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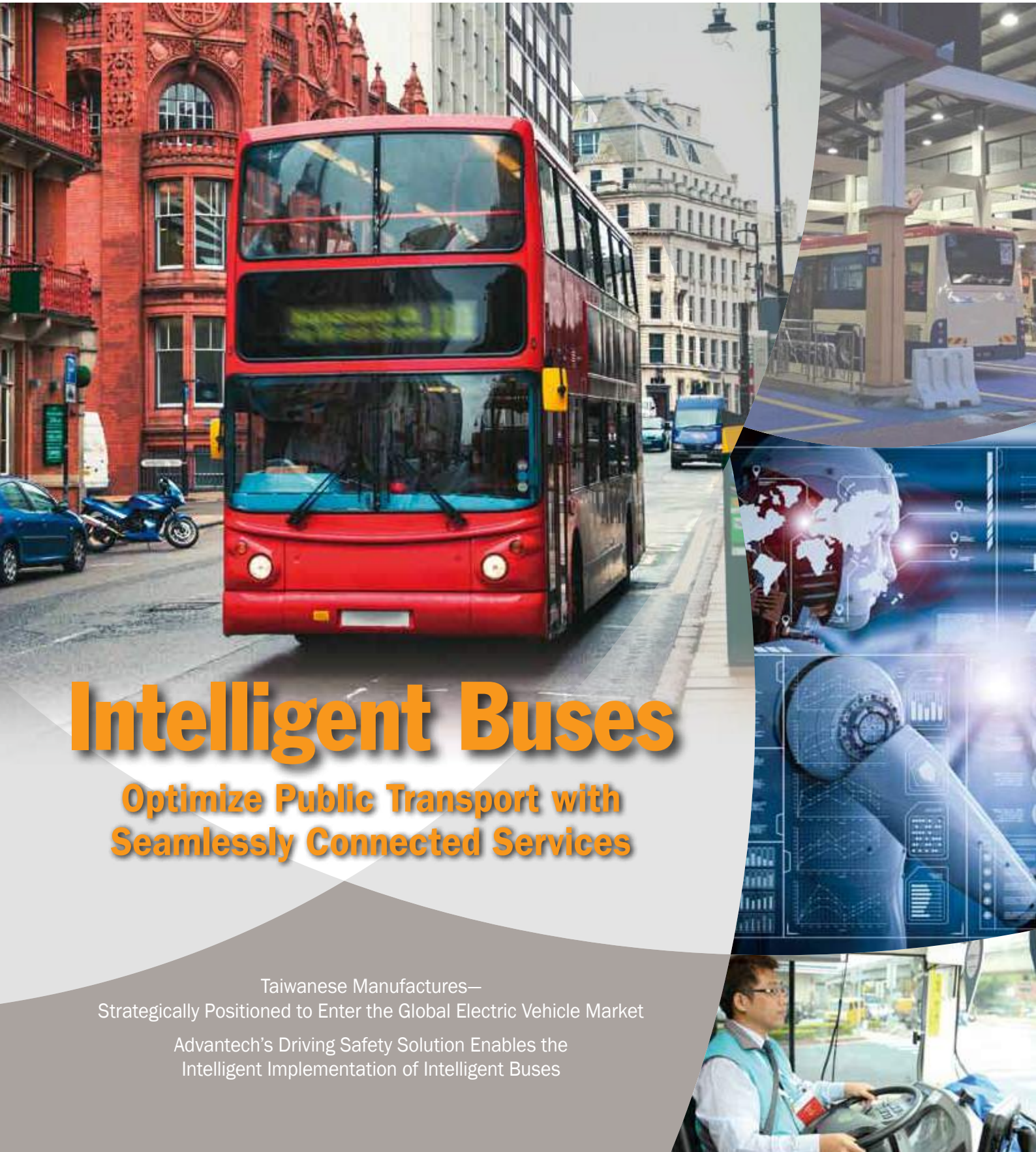


Intelligent Buses

Optimize Public Transport with Seamlessly Connected Services

Taiwanese Manufactures—
Strategically Positioned to Enter the Global Electric Vehicle Market

Advantech's Driving Safety Solution Enables the
Intelligent Implementation of Intelligent Buses

10

Power Insight

Taiwanese Manufactures—Strategically Positioned to Enter the Global Electric Vehicle Market

12

HBR Select

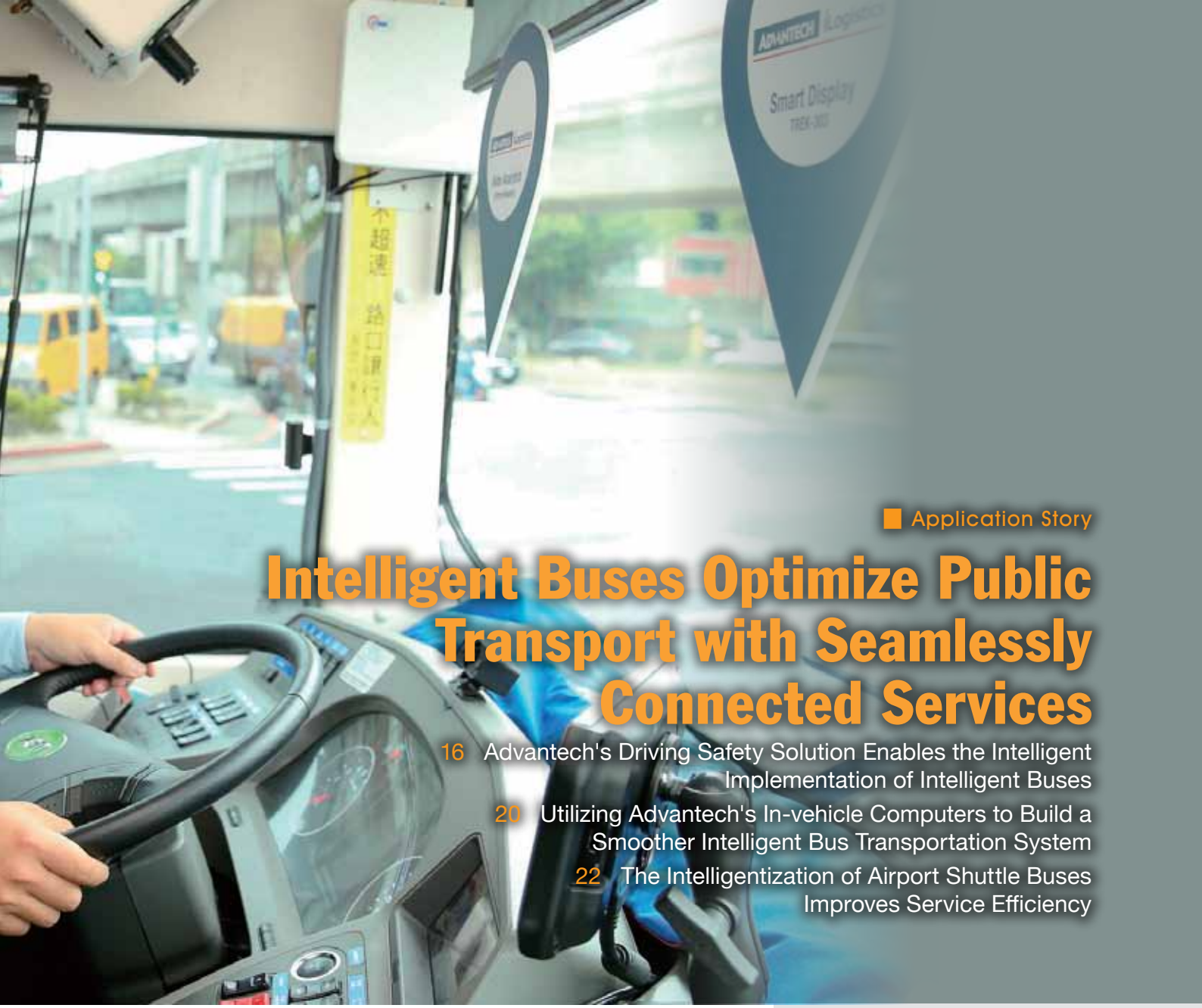
What's Driving the Machine Learning Explosion?

