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ARK-2252 - Evolving Remote Monitoring with Edge AI Intelligence

Written by Ryan Chen, Product Manager, Advantech

Customer Background

The mining operator in the Australian outback manages widely distributed field equipment across remote and harsh environments. To ensure safe and efficient operations, the customer relies on a **remote monitoring and data acquisition system** to collect real-time data and visual information from critical assets such as conveyors, pumps, electrical cabinets, and auxiliary equipment.

As operational demands increased, the customer sought to **enhance its existing monitoring architecture** by adding more intelligence at the edge. Instead of streaming raw images alone, the edge system can generate **context-aware descriptions and alerts**, such as identifying visible wear, misalignment, or environmental anomalies. All AI processing is performed locally, ensuring fast response times and minimizing dependency on cloud connectivity.

Customer's Pain Points

1. Remote monitoring systems provided real-time data and images, but lacked automated visual interpretation.
2. Human operators needed to manually review images to identify abnormal conditions.
3. Remote locations face network bandwidth and latency constraints, and limiting cloud-based analysis.
4. Equipment operated in extreme environments with heat, dust, and vibration.



Solutions

Powered by **Intel® Core™ Ultra Series 3 processor**, Advantech's ARK-2252 integrates CPU, iGPU, and NPU compute resources to enable both **real-time data acquisition** and **on-device VLM inference** at remote sites. Industrial cameras and sensors are connected to enable Automated Optical Inspection (AOI), with visual workloads accelerated by the integrated GPU for image processing and inference. In parallel, the on-chip NPU supports efficient execution of Vision-Language Model (VLM) workloads, enabling contextual interpretation of visual data and helping maintenance teams act faster in remote mining environments.

The ARK-2252's **fanless, rugged design** ensures reliable operation in harsh mining environments, while its modular expansion options allow future integration of additional sensors, cameras, or communication modules.

Key Solution Highlights

- Intel® Core™ Ultra Series 3 processors deliver up to 180 TOPS AI performance for advanced edge AI inference.
- Fanless industrial design for reliable and maintenance-free operation.
- Rich industrial I/O supports seamless sensor and controller integration.
- Modular expansion supports future AI, vision, and connectivity needs.