



JARVIS

DRIVING HUMAN-ROBOT COLLABORATION: QUARK – Quality Assurance with Robotic Knowledge



Funded by
the European Union

Project name

QUARK – QQuality Assurance with Robotic Knowledge

Introduce your pilot project in a few sentences (What problem are you addressing? What is your solution or approach? What makes it innovative or impactful?):

The QUARK pilot addresses the challenge of quality inspection processes in plastics industry. Current inspection systems require extensive reprogramming and lack flexibility when adapting to new product types.

QUARK introduces an AI-driven, human-centered robotic inspection system that combines advanced vision, dynamic object recognition, and intuitive operator interaction through Augmented Reality (AR).

By integrating these capabilities, the pilot enables faster reconfiguration, higher defect detection accuracy, and reduced operator workload, making it innovative and highly impactful for small and medium-sized manufacturers.

How does your work align with the goals or methodology of JARVIS?

QUARK fully aligns with the JARVIS mission of enabling adaptive, trustworthy, and human-centered robotics.

The pilot leverages JARVIS tools—specifically AR Interfaces and Object Recognition & Pose Estimation—within a real industrial environment, demonstrating practical integration and validation at TRL 7.

The project contributes to JARVIS goals by validating multimodal Human-Robot Interaction (HRI) technologies, promoting explainable AI-based inspection, and showcasing an interoperable ROS2-based framework that can be replicated across different manufacturing domains.

Briefly outline the upcoming focus or next milestones in the pilot's development:

The next phase of the QUARK pilot will focus on:

- Integrating AR Interfaces and Object Recognition & Pose Estimation tools within the existing robotic inspection cell.

- Expanding the AI dataset with real and synthetic images to improve defect detection robustness.
- Deploying and testing the automated palletization module in an operational environment.
- Conducting usability and operator acceptance studies with GERMANPLAST personnel. These activities will lead to the final TRL 7 validation of the integrated system during Sprint 3.

How does your solution advance Human-Robot Collaboration in a user-centric manner?

QUARK enhances Human-Robot Collaboration by placing the operator at the center of the inspection workflow.

Through AR-based interfaces, operators can intuitively configure and monitor inspection tasks, visualize AI outcomes, and provide feedback in real time—without needing programming skills.

This approach transforms the operator's role from passive monitoring to active collaboration, increasing engagement, trust, and system transparency.

By combining automation with human insight, QUARK embodies the JARVIS vision of ethical, explainable, and user-driven collaboration between humans and robots.