32

Inside Advantech

Advantech Wins "ROI Industry 4.0 Award China" for Its Digital Factory

CONTENTS



Application Story

Intelligent Buses Optimize Public Transport with Seamlessly Connected Services

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Integration is Essential for Smart Applications

Large cities around the world are becoming ever smarter with the rise of fast growing urban populations. The demand for expanding infrastructure means integrated mass public transportation systems are an essential aspect of urban development. Although public attention has been focused on railway transportation systems such as MRTs and LRTs in recent years, new Bus Rapid Transit (BRT) systems have been favored by countries and regions that are not able to invest in massive metropolitan MRT systems. BRT systems offer lower construction cost and a shorter construction period, and so quickly provide cities with a high quality integrated public transportation solution.

Smart bus applications are central to the development of BRT systems. Currently, smart bus applications can be divided into 8 major categories: automatic fare collection, video surveillance, transportation management, safe driving, fleet management, advertising, passenger information, and networking services. In the past, these systems were separate from each other, resulting in overlapping and redundant management and maintenance effort for bus companies.

Although bus companies are operated by the private sector, they are also under government regulation. Typically, private bus companies do not proactively introduce smart bus applications due to cost and profit considerations. Smart bus systems are also complicated and difficult to manage and maintain, so government subsidies are essential for stimulating investment. This situation is typical and as a result, smart bus systems were not been widely implemented in the past.

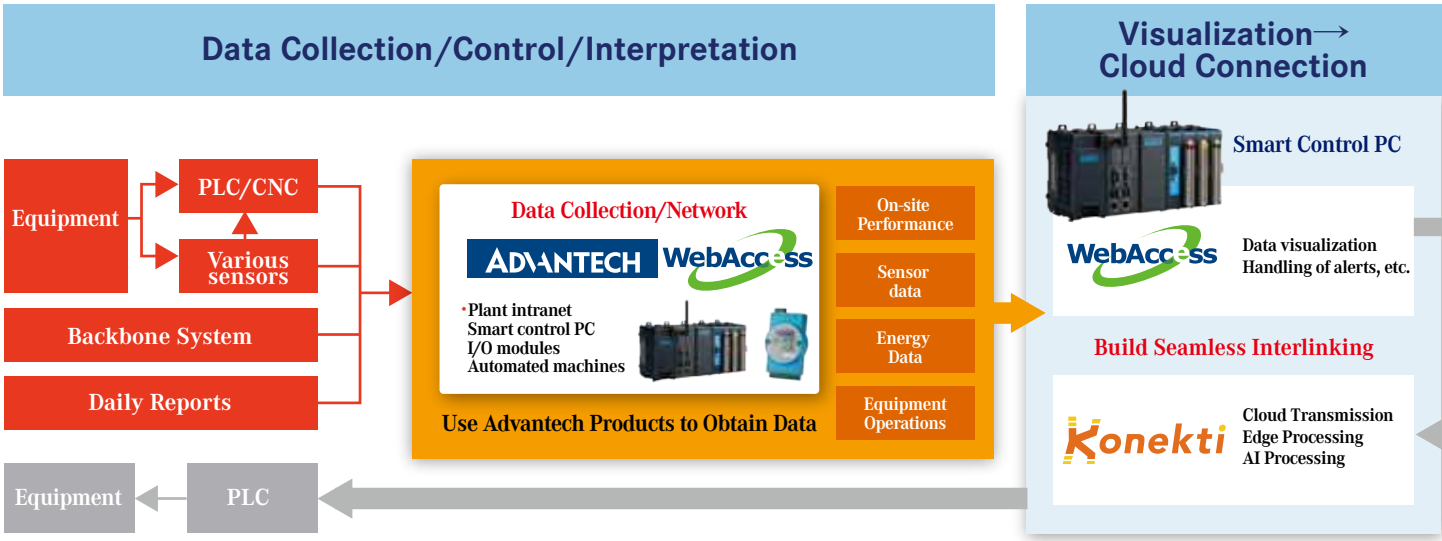
Advantech developed the world's first smart bus industrial standard in 2010 to provide a solution to overcome the challenges inherent in the introduction of smart bus systems. They proposed the concept of the "Integrated Smart Bus" to assimilate the many systems into vehicles from a single hardware platform. This all-in-one machine approach seamlessly links all the services together on smart buses, and Advantech hopes to further promote the development of smart bus applications by providing passengers with smarter and safer bus travel, and SI with a roadmap for easier integration.

In addition to the integration of smart buses, the Insider Insights column invites Paul Chou, Secretary General of the Taiwan Telematics Industry Association (TTIA), to share insights about the development of telematics. Paul emphasizes that the Taiwan automotive industry has lagged behind Europe and USA for at least 50 years due to the industry not being able to develop its limited domestic market, but as the industry moves toward electric vehicles and automation, Taiwan has the opportunity to build up its brand image with its extensive manufacturing and supply chain experience, and its quality assurance and cost management expertise in the hi-tech industry.

All this fits in with Advantech's long-standing philosophy. Since 1983, Advantech has been an innovator in the design and development of high-end industrial computing platforms, and has launched a multitude of applications across different sectors. Advantech not only uses the most trusted technology, but also tries to find the right balance between technological development and human progress to lead the industry into a future with unlimited potential. ■

Advantech and Nippon RAD Enter into Japan's First WISE-PaaS/IIoT Alliance to Provide Industry 4.0 Solutions

By Marty Kondo with Images provided by Nippon RAD
Interview with Tsuyoshi Hirai, IoT Solution Division / General Manager, Nippon RAD

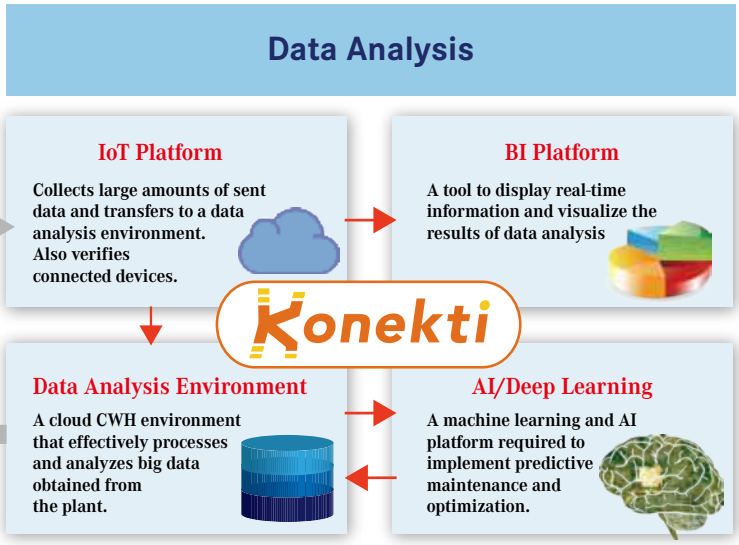


日本ラッド株式会社
NIPPON RAD INC.

Advantech and Nippon RAD announced in August 2017 that they would collaborate to market and sell industrial IoT (IIoT) solutions. This collaboration will use Advantech's solutions to connect Advantech technologies such as the HTML5-supporting SCADA software WebAccess, the TPC and UNO lines of industrial PCs, the APAX smart control PC, the EKI line of network equipment, and the WISE and ADAM lines of IoT devices with "Konekti™", Nippon RAD's IoT cloud platform. This will create a "RAD-style" factory IoT solution that fully leverages the strong wireless technology, AI development expertise, and cloud integration expertise of the two companies.

