

MyAdvantech

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Edgex Consortium Gets Underway in Japan

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Creating a New Era for IoT and Smart Applications

In 1995, Bill Gates published his book “The Road Ahead”, in which he mentioned his thoughts about “an interconnected world built around the Internet” and “smart families”, inspiring the concept of Internet of Things. In 2014, Morris Chang, chairman and CEO of Taiwan Semiconductor Manufacturing Company (TSMC) spoke bluntly at a keynote speech in the Taiwan Semiconductor Industry Association that the Internet of Things (IoT) would be the next bright spot to develop in the semiconductor industry.

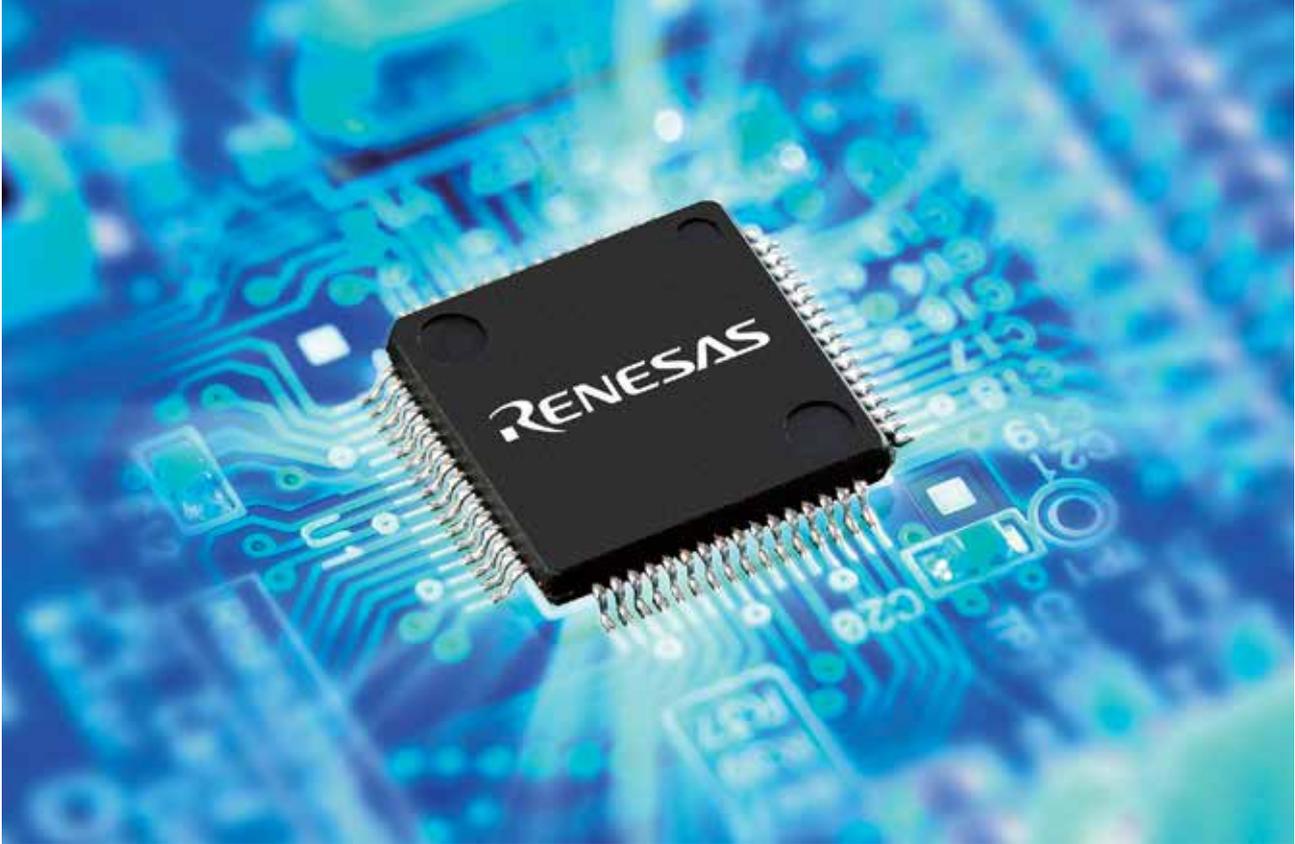
Nowadays, from wafers, semiconductors, smart hardware, software, to traditional industries, all the manufacturers have grasped any opportunity to hook up online. According to a recent report by a famous Consulting Group, the global IoT market this year will break 100 billion U.S. dollars, an increase of 30% year over year, which has become a star industry that none can ignore. More importantly, an important trend can be seen from the 2018 Mobile World Congress (MWC) that artificial intelligence (AI) will become the center of the IoT stage, and a new economic outlook based on AI is being brewed gradually.

As a result, many people are over-optimistic about the future of AI and IoT. In fact, the biggest bottleneck in the current IoT is “its being not connected to the Internet.” According to a report about the global manufacturing issued by Cisco, 90% of the machines used in production lines have not yet been connected to the Internet, and many of them have been used for more than a decade. For many manufacturers, the cost to replace old equipment with a smart factory is too high;

however, AI will not have practical application if there is no large amount of data to support.

Therefore, it is the most important strategy for Advantech Co., Ltd. to incorporate its long-term experience with the current AI wave to make AI suitable for different industries, allowing existing manufacturing processes to create higher added value.

In the past, Advantech Co., Ltd. made use of its automation technology as a base to develop equipment connection and data acquisition and has currently focused on the visualization of manufacturing execution and processes. All of these efforts are geared up towards data analytics and preventive maintenance, so as to lay a solid foundation for AI-based services. Now, through the AI-based machine learning and edge computing architecture, Advantech Co., Ltd. has already developed corresponding solutions for visual inspection of production defects and predictive analysis of the machine. To speed up market development and share with our partners Advantech’s 30 years of experience in the IoT industry, “MyAdvantech” has since this issue opened a new column, named as “IoT.SENSE” (IoT Solution Enabling Services). And will propose its new IoT.SENSE vision and lead our readers to the IoT world to explore every data-driven possibility through WISE-PaaS, Solution Ready Package (SRP), and Advantech’s altruistic philosophy (co-creation). Moreover, the “Application Story” column will also break through allowing you to see more real cases of IoT applications and create a new IoT and smart applications era with us! ■



Creating Artificial Intelligence Units for Smart Factories

Aiding industrial clients with the transition to Industry 4.0, Renesas Electronics continues to invest in the development of second-generation artificial intelligence (AI) units. Through Advantech's design-to-order-services (DTOS) team, Renesas Electronics is also able to assist clients with the transition in the most cost-effective way possible.

**By Yu-Feng Chen with Image provided by Renesas Electronics
Interview with Po-Chun Lee, Renesas Electronics Taiwan Marketing Dept. Manager**

As a leader in industrial markets, Renesas Electronics has extensive experience in applying semiconductor components, such as micro-controller units (MCUs) and application-specific integrated circuits, to motor drivers, programmable controllers, and other industrial products. Renesas Electronics' industrial MCU shipments have been consistently higher than those of its competitors for a long time, reflecting its market share of more than 20%.

"The development of AI units with network and embedded AI is mainly aimed at assisting clients in quickly building the two cores of industry 4.0: industrial IoT and big data analysis," Bo Jun Li, marketing manager of Renesas Electronics in Taiwan explained. "We started with the development two years ago. The first generation of products was built with a complete real-time communication network and data exchange structure.

The new generation of products, however, has had AI big data analysis further enhanced, allowing clients to find the best solution for improving their factory efficiency and boosting business performance through the utilization of AI units."

Innovative AI Model: AI in the Cloud, Machines On Site

Compared to edge computing, with its strong computing power distributed at each end, which invariably leads to greater costs and power consumption in operating edge devices, Renesas utilizes the development of AI units to define an innovative embedded AI model: AI in the cloud, machines onsite. Under this model, data are sent back to the cloud and processed by a cloud server before the data analysis results are sent back to the site, which can lower onsite equipment costs

and power consumption significantly. Since the high-efficiency communication network has been established, the data transmission speed is not necessarily inferior. “Let our clients enjoy the value of AI data analysis at a limited cost; this is our goal for developing AI units.” Mr. Li emphasized.

According to a Cisco report, 90% of machines in production lines in global manufacturing have not yet been connected to the Internet, and many machines have been used for more than a decade. For manufacturers who need to upgrade old equipment to build a smart factory, the expensive cost is prohibitive. Therefore, the realization of industrial IoT and big data analytics through such modules as AI units has to date been the most feasible solution for the transition to becoming a smart factory.

Machines Need Not Be Modified to Obtain AI Functionality

At the beginning of 2017, Renesas completed the proof of concept of its first generation of AI units, which are fully installed in the Renesas Semiconductor Factory in Ibaraki Prefecture, Japan. With the AI unit add-on method, there is no need to modify the many different brands of etching machines, yellow machines, and other machines to gain AI capability. By collecting, accumulating, and analyzing relevant data from each machine (e.g., power consumption, vibration) and comparing the difference between normal and abnormal machines, the possibility of machine failure can be predicted, thus allowing early preventive maintenance practices to be implemented. This also significantly reduces the cost of repairs and maintenance as well as machine downtime.

Mr. Li further pointed out, “After the introduction of AI Units, the number of false alarms per machine has dropped from an average of 50 per month to zero. Since the production line is no longer stopped to handle false signals, overall production output has been significantly increased.” Since having achieved these excellent results, Renesas began cooperating with Advantech’s DTOS team in the third quarter of 2017 to design and develop a new generation of AI units. It is expected that in June 2018, the sample will be completed, a mass production trial will commence, and the product will be introduced to other Renesas factories. In the second half of the year, the products are expected to be promoted to the global market.

