



Case Study

AI-Enabled Recycle Bin

The First Step to Environmental Protection and Sustainable Development

To aim for a sustainable environment, recycling has become a daily routine that every civilian can contribute to their everyday lives. Recycling brings several advantages to our motherland such as waste reduction, pollution prevention, and economic benefits. To improve the efficiency and accuracy of recycling facilities, artificial intelligence and edge computing have been introduced and deployed in the recycle bin to streamline the process.

Challenges

The customer, who was a system integrator, was looking for a compact edge AI system to develop an AI-enabled recycle bin. The system should offer decent computing capability to identify waste through AI algorithms and integrate with an automatic sorting system.

Main Requirements

- An edge AI system with NVIDIA® Jetson SoM
- Fanless design with noiseless
- Supports one 15W GbE PoE for camera
- High quality, supports 24/7 secure remote monitoring

The AIE100-T2NX strikes a balance between performance and compactness

Axiomtek proposed the AIE100-T2NX, powered by the NVIDIA® Jetson™ TX2 NX SoM, a compact embedded platform for edge AI computing with outstanding speed and power efficiency. This module features various standard hardware interfaces, making integrating into various products and forms easy.

Based on the Pascal™ architecture GPU with 256 CUDA cores, the AIE100-T2NX gets the edge on entry-level AI vision use cases, notably with one



15W GbE PoE for the IP camera. It has one USB 3.1 Gen1 port, one USB 2.0 port, one Micro USB port, one GbE LAN, one GbE PoE, and one HDMI 2.0 with 4K2K supported. Therefore, in terms of the lightweight of 1kg, computing capability and sufficient I/O, it is ideal for edge AI smart city applications. This user-friendly AI-powered system offers support for the NVIDIA JetPack™ SDK for ease of development in AI computing. Moreover, it supports 24/7 secure remote monitoring, control, and OTA deployment empowered by Allxon.

Application

Optimizing Efficiency in the Recycle Bin with AI Capability

The integration of the AIE100-T2NX into an AI-enabled recycle bin has made revolutionary changes to recycling. Leveraging AI vision capabilities, users can effortlessly deposit recyclable waste like plastic, bottles, and cans, leaving the system to autonomously handle waste sorting. This not only enhances sorting accuracy but also boosts the overall recycling rate by ensuring materials are correctly categorized for optimal resource recovery. Moreover, the system maximizes physical storage space by incorporating automation for bottle and paper compression. This strategic approach minimizes the frequency of cleaner visits, promoting time and labor efficiency in waste collection processes.

The AI-powered recycle bin takes a proactive role in maintenance, notifying cleaners through remote management when it requires attention. The sensor continuously updates real-time fill levels to the AIE100-T2NX, triggering a notification to cleaners when the waste level is close to full, streamlining operational processes and reducing the need for constant manual monitoring. This integrated solution offers improved accuracy, increased recycling rates and higher operational efficiency.



System Configurations of the AIE100-T2NX

- NVIDIA® Jetson™ TX2 NX with Pascal™ architecture GPU with 256 CUDA cores
- High AI computing performance for GPU-accelerated processing
- Ideal for edge AI smart city applications
- Supports one 15W GbE PoE for camera
- Wide operating temperature from -30°C to +60°C
- Supports JetPack
- Supports Allxon Device Management Solutions (Allxon DMS)

Why Axiomtek

As a committed leader in IPC, Axiomtek makes its commitment to shaping a superior world through technology. With long-time collaboration, Axiomtek proudly stands as a key partner of NVIDIA, aligning its focus on delivering exceptional OEM and ODM services. Being centered on the integration of AI applications, Axiomtek designs edge AI systems across diverse form factors and

performance levels, all centered around its System on Module (SoM). This strategic collaboration positions Axiomtek at the forefront of advancing AI technologies, seamlessly bringing the power of AI closer to various aspects of our daily lives.

About Axiomtek Co., Ltd.

Axiomtek has experienced extraordinary growth in the past 30 years because of our people, our years of learning which resulted in our tremendous industry experience, and our desire to deliver well-rounded, easy-to-integrate solutions to our customers. These factors have influenced us to invest in a growing team of engineers including software, hardware, firmware, and application engineers. For the next few decades, our success will be determined by our ability to lead with unique technologies for AIoT and serve our key markets with innovatively designed solution packages of hardware and software – coupled with unmatched engineering and value-added services that will help lessen the challenges faced by our systems integrator, OEM and ODM customers and prospects alike. We will continue to enlist more technology partners and increase collaborations with our growing ecosystem who are leaders in their fields. With such alliances, we will create synergy and better deliver solutions, value, and the expertise our customers need.