

## Making AI-powered Edge Computing More Agile with Intel and Solomon

Traditional IoT and edge use cases such as defect detection, item classification, optical character recognition, and presence/absence checks now demand innovation through compact and cost-efficient solutions. By integrating advanced AI with existing IoT investments, enterprises can optimize their operations to ensure competitiveness and agility.

“ SolVision Edge AI Box solution can reduce integration costs by 50% while delivering the same detection results and speed as high-end GPUs. Its versatility and compatibility with both Windows and Linux systems offer convenience and offers a new business cooperation model for systems integrators and end users. ”

- *Jonathan Huang,*  
*SolVision Project Manager,*  
*SOLOMON Technology Corporation*

### Key Takeaways

1. Visual detection and inspection capabilities traditionally achieved by larger systems can benefit from robust AI-driven solutions that seamlessly integrate with existing infrastructure for comprehensive operational efficiency.
2. Compact solutions that include high-performing CPUs and intelligent GPUs can reduce hardware expenses and system integration costs, making high quality AI solutions more accessible and scalable.
3. Such compact solutions can also be easily deployed across a wide range of operating environments to meet unique business needs and space constraints.
4. Collaboration between Intel and solution developers can drive the development of advanced edge computing solutions that enhance competitive advantage and technological agility.

### Summary

The SolVision Edge AI Box optimizes automated systems for tasks such as defect detection, item classification, optical character recognition (OCR), and presence/absence checks through the integration of IoT and AI technologies. Initially constrained by hardware limitations, these systems have progressively incorporated IoT and AI to manage complex workloads via enhanced connectivity, faster inference and compact form factors.

Furthermore, by leveraging software and hardware that dovetails with existing infrastructure, these systems have evolved to process data dynamically and enhance decision-making without the significant upgrade costs involved. This facilitates not only streamlined and scalable operations but also aligns with modern industrial demands, optimizing productivity and operational efficiencies.

## Enhancing Visual Inspection Solutions with IoT and AI

Initially limited by hardware capabilities, visual inspection solutions have evolved with IoT to handle complex workloads efficiently by leveraging enhanced data connectivity and analytics.

Augmenting IoT systems with AI technologies such as machine learning and deep learning enhances these systems' capabilities, enabling them to learn from data, improve continuously, and make intelligent decisions swiftly.

For instance, AI-powered defect detection can better identify and predict defects from past data, drastically reducing waste and improving product quality, while AI-enhanced OCR systems adapt to various fonts and conditions, significantly boosting text recognition accuracy.

This synergy of IoT and AI not only makes these functions more streamlined and scalable but also aligns them with the evolving needs of modern industries such as agility, scalability and enhanced output.

However, these advanced IoT and AI solutions do face significant challenges, including high hardware and integration expenses, substantial solution footprints, and complex system requirements. Overcoming these hurdles is crucial for maximizing the effectiveness and scalability of IoT and AI technologies in industrial automation. Effective management of these challenges involves leveraging compact and efficient solutions like the SolVision Edge AI Box, which reduces complexity and costs while maintaining high performance and adaptability across various applications.

## Navigating the Challenges of Integrating IoT and AI into Visual Inspection Systems

The integration of IoT and AI into visual inspection systems faces challenges such as significant hardware and integration expenses, large solution footprints, and intricate system complexities. These issues often stem from the need for extensive computational power to process and analyze large datasets in real-time, which traditionally requires expensive and bulky hardware. Furthermore, the integration of these sophisticated technologies with existing systems can be complex and costly, requiring substantial technical expertise, time and investments.

To address these critical business challenges of lowering hardware expenses at the edge, integrated AI systems enable inference capabilities without the need for expensive hardware upgrades. They also enhance the adaptability of AI edge integration and reduce system integration expenses, making the deployment more feasible and cost-effective. Additionally, these advanced systems minimize the hardware footprint required at the edge, which is essential for operations where space is at a premium or environmental impact needs consideration. This strategic integration facilitates not only a reduction in operational costs but also supports sustainable industrial practices by optimizing resource allocation. This comprehensive approach ensures that industries can leverage the full potential of AI and IoT without the prohibitive costs and complexities traditionally associated with such advancements.

## The SolVision Edge AI Box Solution

The SolVision Edge AI Box solution significantly enhances enterprises' existing visual inspection processes. This dedicated AI visual detection inference machine is powered by an Intel® Core™ processor, offering compact yet powerful inference capabilities equivalent to larger systems using PCs and graphics cards.

SolVision AI vision software optimizes inspections through rapid AI model training for superior defect detection, item classification, optical character recognition, and presence/absence checks. It seamlessly integrates with various industrial cameras and includes built-in PLC communications via TCP/IP and Modbus protocols, all at no extra cost. This integration not only reduces inspection time but also boosts accuracy compared to manual and less advanced systems, ensuring that manufacturers meet rigorous quality standards.

The implementation of the SolVision Edge AI Box in manufacturing processes ensures a future-ready approach to visual inspection, addressing unique operational challenges such as space constraints and the need for high computational power. At its core are Intel's powerful platforms and tools, optimized for AI and edge computing use cases. They include:

- **Intel® Core™ i5-1145G7E Processor:** 11th Generation Intel® Core™ i5 Processors are high-performance, low-power CPUs designed for commercial and industrial applications. The platform's combination of speed, high-powered Intel® Iris® Xe graphics and AI acceleration, along with hardware support for real-time computing makes it ideal for mission-critical applications such as real-time object detection and recognition which demand high-performance vision systems, deep learning capabilities, and/or deterministic computing.

- **Intel® Distribution of OpenVINO™ Toolkit:** Utilized for advanced object detection and navigation, the OpenVINO™ toolkit enhances the SolVision Edge AI Box solution's ability to navigate demanding machine learning and computer vision workloads. The toolkit allows for the optimization of deep learning models on the Intel hardware architecture, significantly enhancing the performance and efficiency of the Edge AI Box.

## SolVision In Action

The SolVision solution has been deployed across various industries and sectors to enhance the efficiency of object detection and recognition workloads and optimize production lines. A prime use case of such a deployment comes from the semiconductor sector where SolVision is being leveraged to accurately identify defects in wafer chips, including die bond solid crystal bonding, foreign particles, cracks, scratches, chipping along crystal edges, and incorrect probe marks.

## Future Applications of the Solvision Edge AI Box Solution

SolVision's versatility makes it a viable solution for evolving object detection and recognition workloads across diverse environments and scenarios. For instance, AI recognition could be implemented in unmanned stores for instant product identification and streamlined checkout processes. With a commitment to adopting the latest advancements and innovations, SolVision is poised to further enhance detection and recognition capabilities across multiple verticals.



<sup>1</sup> Source: International Tourism to Reach Pre-Pandemic Levels in 2024 | UNWTO

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