TOMOTA

ADLINK
LEADING EDGE COMPUTING



AI Platform Applied to Aquaculture Aims for Improved Efficiency

Otanics Enhances IIoT Shrimp Farm Management with ADLINK's Edge AI Inference Platforms

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Executive summary

Otanics Technology partnered with ADLINK to implement IIoT and Automation 4.0 on Minh Phu Seafood Group's shrimp farms. Using ADLINK's high-performance edge AI platform DLAP-211-Nano and with the help of ADLINK's team of IIoT experts, Otanics implemented a complete shrimp farm management solution at Minh Phu shrimp farms.

Product Used

- ADLINK DLAP-211-Nano Edge Inference Platform
- Otanics Aquaculture Management System

Result

Monitor and control the shrimp farm for higher productivity and less risk with an end to end smart IoT enabled aquaculture solution.

> *"As a global leader in the processing and export of shrimp products, Minh Phu sees the potential gains from the deployment of Industrial Internet of Things and Industrial Automation 4.0, especially for large-scale management efficiency and detailed production yield analysis. ADLINK was the obvious partner for Otanics Technology, and in cooperation with ADLINK's high-performance Edge AI Platform and team of IIoT experts, Otanics quickly completed and implemented the management software solution on Minh Phu farms."*
>
> **Nguyen Nhat Tuan**, Co-Founder and COO of Otanics Technology.

- Make better decisions
- Lower your operation costs
- Significantly increase your yield



Introduction

Shrimp exports have hit record highs in Vietnam, with average exports reaching 4 billion dollars and set to top 10 billion dollars in the next five years. Combined with 30–50% estimated profit margins, the industry has become a hot favorite for new investment, with established players expanding operations and innovative newcomers making their mark. As competition grows, there is more focus on better quality control and stabilizing quantity for harvesting, processing, and trading.

Shrimp farms need to ensure product quality, increase output, and raise overall efficiency to bring products of the highest quality to the international market, farm enough shrimp to meet the increasing demand, and keep their operations efficient for easier management. For continued sustainable growth, farmers must tackle the complexities of large-scale farm management, reduce manually operated equipment, and gain greater insight into production capacity and yield by deploying IIoT and Automation 4.0.

The Challenge: How to bring IIoT and Automation 4.0 to shrimp farms

Otanics Technology wanted to bring modernization to a traditional industry. As a part of Minh Phu Seafood, their first mission was to analyze the situation in their operations to make an action plan for streamlining farm management. They had to tackle the complexities of large-scale farm management, reduce manually operated equipment, and gain greater insight into their farms' overall production capacity and yield.

The complexity of large-scale farm management makes it difficult to assess the overall situation on the farm accurately. With equipment spaced far apart and many moving parts, checking on equipment becomes too time-consuming, and implementing a preventative management plan is almost impossible, especially when done manually.

Turning machines on and off by hand is a major part of operating a shrimp farm. Daily tasks, including turning on fans and feeders, are often done by hand, but with multiple ponds per farm, that process can take a long time. Reducing repetitive tasks can free up valuable time and resources for activities that impact the bottom line, like monitoring the quantity and quality of shrimp.

Measuring yield is challenging when the data is not sufficient, accurate, or detailed enough to make better decisions from that data. Farms need to quickly know the quantities for each pond so they can measure their current yield against production targets and make the necessary adjustments.

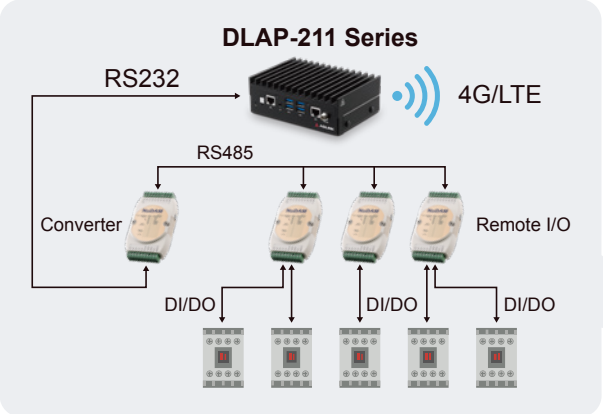
Bringing the power of AI and automation to farm processes is where ADLINK comes in.