Collaboration Brings Powerful Advantages

Advantech's WebAccess was the key software technology that interlinked the elements of the solution, filling in the blanks that existed in the end-to-end solution that was the RAD-style Internet of Things. WebAccess collects information from PLC and CNC machine tools from all major manufacturers in Japan and abroad, providing rapid data collection and visualization environments for a reasonable cost, even in a multi-brand factory. WebAccess also uses the newest web technologies and offers excellent compatibility with cloud solutions. Customer needs such as real-time information, data analysis, optimization controls, and predictive maintenance are all supported through WebAccess, providing manufacturers and smart factories an environment to fully leverage Nippon RAD's technologies. WebAccess also connects to Nippon RAD's AI tools to greatly enhance machine maintenance and predictive analysis capabilities on the factory end, allowing the use of all kinds of BI applications to directly monitor on-site operations.



A One-Stop Shop or Pilot Project

Advantech and Nippon RAD offer customers an ideal solution, whether it's a one-stop shop or a small-scale pilot project. Large solution providers often offer comprehensive solutions that cost tens of millions of yen, even at the very beginning. However, such an approach might not meet the needs of manufacturers in the Industry 4.0 era. The introduction of AI and BI also means that on-site proposals have been completely decoupled from up-stream consultants. Providers often propose their own solutions without truly understanding their clients' pain points. Both Advantech and Nippon RAD share the approach of suggesting that clients adopt "trial" or "pilot" solutions to begin with. Regardless of how much the client ultimately decides to spend, Advantech and Nippon RAD will implement the solution with care.

AI: From Cloud to Edge

In terms of applying AI to predictive maintenance, Nippon RAD believes that current PCs have the processing power and speed needed to fully support trend analysis. PCs such as APAX are already capable of processing at the edge. However, the resources available

may not yet be ideal for immediate data processing at the edge. Nippon RAD therefore suggests beginning AI deployment in the cloud before installing capabilities at the edge. Data learning requires high-level computing power, such as a PC equipped with a NVIDIA GPU or a real-time cloud service. It is also better to implement learning in the cloud from a management perspective. In current practice, no company does data modeling at the edge, and systems have not yet reached the level needed to do so. All such computing is still done in the cloud. Although the fastest development of AI engines currently occurs in the cloud, it is predicted that AI engines at the edge will eventually become the mainstream. If primary learning by AI can be achieved, edge computing will become more advantageous.

Future Outlook

Advantech's WebAccess can collect and store data, but lacks analysis tools. Advantech therefore looks forward to packaging Nippon RAD's analysis tools with WebAccess. This will create solutions for many users in manufacturing. VIP members of the WISE-PaaS/IIoT alliance will not only enjoy WebAccess at special discounted prices, they can also communicate with partners around the world through Advantech's updates and communications, as well as take advantage of the newest business opportunities. We are confident that the WISE-PaaS marketplace, Advantech's online software store, will allow us to promote Nippon RAD's tools across the globe. ■

Palm-Sized
DAQ Embedded Computer

for Space-limited Applications

Easy Wiring

Software Support

Palm-Sized

Multifunction I/O

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Embedded Data Acquisition Computer for Space-limited Applications

Advantech's MIC-1800 series, comprising the MIC-1810 and MIC-1816, is the industry's first embedded data acquisition computer module with signal conditioning and processing transducer integrated into a PC-based control platform. The series is made palm-sized for easy in-cabinet placement, and also adopts a fanless design, which is ideal for space-limited applications. It also supports Advantech's WebAccess/MCM and DAQNavi software for system setup without programming.

More Information

DAQ Integration Search

Product Offerings

DAQ-Embedded Computers

MIC-1810
12-bit, 500 KS/s, 12-ch DAQ platform with Core™ i3/ Celeron® processer

MIC-1816
16-bit, 1MS/s, 16-ch DAQ platform with Core™ i3/ Celeron® processer

Software

WebAccess/MCM
Machine Condition Monitoring Software

DAQNavi
Software Development Package for Advantech DAQ Products

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intel IoT Solutions Alliance Premier

Paul Chou, Secretary General of Taiwan Telematics Industry Association

Taiwanese Manufactures—Strategically Positioned to Enter the Global Electric Vehicle Market

By Pei-Chun Liao with image provided by TTIA

The Internet of Vehicles (IoV) is a natural evolution in the development of smart transportation. IoV is an inevitable convergence of the mobile Internet and the Internet of Things and has significantly impacted many modes of transportation, as well as making travel more convenient and comfortable. Looking at IoV development, we shall discuss three important aspects including markets, technology, and industries.

Aspects of IoV Development : Market Perspective

First, in terms of market perspective, the sharing economy with Mobility as a Service (MaaS) will transform the way people purchase and use vehicles. MaaS defines a shift away from personally owned modes of transportation towards mobility solutions that are consumed as a service. This is enabled by combining transportation services from public and private transportation providers, through a unified gateway that creates and manages journeys, which users can pay for with a single account.

Currently, most vehicles are only used for commuting purposes during rush hours. The rest of the time, vehicles are parked near work or at home. In total, the daily usage hours of vehicles during an entire day might only be 2-3 hours or less. But by using a matchmaking service incorporating IoV technologies, the usage frequency of vehicles can be effectively increased. Vehicle owners can log idle times of vehicles on the platform (for example: 10:00-18:00 hours) so that other car sharing commuters can rent them out at alternate times.

As a result, vehicles won't be uselessly parked in parking lots but will become an income stream for vehicle owners or provide a valuable short-term hire service for congested inner cities like Paris. This is just another business model based on the spirit of vehicle sharing. Since car sharing will become convenient and cheap, fewer people will want to buy vehicles and instead hire them as needed. When vehicle production demands decline, car manufacturing will change accordingly, with fewer new cars or adapted designs for the purpose of sharing and rental.

Aspects of IoV Development : Technology Perspective

Looking at technical challenges, electrification, digitalization, and automation are the three primary developments in the realization of IoV. Not only are electric vehicles on the road increasing, but quite a few vehicles are also being embedded with digital controllers or active safety systems. Some large buses even provide Wi-Fi services onboard, while unmanned vehicles have already migrated from the R&D phase to actual operation. For example, the world's 1st autopilot taxi officially hit the road in Singapore in August of last year. In July of this year, Taiwan's first unmanned bus started operation on Shuiyuan campus, National Taiwan University.

Taiwan's long manufacturing experience, product quality assurance, and cost control capacity of its high-tech industries, as well as its leading position in the global semiconductor industry, have made Taiwan the obvious choice for a new generation of suppliers of automobile parts and components.

Aspects of IoV Development : Industry Perspective

In response to these technologies, the automobile industry will experience revolutionary changes in production, technology, and products accordingly. For example, many car manufacturers have indicated that the production of gasoline or diesel vehicles will end after 2025. With the introduction of numerous new technologies such as the mobile Internet and IoT, cars will no longer be just a mode of transportation but a mobile office that helps drivers connect to the world outside. For example, Volvo announced in January of this year that it would integrate Skype, a Microsoft communication tool onboard so that car drivers can simply push a button and participate in a conference call.

Disruptive Technologies Present new Opportunities for Taiwan

The cumulative result of these disruptive technologies will not only change the automobile industry forever but also create new market opportunities for Taiwan.

In the past, Taiwan has had a limited domestic automobile market scale, causing it to fall behind other industries in Europe and America. But now, as vehicles are evolving towards electrification and automation, the demands for semiconductors and high-tech parts and components by the automobile industry are growing significantly. Taiwan's long manufacturing experience, product quality assurance, and cost control capacity of its high-tech industries, as well as its leading position in the global semiconductor industry, have made Taiwan the obvious choice for a new generation of suppliers of automobile parts and components.

