

Enhance computer vision with *generative AI* and the metaverse

How synthetic data drives AI models
for effective equipment monitoring





Inspecting complex manufacturing or facilities equipment is often expensive and challenging, which means these processes need to become more intelligent to maximize the use of the equipment while ensuring employee safety.

Artificial intelligence, computer vision, and drones or cameras can quickly identify issues and take action to boost facility revenue, reliability, and utilization.

But a lack of visuals for defect detection or other critical scenarios makes it hard to develop reliable AI models. For manufacturing and production facilities, the need for inspection, critical scenario detection, health and safety, emission monitoring, and quality control is now.

Synthetic data from simulations

Capgemini's computer-vision framework can receive visual data from drones or other devices to detect defects or scenarios. It applies AI models that are trained for this purpose. When there is a lack of visual information available, synthetic data is generated using metaverse simulations for AI model training; this delivers a wide range of scenarios and data to drive machine learning and better AI models.

3D models are generated using simple visual or asset specifications, with computer graphics to simulate realistic use of operating assets and different potential defects over time. Simulations can generate thousands of images for multiple scenarios per minute to train the computer-vision model.



Computer-vision framework

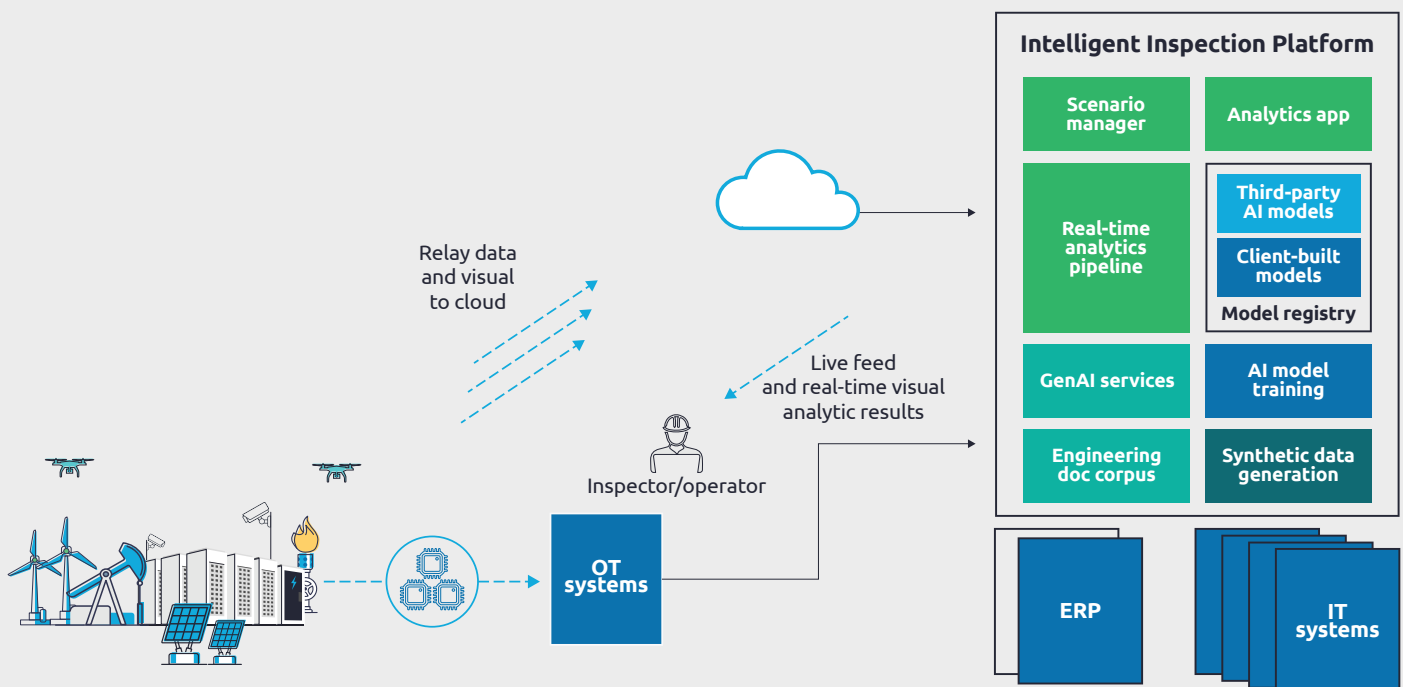
The plug-and-play framework receives real-world visuals, applies scenario detection using computer vision AI models, and sends the results to systems to manage the work order or inspection.