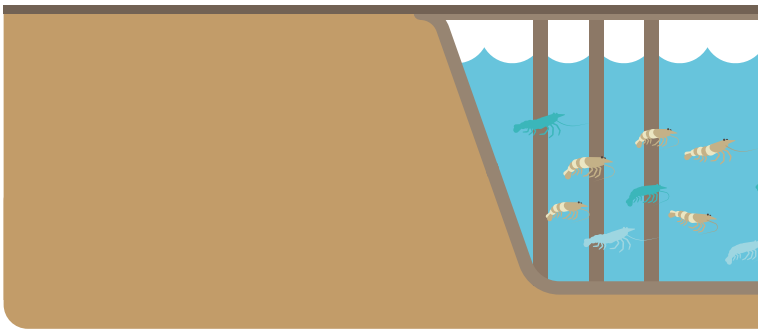


The Solution: All-in-one system with AI edge inference and Modbus

Otanics Technology's Seafood Farming AI Monitoring System used the ADLINK DLAP-211-Nano Edge Inference Platform and industrial Modbus remote I/O modules as the hardware for their Shrimp Farm Management System.

Otanics Technology chose ADLINK because of its years of expertise in industrial automation and a comprehensive lineup of hardware solutions. ADLINK was able to quickly assess Otanics' requirements, answer their technical questions, and even provide a modified operating system image during the sample testing stage to help Otanics meet their project schedule.





ADLINK Solution:

he ADLINK DLAP-211-Nano Edge AI Platform is a compact, durable, and fanless system with an NVIDIA® Jetson™ Nano™ SOM that bundles a 128-core Maxwell™ GPU and 4-core ARM® Cortex-A57 CPU in a high performance yet energy efficient package, sturdy enough for outdoor use. The NVIDIA® Jetson Nano™ is also tailored for AI workloads at the edge, providing the power needed to assess the quantity and quality of shrimp by analyzing images taken with a smartphone.

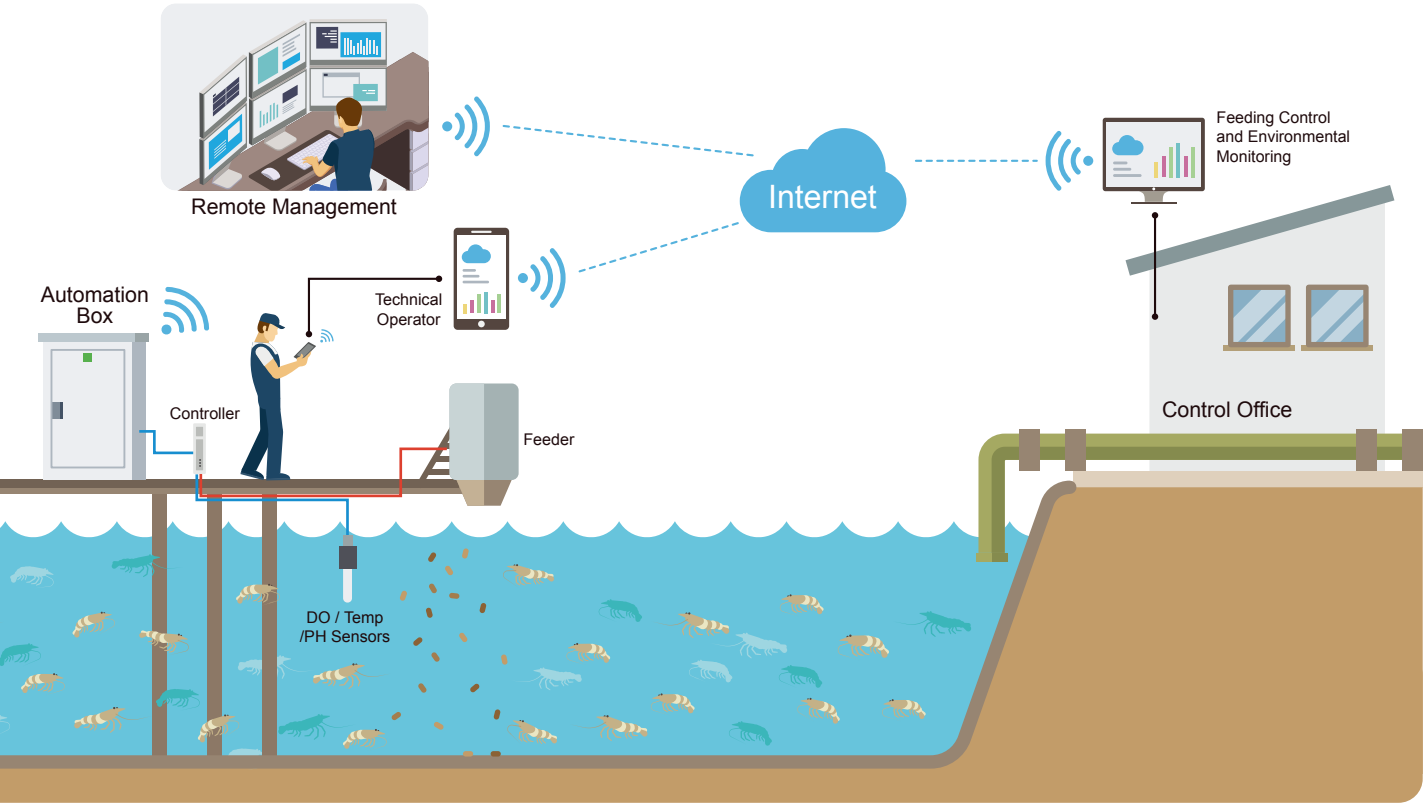
The ADLINK DLAP-211-Nano was installed in an outdoor control cabinet. Internet connectivity was provided by a network connection to a 4G router in the cabinet. For device control on the farm, the RS-232 port was connected to an RS-232 to RS-485 module, then the RS-485 connection was connected to the remote I/O modules, then finally connected to the remote devices through DIO.