For example, Tesla, the high-end electric vehicle manufacturer, has sourced more than 40% of its parts and components from Taiwan. So now, other electric vehicle manufacturers will have more confidence and willingness to source parts and components from Taiwan, which in turn will enable Taiwan manufacturers to finally enter the electric vehicle industry through an alternative route.

Taiwan is full of comprehensive supply chains which form part of its strong high-tech manufacturing capacity. When any car manufacturers or assembly factories are in need of any new parts, in most cases they can get parts without difficulty within two hours via high-speed rail or truck, whereas in other countries it may take two to three days or even a week to get the necessary parts.

Finally, Taiwan has impressive R&D centers, such as the Automotive Research & Testing Center (ARTC), Metal Industries Research & Development Centre (MIRDC), Industrial Technology Research Institute (ITRI), and the Institute for Information Industry (III). During the development of Taiwan's high-tech industries, these respected R&D centers have provided a huge amount of technical support and helped Taiwan manufacturers establish a leading position in the global high-tech industry. Now, these R&D capacities are being applied to the IoV industry. With cooperation and support led by the government, I believe that Taiwan will enjoy great success and hold an important place in the global IoV industry. ■

What's Driving the Machine Learning Explosion?

By Erik Brynjolfsson and Andrew Mcafee for the Harvard Business Review
See the official Harvard Business Review
Website: HBR.org. 07/18/2017

Machine learning systems have been around since the 1950s, so why are we suddenly seeing breakthroughs in so many diverse areas? Three factors are at play: enormously increased data, significantly improved algorithms, and substantially more-powerful computer hardware. Over the past two decades (depending on the application) data availability has increased as much as 1,000-fold, key algorithms have improved 10-fold to 100-fold, and hardware speed has improved by at least 100-fold. According to MIT's Tomaso Poggio, these can combine to generate improvements of up to a millionfold in applications such as the pedestrian-detection vision systems used in self-driving cars. Let's look at each factor in turn.

Data. Music CDs, movie DVDs, and web pages have been adding to the world's stock of digitally encoded information for decades, but over the past few years the rate of creation has exploded. Signals from sensors in smartphones and industrial equipment, digital photos and videos, a nonstop global torrent of social media, and many other sources combine to put us in a totally unprecedented era of data abundance. Ninety percent of the digital data in the world today has been created in the past two years alone. With the burgeoning internet of things (IoT) promising to connect billions of new devices and their data streams, it's a sure bet we'll have far more digital data to work with in the coming decade.

Algorithms. The data deluge is important not only because it makes existing algorithms more effective, but also because it encourages, supports, and accelerates the development of better algorithms. The algorithms and approaches that now dominate the discipline – such as deep supervised learning and reinforcement learning – share a vital basic property: Their results improve as the amount of training data they're given increases. The performance of an algorithm usually levels off at some point, after which feeding it more data has little or no effect. But that does not yet appear to be the case for many of the algorithms being widely used today. At the same time, new algorithms are transferring the learning from one application to another, making it possible to learn from fewer and fewer examples.

Computer hardware. Moore's Law – that integrated circuit capability steadily doubles every 18 to 24 months – celebrated its 50th anniversary in 2015, at which time it was still going strong. Some have commented recently that it's running up against the limits of physics and so will slow down in the years to come; and indeed, clock speed for standard microprocessors has leveled off. But by a fortuitous coincidence, a related type of computer chip, called a graphic processing unit, or GPU, turns out to be very effective when applied to the types of

calculations needed for neural nets. In fact, speedups of 10X are not uncommon when neural nets are moved from traditional central processing units to GPUs. GPUs were initially developed to rapidly display graphics for applications such as computer gaming, which provided scale economies and drove down unit costs, but an increasing number of them are now used for neural nets. As neural net applications become even more common, several companies have developed specialized chips optimized for this application, including Google's tensor processing unit, or TPU. According to Shane Legg, a cofounder of Google DeepMind, a training run that takes one day on a single TPU device would have taken a quarter of a million years on an 80486 from 1990. This can generate about another 10-fold improvement.

These improvements have a synergistic effect on one another. For instance, the better hardware makes it easier for engineers to test and develop better algorithms and, of course, enables machines to crunch much larger data sets in a reasonable amount of time. Some of the applications being solved today — converting sound waves from speech into meaningful text, for example — would take literally centuries to run on 1990s-vintage hardware. Successes motivate more bright researchers to go into the field and more investors and executives to fund further work.

Further amplifying these synergies are two additional technologies: global networking and the cloud. The mobile internet can now deliver digital technologies virtually anywhere on the planet, connecting billions of potential customers to AI breakthroughs. Think about the intelligent assistants you're probably already using on your smartphone, the digital knowledge bases that large companies now share globally, and the crowdsourced systems, like Wikipedia and Kaggle, whose main users and contributors are smart people outside your organization.

Perhaps even more important is the potential of cloud-based AI and robotics to accelerate learning and diffusion. Consider a robot in one location that struggles with a task, such as recognizing an object. Once it has mastered that task, it will be able to upload that knowledge to the cloud and share it with other robots that use a compatible knowledge-representation system (Rethink Robotics is working on such a platform). In this way robots, working independently, can effectively gather data from hundreds, thousands, and eventually millions of eyes and ears. By combining their information in a single system, they can learn vastly more rapidly and share their insights almost instantaneously. ■

Intelligent Buses Optimize Public Transport with Seamlessly Connected Services

Several years ago, attempts to reduce energy consumption and emissions while dealing with increasing urbanization gave rise to demands for more efficient and convenient public transportation systems. Consequently, a wide range of intelligent systems were developed for automatic toll collection, in-vehicle surveillance, digital signage, and fleet management.

However, the implementation of all this technology soon resulted in drivers having to navigate several displays and system interfaces to access information. Backend administrators also had to switch between multiple systems to conduct fleet management. In addition to being time consuming and confusing, this toggling between systems and display screens led to frequent data losses and operational errors.

Because numerous technologies are required to make buses smart, the industry soon realized that integrated hardware and software solutions were necessary for achieving intelligent transportation services. By streamlining in-vehicle systems, integrated solutions would not only facilitate adoption and implementation, but also improve passenger safety by reducing driver distraction. With all data and systems accessible via a single interface, drivers only needed a single display screen and so could pay more attention to the road. Moreover, backend administrators would be able to integrate data collected from diverse systems, conduct data analysis, and then optimize operations according to the analysis results.

Nowadays, smart transportation is growing. Numerous countries have implemented intelligent buses as part of intelligent transportation systems designed to reduce traffic congestion, increase management efficiency, and improve passengers' commuting experience.

Advantech's Driving Safety Solution Enables the Intelligent Implementation of Intelligent Buses

Intelligent bus systems are critical to developing Bus Rapid Transit (BRT) systems. However, from a management and maintenance perspective, previous stand-alone systems have become a burden for bus operators. New-generation Intelligent bus systems emphasize integration and flexibility. Using a expandable hardware platform, bus operators can integrate established systems in stages to develop a unified hardware system and provide the public with a truly smart and safe travel experience.

By Pei-Chun Liao with images provided by Advantech
Interview with Van Lin, Director of Intelligent Logistics Sector

In many countries, economic development has increased urban migration. Against the backdrop of urban growth, increases in morning and evening peak traffic have exacerbated road congestion, resulting in greater pollution from both noise and exhaust emissions. To solve such traffic problems, governments worldwide have been proactive in developing various smart transportation applications, examples of this are BRT systems.

BRT systems are similar to MRT systems except for buses. They include various transportation optimization measures, such as busways, priority signal systems at intersections, and intelligent bus systems, all of which contribute to realizing a new form of public transportation that approximates the service level of MRT systems in terms of transportation capacity, reliability, and safety. Because the advantages of BRT systems include low setup and operating costs, high flexibility, and short construction periods, such systems have become popular transportation systems in developing countries and regions, particularly those with limited budgets or those experiencing difficulty establishing comprehensive track-based MRT systems.

