

Press release

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AI-enabled sensors deliver life-changing use cases

Coded #LikeABosch – how we're creating software and AI sensing solutions

- Intelligent software and edge AI deliver powerful, integrated sensor solutions.
- Accurate, real-time and personalized data provided to users.
- Feature-rich, compact and power-saving sensors for consumer devices.

Las Vegas, NV - Sensor technology is transforming our lives: tracking our fitness, making our gadgets easy to use, and monitoring air quality, to mention just a few examples. To provide all these sophisticated functions to consumers, Bosch Sensortec's sensors are evolving to be smarter – by integrating MEMS technology with embedded microcontrollers, software, and AI runs inside the sensor itself.

Stefan Finkbeiner, CEO at Bosch Sensortec, said: “Bosch’s innovative cutting-edge sensor solutions are making an impact in diverse areas such as consumer health, smart homes and smart cities. AI and intelligent software are the key enabling technologies that make this possible.”

Vision 2030: Bosch aims for more than 10 billion intelligent sensors

According to market research and strategy consulting company Yole Group, Bosch is the market leader for MEMS for the fourth year in a row. In 2024 alone, Bosch Sensortec surpassed the milestone of delivering over 1 billion MEMS sensors featuring integrated microcontrollers and software. From 2027 onwards, 90 % of the products will include these integrated features. By 2030, the company aims to achieve a remarkable total of more than 10 billion MEMS sensors sold with this advanced integration.

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AI on the edge

With AI running on the edge (meaning directly in the sensor), there's no need for constant cloud connectivity. This ensures data remains private, dramatically reduces latency, and cuts power consumption, all while delivering accurate real-time feedback to users.

State-of-the-art software solutions add value not only to the sensor but to the entire system, enabling new applications and forming the basis for AI inside the sensor itself.

Always-on and ready to go

Always-on technology is essential in consumer electronics, enabling continuous access to features without the need to activate the device and wake up the main processor. This significantly extends battery life, and creates a more intuitive and effortless experience for users, especially in smartphones and wearables.

This is achieved with intelligent sensors combined with smart software, enabling quick access to voice assistants, health monitoring, and more, empowered by MEMS sensors with integrated microcontrollers. Examples of always-on use cases include voice activity detection and keyword triggering to activate voice assistants in wearables, fall detection in smartwatches for faster emergency assistance, and automatic orientation sensing in smartphones to adjust modes and enter sleep mode when inactive.

Smart Connected Sensors (SCS): the personal AI feedback coach

Can you imagine having unlimited access to a professional fitness trainer, with feedback at any time? This is the future of exercising – made possible by the Smart Connected Sensors platform from Bosch Sensortec.

The platform gives users qualitative feedback on the movement execution, as well as measuring movements and repetitions. Specifically designed for full-body motion tracking, the SCS platform provides a fully integrated hardware and software solution (based on the BHI380, a programmable IMU-based sensor system with AI) that dramatically cuts development costs and time to market.

A sound move for software-enabled voice control

Wireless headsets have transformed how we listen to music, podcasts and audiobooks, providing free, unhindered movement – as well as new features enabled by sensors, such as activity recognition and indoor navigation. But shifting to voice control can cause problems, when the system is triggered unintentionally because it reacts to ambient noise.

To fix this issue, Bosch Sensortec has come up with a software-based innovation: a new type of acceleration sensor, the BMA550, detects sound through bone vibrations. Intelligent algorithms then ensure voice control activates only when the wearer of the headset is actually speaking.

Take a breath: air quality sensing

Poor indoor air quality is a problem: the concentration of PM2.5 particulates from domestic cooking can reach levels 100 times higher than acceptable limits. Localized, actionable data from Bosch's particulate matter sensor for PM2.5 and PM1 enables effective responses to poor air quality. A software update coming soon will activate PM10 measurement in addition.