Features

- Deep learning acceleration with NVIDIA® Jetson Nano™ SOM
- 128-core Maxwell™ GPU and 4-core ARM® Cortex-A57 CPU
- Compact, durable and fanless design for 24/7 operation
- High performance and energy efficient
- Linux® Ubuntu operating system
- Wide operating temperature



DLAP-211 Series Edge AI Platforms



Otanics Solution:

While integrating ADLINK's hardware devices, Otanics Technology developed the Shrimp Farm Management System, an IIoT and Automation 4.0 system with web-based software to control and manage all shrimp farm operations, including equipment, inventory, and task scheduling.

The Otanics Technology Shrimp Farm Management System software provides a complete picture of all aspects of farm operations. Digital data is organized into editable farms, zones, modules, and ponds while providing a digital diary for all the data. Automated systems include reminders for tasks that must be completed, full control of pond equipment through the interface, and alerts when maintenance is needed or a problem arises. The system tracks inventory for each crop or for all ponds, providing a valuable planning resource for the following season. Finally, the analysis system compares current logs against data to warn of potential environmental problems or development rates.

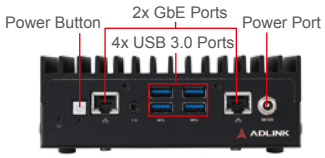
Features

- Sizing and counting shrimp with a smartphone camera
- Remote control and automate farm operations
- Shrimp rearing daily task reminders
- Preventative maintenance
- Warehouse management
- Real-time status updates
- Shrimp industry news



Specifications

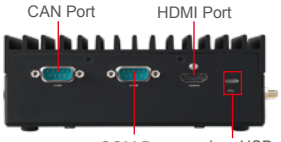
DLAP-211-JNX/Nano



DLAP-211-JNXS/JT2S/NanoS



DLAP-211-JNX/Nano (backside)