Statistics from global BRT data show that, to date, 250 cities worldwide have established BRT systems. The combined route length of these systems is 5,631 km and the daily passenger load is nearly 35 million. They are most prevalent in Central and South America. “Central and South America not only have the most BRT systems in the world, but their innovation and integration level are higher than those in other regions,” explained Van Lin, Director of the Advantech Intelligent Logistics Business Unit.

Van further pointed out that intelligent buses are at the heart of BRT systems. Through various applications such as GPS tracking, driver behavior monitoring, electronic toll collection, passenger statistics, arrival information displays, and in-vehicle video surveillance, bus operators can be fully informed of the status of their vehicles in real time and thus improve their operational efficiency. For passengers, this gives them access to real-time bus arrival information, and it is also expected to increase their willingness to take the bus because they can enjoy a fast, convenient, and safe journey experience.

Challenges of Independent Management, Maintenance, and Data Integration

Automated fare collection was one of the earliest systems to be applied to buses. The technology was introduced into Taiwan more than 10 years ago, and passenger information and GPS tracking systems have since been implemented as well. However, bus services are a public industry run by civil bodies that are not typically proactive about introducing various intelligent bus applications, mainly because of the trade-off between their cost and benefits. Government subsidies are thus essential drivers of investment in this area. This is not just the case in Taiwan; more than 50% of other countries are facing the same situation, and this has been exacerbated by the fact that the concept of system integration is still relatively new. All of these factors have resulted in extant intelligent bus systems being needlessly duplicated.

Van explained that bus operators tend to establish intelligent bus system by tendering projects on an annual basis; for example, automatic fare collection might be introduced one year, and a fleet management system might be introduced the year after. Another factor is that new hardware must be installed for each new system; for example, three different systems might have three different mainframes with corresponding peripherals. This can cause three problems.

First, repeated investment in hardware increases the aggregated yearly cost of procurement and maintenance in comparison with purchasing all system components at once. Second, because most of these systems are closed frameworks, data cannot be exchanged or integrated and backend management systems would require multiple independent interfaces to accommodate the different systems installed on buses. Furthermore, because closed platforms lack SDK support, it can be difficult for bus operators to develop their own software applications. Finally, some systems requiring real-time data transmission will have SIM cards installed in the mainframe to enable data transmission via 3G/4G, meaning that two new systems would incur twice the communication cost.

Integrated In-vehicle Computer with Driving Safety Software as a Solution

To solve long-term dilemmas associated with the implementation of intelligent buses, Advantech has proposed an integrated intelligent bus standard that incorporates multiple systems into a single hardware platform. Van indicated that this concept requires a platform that is highly flexible that should be established during the first phase of implementation. Doing so not only reduces the likelihood of needing to replace the platform in the future but also facilitates the analysis of data.

In other words, the all-in-one platform must meet all intelligent bus system requirements. Regardless of which system is introduced, the adopted platform must be one that can use the same mainframe. For example, Advantech's TREK in-vehicle computer is an all-in-one platform that supports Wi-Fi and the LET communication protocol, among others, with the six connector types: RS-232, RS-485, CVBS (AV Terminal), Ethernet, VGA, and digital I/O. As examples, the VGA port allows for video/advertising playback on embedded LCD displays; the RS-232 port provides a connection for a TPMS receiver, which enables instantaneously monitoring tire status; and the CVBS port provides a connection for in-car surveillance cameras for monitoring driver behavior and passenger safety.

Furthermore, the TREK in-vehicle computer adopts an open framework, meaning that in addition to being capable of data collection, it is also suitable for integration analysis. This provides vital information to the driver to promote driving safety. For example, a camera installed at the front of buses can detect when the leading vehicle is too close or driving dangerously (e.g., lane departure). Additionally, a camera installed near the driver can perform intelligent video analytic to detect any dangerous behaviors, such as nodding, eating, and talking on a mobile phone, and immediately notify both the driver and the driving control center.

Van emphasized that although the approach of using an all-in-one platform requires more capital input, the overall establishment costs are actually lower. Furthermore, it has a high degree of flexibility for system integration, facilitating future expansion, maintenance, and management.

Although MRT systems are being developed in many countries, BRT systems have comparatively lower costs and shorter development times, and these factors have allowed market demand for BRT system to gradually grow. Van hopes that, in addition to its MRT systems, Taiwan may utilize some of these resources to plan a complete, comprehensive, and visionary intelligent bus grid and use Taiwan's success as a blueprint for other countries. ■

TREK-572 Ultra Compact In-vehicle Computing Box

The Best Light-Duty Solution for Fleet Management

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Advantech, a leading mobile computing platform provider, is pleased to announce TREK-572 – a next-generation ultra-compact in-vehicle computing box. TREK-572 is powered by an Intel Atom(SOC) processor, equipped with wide temperature range (-30 ~ 70 °C), and certified to MIL-STD-810G and 5M3 standards for shock vibration tolerance. Rich built-in RF features, including WLAN, WWAN, GPS, Bluetooth, and Wi-Fi technology, enable vehicle tracking and positioning, as well as real-time data transmissions to a centralized control center via WWAN.

TREK-572 also features dual CAN bus ports (J1939, J1708/J1587, OBD-II/ISO 15765) and supports diverse vehicle protocols (J1939, OBD-II/ISO 15765) to facilitate vehicle diagnostics data collection and driver behavior management.

- Ultra-Compact, Industrial-Grade Design Ensures Flexible Installation
- Configurable CAN Bus Protocols for Vehicle Diagnostics and Data Collection
- MRM SDK Streamlines Software Development and Integration

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Utilizing Advantech's In-vehicle Computers to Build a Smoother Intelligent Bus Transportation System

From Colombia and South Korea to Taiwan

In many countries, increased traffic resulting from population growth is an ongoing problem for large metropolitan conurbations. In an effort to improve this situation, intelligent bus systems have been implemented in Colombia, South Korea, and Taiwan to reduce traffic congestion and enhance public transportation safety and convenience.

By Pei-Chun Liao with images provided by Advantech
Interview with CJ Li, Business Development Manager, Intelligent Logistics Sector

Bogota, the capital of Colombia, South America, has the world's most renowned bus rapid transit (BRT) system. In Seoul, South Korea, intelligent buses have been integrated with the city's Mass Rapid Transit (MRT) and public railroad systems in order to minimize traffic congestion while increasing bus patronage. And, developments in Taiwan have led to the introduction of electric buses and intelligent buses with advanced driver-assistance systems.

Despite the differences between the intelligent bus systems implemented in these three countries, all of them use in-vehicle computers from Advantech. Using an all-in-one platform, all onboard systems have been integrated with smart management features to automate and improve current practices.

Bogota—Redesigning Public Transportation with Intelligent buses

In recent years, the local government in Bogota has invested heavily to significantly improve the city's transportation infrastructure. CJ Li, Business Development Manager, indicated that before Bogota's BRT system was built, bus transportation in the city was chaotic and the routes were complex and difficult to manage. Bus operators were private enterprises, many of which purchased their own vehicles and set their own routes. As a result of poor administration, bus timetables and service quality varied greatly. Furthermore, when a cash toll system was adopted, incidents of robbery and embezzlement occurred on occasion.

To solve these problems and improve public transportation on a limited budget, the city government sought to introduce the current BRT system by merging the individual bus operators. The BRT routes were reorganized into 12 routes covering 113 km with 146 bus stops across the city's main metropolitan areas.

Advantech in-vehicle computers were installed in every bus in the BRT system to provide functions such as vehicle tracking and dispatch, electronic toll collection, passenger statistics, and depart/arrival information displays. Now, both city government and bus operators have a comprehensive overview of the condition, status, and location of all BRT buses.

