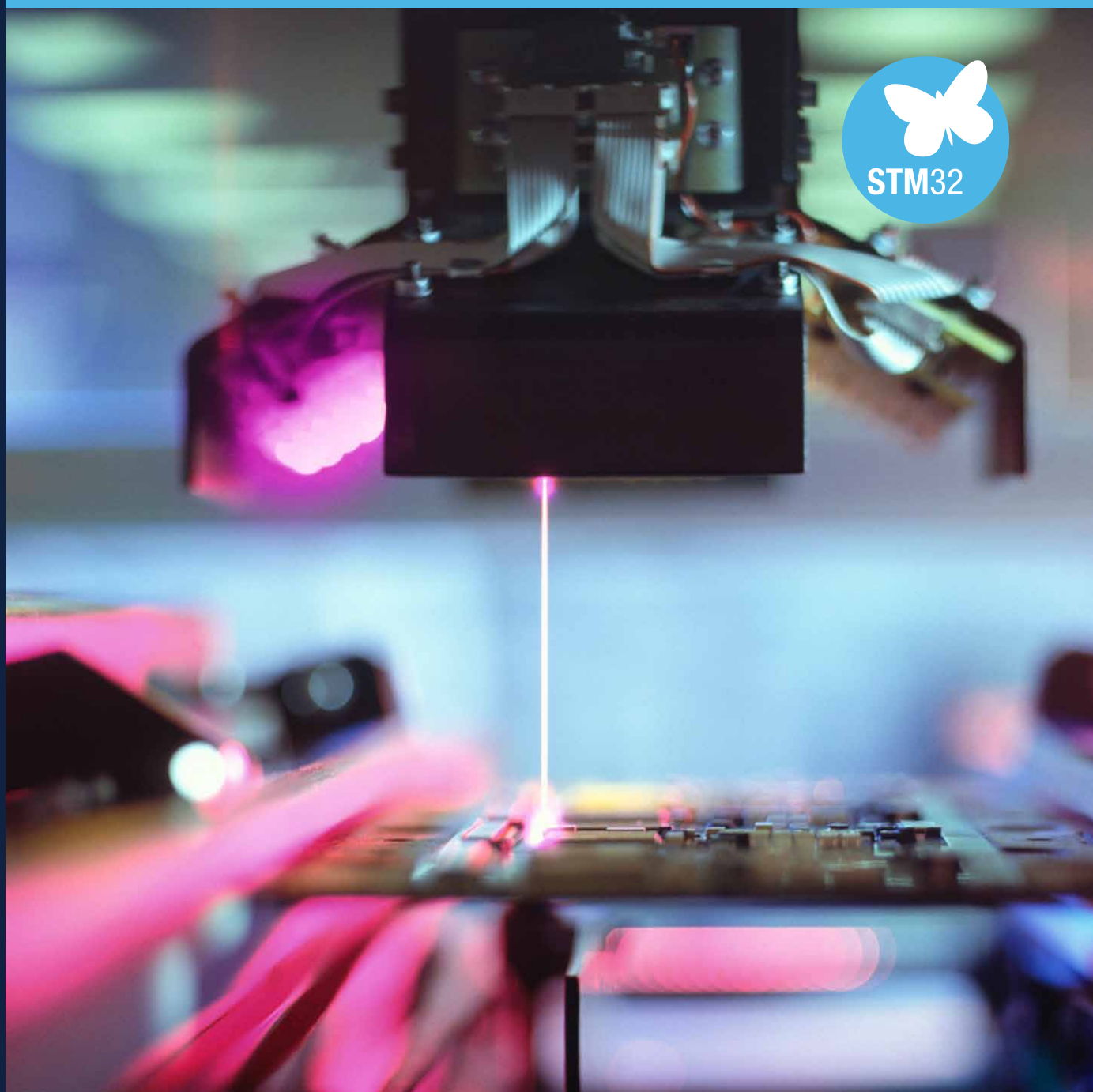




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Give your product an Edge using AI on STM32



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Artificial intelligence solutions

Use the power of Machine Learning (ML) and Neural Networks to enhance signal processing performance, increase productivity and add new capabilities to your STM32 application.

STMicroelectronics offers a comprehensive development ecosystem that helps you embed Machine Learning and Deep Learning algorithms into your STM32-based solutions and leverage the benefits of Artificial Intelligence to imagine new user experiences.

Run AI algorithms locally on your MCU without necessarily relying on cloud capabilities.



