Adding AI to Optra Edge

EDGE IMPULSE | **optra™** powered by Lexmark

edge

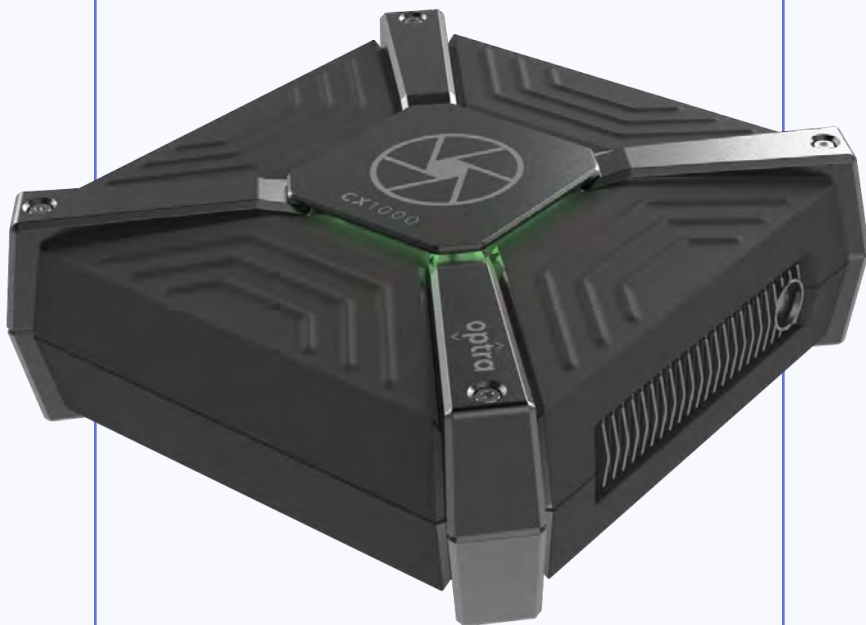**EDGE IMPULSE**

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When Lexmark needed to incorporate machine learning into their new industrial gateways, Edge Impulse was the immediate solution.

Inside the Lexmark offices, one can find a wide-ranging assortment of hardware components originally used on printer devices that the company has produced. Laser-printer fuser heating elements, paper-feeder motors, embedded processors that run print jobs and other necessary operations — all these building blocks are a treasure trove for the engineers tasked with prototyping new products, allowing them to leverage their device-making experience to quickly assemble novel ideas. This insider access and know-how has allowed the company to remain nimble, innovative, and positioned as a leader in the technology

"Having proactive diagnostics and predictive analytics is really useful for us."

Scott Castle
Director of Innovation and Emerging Technologies, Lexmark

industry. The projects that the team there puts together create new opportunities for the company, and when fused with the right partner, like in the case of Edge Impulse, can jointly create highly compelling new capabilities.

Recently, the Lexmark team debuted their **Optra Edge** platform, a set of industrial edge computing devices designed to help maneuver the company into the edge IoT space, an area in which Lexmark had considerable internal experience but had not yet approached from a dedicated business perspective. The new platform would consist of a range of hardware devices, a secure embedded operating system, and a cloud software solution that would permit a vendor to deploy and manage a fleet of Optra installations distributed throughout various locations, such as warehouses, manufacturing plants, or nationwide retail shops.

The new Optra Edge products were built in partnership with a variety of industry trusted names like NVIDIA and Microsoft Azure. With the latest Optra Edge portal release of "Skill Builder," that partner list now includes Edge Impulse, who brings a critical set of experiences in the edge AI model building space.

Deploying Machine Learning To The Edge

Edge Impulse, the leading platform for building, refining, and deploying machine learning models and algorithms to edge devices, is playing a key role in the development of AI models and applications to Optra's onboard ML capabilities. This approach, only recently possible due to advances in computing hardware, will allow for benefits over common cloud-based solutions, such as minimizing the bandwidth and latency requirements, increasing data security, and improving reliability. Robbie Muyskens, a member of Lexmark's Optra Edge development team, explains "Much of what is being done today in the AI application space is being done in the cloud, not necessarily because it's the right place for that processing to happen, but because for many years it was the only way to make something scalable."

Scott Castle, Lexmark's Director of Innovation and Emerging Technologies, is enthusiastic about utilizing Edge Impulse on Optra: "Edge Impulse has a very good user interface and user experience for someone who's not an engineer. The tools are accessible to someone who is technically competent but is not an expert in that field. They also offer the ability to dig into the plumbing if someone does have that skillset. They fill this really important niche of computationally efficient models."

