



leti



AI smart sensors



Very-low-power smart sensors with optimized embedded artificial intelligence and efficient hardware

What it is

CEA-Leti's AI algorithms can add smart capabilities to sensors in a wide range of products. With expertise spanning the sensor value chain from hardware to algorithms, CEA-Leti can develop complete solutions or bring additional features to existing sensor-based products in very constrained hardware environments.

CEA-Leti can determine the optimal specifications for a given use case, develop the hardware—clusters of sensors—needed to capture data, build an initial database, run data acquisition and testing campaigns, and optimize the AI algorithms for the target hardware before transferring the technology for integration into a product.

What it can do

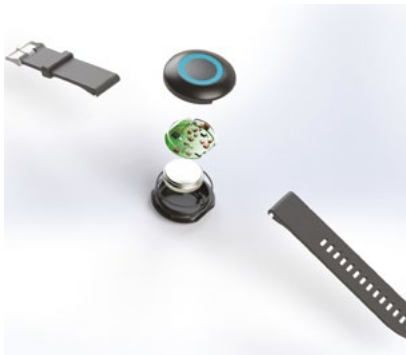
AI algorithms optimized for implementation in low-resource environments like IoT devices can bring smart features to a wide range of markets that require very-low-power sensing and detection solutions:

- Independent living solutions like in-home fall detection and monitoring.
- Monitoring of isolated workers or workers in at-risk situations.
- Predictive maintenance.
- Monitoring of sensitive parcels during shipping.
- Gesture recognition.
- Environmental monitoring.

What makes it unique

CEA-Leti's smart systems including AI algorithms and sensors are optimized for implementation in IoT devices:

- Frugal in terms of hardware resource requirements.
- Low-power, making them ideal for self-powering or battery-powered devices.
- Associated software with machine learning capabilities for continued improvement of the AI based on real-world data.



▲ CEA-Leti's device inside Solem's fall detection wristband.



▲ Smart skis equipped with the technology for performance monitoring.

Working with CEA-Leti

CEA-Leti developed an AI algorithm for partner Solem's fall-detection wearable, which previously relied on the wearer to activate an alert by pressing a button. The algorithm was optimized for Solem's hardware and is now available in the latest version of Solem's fall detection system. Solem can also use the associated software developed by CEA-Leti to train its device on new data, making it even smarter.

Companies of all types and sizes can work with CEA-Leti to develop optimized AI-based sensing solutions for their products.

Added-value AI for Solem

- 69%+ falls detected correctly
- 99%+ non-hazardous situations ignored correctly for a false alarm rate of less than 1 per week
- 18-month battery life (standard button battery)

Scientific publications

- Caroff, T., Brulais, S., Faucon, A., Boness, A., Sanz Arrizabalaga, A., & Ellinger, J. (2020). Ultra low power wireless multi-sensor platform dedicated to machine tool condition monitoring. *Procedia Manufacturing*, 51, 296-301.
- Fourcade, P., Cabanillas, E., & Brulais, S. (2024). Autonomous, Connected, and AI-Embedded Multi-Sensor System for Wildlife Monitoring. *2024 IEEE Smart Systems Integration Conference and Exhibition (SSI)*.

Interested in this technology?

Contact:

Swan Gerome

swan.gerome@cea.fr

+33 438 784 624

CEA-Leti, technology research institute

17 avenue des Martyrs, 38054 Grenoble Cedex 9, France

cea-leti.com

in   @CEA-Leti