Better user experience



Real time, no latency



Reliable



Privacy by design



Optimized cloud usage



Sustainable

CONDITION MONITORING AND PREDICTIVE MAINTENANCE

Predictive maintenance applications benefit from the wide expansion of the tinyML ecosystem for a wide range of deep learning AI systems. Such systems bring enormous value to industrial applications by reducing maintenance cost and downtime. Today's condition-monitoring solutions use various sensors to monitor motor vibration, electrical current, pipe flow rates and pressure drops, or acoustic levels.



ST supports the development of Predictive Maintenance solutions for in-field retrofitting of existing systems or for built-in systems. NanoEdge AI Studio, a new a PC-based push-button machine learning (ML) development studio, lets developers generate optimized ML libraries for anomaly detection and classification applications in a few simple steps.

Deploy optimized ML libraries and prototype advanced predictive maintenance applications on STM32 boards embedding industrial-grade sensors:



SensorTile Wireless Industrial Node Development Kit (STEWAL-STWINBX1)



Industrial sensor evaluation kit for condition monitoring based on a 2.4 GHz multiprotocol wireless ultra-low-power STM32WB module (STEWAL-PROTEUS1)

COMPUTER VISION AT THE EDGE

The momentum around computer vision applications keep rising with today's strong demand for data-driven insights for smart devices. ST offers hardware and software tools as well as a complete ecosystem for developers to run computer vision applications based on STM32.

These resources help them find the best solutions for a wide range of applications including room occupancy, face recognition, smart city management, meter reading and many more.

ST offers several small and low-power STM32 boards to help developers rapidly prototype computer vision applications:



Discovery kit with high-performance STM32H7 series microcontroller with DSP and DP-FPU (STM32H747I-DISCO)



OpenMV Cam H7 machine vision board with embedded STM32H743VI MCU

Flash and operate in real time the Convolutional Neural Network optimized using STM32Cube.AI to extend your project with machine vision.

Wide set of OpenMV computer vision libraries and simple run time configuration via microPython.

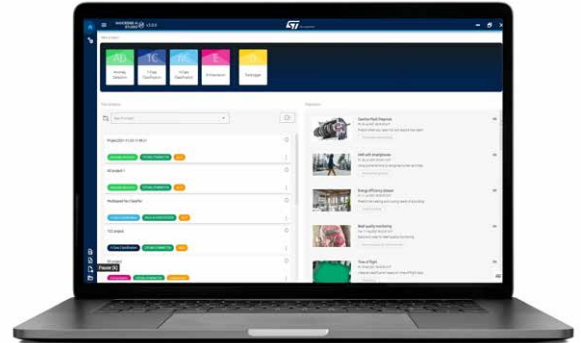
NANOEDGE AI STUDIO: AUTOMATED MACHINE LEARNING TOOL FOR SMARTER PRODUCTS

With NanoEdge AI Studio, ST makes AI more accessible: software developers can now create optimized ML libraries from the tool's user-friendly environment, without needing advanced data science skills or expertise in Artificial Intelligence (AI).

NanoEdge AI Studio is a PC-based push-button development studio that embeds an automatic search engine for AI libraries. It enables developers to easily generate an optimized ML library for their project, based on a minimal amount of data and in a matter of minutes. Input signals can come from a wide variety of vibration, pressure, sound, magnetic, and time-of-flight sensors, just to name a few, or even a combination of signals from several different sources. Multiple sensors can be combined, either in a single library, or using multiple libraries concurrently.

Once the library is created, it can be easily loaded into a microcontroller to train and infer directly at the edge for improved security and reduced latency.

On-device learning allows to refine the ML model for any specific product/environment without having to re-develop the entire algorithm on a PC or gateway. This way, it becomes easy to improve a solution for a specific system/environment or usage.

