

ADLINK

Accelerating Railway Digitalisation with Edge AI



Railway transportation has long been thought of as conservative or ‘old school’, but current trends are rapidly pushing the rail industry to digitalise and embrace cutting-edge technologies.

From an environmental standpoint, rail emits over 6x less CO2 per passenger than air travel, making rail clearly preferable for those wanting to combat climate change.

Meanwhile, the world’s growing population continues to urbanise, putting more pressure on railways to help move more people more efficiently, and over-congested global supply chains need every possible bit of added transportation productivity to help alleviate ongoing shortages.

Railway efficiency is not bounded by gauge or speed. Rather, AI deployed on railway computing infrastructure, especially at the network edge, has tremendous potential to improve operations and

bottom lines. When implemented in trucks, a 2020 study found that driverless vehicles realised 29% to 45% cost savings compared to those driven manually, and total cost of vehicle ownership dropped by over 15 percent. Analogous improvements can be found in rail transportation. AI effectively eliminates the delays and errors caused by humans in everyday operation, and automated driving negates the need for engineers to operate trains.

AI opens possibilities for a host

of other railway applications and improvements, including:

- **Biometric ticketing**, which uses AI to streamline handling passenger fares by using body scans (e.g. face, fingerprint or retina) linked to passenger payment accounts
- **Crowd monitoring**, to help assess terminal congestion and ensure patrons don't evade paying fares
- **Delay-time prediction**, which involves AI assessing current train statuses against a wealth of historical data to make informed estimates on train delay developments and remediation times
- **Fuel management**, to generate fewer emissions while idling by putting the engine into a low-power state
- **Infrastructure monitoring**, wherein AI analyses real-time camera feeds from locations ranging from train axles to wayside stations to watch for obstructions, damage, or other anomalies
- **Standalone switching**, in which AI systems and machine-to-machine (M2M) communications optimise train schedules and paths

ADLINK now offers a host of solutions optimised for different workloads and environments. Most are designed with specific advantages for AI-enhanced applications, such as hardware-based algorithm acceleration built into the CPU or extensibility to add



greater AI acceleration with GPU and / or FPGA resources. In all cases, ADLINK engineers these solutions to deliver an optimal blend of performance, low-power operation and ruggedness for surviving many years in railway environments. ADLINK prepares railway clients to seize AI's benefits today and make sure those benefits deliver increasing value into the future.

ADLINK's Rugged by Design hardware survives where other manufacturers fall short, but the company focuses on more than resilience. As a member of the Intel® IoT Solutions Titanium Partner and NVIDIA Preferred Partner programmes, ADLINK obtains access to the latest CPU and GPU technologies as well as the highest levels of technical support from Intel and NVIDIA. As a result, ADLINK small form factor railway solutions provide the performance and power savings for AI, IoT or edge railway computing applications.

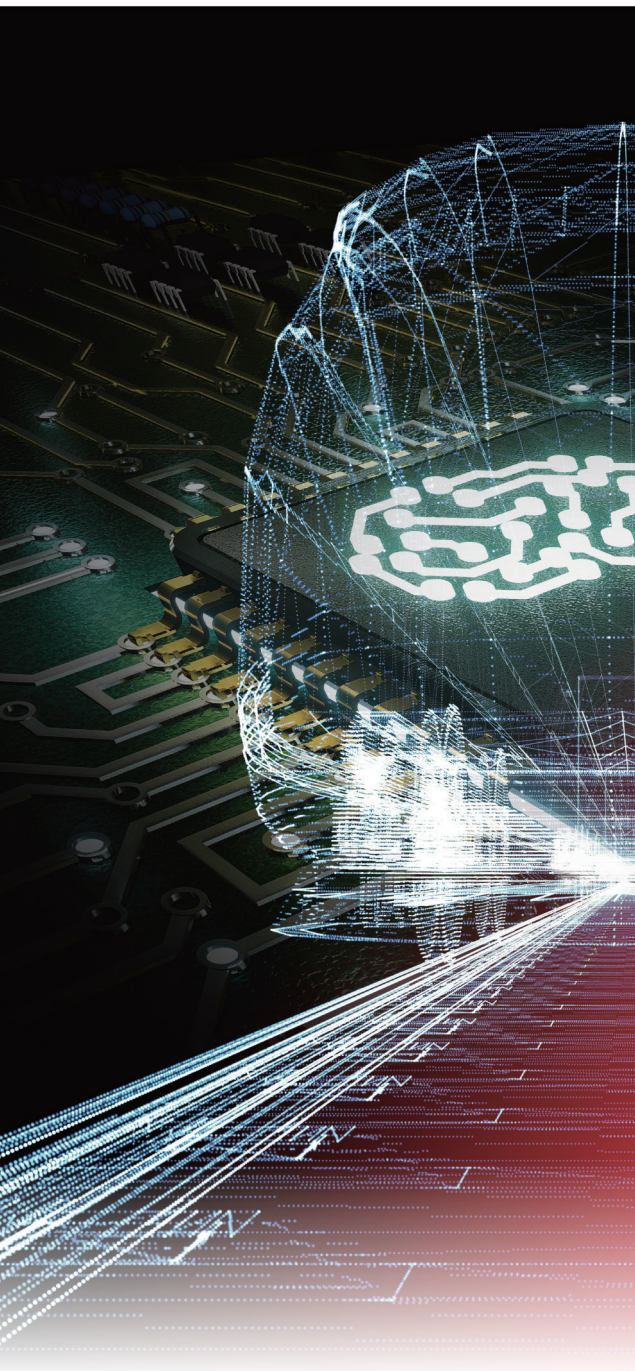
By leveraging more than 25 years

of expertise in developing highly reliable and available embedded computing systems, ADLINK is a premier supplier to the rail industry that offers not only an extensive, cost-effective and standards-based COTS portfolio, but also a wide range of rugged fanless embedded computers and custom solutions enabled by its best-in-class ODM capabilities.

ADLINK is committed to helping rail integrators and application developers focus on differentiating and transforming their end applications in train control, rail signalling, automation and digitalisation. Moreover, ADLINK can help facilitate deployments for onboard and wayside applications as well as greenfield and brownfield projects, ultimately driving safer, smarter and more reliable railway operations.



Building AI's Pervasiveness throughout Rail with AI-enabled Video Analytics Platforms



A line of EN 50155 compliant AI-enabled platforms offer rail solution providers with a high level of flexibility to select the configuration best suited to their use cases, and help them achieve railway digital transformation

AVA-5500

Rugged, fanless AIoT platform with NVIDIA Quadro GPU embedded for real-time video/graphics analytics



AVA-5600

19" 2U rackmount rugged, fanless AIoT platform with high performance GPU for compute-intensive applications



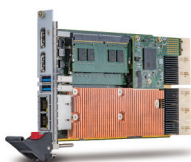
AVA-RAGX

Compact, fanless AIoT video analytics platform with NVIDIA Jetson AGX Xavier for SWaP-constrained deployments

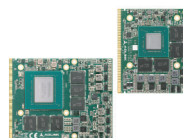


CompactPCI Platforms

Complete solutions consisting of high performance CPCI-S.0 processor/carrier blades, NVIDIA MXM GPU modules and CompactPCI systems



CompactPCI Serial
Processor Blades



MXM GPU
Modules



CompactPCI
Systems