Model	DLAP-211-JNX	DLAP-211-JNXS	DLAP-211-JT2	DLAP-211-JT2S	DLAP-211-Nano	DLAP-211-NanoS
System						
GPU	384-core NVIDIA Volta™ GPU with 48 Tensor Cores		NVIDIA Pascal™ Architecture GPU with 256 CUDA® cores		NVIDIA Maxwell architecture with 128 NVIDIA CUDA® cores	
CPU	6-core ARM® v8.2 64-bit		2-core Denver 2 64-bit and 4-core ARM A57 Complex		4-core ARM® Cortex-A57	
RAM	8GB/16GB	8GB	4GB			
Storage	16 GB eMMC 5.1					
OS	Linux® Ubuntu					
Front Panel I/O Ports						
Button	1x power, 1x reset, 1x recovery					
HDMI	1x lockable					
USB	4x USB 3.0 Type-A					
Ethernet	2x 10/100/1000Mbps Ethernet					
Audio	Mic-in, line-out					
Expansion I/O	N/A	2x I2-C, 2x SPI, 1x UART, 8x GPIO, Relay through 1x 37pin D sub connector	N/A	2x I2-C, 2x SPI, 1x UART, 8x GPIO, Relay through 1x 37pin D sub connector	N/A	2x I2-C, 2x SPI, 1x UART, 8x GPIO, Relay through 1x 37pin D sub connector
Back Panel I/O Ports						
USB	1x USB 2.0 OTG					
Serial Port	1x COM RS-232/RS-422/RS-485					
CAN Bus	1x 2.0b				N/A	
Extension Slots						
Mini PCIe	1x PCIe mini card slot					
M.2	1x M.2 B key 2242 socket					
SD Card Slot	1x SD card slot					
Power Supply						
DC Input	12V					
AC Input	60W power adapter					
Mechanical						
Dimensions (W x D x H)	148mm x 120mm x 52mm (LAP-211-JNX/DLAP-211-JT2/DLAP-211-Nano) 148mm x 120mm x 64mm (DLAP-211-JNXS/DLAP-211-JT2S/DLAP-211-NanoS)					
Weight	Gross 1.725 KG / Net 1.5 KG					
Mounting	Wall mount, VESA DIN rail (optional)					
SMA Antenna Connector	4					
Environmental						
Operating Temperature	Standard -20°C to 70°C (system level), -20°C to 85°C (board level)					
Operating Humidity	~95% @40°C (non-condensing, optional with fanless solution)					
Storage Temperature	-40°C to +85°C					
Vibration	Operating 5Grms, 5-500Hz, 3 axes w/M.2 SSD					
Shock	Operating 100G, half sine 11ms duration w/ SD, M.2 SSD					
ESD	Contact ± 4kV, Air ± 8kV					
Regularity	CE & FCC class B, (EN61000-6-4/-6-2), CE-LVD & UL by CB, FCCID					
F/W Support						
WDT	WDT supported					

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ABOUT ADLINK

ADLINK Technology Inc. (TAIEX:6166) leads edge computing, the catalyst for a world powered by artificial intelligence. ADLINK manufactures edge hardware and develops edge software for embedded, distributed and intelligent computing – from powering medical PCs in the intensive care unit to building the world's first high-speed autonomous race car – more than 1600 customers around the world trust ADLINK for mission-critical success. ADLINK holds top-tier edge partnerships with Intel, NVIDIA, AWS and SAS, and also participates on the Intel Board of Advisors, ROS 2 Technical Steering Committee and Autoware Foundation Board. ADLINK contributes to open source, robotics, autonomous, IoT and 5G standards initiatives across 24+ consortiums, driving innovation in manufacturing, telecommunications, healthcare, energy, defense, transportation and infotainment. For over 25 years, with 1800+ ADLINKers and 200+ partners, ADLINK enables the technologies of today and tomorrow, advancing technology and society around the world. Follow ADLINK Technology on LinkedIn, Twitter, Facebook or visit adlinktech.com.

ABOUT OTANICS

Otanics Technology Joint Stock Company was founded in October 2022, with the goal of creating a transparent & cooperative seafood community by providing connection platforms and high-quality technology products at reasonable prices.

The desire of Otanics is to make the "shrimp is no longer eat a land ownership certificate" of the farmers who have put all their hopes and possessions into the shrimp crops.

Otanics understands that each region has a different natural environment , each shrimp farmer has his own technique and experience. We respect that and offer farmers a package of "tailor-made" TOMOTA solutions tailored to your own farming techniques and methods.

TOMOTA - Technology to improve the value chain of shrimp industry

The journey to turn ideas into reality:

- 3+ years for product research and development.
- 270+ meetings with famers
- 6000+ hours: Fine-tune to completion
- 2+ years: Site Implementation
- 1100+ Shrimp Farms was applied

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