Promoting the Global Application Market with Advantech’s DTOS

Advantech’s DTOS team provides tailor-made systems and motherboards. With diversified, customized, and flexible design and manufacturing capabilities coupled up with worldwide technical and logistics support, project development can be significantly accelerated; systems can be fully built, verified, and delivered within a very short period of time; time to market can be shortened; and competitive advantages can be well-maintained. In cooperation with Advantech, Renesas is responsible for providing network, e-AI chip, and software solutions while Advantech is responsible for designing and manufacturing modules.

“We used to cooperate with Japanese manufacturers to develop prototype products for AI units. However, as Japanese manufacturers are less familiar with the global application market, we have commissioned Advantech instead.” Mr. Li explained. “Advantech not only has excellent design capabilities but also a high degree of mastery in the global market and in a diverse range of applications. In addition, the company’s back-end operations, cloud server environment, and ecosystem construction are all well established. As a result, the excellent strength of the software team and other advantages prompted Renesas to actively seek cooperation with Advantech.” Notably, through the complete software structure provided by Advantech’s WISE-PaaS 2.0, end customers can quickly establish their own AI unit application model, which helps with the AI unit being quickly accepted by the market. ■



To Industry 4.0 and Beyond— Edgecross Consortium Gets Underway in Japan

By Joe Prieto with images provided by Sugiyama Hajime
Interview with Sugiyama Hajime, Mitsubishi Electric, member of Edgecross Consortium

Ongoing advances in computing and connectivity in recent years have made Industry 4.0 a growing trend in manufacturing worldwide. However, this ongoing industrial revolution also poses a variety of challenges as firms strive to remain competitive in the rapidly changing technological landscape. As Sugiyama Hajime of Mitsubishi Electric, one of the founding partners of the recently established Edgecross consortium, put it in a recent interview, “The Industry 4.0 revolution offers enormous opportunities. For example, small companies can potentially provide their products and services around the world almost immediately with limited investment. On the other hand, being globally connected means being in competition with the entire world, from gigantic multi-nationals to small start-ups. The challenge for manufacturers, then, is to embrace the innovations of Industry 4.0 in order to stay competitive. Otherwise, it will be difficult to survive.”

The Edgecross Consortium was launched with the express aim of helping manufacturers to overcome the challenges of Industry 4.0 by providing the core functionality required in the emerging era of edge computing, including an edge platform that provides seamless coordination throughout system architectures. But what exactly is “edge computing,” and why is it so critical for Industry 4.0? As Hajime explained, “When we talk about the use of IoT in factories, edge computing is a very important factor. With respect to IT in general, data is processed over months, weeks, and days. But as you know, in factories where machining and processing occurs, differences in timing as small as milliseconds and nanoseconds can have enormous effects. Therefore, it is critical to process data from

the factory floor very close to the floor and as close to instantaneously as possible, which is where the importance of edge computing comes in. Simply put, edge computing can be defined as a method for optimizing cloud computing systems by performing data processing at the edge of the network, near the source of the data. And this, of course, is where the ‘edge’ in ‘Edgecross’ comes from, while the ‘cross’ refers to the consortium’s primary goal of establishing a software platform that can overcome the walls between companies and industries.”

Crossing the Edge to Industry 4.0

As Hajime observed, “Establishing Industry 4.0-enabled facilities is not so easy. In order to utilize the full power of new technologies, such as AI and big data analytics, you need to first connect your current machinery and systems together. In the factory, there are various automated components, including existing equipment lacking even basic internet connectivity. The types and vendors of these components and the means of connecting them vary, so it takes a lot of time and cost just to get to the starting point of IoT.” In fact, while Mitsubishi Electric is itself one of the world’s leading manufacturers of electrical and electronic products and systems and thus has considerable in-house expertise, Hajime noted that the firm “needed to work more closely with other companies in the industry to unleash the full power of IoT. This is why we asked five other major FA and IT specialists, Advantech, Omron, NEC, IBM Japan, and Oracle Japan, to join us to co-found the Edgecross Consortium.” With the combined knowledge and technical capabilities of these member firms, the consortium aims to



provide “a common and open platform to connect factory automation (FA) and operational technology (OT) with information technology (IT).” By doing so, it aims to help companies and industries throughout Asia and beyond to more rapidly overcome the various challenges of establishing true Industry 4.0 capabilities.

IoT Acceleration through Cooperation

Fundamentally, the Edgecross Consortium aims to accelerate the utilization of IoT across industries by helping firms to bridge the gap between IT and OT. As such, with its vast array of edge computing solutions and unparalleled experience in their implementation, Advantech was an obvious choice for inclusion in the consortium. As Hajime explained, “We were well aware that Advantech has been an innovator and technology leader in edge computing solutions, software, and hardware for quite some time, and we were also excited about its ongoing product development in terms of IT and edge layer solutions.”

Advantech’s UNO series of embedded automation computers is just one example of the innovative products in question. The UNO series solutions can serve as intelligent IoT edge gateways helping manufacturers to establish state-of-the-art smart factory capabilities. Advantech’s strong base in Asia was also a key factor for its inclusion in the consortium. As Hajime put it, “We were also looking for a global company with strength in Asia as the Edgecross platform targets a global platform. The fact that most of the manufacturing and future related investments will occur in Asia cannot be denied, so Advantech fit the role perfectly given its longstanding and substantial ties to the region.”

A Clear View of the Future in 2018

In short, with founding partners such as Advantech and Mitsubishi, and with an additional 140 companies joining (as of April, 2018), the Edgecross Consortium is fostering direct services to manufacturers. According to Hajime, “We have already released the Edgecross platform software together with various applications that run on the Edgecross platform in May, 2018. We are

Establishing Industry 4.0-enabled facilities is not so easy. In order to utilize the full power of new technologies, such as AI and big data analytics, you need to first connect your current machinery and systems together.

confident that the platform will be able to accelerate IoT utilization, allowing seamless data collection and transmission throughout FA/OT and IT systems so that manufacturers will be able to focus of the true utilization of the data without

wasting time on its collection. In addition, the Edgecross Consortium brings together a variety of industry and application expert companies, meaning that customers will have a wide and open selection of solutions to choose from.”

As it continues to grow, Edgecross is ever motivated to realize one of its core principals, greater client competitiveness on a global scale. One such approach already took place at Hannover Messe 2018, where the Edgecross solution was unveiled to a global audience. Closer to its base of operations, Edgecross along with Advantech and numerous partners such as Mitsubishi Electric are set to take center stage at the IoT Co-Creation Summit in Suzhou, China to demonstrate the capability of the Edgecross platform to accelerate IoT utilization. By providing a nexus of industry and application expertise, Edgecross intends to provide seamless access to a wide and open selection of solutions.

The challenges created by Industry 4.0 are substantial, but so, too, are the opportunities. For the Edgecross consortium and its partners, 2018 figures to be a year in which the challenges are made smaller and the opportunities grow greater and greater. ■

In “*The Third Wave: An Entrepreneur’s Vision of the Future*,” Steve Case describes a new world that is gradually developing based on a platform where the sharing economy is king and partners create victories. At present, we are seeing this new world take shape.

In line with this philosophy, the vision of Advantech’s IoT Solution Enabling Services (IoT.SENSE) team is to guide partners in leveraging this new trend to achieve success in the new digital world. To realize this ultimate goal, we must use our soft knowledge and hard power of the IoT industry, an in which Taiwan has been undergoing development more than 30 years. Through intellectual sharing and consulting services, we have worked hand in hand with our partners to create solutions to build a complete IoT cloud service platform that can assist system integrators in developing suitable industrial applications in the shortest possible period of time.

Data Driver Lays a Solid Foundation for IoT while SRPs Help Create Market Opportunities

By You-Huan Yan with images provided by Advantech
Interview with Advantech CTO, Rui-Xiang Yang

With the rise of the IoT industry, increasingly more diverse applications have emerged from different industries. At the same time, this has attracted more competitors. In fact, Advantech has maintained the same developmental direction since its first investment in smart industrial applications. However, based on market developments and client needs, the company is now facing a transitional period from IoT Phase 1 (embedded platforms) to IoT Phase 2 (IoT integrated solution platforms).

IoT Phase 2 emphasizes not only the type of embedded hardware applications and platforms but also the SRP concept. However, when it comes to SRPs, many people still do not understand exactly what they are or why they are so essential for Advantech.

SRPs (Solution Ready Packages) are defined as a solution integrated with an embedded hardware and IoT software platform—specifically platforms used in

industrial IoT. As a semi-finished product, SRPs are provided to vertically focused cloud service companies. Through the integration of solutions from different vertical industries, finished products are then provided to customers from different industries.

In simple terms, SRPs can help clients reduce their market access time and system development time and thus raise overall efficiency. SRPs can also help Advantech break through industrial market restrictions to provide clients in different industries with the best tailored solution for their specific requirements.

To be more precise, all applications are associated with data collection during the course of smart industrial development; without data, subsequent smart applications and services would simply be irrelevant. For example, to predict the life cycle of a machine and prepare a mechanical repair and maintenance schedule, relevant data must first be collected. Likewise, to engage in

YOUR TICKET TO THE IoT WORLD

energy conservation and emission reduction, all relevant data need to be collected first to verify and validate the overall effectiveness of such an endeavor.