In a matter of weeks, Edge Impulse was able to integrate its advanced ML tools into the Optra Edge platform, enabling onboard data collection and processing for professional and industrial applications. Edge Impulse also provided a white-label solution that allows Optra Edge users to quickly build ML models for deployment within the Optra ecosystem. Now Optra Edge users have immediate access to Edge Impulse's powerful yet intuitive tools for building advanced solutions.
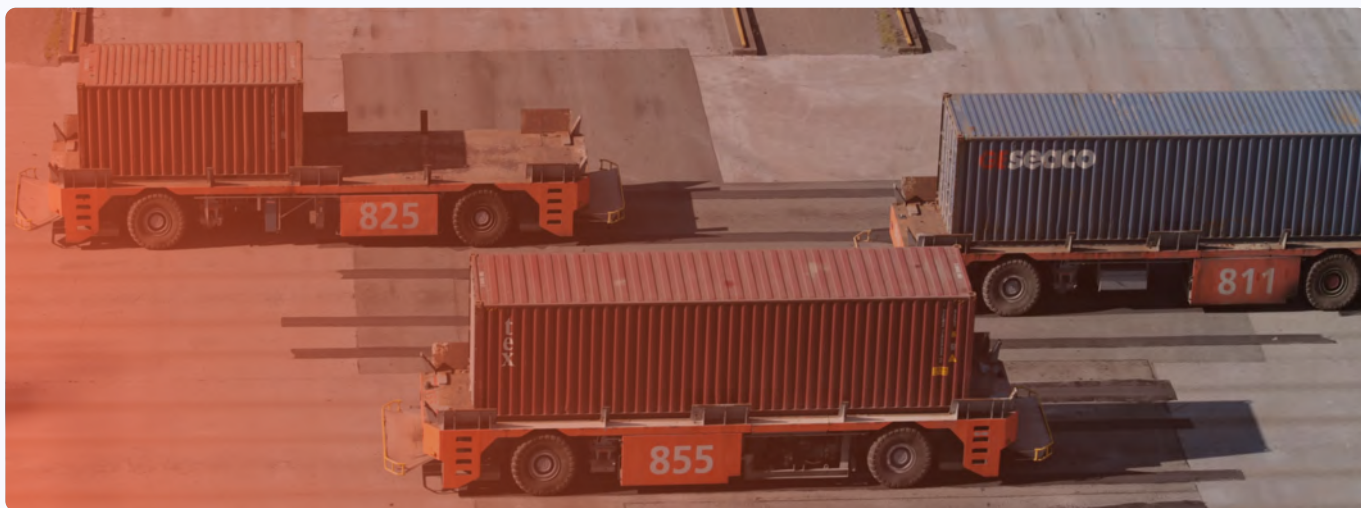
Skill Builder