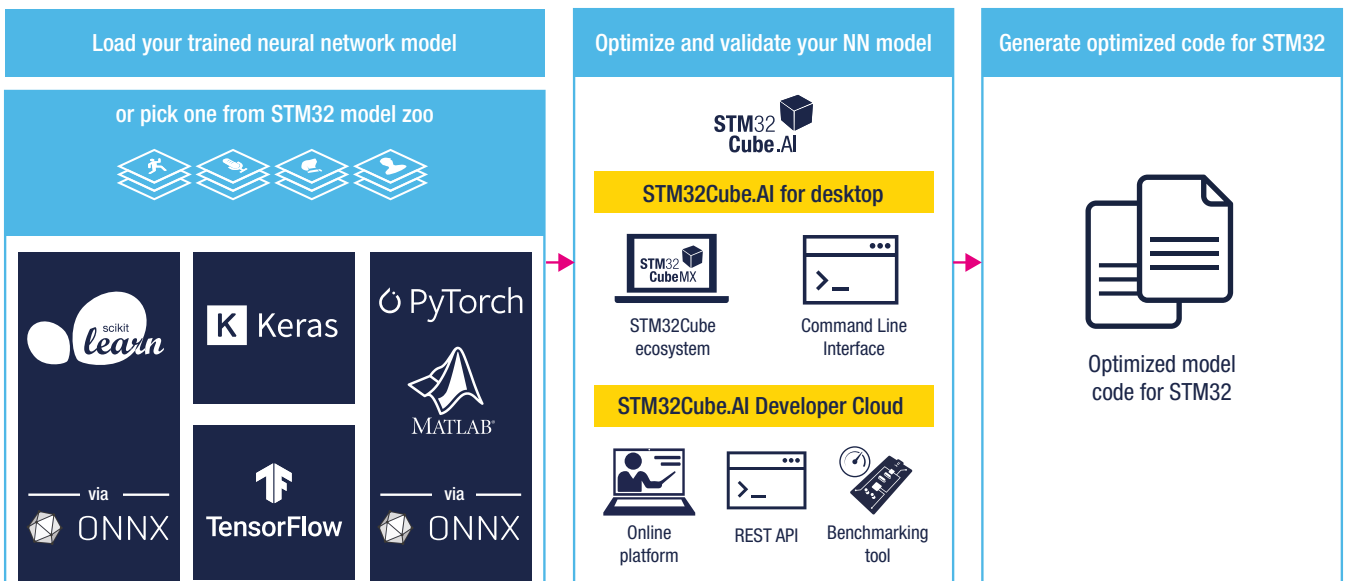


STM32CUBE.AI: FREE TOOL FOR EDGE AI DEVELOPERS

STM32Cube.AI allows to optimize and deploy trained Neural Network models from the most popular AI frameworks on any STM32 microcontroller. The tool is available via a graphical interface in the STM32CubeMX environment as well as in command line. For a pure digital experience, this tool is now available online through STM32Cube.AI Developer Cloud.

STM32Cube.AI offers options for large network to store weights and activation buffers in external memories while supporting 8-bit quantization of ONNX networks and TensorFlow™ Lite quantized networks. In addition, to further accelerate application prototyping, we offer access to STM32 Model zoo on Github. It includes a repository of models, training scripts and application code examples to make the work of data scientists easier.

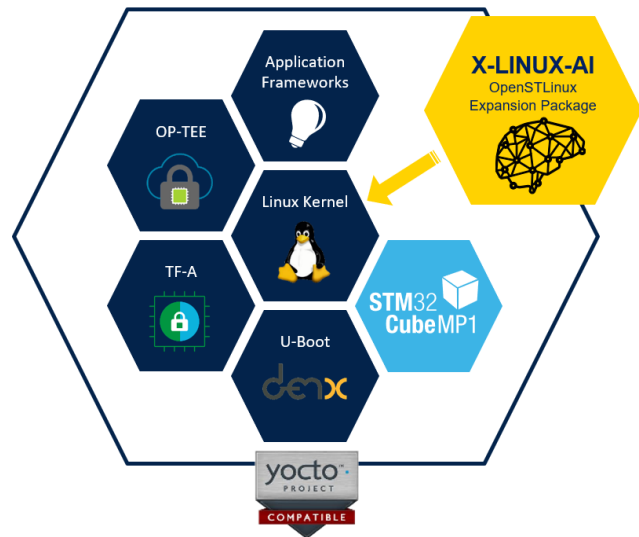
From ideation to production, it boosts AI performance with highly optimized code on STM32.



AI ON MPUs: LIBRARIES AND RUNTIMES FOR OPENSTLINUX

To take full advantage of the many capabilities of the feature-rich STM32MP1 microprocessor, developers can use our STM32Cube Expansion Package (X-CUBE-AI) for the embedded Arm Cortex-M4 core. You can also run various AI frameworks on the Cortex-A7 core thanks to our mainlined open-source Linux distribution, X-LINUX-AI.

This STM32 MPU OpenSTLinux expansion package targets Artificial Intelligence applications and contains Linux® AI frameworks as well as application examples to get started with typical use cases such as computer vision.



Learn more on
www.st.com/STM32AI

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Order code: **BR2303ARTI**

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