Therefore, data collection and transmission—or digitization and networking—form the most critical foundation in the course of smart industrial development. The SRP concept has been designed so that with Advantech's assistance, users can concentrate more on application and service development rather than spending time on data collection.

Of course, Advantech has also provided complete solutions for clients in the past, and this has been achieved through a deep understanding of individual industries as well as through the assistance the company has provided with relevant hardware platforms. This is mostly a unitary development that covers data collection at the bottom level to service applications at the top level for individual industries/clients. However, solutions that are suitable for one industry or client can seldom if ever be applied to other industries or clients in a horizontal manner.

When Advantech was in IoT Phase 1, the company placed greater emphasis on the demand for product functionality. For different needs, product specifications were developed to design solutions with relevant functions that address client problems. Due to industrial developments, everything is now based on data and the market environment is driven by the demand for data, which is what Advantech must face. The type of solution based on a data-driven market is exactly the core concept of SRPs.

Since data are driven by client needs, everything is focused on the purpose of data collection. In Advantech's current SRP concept, whether it is the underlying sensors, gateways, or cloud platforms that provide storage, computing, analysis, and management, everything can be

flexibly adjusted and built in accordance with user needs. Moreover, Advantech's SRPs emphasize the concept of cross-cloud configuration. Whether it is in Microsoft Azure, Amazon AWS, or even Alibaba Cloud, WISE-PaaS platforms can be built to assist with the development and utilization of relevant applications.

Currently, SRPs are mainly aimed at providing users with suitable solutions for data collection. On one hand, the emergence of the SRP concept has satisfied the data-driven concept; on the other hand, it appears to be fragmented in terms of industrial applications, in that 10 different industries may in fact have more than 10 different needs, which is contrast to general consumer services and applications. In the past, the unitary developmental approach, which mainly focuses on functionalities, has made it even more difficult to implement cross-industry applications.

Through SRPs, clients and users can select the most needed and suitable methods before combining them into the most appropriate solution. Enterprises with sufficient IT resources and capabilities can even establish their own SRPs through cost-cutting and profit-boosting strategies. For SMEs, it is also possible to create a suitable data collection environment with existing software packages and public cloud platforms available on the market. For Advantech, SRPs help accelerate the realization of IoT, thus allowing the company to better concentrate on developing new markets and finding new business opportunities.

In the future, the IoT.SENSE column will guide readers to the world of IoT and explore every possibility driven by data through various applications such as software applications, vertical industries, and business opportunities. ■



Advantech's Continuous Cold Chain Management Solution Assists an International Hypermarket

To strengthen quality control over frozen and refrigerated products, an international hypermarket chain in Taiwan introduced Advantech's Cold Chain Management Solution at the beginning of 2018. LoRa wireless cold chain sensors were utilized to establish a surveillance network to monitor temperature changes in freezers and refrigerators. This way, products can be protected from the risk of spoilage due to fluctuations in temperature.

By Liao Peijun with images provided by Advantech
Interview with Yang, Kai-Xiang, Advantech iLogistics Market Development Manager

To ensure the quality of frozen and refrigerated foods, an international hypermarket in Taiwan introduced Advantech's Cold Chain Management Solution in early 2018. By utilizing LoRa wireless cold chain sensors, the company was able to build up a systematic monitoring network so that all frozen and refrigerated products—whether on sale, in the warehouse, or at the logistics center—can be monitored by management by tracking temperature changes in all freezers or refrigerators via a cloud platform.

Complete Cold-Chain Monitoring System from Transportation to Food Storage

Problems with cold chain distribution and storage around the world have led to many food safety incidents, raising both public awareness on and retailer demand for higher levels of food safety. As an example, in addition to food safety concerns, cold chain management problems in China have resulted in food spoilage rate of 20%, resulting in a total loss of RMB 100 billion in logistics costs.

Kai-Xiang Yang, Advantech's ilogistics Market Development Manager, pointed out that when discussing the safety of frozen or refrigerated food, most retailers in the past only paid attention to temperature control during transportation to avoid losses. Today, the scope of control has been expanded to warehouses and stores to ensure that frozen and refrigerated foods at every part of the supply chain are stored at the appropriate temperature, thus ensuring product freshness. This not only helps retailers reduce losses but also protects their reputation, thus ensuring customer loyalty. This is also the main purpose for Advantech introducing their Cold Chain Management Solution.

Recently, the hypermarket installed LoRa wireless cold chain sensors to the wall-mounted refrigerators and freezers at both the hypermarket and its storage/logistics center. This enabled management to monitor the temperature in the freezers and refrigerators at every stage of distribution, at any time and from any location. The hypermarket has also provided LoRa wireless sensors to its suppliers in order to better monitor fresh food products whose quality changes with the temperature, requesting them to install the sensors in their freezer containers so that temperatures can be monitored during transportation.

Benefits of Cold Chain Management Solutions: Regulatory Compliance, Efficiency, and Reduced Costs

Mr. Yang revealed that aside from enhancing food safety control, the hypermarket has enhanced its operating efficiency, reduced the incidence of spoiled goods, lowered electricity costs, and improved regulatory compliance by introducing Advantech's Cold Chain Management Solution.

This is significant progress from past practices in food safety management, which involved intensive manual labor, in which staff would randomly select a batch of refrigerated or frozen products, check the temperature with a sensor, record the reading on paper, and then return to the office and input the data into a computer system. The shortcomings of this type of operating method are twofold: first, human error is inevitable in manual records; second, paper records are relatively easier to lose. Since current regulations governing food safety and sanitation require relevant documents to be preserved for 5 years, data management has become a crucial concern for food safety management. Thus, a better system had to be implemented.

With Advantech's Cold Chain Management Solution, staff can install LoRa wireless cold chain sensors among refrigerated products, use a handheld device to scan the order number, confirm the products to be inspected, and scan the LoRa sensors so that the temperature data will be automatically uploaded to the system. This approach not only saves staff time but also ensure compliance with data preservation regulations pertaining to food safety and sanitation.

This efficiency also extends to the shopfront. Today, whenever there is an abnormality in the temperature of any freezer or refrigerator, the system will notify management immediately so that any problem can be identified, rectified, and possibly prevented from occurring again in the future.

Advantech's Unique Technology Innovation Can Alleviate Pain Points

Despite the wide availability of handheld devices and temperature sensors currently on the market, many hypermarket operators still choose Advantech. The main reason is that Advantech's solutions are unique and innovative technologies.

Mr. Yang pointed out that the most notable feature

about Advantech's PWS-472 industrial-grade handheld device is that it supports IR temperature input, which is particularly relevant for cold chain retailers. Additionally, the device is based on Android OS, thus providing an open platform that facilitates system integration, which can significantly improve operational efficiency.

Over a wireless network, the TREK-120 LoRa wireless cold chain sensor can be installed in a matter of seconds once the installation location has been confirmed. This is a sharp contrast against traditional wired sensors that require cabling to be installed, which can be time-consuming and difficult to install. Furthermore, the TREK-120 can simultaneously measure food temperature, humidity, and vibration levels. Although the functionality of the TREK-120 is relatively similar to other general sensors in terms of items to be measured, the TREK-120 can perform data transmission over long distances with low power consumption. In fact, it can be used for many years without having to replace the battery.

Mr. Yang explained that traditional sensors use Wi-Fi or Bluetooth for data transmission, the biggest drawback of which is their large power consumption. This requires users to recharge or replace batteries often in order to avoid data loss. Even if a low power consumption Bluetooth technology were to be launched in the future, it would still likely be vulnerable to outside interference, making it unsuitable for cold chain food safety monitoring.

Since LoRa has a higher penetration rate and longer transmission distance than previous transmission methods, it is quite adequate for supermarkets to install one or two gateways, which reduces system installation costs relative to wired systems. Furthermore, LoRa base stations are relatively easier to install. All that is required for any IT device to be taken as a base station is to install software and a dongle. Thus, stability and reliability in telecommunication services are easily realizable.

Demonstrating Advantech's commitment



to meeting customer needs, the company is dedicated to ensuring smooth system implementation. Because LoRa operates mainly in the global free-to-air frequency band, it can easily overlap communication frequency bands already used by the customer, causing mutual interference between signals. The supermarket encountered this problem while installing the Advantech Cold Chain Management Solution, and Advantech engineers immediately assisted with adjusting the operating frequency band. Additionally, the system was set up so that the sensors would first inquire as to whether there