The Optra Skill Builder is a toolkit developed by Lexmark, comprising containerized applications — "skills" — that can be deployed throughout users' setups. Lexmark has employed Edge Impulse as a codeless model-building solution to their platform, to facilitate the creation and easy deployment of AI models. Optra Skill Builder is designed to cater to users with various levels of expertise, from those who need custom development for large-scale projects to those who want to build and deploy simpler AI models themselves. It provides a do-it-yourself approach to model creation and deployment, enabling users to develop AI solutions without the need for extensive engineering resources.
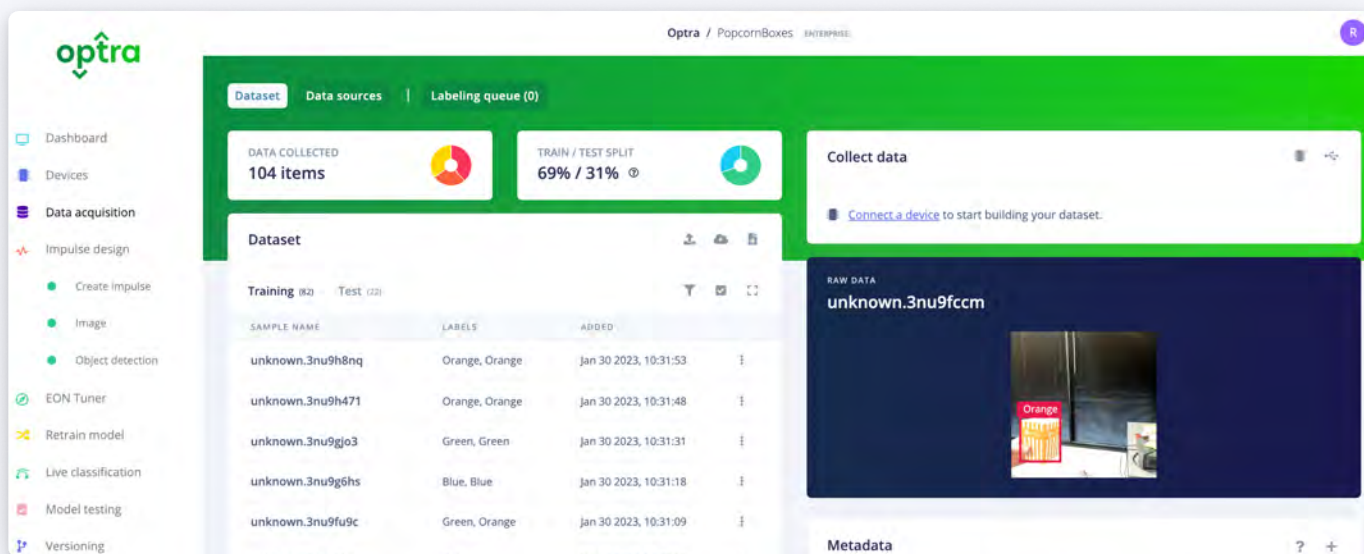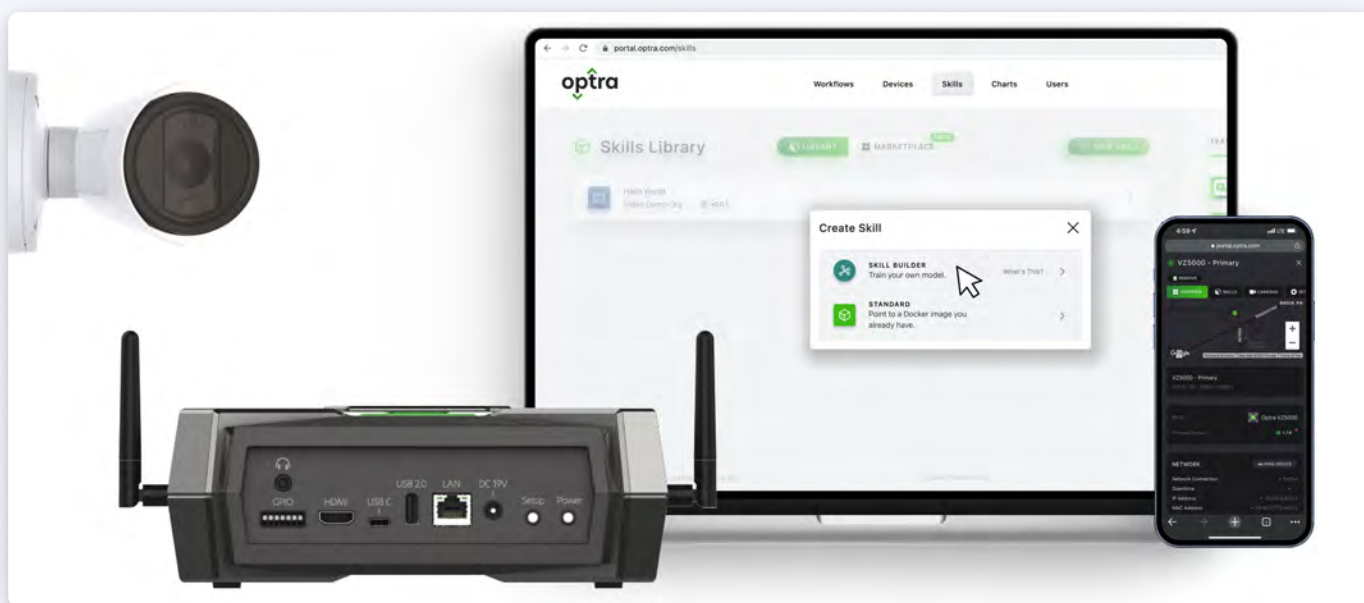
Making Hardware Smart

Lexmark has robust experience with edge processing from decades of experience developing processors for printers, and has productized two Arm-based hardware options available in the Optra Edge lineup: the low-cost, rack-mountable Compute 550 and the standalone CX1000, each running a 1.2GHz quad-core Arm V8 that provides 20 GFlops of performance, and holds 16GB of storage and 2GB of 32-bit DDR4 memory.

For more intensive AI/ML or computer vision applications, Lexmark partnered with NVIDIA to provide GPU enabled processors for their industrial-grade, AI-capable gateways. Two NVIDIA-powered Optra Edge options are available:

Optra VZ1000:	Optra VZ5000:
NVIDIA Xavier Nano, 128-core NVIDIA Maxwell™ GPU, 1.43GHz quad-core ARM A57, 472 GFlops. 16GB of storage with optional M.2 SSD expansion, and 4GB 64-bit LPDDR4 25.6 GB/s memory.	NVIDIA Xavier NX, 384-core NVIDIA Volta™ GPU, 64-bit 6-core NVIDIA Carmel ARM v8.2 CPU, 21 TFlops. 16GB of storage with optional M.2 SSD expansion, and 8GB 128-bit LPDDR4x 51.2 GB/s memory.

Edge Impulse is able to seamlessly integrate into all of the platforms, as it is hardware-agnostic but also optimized to work specifically with Arm and NVIDIA processors. The ability to work on any platform allows it to be future-proofed with any new hardware partnerships that Lexmark might introduce.

Positive Results

The relationship between Lexmark and Edge Impulse shows how two nimble technology companies can conceive and launch groundbreaking tools in short order. Lexmark has identified a need for intelligent, configurable tools for industrial and professional purposes, leveraging its hardware engineering and manufacturing skills to launch its new platform. Edge Impulse, with its easy-to-use ML tools, has demonstrated that it can quickly help amplify the capabilities of these tools, allowing a company to keep its resources focused on its own competitive advantages. This allows companies to deploy solutions faster, and in turn, achieve stronger results.

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