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STMicroelectronics accelerates Edge AI adoption
to help companies transform their products

- *Announcing the ST Edge AI Suite, a comprehensive, integrated set of software and tools offering a simpler, more cost-effective way for developers and companies to embed AI-enabled ST products into industrial, automotive/mobility, consumer, communication applications*

- *ST offering developers and companies a comprehensive ecosystem with a broad range of hardware with free software and tools, supported by partnerships with cloud services and AI toolchain providers*

- *Companies of any size to benefit from unconstrained edge AI deployment, accelerating its adoption globally*

Geneva, Switzerland, December 6, 2023 -- STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, is introducing its comprehensive ecosystem offer for companies to transform their products with edge AI. The announcement of the ST **Edge AI Suite**, an integrated set of software tools free-to-use with ST hardware, takes the offer to customers one step further, enabling them to jumpstart the design and deployment of billions of connected, autonomous things embedding artificial intelligence locally. The **ST Edge AI Suite** will simplify the development of customers' AI solutions exploiting ST's broad range of hardware (general-purpose and automotive microcontrollers and microprocessors, smart sensors) and related tools for embedded AI optimizations. It will expand and integrate the multiple software tools, evaluation, and development kits introduced over the past 10 years, while leveraging the existing AI ecosystem of machine learning (ML) frameworks and key partners (such as Nvidia and AWS).

"We are moving towards a world with tens of billions of connected, autonomous things bringing value and convenience to their users throughout all aspects of consumer life and enterprise productivity. To achieve this, AI algorithms will need to be run both in the cloud and on-device, at the edge across a broad range of devices: smartphones and connected personal devices, smart home and building control systems, industrial machines, cars and many more," said **Jean-Marc Chery, President and CEO of STMicroelectronics**. *"ST products are already at the core of all those devices, but it is their combination with the industry-leading, free software suite we are announcing today that will make the difference. This combination will enable the transition to a more intelligent edge, empowering customers of any size to deploy edge AI more easily and build their vision of this connected future leveraging ST's hardware portfolio."*

A preview of the ST Edge AI suite capabilities was presented today at ST's online Edge AI Summit. ST's industry-leading offer will empower embedded developers who want to create optimized machine learning models, data scientists who want to run their model on an embedded device, and product designers and creators who want to redefine product greatness.

With free access, ST will enable customers large and small, pooling resources and knowledge into a community-driven approach. The Suite will further enable this transformation by federating the tools and their users around a broader edge AI community.

The first release of the ST Edge AI suite will be available in the first half of 2024.

More information about the benefits of the adoption of edge AI

Edge AI is a crucial technology for businesses to transform their products in today's connected world by bringing intelligence and decision-making capabilities closer to the data source. This offers numerous benefits in terms of speed, power consumption, privacy, security, and cost-efficiency empowering businesses to create more intelligent, responsive and efficient products that meet the demands of today's fast-paced and data-driven world.

Examples of businesses transforming their products with ST:

15-40% performance improvement for washing machines:

A **major home appliance maker** is currently adopting this solution and we should see their product on the market next year. The first machine learning algorithm is creating a virtual sensor approach, estimating the weight of the clothes to be washed based on the motor current measurement. Another machine learning algorithm is collecting data from a 6-axis motion sensor to enable drum collision avoidance by calculating if the drum will touch the outer shell of the washing machine. Based on the algorithm input, a program drives the motor using exactly the current needed and adjusts the water and detergent used to save between 15 and 40% energy and water for a washing cycle. Both algorithms have been developed with NanoEdge AI and are running on an STM32G0 MCU together with an ST 6-axis motion sensor.

Ultra low power PC activity monitoring:

The **HP** engineering team worked closely with ST to develop and train AI models that recognize different user activities based on device and user motion. Multiple use cases were addressed, including scenarios where the laptop is placed on a table, on the user's lap, or carried inside a bag and taken out. This helped create an AI model specific to HP devices that was put on a smart 6-axis motion sensor. But the really interesting part here is the power consumption. This sensor is running an edge AI algorithm at 34 microamps. This allows HP computers to detect changes and respond accordingly. And most importantly, conserve the battery power for more critical tasks.