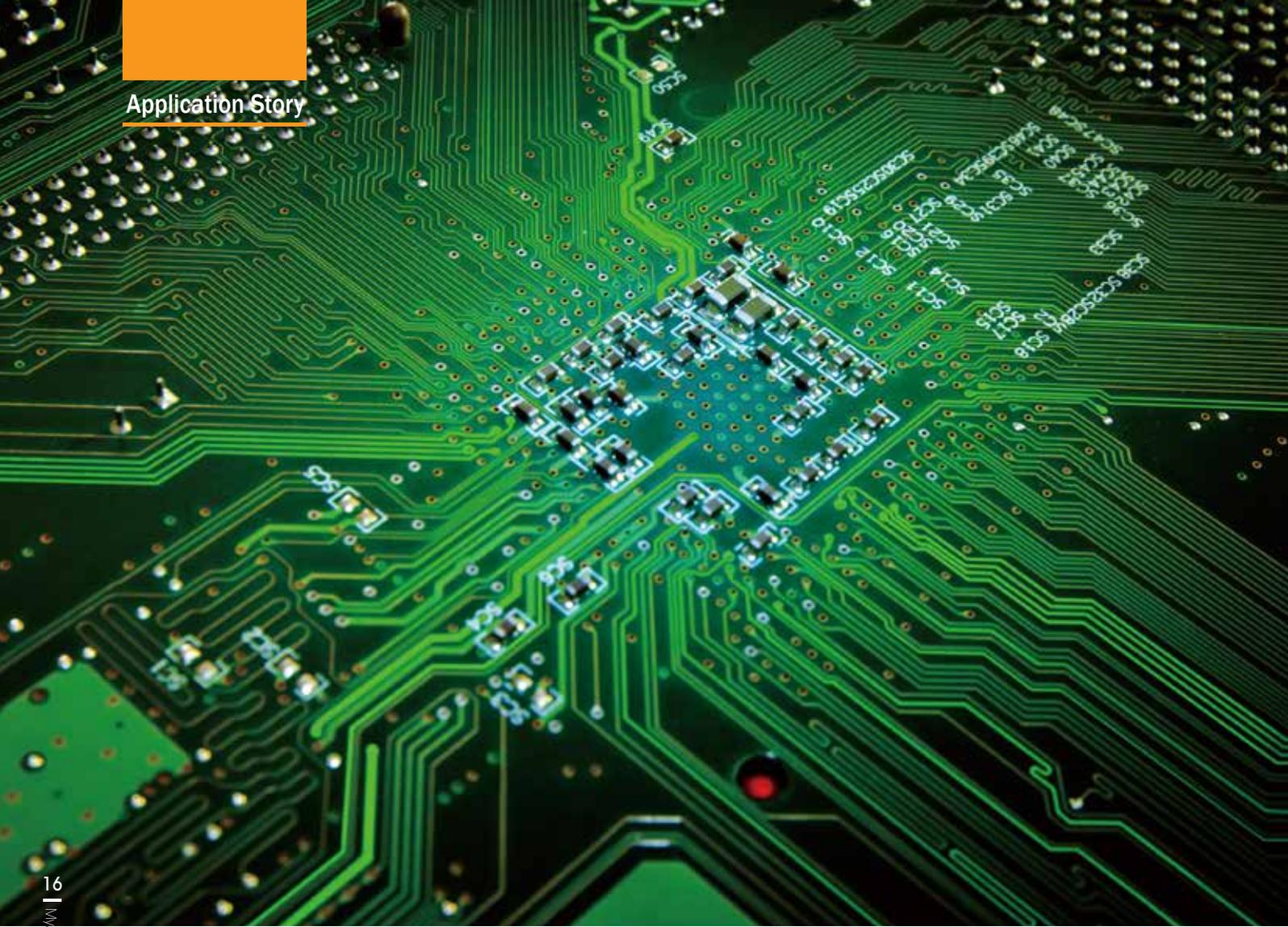


is any signal occupying the channel before transmitting data, thus ensuring data transmission quality.

With modern society's emphasis on food safety, a reliable solution for complete cold chain management can help retailers ensure food safety, which can give their customers peace of mind while also protecting their reputation. Since the hypermarket introduced Advantech's Cold Chain Management Solution, their practices for monitoring frozen/refrigerated food product safety have fallen in line with global trends. With the initiative demonstrated by this hypermarket, more retailers are expected to be motivated to introduce Advantech's Cold Chain Management Solution. ■

Company Profile:

An internationally renowned hypermarket chain that currently distributes to 10,000 retail outlets in 30 countries and regions around the world.



Joint Launch of the WebAccess / SCADA Solution to Optimize PCB Factory Processes

Through Advantech's WebAccess/SCADA IoT platform and related hardware, CYAN Intelligent has successfully integrated equipment and information terminals for PCB manufacturing plants, and their efforts have brought about a high level of customer satisfaction from electronics factories. Their monitoring system has been implemented at two PCB factories, with plans to expand the scope of monitoring to optimize all manufacturing processes.

By Sharlene Yu with images provided by Advantech and Shutterstock

With ever-increasing technical precision, traditional manual production methods have been unable to meet the evolving needs of industry, whether in terms of accuracy or control. In particular, for large production lines that cannot be controlled remotely, the inability to take responsive measures when an incident occurs can waste a lot of human resources and incur considerable losses.

For factories, the implementation of Industry 4.0 in the search for process optimization has become a top priority. A wide range of businesses, including those in hydraulics, power, glass, solar, semiconductor, and other industries, have already started using SCADA systems to collect equipment data, minimize the need for manual intervention, control production processes, and plan production schedules, all of which have made significant contributions to increasing production efficiency.

To meet client needs, the technology industry is constantly seeking new means of process optimization. In particular, when factories introduce optimization measures, it is essential that they first establish serial connections for all of their equipment and information terminals. Originally, however, these two ends were independent operating systems. To integrate the two systems, an IoT platform must be adopted to act as a central bridge so that low-level device data can be uploaded to the upper-level management system for it to give instructions to the low-level devices.

In this regard, Advantech's WISE-PaaS Alliance VIP partner, CYAN Intelligent, has utilized Advantech's WebAccess/SCADA IoT platform and related hardware to integrate device terminals and information terminals for PCB manufacturing factories.

Precision Monitoring System Replaces Human Control

CYAN Intelligent is a system integrator and provider of SCADA systems. The company has also provided a variety of customized monitoring solutions for government agencies, academic institutions, medical centers, traditional printing, and high-tech industries.

At present, they are planning a monitoring system for the production line of a PCB factory in Taiwan. Since this factory is dedicated to the manufacturing of special PCBs for high-end computers, its high-mix, low-volume production means that it is necessary to constantly adjust production items to manufacture the low number of

diversified products. This has put the company's quality control process to the test. For example, the factory's original PCB baking process was manually controlled by an operator on the production line. In this situation, it is relatively difficult to notice when baking settings are wrong, when someone opens the door arbitrarily during baking, or when there are problems such as abnormal oven temperatures. All of these are problems that could lead to the final production of low-quality PCBs.

To solve these problems, CYAN Intelligent demonstrated to the client how the device terminals could be connected to the information terminals in series in order to monitor the baking process. The monitoring system would use a single bar-code to allow production parameters to be transmitted directly from the manufacturing execution system (MES) to the oven, thus eliminating the need for an operator on the production line and allowing for relevant data to be recorded during the baking process. In the event of a temperature abnormality or the oven door being opened during baking, a warning alarm would be automatically set off.

With the feature-rich functions and open environment of Advantech's WebAccess/SCADA solution, the proposed system can collect production line data and store it in the existing MES. A mistake-proofing design was also proposed to reduce the chance of human error. With this system, complete production records can be used to generate a production history for a product to provide reference material for future process optimization.





Advantech Solution Seamlessly Integrates Heterogeneous Systems

Advantech WebAccess/SCADA is a browser-based SCADA remote monitoring software package that provides drawing tools and supports programming languages for designers to complete system development within a short period of time. This includes user interfaces, trend charts, exception alerts, and mistake-proofing functions for a virtually unlimited range of projects.

In addition, the open interfaces of WebAccess/SCADA (e.g., ODBC, Web Service, and SignalR) also make it easier to integrate data across different systems. Whether it is the underlying equipment data or management production parameters, both can be transmitted easily within the system.

In terms of applications, WebAccess/SCADA comes in different versions that give different I/O point options. System planners can thus configure the version they need according to the amount of data to be acquired. When further expansion is needed, the number of I/O points can be increased to expand the monitoring scope. The software also supports 1024 end-users for free, which not only allows multiple users to simultaneously monitor the production line but also saves on licensing fees.

Regarding the hardware aspect, the IPC-7132—an industrial-grade computer with multiple I/O

interfaces that are easily connected to peripheral devices and networks—was proposed for installation beside 11 hot air circulation ovens. This unit was selected recommended because it can withstand the high-temperature and high-humidity environment of the PCB factory. Furthermore, the EKI-1222 was suggested for signal conversion from serial to Ethernet for data transmission over TCP/IP. Finally, the ADAM-6200 series of isolated I/O modules were selected for their anti-interference characteristics and also for their customizability, which allows designers to configure Modbus addresses with greater flexibility.

The monitoring system required a highly integrated IoT platform that provides sufficient openness for both

hardware and software to bridge the upper level and lower level seamlessly. The system had to have easy-to-develop tools for designers to easily create user interfaces with the required functionalities, and it also needed to be equipped with related hardware, including industrial computers that can withstand the harsh factory environment, communication converters that can reliably transmit data, and I/O modules that can retrieve the data.

To realize Industry 4.0, the first issue to be addressed is cross-platform interoperability. Advantech's WebAccess/SCADA solution not only seamlessly integrates heterogeneous systems in an IoT platform but also provides industrial-grade hardware for monitoring connected devices and collected data. Advantech's powerful WebAccess/SCADA solution and CYAN Intelligent's proven development capabilities ensure that this monitoring system is acceptable for electronics factories' needs. At present, the monitoring system has been implemented at two PCB factories, which have decided to expand the scope of monitoring by adding WebAccess I/O points to introduce additional monitoring functions to its production lines in order to fully optimize their manufacturing processes. ■

Big Data
Cloud
Platform

WebAccess

MES

ERP

Transform Data into Business Insights in Real Time with WebAccess/SCADA 8.3

WebAccess/SCADA Industrial IoT Application Software Platform



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Advantech WebAccess/SCADA 8.3 is a 100% Web-based SCADA software solution/IIoT platform with open interfaces for developing IoT applications for various vertical markets. With WebAccess/Dashboard 2.0, which provides flexible data analysis tools and high performance, and a new app for iOS and Android platforms, WebAccess/SCADA 8.3 allows you to manage your applications from any location. As the next generation of SCADA software, WebAccess/SCADA 8.3 has been designed to improve customer satisfaction by integrating Advantech hardware and software, thus providing you with a simpler and more convenient IIoT solution.