Almost the entire global population (99 %) breathes air that exceeds WHO air quality limits, and threatens their health. Bosch's BMV080 sensor uses software and intelligent algorithms, in a tiny, fanless design which is more than 450 times smaller than any comparable device on the market.

Open platform and strong collaboration

Bosch can't do all this alone and offers a framework that supports customers in creating movement classification algorithms specific for their own application. These models can then run on a smart motion sensor, such as the BHI360.

For example, Bosch Sensortec and Doublepoint have partnered to develop a powerful microgesture control solution for smartwatches, using the BHI360. This enables always-available, reliable control, such as allowing users to adjust light brightness with an intuitive pinch gesture.

Doublepoint's advanced algorithms are seamlessly integrated into Bosch's compact, low-power IMUs via a new software tool. Compared to camera-based solutions, this IMU-based approach enables obstruction-free gesture detection, offering greater reliability and efficiency.

"This collaboration exemplifies Bosch Sensortec's commitment to innovation in the IoT and wearable markets, empowering manufacturers to bring advanced, user-friendly products to market more quickly," said Lucas Ginzinger, Vice President Marketing and Business Strategy at Bosch Sensortec.

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Basic information:

Bosch Sensortec GmbH, a fully owned subsidiary of Robert Bosch GmbH, develops and markets a wide portfolio of microelectromechanical systems (MEMS) sensors and solutions tailored for smartphones, tablets, wearables and hearables, AR/VR devices, drones, robots, smart home and IoT (Internet of Things) applications. The product portfolio includes 3-axis accelerometers, gyroscopes and magnetometers, integrated 6- and 9-axis sensors, smart sensors, barometric pressure sensors, humidity sensors, gas sensors, optical microsystems and comprehensive software. Since its foundation in 2005, Bosch Sensortec has emerged as the MEMS technology leader in the markets it addresses. Bosch has been both a pioneer and one of the leading providers in the MEMS sensor segment since 1995 and has, to date, sold more than 23 billion MEMS sensors.

For more information, please visit www.bosch-sensortec.com, twitter.com/boschMEMS, community.bosch-sensortec.com, linkedin.com/company/bosch-sensortec/, youtube.com/user/BoschSensortec

The Bosch Group is a leading global supplier of technology and services. It employs roughly 429,000 associates worldwide (as of December 31, 2023). The company generated sales of 91.6 billion euros in 2023. Its operations are divided into four business sectors: Mobility, Industrial Technology, Consumer Goods, and Energy and Building Technology. With its business activities, the company aims to use technology to help shape universal trends such as automation, electrification, digitalization, connectivity, and an orientation to sustainability. In this context, Bosch's broad diversification across regions and industries strengthens its innovativeness and robustness. Bosch uses its proven expertise in sensor technology, software, and services to offer customers cross-domain solutions from a single source. It also applies its expertise in connectivity and artificial intelligence in order to develop and manufacture user-friendly, sustainable products. With technology that is "Invented for life," Bosch wants to help improve quality of life and conserve natural resources. The Bosch Group comprises Robert Bosch GmbH and its roughly 470 subsidiary and regional companies in over 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. Bosch's innovative strength is key to the company's further development. At 136 locations across the globe, Bosch employs some 90,000 associates in research and development, of which nearly 48,000 are software engineers.

The company was set up in Stuttgart in 1886 by Robert Bosch (1861-1942) as "Workshop for Precision Mechanics and Electrical Engineering." The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant upfront investments in the safeguarding of its future. Ninety-four percent of the share

capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The remaining shares are held by Robert Bosch GmbH and by a corporation owned by the Bosch family. The majority of voting rights are held by Robert Bosch Industrietreuhand KG. It is entrusted with the task of safeguarding the company's long-term existence and in particular its financial independence - in line with the mission handed down in the will of the company's founder, Robert Bosch.

Additional information is available online at www.bosch.hu, iot.boschblog.hu, www.bosch.com, www.iot.bosch.com, www.bosch-press.com, www.twitter.com/BoschPresse