



PERCEPTA

Human-Aware Edge AI for Safe and Adaptive
Industrial Collaboration



ORGANISATION PROFILE

emotion3D GmbH is a Vienna-based SME and an indie Semiconductor company specialising in camera-based, touchless human analysis. Its production-grade CABIN EYE technology analyses human characteristics and movement in real time on embedded compute.

Core competences: computer vision and deep learning; 2D/3D human pose and head-pose analysis; attention/readiness and drowsiness cues; gesture/action recognition; synthetic-data workflows; embedded/edge optimisation; safety-oriented validation and privacy-by-design.

R&D and market position: series-deployed automotive human-perception software, global OEM/Tier-1 experience, and participation in collaborative European and EUREKA R&D projects. PERCEPTA transfers this mature perception capability from vehicle cabins into manufacturing and factory-intralogistics environments.

SMART roadmap match: 3.1.5 Human-Machine Collaboration and Workforce Adaptation; 4.5.1 Person-Machine Collaboration; 4.5.2 Human Centric Manufacturing. Supporting domains are 4.2 Intelligent & Adaptive Manufacturing Systems and 4.4 Digital, Virtual & Efficient Companies.

PROPOSAL INTRODUCTION (I)

Vision: Create a privacy-preserving edge-AI perception layer that allows industrial machines and robots to understand worker presence, pose, gesture, action, attention/readiness and task context in real time, enabling safer and more intuitive human-machine collaboration.

Motivation: Factories increasingly combine people with cobots, AGVs/AMRs, forklifts, cranes and automated cells. Conventional safety solutions mainly detect presence or fixed zones; they do not sufficiently interpret human intent, readiness, ergonomics or natural gestures. This causes unnecessary stops, constrains flexible collaboration and leaves preventable safety and ergonomic risks.

Content: Develop an industrial human-perception SDK for RGB/IR cameras; deploy low-latency models on edge hardware; implement identity-independent, privacy-preserving processing; recognise gestures/actions and human-robot handover readiness; predict proximity and hazard situations; derive posture/ergonomic and fatigue/readiness indicators; integrate through APIs with robot/PLC/AGV and digital-twin systems; and validate in two operational pilots: a collaborative manufacturing cell and factory intralogistics/heavy-equipment environment.

PROPOSAL INTRODUCTION (II)

Expected outcome: A modular PERCEPTA SDK validated at TRL 7/8, including: (i) worker pose/state and gesture/action perception; (ii) human-aware robot interaction and task-handover functions; (iii) predictive safety-zone and near-miss analytics; (iv) ergonomics/readiness monitoring; (v) industrial integration APIs and edge deployment packages; and (vi) two reference demonstrators with quantified latency, robustness, false-stop, task-time and safety KPIs.

Impacts: A new industrial product line for emotion3D, commercialised through software licensing and integration engineering to robotics, automation and intralogistics OEMs/system integrators. Industrial partners gain safer shared workspaces, fewer unnecessary line interruptions, more natural gesture-based control, faster reconfiguration and improved human-robot task allocation. Results are transferable across automotive manufacturing, capital goods, warehouses and other human-in-the-loop production environments.

Schedule: 30 months; indicative Q4 2027–Q1 2030, subject to national funding timelines. Application-level starting point TRL 5/6; target TRL 7/8 in operational industrial environments.

PARTNERS

Current consortium: emotion3D GmbH (Austria) — project initiator and technical lead for human-perception AI, edge deployment, validation methodology and exploitation. Consortium formation is open for the SMART 10th Call.

Partner search: The target consortium is 4–6 partners across 3–4 SMART countries and should include at least two industrial companies from two participating countries.

- Industrial manufacturing end-user with a collaborative assembly, inspection or material-handling cell; pilot site, operators and operational/safety KPIs.
- Robotics/cobot or industrial-automation OEM/system integrator; robot control, PLC/ROS integration, safety interfaces and commercial integration pathway.
- Factory-intralogistics or heavy-equipment partner: AGV/AMR, forklift, crane/lifting-system OEM or industrial operator for shared-space safety and gesture/intent use cases.
- RTO/university with human–robot interaction, ergonomics, industrial computer vision, functional safety or digital-twin expertise; independent validation and human-factors methodology.

CONTACT INFO

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