WebAccess/SCADA

Industrial IoT application software platform



WebAccess/CNC

Networking solution for CNC machining



UNO-2484G

Intel® Core™ i7/i5/i3 regular-sized modular box platform with 4 x GbE, 1 x mPCIe, HDMI, DP



ADAM-3600

8AI / 8DI / 4DO / 4-slot expansion cloud-enabled edge DAQ platform



EKI-7710G-2CPI

8GE PoE + 2G combo managed Ethernet switch, IEEE802.3af/at, 24~48 VDC, -40~75°C



More Information

Advantech WebAccess

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Realizing Human–Robot Control and Digital Management with Industrial HMI Solution

Industry 4.0 is changing the way manufacturing industry operates. Increasingly more manufacturers are leveraging advanced technologies such as robotics and automation systems to improve productivity and efficiency. As a result, human–machine interfaces (HMIs) play an important role in the digital connectedness of humans and machines. However, using the wrong HMI can lengthen development times and increase implementation costs. Featuring superior applicability and availability, Advantech’s x86-based industrial panel PC – PPC-3120S is ideal for developing robotics and automation systems.

**By Sharlene Yu with images provided by Shutterstock
Interview with Haihu, Sales Manager, KUKA Robotics**

As a specialist in the field of robotics and automation technology, KUKA Robotics is a leading manufacturer in industrial robots. Recently, KUKA Robotics was custom-developing an automated production management system for automotive transmission factory in Shanghai, China. The company previously used a RISC-based computer as the HMI. Since the functionality of this computer is too simple and because the system is difficult to customize, KUKA required an x86-based industrial panel PC to provide richer features for factory users. To facilitate maintenance and management, the new computer was to be utilized in the production lines to control the low-level robots as well as the upper-level MES; it also had to be suitable for monitoring assembly line operations and for managing product reworks.

Advantech Offers A Total Solution

Advantech provides a total solution that met KUKA Robotics’ needs. The solution included the PPC-3120S ultra slim panel PC, and WebAccess/HMI software. The project contains two parts: human robot control and digital management. For the human-robot control, the PPC-3120S was installed to provide an HMI for each work station. This unit was responsible for receiving work orders from the MES via the network while also being connected to PLCs via Profinet in order to control the robotics. It also displayed the SOP to help ensure that staff perform their job properly. For digital management, the PPC-3120S can act as a general computer for assembly line operation monitoring and rework management.

WebAccess/HMI, Web-based Software Solution

WebAccess/HMI provides a convenient



graphical programming environment for system developers to intuitively create HMI screens, thus reducing programming time. With its web-based interface, users can remotely engineer, monitor, and control the system via any standard browser such as IE. Supporting hundreds of industrial communication protocols, the PPC-3120S can be connected to a range of devices such as PLCs.

Reliable Industrial-grade Panel Platform

PPC-3120S is an 12" fanless, ultra-slim industrial-grade panel PC that users can freely install at their own convenience. The Intel® Celeron® N2930 processor ensures that the PPC-3120S delivers high-performance computing in an x86 development environment, providing flexibility for system developers in designing a multifunctional system. Equipped with a die-cast aluminum alloy enclosure and a touch screen with an IP65 rating for the front panel, the PPC-3120S also offers

anti-shock and anti-vibration that make it solid and highly durable. Additionally, with the accessory - PPC-IPS-AE - uninterruptible power supply (UPS) module, the platform can ensure continual operation even in the event of a temporary power outage while also protecting the panel PC from being damaged or losing data.

Choosing the wrong product can lead to many problems, including lengthy implementation times and increased setup costs, but the right choice can ensure smooth operations. Advantech's PPC-3120S is an aesthetic, durable, and feature-rich ultra-slim panel PC that can be intuitively operated using WebAccess/HMI software. Furthermore, the PPC-IPS-AE UPS module adds more value by ensuring system stability. This total solution has helped the KUKA's developers to easily complete system development, thus meeting their client's requirements. KUKA Robotics has gained satisfactory results, prompting the company to continue using the total Industrial HMI Solution from Advantech. ■

Advantech Develops Situation Room for Smart Factory Management

In response to the emergence of Industry 4.0, a major CNC machine tool builder in Taiwan has adopted Advantech's M2I/CNC machine tool equipment management solution to progress from equipment/machine intelligence to smart factory management. Leveraging its wealth of experience, this CNC machine tool builder upgraded its products to better assist manufacturers with achieving smart factory management.

By Liao Pei-jun with images provided by Advantech
Interview with Advantech IIoT M2I Division Business Development Manager Alex Yeh

In the past, production information could only be compiled after daily operations and reported to managers the next morning. Now, factory managers can obtain such information in real time to immediately resolve problems with the relevant responsible persons. Establishing a situation room has transformed management by replacing production reports with real-time indexing.

Situation Rooms Can Improve Production Efficiency

By implementing Advantech's Intelligent CNC Machine Management Solution, which enables optimization and visualization of CNC machine monitoring and management through Advantech's WISE-PaaS Industrial IoT Cloud Platform, embedded edge computing and integrated cloud-based services can be realized.

Advantech's IIoT M2I Division Business Development Manager Alex Yeh highlighted that since the CNC machine tool builder implemented a situation room, management have been able to instantly understand the status of each production line in the factory. They can review production indicators, such as the utilization rate and overall equipment effectiveness (OEE), and establish daily production targets and plans. In the afternoon, they can also review each production line's progress by comparing it to the preset targets to ensure the production schedule and requirements are met. If any emergency or urgent issues are identified, such as a

lack of materials, disconnection, shutdown, or equipment failure, managers can contact the relevant responsible persons immediately via WeChat or Line and use real-time analysis graphs and charts to discuss how to best resolve the issues.

Therefore, real-time reviews not only increase production efficiency and yield rates, but also accelerate the resolution of problems. More importantly, with the accumulation of production data, internal problems can be revealed and used to improve production efficiency. Consider the following example, where machine operation reports for the last 6 months indicated that a specific machine issues alarms much more frequently than other machines. After thoroughly researching the reasons for each alarm, the company determined that most of the alarms were caused by inadvertent actions by workers, which led to frequent system shutdowns and restarts that negatively impacted production capacity. However, after conducting additional employee training, the number of false alarms was greatly reduced and production capacity was increased.

According to Alex Yeh, situation rooms are typically closed rooms equipped with several computer screens, each of which displays different data or charts to facilitate managers' decision-making. However, the CNC machine tool builder subverted this traditional approach by using cloud technology to virtualize its situation room, transmit machine data to the cloud platform for computation and



Advantech Co., Ltd., an industrial computer manufacturer, has produced not only a wide variety of solutions for uploading data to the cloud, but also the world's only open-ended WISE-PaaS IoT cloud platform. Accordingly, Advantech was able to assist this CNC machine tool builder with writing its management services to the cloud, integrating the original stand-alone system into four sets of cloud solutions, enabling customers to arrange and combine solutions according to their requirements, and replicating their production modes quickly and flexibly.

analysis, and present the analysis results and collated data on various devices for managers to review. This enables managers to understand the production status remotely and make more precise and flexible decisions.

Pushing CNC Machines into the High-End Application Market

For this CNC machine tool builder, the establishment of a situation room not only improves the efficiency of factory management, but also facilitates the introduction of Industry 4.0. Looking to the future, the company hopes to leverage its own experience in order to assist more manufacturers with transforming their facilities through the integration of smart equipment/machinery.

According to Alex Yeh, this CNC machine tool builder has been using its machine platform to collect data for at least 7 to 8 years. Because it understands clearly how data should be used, the company has collected information on the following six major aspects of production management: manpower, machines/equipment, materials, methods, environments, and testing. Additionally, the company has already developed a stand-alone version of its system to satisfy the needs of various management levels in the metal processing industry. Thus, to fulfill its goals for the future, the company needs to develop professional equipment for uploading data in order to facilitate diverse cloud computation and analysis solutions and applications.

The Transformation to Industry 4.0

With the arrival of Industry 4.0, the traditional CNC industry must move towards smart production and intelligent products in order to anticipate and meet customer needs in the future. Alex Yeh asserted that a smart CNC machine must have at least three capabilities. First, the CNC machine must be able to collect data regarding the machine condition, status, parameters, etc. Second, the collected data must be displayed onscreen as well as transmitted to the cloud. Third, the data collected by the CNC machine must be able to assist manufacturers with optimizing operations.

The intelligentization of machines can enable customers to improve production efficiency and yield rates. However, for equipment manufacturers, the transformation of production processes remains ongoing. The next step should be to transform their business model from being equipment sellers to service providers, much like GE or Xerox, whose business models emphasize “machine as a service” or equipment rental services based on sharing.

With Advantech's M2I/CNC machine tool equipment management solution, this CNC machine tool builder has taken the lead in this transformation for Industry 4.0 and entered the product transformation phase. The company's next step will be to develop a new business model in an effort to break new ground with its business operations amid the shift to Industry 4.0. ■

Advantech's Deep Learning Solutions Give Rise to Smart AI Applications

The implementation of comprehensive solutions reduces the complexity of system construction, making it easier for industry to introduce AI deep learning systems. By investing time and effort in their familiar domain know-how, businesses can create more industrial value.

