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Faster Response, Safer Care

ALERT!



BOXER-8621AI



The Impact of AI Fall Detection

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Overview

Due to a variety of factors, the incidence of falls among older people is high, an unfortunate fact that is compounded by the additional complications falls cause in this demographic.

While elder care facilities maintain strict protocols and safeguards to prevent falls, there are a variety of risk factors, particularly among elderly people, that contribute to their frequency and severity that protective environmental factors cannot address.

One factor that can be controlled, however, is the speed with which staff in care facilities can detect and respond to residents falling, both of which are of vital importance when it comes to mitigating serious injuries.

In a bid to leverage technological innovation to expedite the response times to falls and improve outcomes for care home residents that suffer falls, AI software development company [AIRUCA](#) teamed up with AAEON and leading systems integrator [Novalux](#) to produce the [AI-Behavia FD fall detection system](#).

Key Project Considerations

When searching for a platform capable of running AIRUCA's AI inference software to analyze the behavior of people captured on network cameras, there were a number of considerations. Firstly, the system would require strong inferencing capabilities to provide accurate, latency-free analysis of multiple video feeds, allowing for instant alerts to be triggered in the event of a fall being detected.

Secondly, the platform had to be able to support continuous video streams from up to four network cameras without frame drops that could affect the accuracy or speed of detection. Third, the system needed to be able to display video feeds for local monitoring, while also being equipped with communication protocols capable of triggering alarms or devices to alert staff that a fall had been detected.

Why AAEON's BOXER-8621AI?



Having explored suitable embedded systems on the market, AIRUCA and Novalux found that AAEON's [BOXER-8621AI](#), a compact fanless embedded AI System powered by the NVIDIA® Jetson Orin Nano™, was the perfect system for the task.

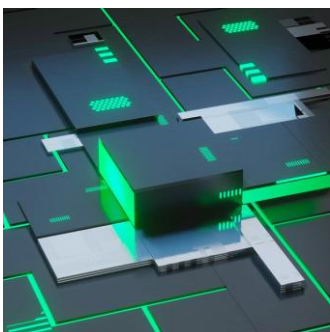
The reasoning behind this decision rested on the fact that the system was robust, equipped with the perfect balance of interfaces to maintain reliable execution of the application's functions, while also being compact and easy to deploy.

Gigabit Ethernet for Centralized Data Acquisition

The application utilized the BOXER-8621AI's RJ-45 Gigabit Ethernet LAN port as the central input pipeline through which to receive multiple HD camera data streams. To do so, the port was equipped with a PoE hub, which in turn hosted up to four network cameras, the feeds from which could be transmitted to the [BOXER-8621AI](#) with sufficient speed and stability to avoid frame drops.

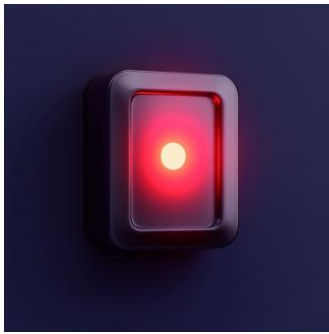
This setup had two auxiliary benefits. The first of these was that it made the application hardware easy to deploy, with all cameras within a given area being both powered and connected via a single cable. Secondly, the use of a PoE hub allowed existing surveillance cameras within care facilities to be integrated into the system, increasing the compatibility of the application to make deployment simplified across different facilities.

An Efficient Yet Powerful AI Engine



The BOXER-8621AI's NVIDIA® Jetson Orin Nano™ module offered up to 67 TOPS of AI performance, with 1024 CUDA and 32 Tensor Cores to facilitate parallel processing and matrix multiplications required to accelerate the convolutional neural networks (CNNs) and pose-estimation models used by AIRUCA's AI algorithm. As a result, the [BOXER-8621AI](#) was more than able to process multiple video streams simultaneously and deliver high-throughput, low-latency analysis to accurately detect fall events in real time.

Digital IO for Dynamic Alert Mechanisms



In the event AIRUCA's AI algorithm detected a fall, the application needed a way to immediately alert staff. To do this, the network-independent digital I/O provided by the BOXER-8621AI's DB-15 port was instrumental. To ensure immediate assistance could be provided to care facility residents in the event of a fall, Novalux connected a Relay Box to the [BOXER-8621AI](#) via its DB-15 port, with the Relay Box acting as an interface between the BOXER-8621AI's digital I/O lines and external TCP devices such as alarms or signal lights.

Impact & Outcomes



To date, the AI-Behavia FD fall detection system has been successfully deployed in over 35 institutions across Japan, with AIRUCA and Novalux outlining plans to expand the deployment sphere of the application from care facilities to hospitals, smart factories, and even public buildings.

Following its initial rollout, the application has proven to offer a number of tangible benefits not only for its primary purpose of expediting the response to falls in care facilities to improve outcomes for residents, but in other ways, too.

Enhanced Safety

The success of the AI-Behavia FD fall detection system has demonstrated remarkable results in its ability to decrease the time taken in responding to instances where care facility residents have falls, allowing staff to aid residents immediately. This is particularly impactful given response time is a critical factor in reducing the harm caused to elderly people due to falls.

Operational Efficiency

By automating fall detection, staff in elder care facilities do not need to rely solely on manual monitoring, providing more time for in-depth care for residents with complex needs. Crucially, this increase in efficiency does not come at the cost of resident care, given the proven effectiveness of the AI-Behavia FD fall detection system.

Market Potential

As noted, the AI-Behavia FD fall detection system is effective but not narrow in its capabilities. Consequently, its benefits are directly transferrable to other settings such as factories, where reducing the time it takes to respond to safety incidents can be invaluable. This also applies to environments within other areas of healthcare, considering falls are a big concern in post-operative patients.

About AAEON

Established in 1992, AAEON is one of the leading designers and manufacturers of industrial IoT and AI Edge solutions. With continual innovation as a core value, AAEON provides reliable, high-quality computing platforms including industrial motherboards and systems, rugged tablets, embedded AI Edge systems, uCPE network appliances, and LoRaWAN/WWAN solutions. AAEON also provides industry-leading experience and knowledge to provide OEM/ODM services worldwide. AAEON works closely with premier chip designers to deliver stable, reliable platforms. For an introduction to AAEON's expansive line of products and services, visit www.aaeon.com.



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