GRACE

JÖNKÖPING UNIVERSITY
School of Engineering

GRACE >_INTELLECT

Intelligent Technology for Equipment Lifecycle Enhancement and Circular Technologies

Intellect is a project within the research profile GRACE to develop and validate integrated frameworks combining multimodal sensor data analytics with flexible automation to address critical haps in how industrial companies systematically leverage digital technologies for circular economy in practice.

Manufacturing industries increasingly recognize digital technologies as essential for circular economy transitions, yet systematic frameworks for their practical integration remain limited. Current multi-sensor data fusion approaches show promise but lack cohesive implementation pathways, while industrial practitioners lack concrete guidance for effectively deploying these capabilities. Intellect addresses this by developing structured integration frameworks that connect multimodal sensor analytics with flexible automation and circular manufacturing principles. Building on evidence that unsupervised data fusion and AI-driven analytics can enable data-driven decision-making without requiring labeled datasets, the project bridges the gap between technical capability and industrial implementation.

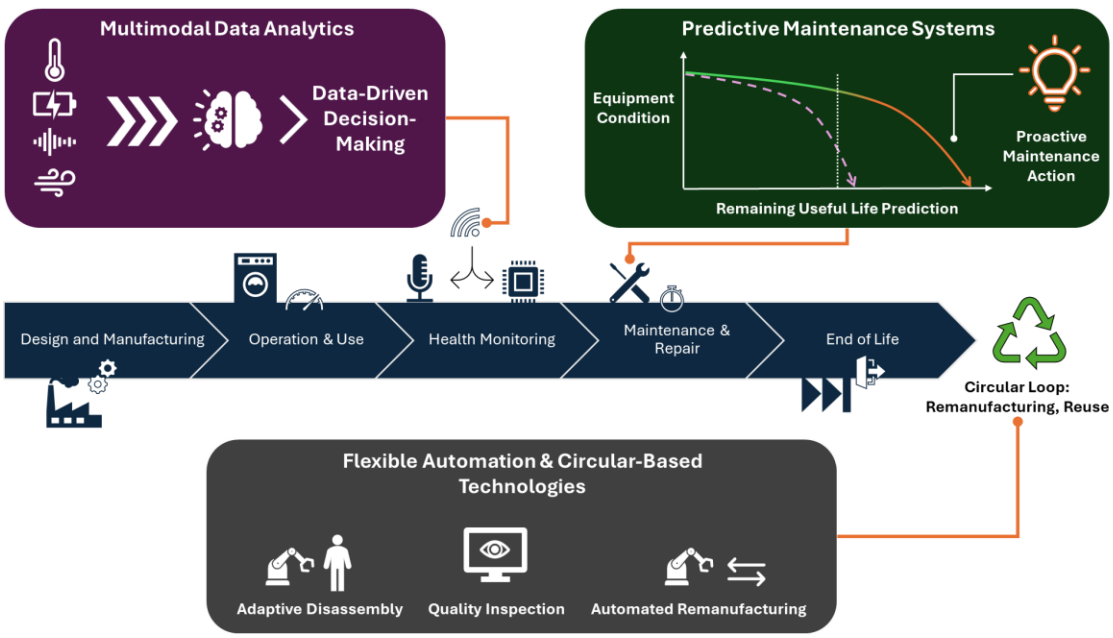

Fig. 1. Overview of Project Intellect

IMPORTANCE OF PROJECT

Industrial equipment failures cost industries billions annually while generating unnecessary waste and emissions. As manufacturing sectors face growing pressure to operate more sustainably, the gap between available technologies and practical application remains wide. ***Intellect*** closes this gap by producing validated frameworks that practitioners can apply, giving engineers and decision-makers concrete tools for monitoring equipment health, extending operational lifetimes, and reducing material waste. The generated knowledge benefits anyone working at the intersection of industrial maintenance, automation, and sustainability, offering evidence-based guidance rather than theoretical recommendations, all grounded in real industrial data.

FACTS

Academic center: School of Engineering (JTH), Jönköping University

Partner companies: FläktGroup

Project duration: 2026 – 2029

Research team:
- Milad Ashourpour, *Assistant Prof.*
- Mahdis Nejatnia, *PhD Student*

Funded by:

KK-stiftelsen

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EXPECTED RESULTS

Intellect benefits two primary groups. Industrial practitioners, particularly maintenance engineers, production managers, and sustainability officers, gain validated frameworks and implementation guidelines for integrating sensor analytics and automation into their operations and products. Academic researchers gain field-validated methodologies, published findings, and demonstrated platforms that advance the scientific edge beyond theoretical proposals. Secondary beneficiaries include equipment manufacturers seeking longer product lifetimes and policymakers working toward circular economy targets. By grounding outcomes in real industrial environment, the project ensures its results are immediately transferable rather than confined to laboratory conditions.

FOR MORE INFORMATION
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