By Xiao-Jing Yu with images provided by Shutterstock
Interview with Advantech Smart System Business Group Director Hou-Yi Liu and Zhi-Wei Bao

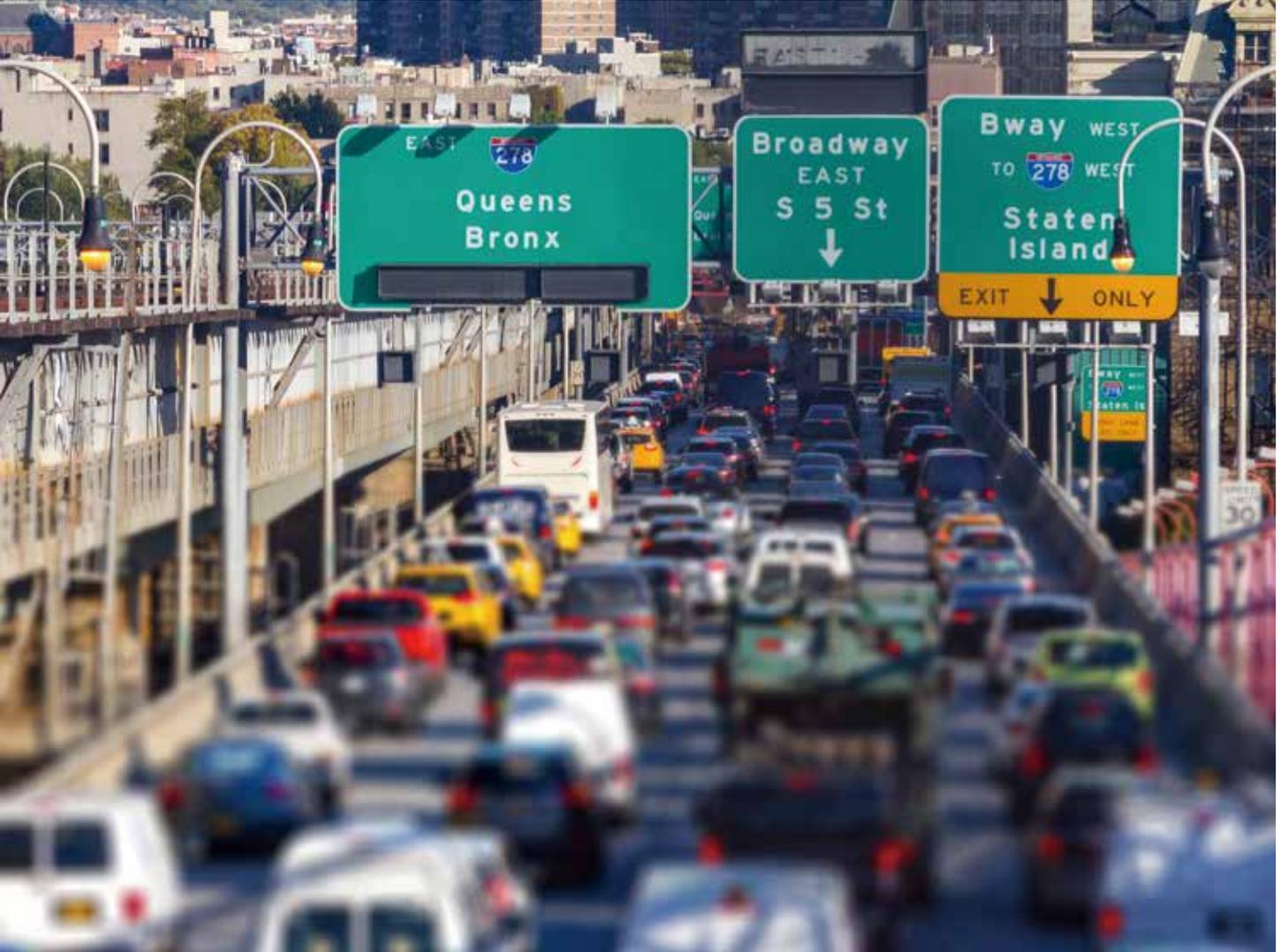
After having been a topic of discussion and research for more than fifty years, artificial intelligence (AI) has finally stepped out from the laboratory following the development of neural network algorithms of deep learning techniques. Nowadays, AI is no longer a technology exclusive to R&D; in addition to being used in supercomputers that have beaten the world's best chess players, driverless vehicles currently being road-tested, and robots that have been developed to have a sense of personality and identity, AI is also becoming widely accepted as an application tool with a high level of practicability. For example, deep learning technology is employed in a wide range of specialized applications such as quality screening for fruit and vegetables, retail traffic counting and analytics, medical imaging, and intelligent transportation.

A general concept of AI deep learning is to 1) collect a mass amount of learning materials, 2) acquire a knowledge model developed from an AI training system, and 3) introduce a model that has been designed for application in a specific field. These seemingly simple steps actually require a considerable amount of hardware and software expertise and relevant field expertise. As industries begin to utilize

AI deep learning to improve their quality and efficiency, many relevant technologies will start to emerge in the market. Such a prosperous yet competitive business market is not only a strength but also a weakness for those seeking to implement AI deep learning. The strength for users lies in the variety of resources that developers may choose from, while major weaknesses include the time-consuming and painstaking task of integrating different types of hardware and software.

Simplifying the Development of AI Deep Learning Systems

While actively investing in AI deep learning, Advantech has found that aside from the arduous task of collecting learning materials, the most common problem faced by industries introducing AI deep learning is the tedious work involved in system construction. For example, what kind of hardware platform is needed in order to have sufficient functionality for complex computations? What type of hardware specifications are needed to meet the strict requirements of the application environment (e.g., public transportation, factories, clean rooms, and medical institutions)? How do AI systems connect to upper management software



or cloud platforms? Are there any knowledge models available to shorten the overall training time? Is a new system to be developed or is an existing system to be upgraded to a deep learning system?

To solve the aforementioned problems, Advantech provides a complete deep learning solution with integrated hardware/software. The solution includes a training platform for developing deep learning models, a knowledge model for an inference platform to make real-time inferences, an SDK applicable to the development of deep learning systems, a ready-for-use knowledge model developed from the training process, and system planning and technical consulting services provided by professional teams. This simplifies system construction, making it easier for developers to build an AI deep

learning system. This allows developers to concentrate on their domain know-how to generate applications that are more innovative and practical.

Precise Traffic Flow Monitoring and Efficient Law Enforcement

Advantech's deep learning solutions have been successfully implemented in manufacturing, retail, transportation, and many other industries. Applications in intelligent transportation, for example, include the statistical analysis of traffic flow, MRT passenger detection, car and license plate identification, parking space detection, enforcement of bus stop parking violations, large vehicle control, and railway intrusion detection.



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Advantech

Among these, the solution for the statistical analysis of road traffic involves installation of the SKY-6100 server-grade training and inference platform at a traffic control center as well as the MIC-7500 high-functionality inference platform on the roadside. These two platforms work together to identify vehicles in separate lanes by car type (e.g., bicycle, motorcycle, car, truck, bus, etc.), and this data is uploaded to a cloud platform. Additionally, the APIs in Advantech's SDK also allow for seamless connectivity between data and system integrator applications for generating traffic management reports. The dashboard also provides a real-time display for information that is critical to smart transportation system control. In contrast to previous systems, where induction coils were installed on the roadside to detect and count the number of vehicles passing by within a given period, the introduction of a deep learning system eliminates the need for induction coil installation while yielding statistical data that is more complete and precise.

In the case of enforcing bus stop parking violations, a compact MIC-7200 inference platform equipped with a built-in knowledge model is installed on site to receive captured images. When a vehicle is detected parking in

the bus stop and found not to be a bus (as identified by the inference platform), an on-site digital display board and broadcaster will warn the owner of the illegally parked vehicle. Additionally, relevant data will be uploaded to the license plate identification system and police station cloud platform in just over three minutes after an infringement occurs. This aids police with enforcing relevant traffic laws and regulations. Through such technological law enforcement tools, police stations with reduced human resources can remotely monitor bus stops and issue fines for parking infringements without needing to be on site; furthermore, violators will find it difficult to flee the scene because of traffic camera surveillance.

Lowering Technology Barriers to Promote Innovative Deep Learning

AI is a tool that has the potential to solve many problems affecting humans. Deep learning with self-training ability significantly improves the clarity of images, video, and text, making it a versatile tool for any application. However, system developers who might be competent at data collation and analysis in some fields might not necessarily understand what kind of computing environment is required for smooth deep learning.

Advantech has extensive experience in hardware and software integration within vertical industries. The company also owns its own production lines and manufactures a wide range of products. This means that Advantech can provide complete solutions suitable for deep learning while also being able to introduce valuable resources from many third-party partners, which simplifies system construction and lowers technical barriers. Ultimately, this aids developers with completing their projects within the shortest possible time.

