Explainer

Digital Twin Explained.

A digital twin is a virtual representation of a physical object, system, or process. It acts as a bridge between the physical and digital worlds, enabling real-time monitoring, analysis, and simulation. This concept has rapidly gained traction across industries like manufacturing, transportation, energy, and infrastructure due to its ability to improve efficiency, predict problems, and support better decision-making.

At its core, a digital twin mirrors its real-world counterpart by using data from sensors and other sources to reflect the current state, behaviour, and performance of the physical entity. Think of it as a live, evolving digital model that provides insight into how something is functioning in the real world.

The core value proposition of Digital Twin is its ability to deliver holistic intelligence. Intelligence that spans entire organisations, process or workflow and delivers intelligence and automation at both a macro and micro level. This is what separates 'Digital Twin' from typical IT systems. You may have an IT system to manage bookings at a desk – the Digital Twin would model the entire operation, likely taking a feed from the system managing bookings at the desk, but capable of delivering much more powerful intelligence.

Digital Twins are becoming more and more present in our everyday lives. Systems that connect the physical and digital worlds are behind many of the services we benefit from today and are becoming a prominent tool in industry to tackle critical challenges and make organisations more data-driven. In fact, the Digital Twin market is expected to grow rapidly over the next few years, with companies like McKinsey projecting the market to reach $150 billion by 2032 with a CAGR of >40%. The drivers behind this growth are a need for organisations to leverage data across real-world contexts, an increase of IoT sensor deployments with over 40 billion connected devices expected by 2030 which is up from ~11 billion in 2020 and the emergence of artificial intelligence (AI) technology. So, a combination of greater demand, more data and a need to future-proof are driving this exponential growth.

AI-enabled Digital Twin

As demand grows, what is becoming apparent is that leaders and organisations want Digital Twins to predict and simulate future events and scenarios – not to just monitor. This is creating a demand for a more advanced form of Digital Twin technology – AI-enabled Digital Twins.

An AI-enabled digital twin is an advanced form of digital twin that integrates AI to enhance decision-making, prediction, and automation. While a traditional digital twin provides a real-time digital replica of a physical system, an AI-enabled digital twin goes further—it understands patterns, learns from data, and makes intelligent recommendations or decisions based on that understanding.

Entopy's AI-enabled Digital Twin platform

Entopy uses AI in two core areas within its Digital Twin technology stack.

AI-micromodels: Entopy's AI micromodels technology enables it to deliver highly accurate and dynamic predictive intelligence across complex operational environments. This involves deploying many, smaller and more focused AI models to specific parts of the problem and then integrating them together to deliver overall, holistic intelligence. The AI micromodels feed the Digital Twin enabling prediction and simulation capabilities with the central concept of orchestrating multiple AI models together enabled by the Digital Twin itself.

AI Agents: With the emergence of LLMs through 2023 on, businesses have been trying to find innovative ways to tap into this 'assistant'-like capability in more and more complex scenarios. Digital Twin is a technology that organises, data and knowledge into a form that can super-charge those LLM chatbots, taking them from a nice to have to fully fledged operational assistants and analysts.

Entopy is using AI-agents to deliver this capability, creating natural language interfaces to the Digital Twin and in turn, feeding the LLMs with a wealth of structure data and AI micromodel outputs.