PRESS RELEASE

Open platform aims to bring AI to where data is generated in an energy-efficient manner

Research and Innovation Factory for AI & Microelectronics – first approved module AI-DISCO begins work

The Federal Ministry of Research, Technology, and Space (BMFTR) has approved €15 million in funding for the AI-DISCO project – Edge/Cloud AI for Distributed Sensing & Computing. AI-DISCO is the first module of the R+I Factory (Research and Innovation Factory AI & Microelectronics), a nationwide novel, modular research and innovation structure at the interface of artificial intelligence and microelectronics. The consortium leader is the IHP – Leibniz Institute for Innovative Microelectronics. Fraunhofer IPMS contributes its expertise in AI-based sensor technology and edge computing.

Modern applications increasingly use real-time data analysis – in smart cities, critical infrastructure, Industry 4.0, and energy supply. At the same time, energy requirements are rising sharply when large amounts of data are transferred between applications and data centers. This is exactly where AI-DISCO comes in: The project is developing an open, reconfigurable platform for energy-efficient, distributed AI processing at the interconnection between edge and cloud.

The idea is simple: intelligent edge nodes process sensor data, for example, directly where it is generated – locally, in real time, and without unnecessary data transfer. This allows the system to save energy, reduce latency, and better protect sensitive data. Only the essentials are shared with the cloud. AI-DISCO builds on various preliminary work and developments, including HARMMONAI AI accelerator circuit, an RRAM-based AI accelerator, and a novel spiking neural network architecture. The technical basis includes RISC-V-based edge hardware, which is enhanced with energy-efficient AI accelerators, as well as methods such as federated learning (distributed learning, i.e., AI learning without central data collection) and approaches from neuromorphic AI. Topics such as integrated communication and sensor technology (ISAC/6G) are also addressed as application cases.

Fraunhofer IPMS: Expertise in intelligent sensing and neuromorphic hardware

Fraunhofer IPMS is contributing its proven expertise in AI-based sensor technology and neuromorphic hardware to the AI-DISCO joint project. The aim is to develop energy-efficient, AI-enabled hardware components and application-oriented demonstrators for industry, agriculture, and medical technology. The work focuses on intelligent sensor systems with low-latency interfaces to the edge AI platform, for which the institute

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develops demonstrators such as a miniaturized, AI-supported NIR spectrometer for determining the ripeness of fruit and a glasses-based ultrasound eye-tracking system for medical applications and human-machine collaboration.

In addition, the institute develops novel, neuromorphic AI processors based on FeRAM, which combine computing and memory operations directly (known as "in-memory computing"). Manufacturing using modern 22 nm FDSOI technology and comprehensive characterization and optimization result in particularly energy-efficient edge AI solutions.

"With our research into neuromorphic hardware and intelligent sensor integration, we are laying the technological foundation for powerful and energy-efficient AI systems. At the same time, we are making an important contribution to strengthening Lusatia as a forward-looking high-tech location," explains Dr. Sebastian Meyer, head of the Integrated Silicon Systems division of Fraunhofer IPMS in Cottbus.

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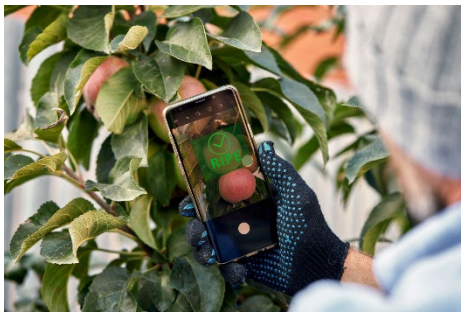
About Fraunhofer IPMS
Fraunhofer IPMS is a leading international research and development service provider for electronic and photonic microsystems in the fields of intelligent industrial solutions, medical technology and health, mobility, and green and sustainable microelectronics. Its research focuses on customer-specific miniaturized sensors and actuators, MEMS systems, microdisplays, and integrated circuits, as well as wireless and wired data communication. Its services range from consulting and design to process development and pilot series production.

About R+I Factory
The R+I Factory (Research and Innovation Factory AI & Microelectronics) is a modular research and innovation project at the interface between AI and microelectronics in Lusatia. AI-DISCO is the first approved module. The initiative contributes to strengthening Cottbus as a research location by merging expertise, facilitating cooperation between science and industry, and enabling application-oriented developments for regional companies and infrastructures. The AI-DISCO consortium consists of the IHP (Frankfurt (Oder) and Cottbus), the BTU Cottbus-Senftenberg, the German Research Center for Artificial Intelligence GmbH (DFKI), the Fraunhofer Institute for Photonic Microsystems IPMS, and the Leibniz Institute for Neurobiology (LIN), as well as industry partners ABB, ENERTRAG, and Perinet. Strategically, the R+I Factory is designed so that future modules can address other key areas at the interconnection between AI and microelectronics—such as AI for microelectronics manufacturing, AI for circuit and algorithm design, energy-efficient microelectronics for AI applications, and time-critical systems.

Microelectronics and artificial intelligence are key technologies that the German government is specifically pursuing in its High-Tech Agenda published in July 2025. The

R+I Factory thus contributes to achieving the goals defined therein, such as technological sovereignty and the rapid transfer of research into application.

Image



Application example: In the AI-DISCO project, Fraunhofer IPMS is developing demonstrators such as a miniaturized, AI-supported NIR spectrometer for determining the ripeness of fruit. © Fraunhofer IPMS

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