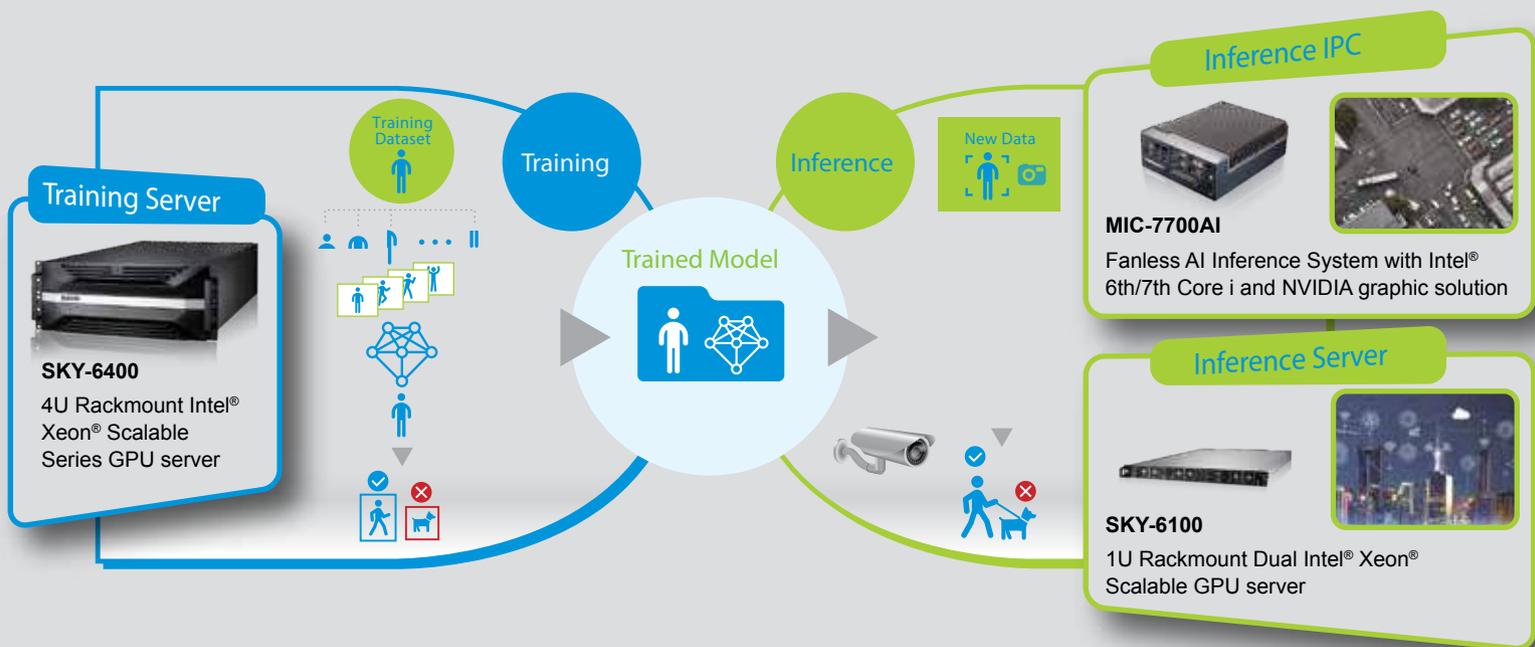
Advantech believes that through such a comprehensive resource integration service, smart and innovative applications extended from AI deep learning technology will soon start to thrive and prosper without boundaries. ■

AI Deep Learning Solutions for Industrial IoT



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New Generation ADAM Presents New Logics & Designs to Drive the Future of Big Data

ADAM is a product for data acquisition that ADVANTECH specializes in. With the rise of Industry 4.0, more and more enterprises rely on big data analysis to manage and arrange their products and services. With a wealth of experience and R&D advantages, the ADAM production line has officially launched a brand new smart design to provide system integrators, equipment service providers, and end users with professional solutions for device networking, communication efficiency, data processing, device management, and other data-related requirements.

By WANG, MING-DE with images provided by Advantech
Interview with WANG, YU-HONG, Senior Engineer & Product Planner of ADVANTECH IoT Business Group

Since Industry 4.0 benefits many business owners by creating more opportunities for them to win market share, many companies are driven to introduce IoT technology and improve their production efficiency. In order to build a big data foundation that contributes to increased production efficiency, a large number of devices must be networked. At the same time, in response to the higher environmental monitoring standard required by existing environmental laws and regulations, the challenges of the size and type of sensors that need to be built will be completely different from the past: how to shorten the online hardware period, how to integrate IT and OT systems, and how to change the efficiency of communication between devices and the cloud system. In order to achieve a smart vision, Advantech's new generation of ADAM (Advantech Data Acquisition Modules) is to use the industrial IoT application as the core of the design, so that the lightweight module will play a greater role in helping clients build a big data foundation.

Breakthrough 1: Reduce the Hardware Internet Access Period Required for the Big and Diverse Data Collection through Rapid Configuration and Embedded Platform Integration.

Advantech announced the revision of its ADAM-4000 series, adding passive RFID tags and USB communications to address the needs of big and diverse data collection in the era of the Internet of Things. Taking smart manufacturing applications as an example, machine monitoring and preventive maintenance must rely on a reliable data source to make prediction models and precise diagnoses. Therefore, the site will need to build a large number of modules so that the efficiency of distribution will become the main focus of on-site introductions. The ADAM-4000 series uses wireless and non-power connection features to eliminate the cumbersome steps of reconnecting power and reconnecting networks during configuration. In the R&D phase, testing and configuring 5 ADAMs with the existing RS-485 configuration takes 8 minutes while using RFID only takes 30 seconds, which is 16 times faster. In practice, if the number of ADAMs set up increases, the gap will become even more obvious while the introduction schedule will be greatly shortened.

On the other hand, clients generally ask for reduction of personnel costs and time spent on inspection sites. Unlike the fixed records of the general logistic industry, the ADAM-4000's RFID is able to dynamically update I/O signals, alarms, and other information on the RFID

tags, which can be tracked and inspected as long as there is a RFID reader available. Compared to the past where ADAM must be taken down and carried to the computer for testing, the use of RFID is much more efficient. If the ADAM-4000 is using an RS-485 port, the idle USB port can be connected to the laptop during the inspection process to eliminate losses from shutdowns caused by the discharge and removal of the module.

The correspondingly small size and low power consumption of hardware requirements in the era of the industrial Internet of Things (IoT) have led to a large number of USB ports being used in the embedded platform. The new generation of ADAM-4000 equipped with USB ports not only simplifies the wiring and distribution during the application process, but also uses standard Windows port drivers to eliminate the need of additional USB drivers for general USB devices and SCADA integration. All of these are aimed at obtaining the I/O module so that the plug-to-play effect is fully achieved.

Breakthrough 2: Diversified Communication Protocols are Applied to Break the Communication Barriers Between IT and OT Systems.

Data plays a key role in the effectiveness of smart manufacturing systems in the era of Industry 4.0, and the greatest change in the smart manufacturing system lies in the integration of the upper IT system with the on-site OT system. Data that used to be restricted to a single plant network in the past now requires serial and integration with the corporate cloud system to produce subsequent analysis for enterprises to optimize their processes and services. How to allow the upper IT system to obtain data at a fast pace with manpower or systems is also one of the topics for system integrators or corporate users at present.

The new generation of ADAM-6000 series strengthens the integration capabilities with upper-tier systems such as MES, SCADA, and cloud platforms. In addition to the traditional Modbus communication protocol, a network transmission design was further added. In recent years, OPC UA, MQTT, SNMP, REST and other communication protocols have become mainstream in the field of industrial Internet of Things so that data can be automatically uploaded to have the Modbus passive transmission efficiency fully resolved through network management. Since MQTT and SNMP are languages that IT staff can quickly start with, IT personnel are able to control the OT system in a familiar

language through these two communication protocols to accelerate the integration of OT with MES, SCADA, and the cloud platform.

Breakthrough 3: Smart Edge Computing Improves Overall Efficiency of Site Management and Data-to-cloud Uploads.

In order to improve the efficiency of cloud computing for central systems to easily acquire and compute field data, we will rely heavily on the edge computing of field equipment so that data acquired can be processed into meaningful data in the field first to avoid the return of useless data. In this way, in addition to effectively reducing the computational load and improving the system performance of the cloud system, it also reduces the data volume of the remote transmission network (such as 3G) which in turn cuts down the cost of data transmission derived from telecommunication services. In view of strong market demand, Advantech has proposed ADAM-3600, ADAM-5630 and ADAM-6700 for a wide range of fields, IT users and industries as a product solution that combines data acquisition and edge computing.

For ADAM-3600, in order to allow remote and unattended areas to be fully monitored, a modular design is applied to the hardware so that users can select I/Os and wireless transmission modules such as Wi-Fi, GPS, or 3G based on site conditions and specific requirements. In addition, this series is also equipped with WebAccess/TagLink software as a result of the integrated designs from Advantech's self-development, integrated computation, communication protocol, and I/O control. This way, data can be preprocessed on site so that the upper SCADA can take over. It also has multiple functions such as resuming transmission of breakpoints, integration and translation of communication protocols, and network encryption.

ADAM-6700 has the same lightweight and powerful computing function as the existing remote ADAM I/O modules. For users who are good at IT language, it proposes an integrated solution of Node-RED as an open source graphical and visual development environment invented by IBM based on JavaScript. The user drags the node to perform programming without learning the syntax of ladder diagrams or function block diagrams used by the PLC. In addition to the hardware design with rich node resources and I/O and platform integration that facilitates system development, ADAM-6700 is equipped with RS-485 and Ethernet communication ports which can be connected



launched ADAM-5630, with rich field experience and provides it to industrial sites that have special needs for centralized data collection and processing. ADAM-5630 is equipped with a Linux open operating system that provides even more flexibility for developing customized product features. Additionally, it also designs more I/O ports and offers a wider variety of I/O or communication port options so as to address different equipment and environment application needs in an even more flexible way.