The registry in the framework can host and manage its own custom or third-party pre-built AI models in one place. The framework organizes training and detection visuals in an easy-to-use structure and allows traceability of results. And users see the results visualized in an intuitive manner. 3D models are generated using simple visual or asset specifications, with computer graphics to simulate realistic use of operating assets and different potential defects over time. Simulations can generate thousands of images for multiple scenarios per minute to train the computer-vision model.

Capgemini's solution delivers:

- Synthetic data to train AI models when real-world visuals are unavailable
- Proactive asset maintenance to allow operators to act on potential issues, preventing costly unscheduled downtime
- Regulatory compliance, so operators meet all commitments
- Scalability with the flexibility to extend beyond the visual spectrum and to incorporate sensor data from assets and the environment
- Quality assurance and improved product quality with visual AI
- Improved worker safety, with visual AI and drone inspection handling hazardous environments.

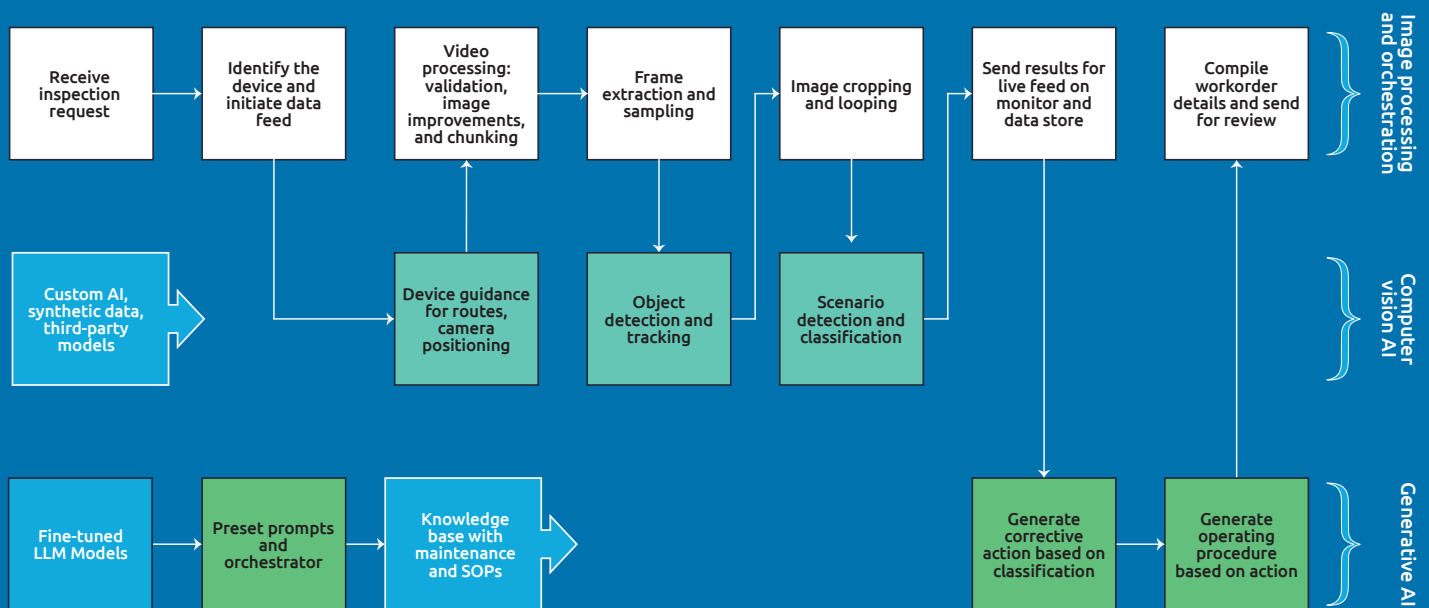
The cost-effective, plug-and-play framework on the cloud provides the flexibility of adding models from new or existing applications and minimizing integration points in the IT landscape.



Leveraging generative AI to create workorders

Generative AI can create new workorders based on operating procedures, maintenance instructions, and historical workorders.

- Each set of documents is utilized to build libraries that are then leveraged by the generative AI module. It uses cognitive search and RAG patterns to build workorder details and instructions section by section.
- Generated workorders can be sent to the workorder management system for further processing.
- Libraries can also be leveraged for building knowledge assistants that operators and field engineers can use to glean information from the large collection of documents, in the context of or independent of the workorder.



Capgemini's strong industry capabilities combined with AI, computer graphics, and metaverse experience deliver a flexible and scalable framework. Now manufacturers and facilities can create a safer and more productive environment with Capgemini's computer-vision framework delivering the future they want.





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