EV motor operation and maintenance optimization:

ST is working with the **HPE Group** to optimize the operation and maintenance of motors in electric vehicles. The challenge here was to monitor the internal temperature of the rotor of an electric motor in actual use, so that power output could be optimized for more efficient and safer operation. This is something that could be done in a lab with the rotor exposed but is not possible in an actual running motor in a vehicle. The solution was to train a model and build a virtual temperature sensor with edge AI to estimate the internal rotor temperature from the external temperature measurement. The algorithm runs on the microcontroller that controls the motor – a Stellar automotive MCU. The same MCU also runs an AI algorithm that detects potential anomalies through the analysis of vibrations. The same approach can be used with other critical components, like EV batteries, where the internal temperature of the battery is not practical to measure but an edge AI model can simulate it from an external measurement.

Additional technical information

ST's strategy on AI relies on the availability of a comprehensive, integrated set of tools (some of them already available today), technical and educational examples, and an innovative, unified optimizer of embedded AI solutions called ST Edge AI Core Technology. The ST Edge AI Suite addresses the needs and requirements of different profiles, like Data scientists, embedded SW developers and HW System Engineers. The suite is easy to use, with a simple and intuitive interface, available in different fashions (Desktop, CLI, Web, API).

- **ST Edge AI Suite works across multiple ST hardware platforms**: will be working across: STM32 general-purpose MCUs, including the already announced portfolio with AI hardware acceleration, STM32N6 and STM32 MPUs built for industrial applications; Stellar automotive microcontrollers, supporting carmakers in their transition to software-defined vehicles with predictive maintenance of the electric powertrain to extend vehicle lifetime or battery management systems to maximize energy efficiency embedded intelligent sensors (based on intelligent sensor processing units, or ISPU, machine learning cores, or MLC, as well as leveraging Time-of-Flight sensors for advanced imaging), ideal for applications in industrial, automotive and anything from wearable accessories to high-end personal electronics applications. All are supported by a broad range of evaluation and development boards.

- **A critical component of the ST Edge AI suite is ST Edge AI Core that brings together all the SW and tools engineers need at each step of their project**: The ST Edge AI Core can import ML and NN algorithms from the most widely used ML frameworks, provide a detailed analysis, optimize the algorithm for the selected devices (sensors, MCU, MPU), validate against the original model, and finally map the resulting embedded AI solution on the selected device. It will be possible to benchmark the same AI algorithm on different platforms, in pure SW or exploiting specific HW accelerators, to assess accuracy and inference time in a few clicks.

- **NanoEdge AI Studio autoML tool becomes free for STM32, and is now available for all ARM Cortex-M based MCUs**: In parallel, ST's autoML tool NanoEdge AI Studio is getting an upgrade to the benefit of customers globally: its use will become free. The deployment of libraries created by NanoEdge AI Studio will now be at no cost for unlimited deployment on any STM32 microcontroller. In addition, as NanoEdge AI Studio targets all ARM Cortex-M based microcontrollers, clients will now be able to build and deploy libraries, including unique on-device learning, on other ARM Cortex-M microcontrollers under a special license agreement.

About STMicroelectronics

At ST, we are over 50,000 creators and makers of semiconductor technologies mastering the semiconductor supply chain with state-of-the-art manufacturing facilities. An integrated device manufacturer, we work with more than 200,000 customers and thousands of partners to design and build products, solutions, and ecosystems that address their challenges and opportunities, and the need to support a more sustainable world. Our technologies enable smarter mobility, more efficient power and energy management, and the wide-scale deployment of cloud-connected autonomous things. We are committed to achieving our goal to become carbon neutral on scope 1 and 2 and partially scope 3 by 2027. Further information can be found at www.st.com.

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