Breakthrough 4: Cloud Platform Manages Remote I/Os in a Simpler Way

The latest generation of ADAM-6000 series is about to launch a cloud management service to provide users with even more value-added services. This way, users are enabled to monitor real-time equipment conditions and alarms remotely, acquire equipment status records, and take preventive measures for equipment on site to optimize overall equipment efficiency. Users are able to monitor, repair, configure, upgrade and update I/O modules through the ADAM-6000 cloud service, which will bring more benefits without any additional round-trip time and cost.

From the automated industrial PLC application in the factory, the new communication application brought by the Internet era, to the cloud services of the industrial Internet of Things, the production goal can be evolved from maximizing production to smart & flexible production. In line with the trend of cloud-based precision equipment management, the equipment has evolved from independent and automatic operations in the past to smart equipment (Machine-to-Intelligence, M2I). The complete solution of the new generation of ADAM has been developed to assist enterprises with comprehensive monitoring of equipment status. We propose response measures to effectively increase the output rate of production lines and control the scale of losses caused by abnormal equipment. ■

360° Digital Transformation for Edge Applications



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Intelligent Sensing: Driving a Digitized Future

In the Industrial IoT era, most applications begin with reliable field data. From data acquisition, to transmission and analysis, Advantech's ADAM series excels in providing painless digital transformation for key edge requirements:

- Diverse environment networking requirements such as RS-485, Wi-Fi, 3G and Ethernet.
- Complex protocols between equipment and machines that needs to be translated or unified.
- Connected legacy equipment to public /private clouds.

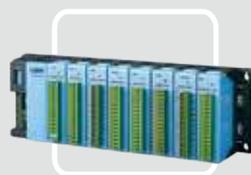
With over 25 years of innovation, Advantech's ADAM series products are Microsoft Azure Cloud IoT certified devices that provide comprehensive solutions that empower enterprises to manage their assets by unlocking their digitized potential.



ADAM-6000
Intelligent Ethernet I/O Modules



ADAM-3600
Wireless Intelligent RTU with
WebAccess/TagLink



ADAM-5630
Edge Intelligent DAQ Controller



ADAM-6700
Data Analytics Gateway



Advantech Expands European Service Center to Support Regional Growth

Advantech officially opened its new European Service Center in January, 2018, with dignitaries from Taiwan and the Netherlands invited to tour the newly expanded smart facility, warehouse, and production plant. The expansion of the Advantech European Service Center (AESC) in Eindhoven will see its warehouse and office space double in size, while its assembly services (CTOS) will nearly triple in production capacity. As the European headquarters, Advantech Eindhoven is also home to most of the staff in the company’s European operations, helping the firm drive regional growth and meet customers’ growing Industry 4.0 needs.

This Year Marks the 25th Anniversary of Advantech Europe

According to Chaney Ho, Executive Director of Advantech and General Manager of Advantech Europe, the One Europe strategy has served as the foundation of Advantech Europe since 2010. From 2014, Advantech has been highly focused on vertical markets in order to serve the specific needs of customers in different sectors. To strengthen Advantech’s leading position in the European IoT market, the company will this year promote and expand its presence in local markets across many application domains. “Through mergers and acquisitions and by working together with local partners, Advantech now has more than 400 local employees working in 14

offices in 10 European countries,” Mr. Ho explained. “We opened new branches locations in Barcelona and Stockholm last year and major investments are currently being made to collaborate closely with local industries, governments, educational institutions, and research organizations. The completion of the European Service Center is Advantech’s first step toward becoming Europe’s most comprehensive IoT solutions provider and will help us reach our target of €350 million in revenues by 2025.”

AESC: Showcasing a Variety of Smart Technology Innovations

Advantech has been at the cutting edge of

Flexible for Industry 4.0

Modular Embedded Automation PC

PROFI
NET

PROFI
BUS

EtherNet/IP

EtherCAT

CANopen



Modular Platform Design

Universal (general application): Domain (vertical application): Customized (by project base), UNO board to board connectors are suitable for all factory applications.



Wide Range PWR Input 10~36V

Wide range power input ensures normal operation in unstable power environments.



iDoor Expansion with 100+ Combination

More than 100+ combinations of iDoor technology enable UNO to fulfill every kind of vertical application scenario.



Versatile Mounting

Variety of mounting methods -VESA, DIN rail, Pole, and Stand mount.

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UNO-2271G Series

- Intel® Atom™ E3815/3825, Pocket-Size Gateway
- 4GB RAM, 32G eMMC, 2 x GbE, 1 x USB, 1 x HDMI
- Optional extension with 3 x USB2.0, 2 x COM ports or iDoor



UNO-2372G Series

- Intel® Atom™ E3845/ Celeron J1900, Small-Size Modular Box PC
- 4GB RAM, 2 x GbE, 4 x USB, 1 x HDMI & DP, 4 x COM
- Optional extension with iDoor



UNO-2484G Series

- Intel® Core™ i, Regular-Size Modular Box PC
- 8GB RAM, 4 x GbE, 4 x USB, 1 x HDMI & DP, 4 x COM
- Optional extension with external accessible HDD, multiple display or iDoor

For More Information





app—and automatically distributes the orders to third-party catering companies. Digital signage throughout the facility is on hand to offer staff and visitors useful information when and where they need it most.

technological innovation for nearly 35 years. The company is confident that its expanded European headquarters will give it the perfect launchpad both to showcase its products in action and to meet the growing regional demand for Industry 4.0 solutions. Serving as Advantech's European headquarters, the building features a range of smart technology innovations, including the iReception system in the completely renovated reception area, the iVisitor system as a digital sign-in for visitors, and the iMeeting smart meeting room management system for booking meeting rooms. Also featured is the smart energy control and monitoring system, which was built using Advantech's own smart power meter, digital I/O, and power relay Modbus products and is managed using Advantech's WebAccess HMI/SCADA software. This system offers intelligent functionality for monitoring and controlling lighting and temperature in the building, reducing costs and carbon emissions and thus improving building management. The IoT technology extends further in the facility with the iLunch booking system, which centralizes staff food orders—made via POS terminal, PC, or smartphone

Practicing Industry 4.0 with iCTOS

In the production area of the new plant, Advantech implements Industry 4.0 practices with a highly customized CTOS manufacturing execution system, process automation, machine automation, and equipment/environment monitoring. Real-time data are collected, analyzed, and then displayed in a situation room to help managers take action, monitor KPIs, accelerate improvement cycles, and support a high degree of product customization.

Compelling Real-World Demonstration

Jeff Shih, Vice President of Advantech Global Services at the AESC, believes that each traditional vertical sector is beginning to leverage IoT technologies with things becoming more connected as the world moves through the Fourth Industrial Revolution. "Through big data and AI," he described, "the world will be more intelligent and smarter. Advantech wants to be the enabler that stimulates this transition into a new AIoT era." ■

TREK-120 LoRa Temperature/Humidity Sensor

Uninterrupted Real-Time Cold Chain Management

• High-penetration data transmissions

• 1+ years of operation*



Seafood



Meat



Agricultural



High-Penetration Data Transmissions

Up to 50 meters signal penetration, including through metal and walls



Rapid and Flexible Installation

(within 5 seconds)
Easy installation via adhesive backing or magnets



Long Battery Life

LoRa technology ensures low battery consumption



Supports Diverse Mobile Devices

Compatible with Windows and Android OS



Water and Dust Resistance

IP65-rated ingress protection



Free-Fall Sensing

Integrated with free-fall sensing capabilities to enable drop detection

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- LoRa connectivity ensures high-penetration, long-distance data transmissions
- Compact and cableless design for easy installation and operation
- Advantech's software development kit allows configurable, cloud-based centralized cold chain management
- Can be paired with a LoRa gateway and NFC reader for uninterrupted cold chain management



TREK-530

In-vehicle LoRa gateway with external antenna



LoRa Gateway Dongle

The LoRa gateway can connect the TREK-120 with any PC/Windows/Android systems via USB connector



Cold Chain NFC Reader

The NFC reader enables cold chain data to be downloaded from the TREK-120 to any PC/Windows systems via USB connector

*Battery life time depends on operating environments



<http://www.advantech.com/solutions/ilogistics>

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Partnering for Smart City & IoT Solutions

驅動智慧城市創新 共建物聯產業典範

Industrial Cloud
& Cloud Networks

Private Cloud

iConnectivity

Transportation IoT Devices Computer On Modules Video and RFID
Power & Energy Environmental & Facility Monitoring Embedded Software
iBuilding/BEMS Industrial HMI Embedded Design-in Services Intelligent Display
Intelligent Systems iRetail & Hospitality iHospital Image & Video Processing
Machine Automation WebAccess+ Digital Healthcare Digital Logistics Industrial PCs

ADVANTECH

Enabling an Intelligent Planet

Partnering for Smart City and IoT Solutions

Advantech holds “Enabling an Intelligent Planet” as our corporate vision, and “Partnering for Smart City & IoT Solutions” is our concrete goal; we will continue collaborating with various partners to build new paradigms in each vertical field. Advantech will consistently follow our LITA (Altruistic) spirit, positively cooperating with partners and engaging in innovation to develop every Smart City opportunities.

研華科技 推動智慧城市創新 共建物聯產業典範

研華以「智能地球的推手」作為企業願景，將「驅動智慧城市創新」作為具體目標，並與各產業夥伴協同合作深耕各垂直領域，共建各式物聯產業典範，期望能持續以利他的精神，積極創新並與夥伴共創智慧城市的每一個可能。