These changes also made system administration more efficient and transparent. As an example of the success of this project, one particular route that was 30 km in length and took 2 hours and 15 minutes to cover in 1998, took only 55 minutes to travel in 2009.

Seoul—Using Intelligent buses to Integrate Different Transportation Systems and Enhance Bus Patronage

Seoul has utilized intelligent buses to effectively integrate its MRT and railroad public transportation systems, and use of bicycles has also been encouraged. The purpose of this approach has been to encourage commuters to use public transportation more frequently in order to minimize their use of private vehicles.

Previously, buses were the primary means of transportation for Seoul residents. However, with the completion of eight subway lines in 1990, bus patronage began declining. This was compounded by the subway/bus/train ticketing systems not being integrated, making transfers between services difficult, resulting in inconsistent service quality and overlapping bus routes.

To resolve these problems, the city government first integrated payment and ticketing systems so that commuters could use one card to take the bus/subway/railroad. Subsequently, bus routes were modified to minimize overlap, and intelligent bus shelters were installed to streamline the displays already at the bus stops. These modified shelters conveniently provided dynamic bus information for waiting commuters, informing them of the bus schedules and/or delays.

The city government also established bus management/information systems by installing integrated in-vehicle computers purchased from Advantech, enabling dynamic bus information to be gathered in real time, including operation status, arrival/departure times, accident data, and so on. To benefit commuters, real-time travel information is also provided onboard buses, and this information also enables the management center to determine when additional vehicles or manpower resources are required.

Statistics show that integrating the public transportation systems has resulted in a 16% increase in bus patronage, a 24% drop in traffic flow due to the decrease in private vehicle usage, a 39% reduction in traffic time, a 5.5% decrease in carbon emissions, and a 15% increase in road safety. Through network and data analysis, the Seoul City Government has been able to successfully create a state-of-the-art smart transportation network.

Taiwan—Kaison Green Energy Technology Co., Ltd. (KGET) Shapes Product Differentiation with In-vehicle computers in Electric buses

Unlike the government-funded intelligent bus systems in Bogota and Seoul, the bus operator KGET was responsible for introducing this technology in BYD Co., Ltd., the world's largest electric bus manufacturer, has been pivotal in developing Advantech's smart in-vehicle computers for electric buses; this smart upgrade for buses not only saves energy but also ensures passenger safety and reduces management costs.

An obvious difference between conventional and electric buses is that electric buses use batteries instead of diesel as a power source. Furthermore, it is easier to collect vehicle information from electric buses. Therefore, KGET oriented its marketing strategy toward smart and green energy buses. In these buses, Advantech's in-vehicle computers were selected for integration with peripheral solutions (e.g., in-vehicle camera, tire pressure monitoring, and advanced driver-assistance systems) to deliver effective active safety measures. In addition to aiding drivers and ensuring safe driving, devices can also upload information on driver behavior and vehicle status to the cloud for analysis, which facilitates fleet management and maintenance.

Apart from using Advantech's hardware solutions, KGET also uses software developed by Advantech for driver behavior management, forward image recognition, and more. This also allows drivers to view assorted information on only one screen, thereby reducing their distraction, which in turn enhances passenger safety. This hardware/software integration approach provides a range of benefits, which not only shortened the development cycle but has also helped KGET invest more effort into integrating other bus information systems. ■

The Intelligentization of Airport Shuttle Buses Improves Service Efficiency

With the emergence of the Internet of Vehicles, airport shuttle buses are no longer merely vehicles for transporting passengers. Instead, they are becoming key factors for increasing efficiency and service quality in the highly competitive air travel industry.

By Liao Peijun with images provided by Advantech
Interview with Angus Shih, Business Development Manager of Intelligent Logistics

Improving Passengers' Airport Transit Experience

Shuttle buses are among the many services provided at international airports to ensure passengers can quickly and conveniently get to the necessary terminal and boarding gate. In the past, shuttle buses simply transported passengers to and from locations. However, nowadays, with the evolution of the Internet of Vehicles, airport shuttle buses are moving towards intelligentization and becoming key factors for increasing airport efficiency and service quality.

INFORM GmbH, a German systems integrator, adopted Advantech's TREK series of in-vehicle computers as the foundation hardware for developing their fleet management system software GroundStar. They successfully created a smart shuttle bus solution that allows dispatch units to monitor vehicle locations and flexibly adjust bus schedules according to the number of passengers. Their solution also provides shuttle bus drivers with easy access to necessary information, including the daily route schedule, vehicle status, and GPS navigation directions, via a single touch panel interface. Moreover, with GroundStar software, in-vehicle smart displays can be used to provide passengers with relevant information, such as airport amenities, boarding gate numbers, and baggage carousel details.

The results of implementing the GroundStar smart

shuttle bus solution at a prominent five-star airport included enhanced service quality, increased commercial effectiveness, improved compliance with airport safety regulations, and optimized fleet management.

In terms of enhanced service quality, in-vehicle computers installed in the shuttle buses are used to play automated airport welcome greetings in multiple languages. In-vehicle smart displays are used to present relevant transit information, including all departing and arriving flights, boarding gate numbers, baggage carousel details, shuttle bus stop names, and estimated shuttle bus travel times. Push-based content delivery ensures that the displays always show the most relevant information. Additionally, digital signage displays located throughout the airport are used to broadcast promotional videos and advertisements for airlines, duty-free merchandise, taxis, and local tour operators for increased marketing and brand awareness.

Regarding improved compliance with airport safety regulations, multiple surveillance cameras were deployed on every shuttle bus, both internally and externally, to increase driving and passenger safety. Drivers are able to use the touch panel interface of the in-vehicle computers to view footage from the external cameras to reduce blind spots and facilitate maneuvering. Meanwhile, the in-vehicle surveillance footage is streamed to the backend management center to allow vehicle monitoring and remote support. In cases of emergency, drivers can also use the in-vehicle device to call for assistance.

In regards to optimizing fleet management, the in-vehicle computers allow the centralized dispatch unit to remotely monitor the location of all airport shuttle buses. Additionally, by installing passenger counting sensors at transfer gates and terminal doors, administrators are able to estimate passenger numbers and dispatch additional buses if necessary. The implementation of a tire-pressure monitoring system and CAN bus network enables vehicle data to be collected in real time. Dispatch managers can also send information to the in-vehicle computers to provide drivers with instructions, updated work schedules, and navigation guidance. Moreover, managers can use the collected vehicle data to monitor driver behavior in order to increase driving safety and minimize vehicle wear and tear.

Superior Management and Airport Service

According to statistics provided by INFORM GmbH, the average airport can recoup the initial costs of implementing smart shuttle buses in as little as three months. However, smart shuttle buses can provide long-term savings of up to €20 million (approximately US$23 million). Not surprisingly, many airports in Europe have adopted the GroundStar smart shuttle bus solution to improve the management and efficiency of their shuttle bus services.

For example, at Zurich International Airport in Switzerland, this smart shuttle bus solution has been used adjust airport operations in accordance with the Schengen Agreement. The Schengen Agreement effectively abolished most of European Union's internal borders, enabling passport-free movement for EU nationals throughout all member states. Accordingly, Zurich International Airport now has separate areas and procedures for passengers traveling to Schengen and non-Schengen destinations. With the GroundStar smart shuttle bus solution, if a shuttle bus carrying passengers from non-Schengen countries parks in front of a gate designated for travel within Schengen countries, the fleet dispatcher can notify the driver and direct them to the appropriate gate. Additionally, in-vehicle LED displays can be used to inform passengers which stop corresponds to the appropriate terminal for their travel.

At Frankfurt Airport in Germany, the smart shuttle bus solution was adopted to improve fleet management efficiency with the collection of comprehensive vehicle data, including gasoline consumption and maintenance history. This data allows administrators to identify areas for improvement, such as reducing gasoline consumption by minimizing engine-idle times, in order to optimize operations. Administrators can also monitor the location of every shuttle bus for flexible and efficient vehicle dispatch to handle peak traffic, effectively reducing passenger wait times.

