Fraunhofer FOKUS

Empowering Adaptive, Real-Time Solutions

Decentralized Intelligence: How Edge-AI is Redefining Operations

Scalable and efficient solutions with Edge-AI

In today's rapidly changing tech landscape, Edge-AI emerges as a pivotal innovator in various markets. By incorporating edge intelligence into existing systems, it offers scalable and efficient solutions. Technologies like real-time object detection, augmented reality, and human-machine interaction demonstrate its capabilities.

Edge-AI ensures data privacy through local processing, reducing reliance on external data centers. This decentralized approach is vital where speed and adaptability are crucial, with data sovereignty being a key operational aspect.

By 2025, 55 percent of enterprise-generated data will be created and processed outside a traditional centralized data center or cloud, a shift driven by the rise of Edge AI."

Gartner Research

Versatile Object Detection with Edge-AI

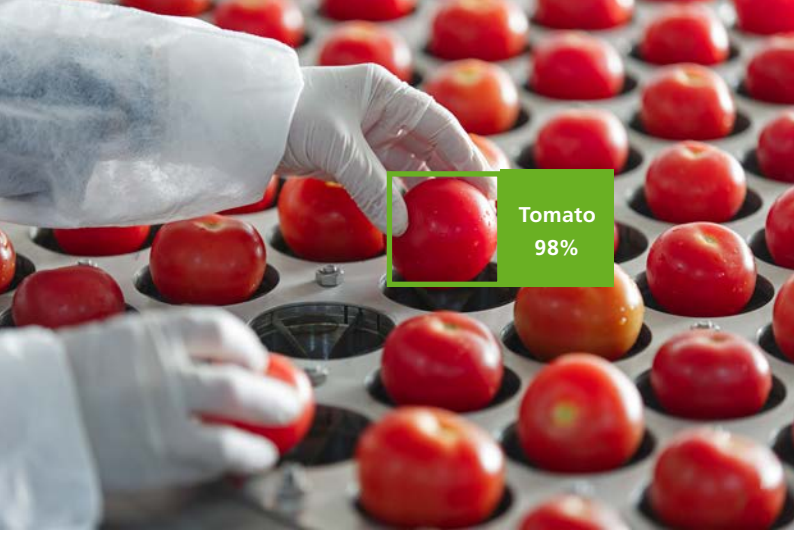
The strength of edge intelligence lies in deploying AI directly on devices for real-time object detection. Unlike cloud-based systems that introduce latency, Edge-AI processes data locally, ensuring quick decision-making. This capability is essential for fast-paced industries like robotics and logistics, enhancing efficiency by minimizing delays. AI models analyze camera feeds to detect items, aiding autonomous functions such as inventory management and quality control. Object detection also boosts wildlife monitoring, healthcare diagnostics, and agricultural productivity, maintaining data privacy by keeping information local.

Enabling Real-Time Control Across Domains

Edge-AI revolutionizes sensor data processing and control of actuators, such as positioning objects with robotic arms. Local data processing allows low latency, crucial for immediate environmental responsiveness in manufacturing and logistics. Without constant cloud connection, Edge-AI reduces down-time from connectivity issues, ensuring reliable performance. Its applications extend beyond robotics to improve smart home solutions, optimize drone logistics, and advance smart city infrastructure, highlighting its broad applicability.

Beyond Touch: Simplifying Interactions with Gesture Detection

Gesture detection enhances interfaces by converting hand movements into device commands, offering intuitive user experiences. This technology minimizes manual inputs, streamlining interaction. In industrial environments, it enables touchless machinery control, boosting safety and efficiency. In healthcare, it provides hygienic interaction with visualization systems. Driven by modern AI algorithms and low-latency pro-cessing, gesture detection ensures swift, accurate responses, transforming interactions across various fields.



Edge AI revolutionizes workflows through object recognition and enables local data processing to improve industrial processes in real-time.

AR and Edge-AI: Transforming Operator Efficiency

Augmented reality (AR) improves human-machine interactions by providing operators with live visual feedback. It displays data overlays, instructions, and diagnostics directly to operators, enhancing training, troubleshooting, and operations. Combined with Edge-AI, it facilitates intuitive decision-making through spatial task visualization, enhancing operator interaction with robotic systems, optimizing workflows, and boosting productivity.

With local data processing, Edge-AI safeguards privacy and ensures data sovereignty for medical applications, enhancing patient trust and compliance.

Efficiency and Data Sovereignty: The Edge-AI Advantage

Edge-AI ensures data sovereignty by processing information locally, avoiding cloud vulnerabilities. Its adaptable architecture suits various applications, from real-time inventory management to automation, fitting operations of any size. Enhanced scalability and real-time decision-making promote operational efficiency and cost-effectiveness. With expertise in Edge-AI, Fraunhofer FOKUS provides exceptional support in implementation, research, and consulting, aiding companies in adopting innovative Edge-AI solutions.

Contact

Marko Harasic
Business Unit Quality Engineering
Phone +49 30 3463-7479
marko.harasic@fokus.fraunhofer.de

Fraunhofer FOKUS
Kaiserin-Augusta-Allee 31
10589 Berlin
Germany

www.fokus.fraunhofer.de/en

We
connect
everything

iku | 2502 (Photos: Cover: Philipp Plum / Fraunhofer FOKUS;
p. 4: adobe stock / Andrey Popov, p. 5: istock / vusta)