications – Hero or Hype?

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ABSTRACT

They're the questions that are forefront of many minds in 2026: what does AI mean for me? How can it benefit my business? How could it impact my job, my career? Will it deliver real value, or is this another fad that isn't worth my time?

Dario Amodei (CEO of Anthropic; i.e. Claude AI for those that are unfamiliar) has recently coined the term "Diffusion Paradox" – where the bottleneck is no longer raw AI or computing capability, but the time that it takes for institutions, laws, and workflows to adapt. In layman's terms: we, the users, are limiting the scale and power of AI deployment. The capability exists – today. The onus now lies on us to utilise this capability in novel and exciting ways.

We demonstrate these principles through two key applications that were built using large language models and retrieval-augmented generation on real facility datasets. The first is an interactive P&ID interface that links each tagged item to its associated documentation - datasheets, line lists, isometrics, instrument schedules and 3D model references (and scope for additional linkages). The second application is a natural-language query tool that allows engineers to pose detailed technical questions across the full document corpus and receive contextualised, source-referenced responses.

Beyond these demonstrated applications, the scope for AI-assisted tools extends across the full breadth of process engineering — from automated fault diagnosis and root-cause analysis following facility trips, to proactive equipment monitoring that identifies degradation before it causes unplanned downtime. Future applications include AI-assisted HAZOP and LOPA studies, automated document cross-verification (e.g.P&IDs against line lists, RATS, C&E and datasheets), real-time production bottleneck analysis, automated language translation of extensive technical documentation; the potential applications are significant.

We look forward to sharing these real-world examples, answering questions and sharing knowledge about this technology that presents a huge opportunity to revolutionize our industry.

KEY WORDS

LLM, Production Optimisation, Asset Management, Industry 4.0, Plant Information Systems, Natural Language Querying, Secure Data Transfer, OT / IT, Cyber Security

BIOGRAPHY

Jarrod has spent his career driving cost-effective optimisation of multi-billion dollar projects around the world. During his time with leading energy producers including Woodside, bp and Mitsui, he has worked across the entire project lifecycle - from conceptual studies through to commissioning, start-up and operations - and understands the importance of safe, reliable and efficient facilities.

Jarrod is passionate about adding value through clever solutions; maximizing production, minimizing downtime, removing unnecessary costs and reducing emissions.

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