The many benefits experienced by these international airports demonstrate that airport shuttle buses are no longer merely vehicles for transporting passengers. Instead, the Internet of Vehicles and smart airport shuttle buses are key factors for increasing airport efficiency and service quality. The integrated hardware and software solution jointly created by INFORM GbmH and Advantech have given shuttle buses the intelligence to support real-time communication with backend management systems, optimizing fleet management and enabling improvements to all aspects of airport service. ■

Advantech's iFactory SRPs Assist Manufacturers in Realizing Industry 4.0

The realization of Industry 4.0 does not have to necessitate a major infrastructure overhaul that costs millions of dollars. With Advantech's iFactory Solution Ready Platforms (SRP), manufacturers can adopt a step-wise approach to realizing Industry 4.0. For system integrators aiming to develop smart factory applications, iFactory SRPs expedite project development as well as facilitate innovative solutions that meet the criteria of Industry 4.0.

By Sharlene Yu with images provided by Advantech
Interview with Wilson Dai, iFactory SRP Product Manager

With the emergence of Industry 4.0 and the ongoing development of real-world applications, manufacturers wishing to maintain their core competitiveness are increasingly adopting new technologies in an effort to gain long-term advantage in today's ever-changing highly competitive market. The reason Industry 4.0 is revolutionizing the entire industry is due to its potential to transform numerous operations including processing, equipment monitoring, factory management, energy consumption, and logistics, all of which can be integrated together into innovative automated systems. However, without a standard method for transformation, the number of potential Industry 4.0 applications would be overwhelming. Many manufacturers remain unsure how exactly to implement Industry 4.0, or what steps should be taken to initiate the smart factory transformation.

Connectivity and process visualization are key prerequisites

As a passionate promoter of smart applications, Advantech has an extensive portfolio of IoT hardware and software products, including sensory devices, mid-layer intelligent hardware, and a top-layer multifunctional WebAccess cloud platform. Advantech continues to develop new solutions and services to assist manufacturers in implementing Industry 4.0 technologies.

Regarding the challenges faced by manufacturers, Wilson Dai, Market Development Manager of Advantech's Automation Computer Business Unit, asserted, "The previous industrial revolution, Industry 3.0, emphasized automation and computerization to enable automated machine production and digitalized data management. Now, in order to move towards Industry 4.0, connectivity and visualization are the key prerequisites, specifically, equipment connectivity process visualization."

With equipment connectivity and the collection of machine data for real-time display, manufacturers can develop a variety of transparent, predictable, optimized, and adaptive smart applications. This will enable the optimization of production lines and corporate resources for low-volume multi-customized production with the highest cost effectiveness.

Equipment Connectivity Solution
SRP-FEC220

Process Visualization Solution
SRP-FPV220

iFactory SRPs integrate smart applications

Regardless of this step-wise approach to transformation, manufacturers with development capabilities as well as system integrators providing integrated services will all encounter the same issue - all processes, including planning, design, testing, and deployment, will need to be redesigned. Thus, the entire transformation process will necessitate at least 6 to 12 months for completion. Because of the amount of time and energy required, few have fully implemented comprehensive factory monitoring. For enterprises attempting to increase corporate competitiveness with Industry 4.0, slow adoption not only weakens the potential benefits but also impacts the development of Industry 4.0.

Therefore, by leveraging its wealth of industry experience and diverse resources, Advantech has developed its iFactory solution-ready platforms (SRPs) aimed at realizing smart factories by combining hardware and software into integrated applications. These SRPs comprise three main components - Demo AP, Domain AP, and a Node-Red template – to allow users to rapidly achieve the required functions using pre-developed application examples. Demo Aps are aimed at single function demands. Domain Aps are aimed at all industry applications and provide comprehensive programs that allow immediate implementation. The Node-Red template is provided for users wishing to develop unique applications using open sources. According to Wilson Dai, “Advantech iFactory SRPs can dramatically reduce development time by providing pre-developed programs and modules for easy customization and expansion.” Manufacturers that have adopted Advantech’s SRPs have been able to successfully develop Industry 4.0 applications in only 3 months.

A foundation platform with turnkey programs for seamless transformation

To illustrate, Wilson Dai used a home interior design scenario to explain the installation of iFactory SRPs. He said, “When decorating a new house, people typically purchase a basic furniture package from a furniture store and either organize the pieces in their home themselves or hire an interior designer to arrange them in their house. They may also customize the basic furniture package to satisfy their personal decoration requirements.”

“Advantech’s iFactory SRPs are like a basic furniture package. With it, Users can choose whether to install the components themselves or have a system integrator

complete the installation. If additional software or hardware is required, the basic package can be customized and equipped with additional functions."

iFactory SRPs not only serve as a foundation platform for smart applications, they also function as a turnkey solution. Wilson Dai also stated, "During system development, users must consider which of Advantech's many products they need. After selection, the products must be assessed and subjected to performance testing. The entire process consumes a substantial amount of time and energy.

"However, with Advantech's iFactory SRPs, after verification and installation, the solution can be applied directly without additional performance testing and trials." He also confidently asserted that Advantech's SRPs can already support 80% of all factory applications. As for the remaining 20%, Advantech offers customer consultations in order to satisfy their unique demands.

All machines and equipment can be connected wirelessly

In regards to equipment networking, Advantech's SRPs can support numerous PLC communication drivers and brands of PLCs by using standard protocols to integrate monitoring and management systems and enable comprehensive data collection, flexible protocol transition, and operational technology (OT) and information technology (IT) convergence. Advantech's SRPs enable easy data acquisition. The efficacy of Advantech SRP's has been further enhanced with the inclusion of RESTful APIs that eliminate the need to convert collected data for MES systems. By eliminating data conversion, the entire system framework has been simplified and streamlined.

With regard to process visualization, Wilson Dai said, "Customers desire a monitoring solution that can increase production efficiency by 30% and be installed without disrupting operations or additional wiring. Currently, there are few solutions capable of satisfying these requirements, except for Advantech's SRPs. Our three-color monitoring system is not only a turnkey solution for rapid implementation, but also provides a non-invasive tool to satisfy customer demands." With iFactory SRPs combined with Advantech's WISE series wireless modules, users only need to install data collection modules at every workstation. The SRPs will enable data display on large signage or mobile devices within the factory. Furthermore, with the integration of various WISE modules, the SRPs can also be used to support factory environment monitoring and management.

Aimed at the three main applications - equipment networking, process visualization, and informatization of factory management - Advantech's SRPs enable machine control, equipment monitoring and optimization, MES data integration, production optimization, productivity management, and intelligent surveillance. Advantech plans to continue developing additional SRP systems for machine wear and tear detection, intelligent assembly monitoring, temperature monitoring system, factory environment monitoring, productivity visualization, comprehensive monitoring and management, production line management system (eSOP).

Enough talk, now is the time for action

As a leading supplier of smart factory products and services, Advantech has experience with both implementing and supplying smart factory products and a clear understanding of the problems encountered during the transformation process.

The iFactory SRPs were designed to assist manufacturers with implementing Industry 4.0. System integrators wanting to develop smart applications can use SRPs to not only implement projects but also develop additional innovative applications that meet the criteria for smart factories.

Based on his interactions with customers, Wilson Dai stated "Many people believe that Industry 4.0 necessitates a massive infrastructure transformation potentially costing million dollars. However, implementing Industry 4.0 is not actually as challenging as people believe. Manufacturers can start by improving production flow with the adoption of iFactory SRPs. Then, manufacturers can identify equipment that must be replaced to increase production efficiency, without remodeling the entire factory. Meanwhile, system integrators can rapidly complete their projects. More importantly, Advantech's SRPs provide key solutions for manufacturing industry to take action and actively implement Industry 4.0." ■

Powerful yet Compact

Modular Embedded Automation PC

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Peak efficiency, extensive flexibility, high cost effectiveness

- 6th Generation Intel® Core™ i7/i5/i3 Processor with 8GB DDR4 Built-in Memory for High-Performance Computing
- Fanless, Cable-Free Design Ensures Easy Assembly and Convenient Installation
- Modular Design supports Rapid Customization According to Application Requirements

UNO-2484G-6731AE

- 4 x GbE, 4 x USB 3.0, 1 x HDMI, 1 x DP (4K), 4 x RS232/422/485
- Additional 2 stack expansion for flexible expansion

UNO-2484G-6732AE

- 4 x GbE, 4 x USB 3.0, 1 x HDMI, 1 x DP (4K), 4 x RS232/422/485, 4 x iDOOR expansion

UNO-2484G-6732H5AE

- 4 x GbE, 4 x USB 3.0, 4 x USB 2.0, 5x HDMI, 1 x DP (4K), 4 x RS232/422/485

UNO-2484G-6732S2AE

- 4 x GbE, 4 x USB 3.0, 1 x HDMI, 1 x DP (4K), 4 x RS232/422/485, 2 x hot swappable storage

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intel IoT Solutions Alliance Premier

Advantech Modular Industrial Computers TPC and UNO

Extreme flexibility to satisfy diverse market requirements

The disadvantages of all-in-one PCs have been mitigated with the emergence of modular IPCs, which offer flexible configuration and high expandability. The provision of convenient scalability and long-term expansion makes them adaptable to meet the demands of an ever-changing market.

Translation by Sharlene Yu with images provided by Advantech
Interview with Elvis Lee, Advantech Automation Panel Product Manager

In technology industries, modularization refers to a system comprising separate components (modules), such as processors, batteries, and system memory that have specific functions and operate autonomously. When such components are standardized, they can be interchangeably combined into different solutions.

Previously, the idea of modularized products being adapted to market changes was primarily part of the system design stage in order to provide developers with a more flexible model for product development. However, users also employ integrated products. But because the product functions are determined by the developer, redundant functions cannot be removed or altered. Consequently, in an effort to "reestablish user control," Advantech has developed IPC platforms that allow users to select and customize the system specifications according to their specific requirements through modularization.

From limited all-in-one systems to flexible modularized solutions

But why has Advantech only now chosen to introduce customers to the concept of modularization? Elvis Lee, Product Planning Assistant Manager of Advantech's Automation Computer Business Unit, indicated that the implementation of Industry 4.0 has become a trend for manufacturing industries to initiate fundamental and dramatic changes.

All manufacturers, whether involved in high-tech precision manufacturing or traditional industrial machining, must adapt to this revolutionary trend. However, the transformation process will differ for each manufacturer. This is because a number of manufacturers are still in the Industry 2.0 stage in regards to automation. While others have achieved Industry 3.0 digitalization, certain manufacturers remain somewhere between Industry 2.5 and 3.5. Accordingly, because manufacturers are at different stages of implementation, the solutions they require also differ.

In response, Advantech abandoned the conventional all-in-one solution model and developed modular IPCs for adapting to various usage requirements. Mr. Lee explained, "Although all-in-one systems offer comprehensive functionality, the level of integration limits customization and expansion. Even using Advantech's customization services, customers will be faced with extended lead times and increased costs. Conversely, modularization allows customers to select their ideal platform and reserve the potential for future expansion."

Of Advantech's extensive product portfolio, its TPC series of embedded tablets and UNO series systems feature a modular design and various optional expansion modules. Both of these series of products offer several outstanding functions. Additionally, these products can be equipped with a range of motherboard (high/medium/low), display (12" to 21"), and I/O options.

Modular IPCs satisfy a wide variety of usage requirements

Mr. Lee gave real-life examples. First, regarding factory implementation, every production line workstation has a number of specific functions. When smart applications are introduced, each workstation may be equipped with devices that vary in performance in order to reduce costs and ensure easy implementation. Unsurprisingly, conducting the necessary solution testing and verification for every workstation can be considerably time consuming.

However, with Advantech's modular TPC series of embedded tablets and optional expansion modules, the requirements for each workstation can be satisfied simultaneously. For example, workstations used for visual inspection operations can be equipped with a high-performance motherboard, multiple LAN ports, and an external camera. Workstations that must be connected to a PLC for machine control can be equipped with a medium-level motherboard and multiple COM ports. Modularization not only shortens verification and implementation times, but also ensures easy maintenance with a streamlined framework.

Another example is a system development project involving a manufacturer of automatic guided vehicles (AGVs). Typically, when system developers decide to integrate additional CANbus and Wi-Fi functions after product procurement, companies are required to spend more money purchasing the upgraded models and conducting new tests, significantly extending the product's time-to-market. Fortunately, in this case, the manufacturer had purchased embedded computers from Advantech's UNO series. The UNO series systems can be employed as touch panel computers and equipped with diverse I/O modules. Thus, the system developers only needed to incorporate an additional layer with the required module to integrate additional CANbus and Wi-Fi functions.

Mr. Lee stated, "The computing modules, displays, and I/O of the TPC or UNO series systems are compatible to each other and can be easily interchanged. Therefore, the system does not require additional testing and verification. This saves considerable development and implementation time."

Solutions with minimal installation barriers and easy upgrades at a competitive price

He noted, the ever-changing market demands shorten product lifecycles and increase need for low-volume, high-variety customization. The Advantech modular IPCs provide a highly scalable solution with minimal installation barriers and unlimited expandability to quickly respond to all kinds of future applications and customer needs.

Modular IPCs also offer a cost-saving solution. For example, users with high CPU performance requirements may typically spend a considerable amount of money purchasing high-performance computers with a number of redundant functions in order to meet their CPU requirements. However, with modular IPCs, they only need to pay for the functions they require.

Additionally, modular IPCs simplify maintenance and repairs with interchangeable components, eliminating the need to maintain large inventories of spare parts and reducing maintenance workloads. Finally, the flexible scalability and long-term expandability of modular IPCs offers an extended lifecycle.

Invest once for sustainable upgrades

Much like dining at a fancy restaurant with numerous appetizers, soups, entrées, desserts, and drinks, modular IPCs offer users a variety of performance, display, and I/O options for their specific usage preferences, allowing users to build their ideal computing solution without being limited to systems with restricted functions.

Mr. Lee asserted, "Modular IPCs are a one-time investment that can be continually upgraded. Considering the unpredictability of current economic conditions, I believe that this type of flexibly configurable system is ideal for manufacturers and system integrators looking to implement smart applications." ■

Intelligent Factory Connectivity of the Future

Multi-Protocol, Cross-System Integration Solution

ADVANTECH

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As manufacturing companies expand and leverage their scale and manufacturing capacity, one of the major challenges they face is to improve their operational efficiency. However, most plants have numerous complex systems that are critical for managing scheduling, production, inventory, and quality data—especially if the company owns several factories in different cities, which complicates management. What is needed is an easy and effective approach to supervising each factory and sharing information across multiple sites.

Product Information

EKI-1242 series
Modbus RTUTCP to EtherNet/IP, EtherCAT, PROFINET conversion

ADAM-6000 series
Ethernet I/O, EtherNet/IP and PROFINET Modules

WebAccess/NMS
A web browser-based software package for networking management system

WebAccess/SCADA
A web browser-based HMI/SCADA software

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Advantech Wins "ROI Industry 4.0 Award China" for Its Digital Factory

Advantech received an award from ROI Management Consulting for its Industry 4.0-compliant digital factory. The "ROI Industry 4.0 Award China" was given to Advantech at the awards ceremony in Shanghai on 17 October to honor its Industry 4.0 achievements as a pioneer in the practical implementation of "real-time equipment and resource monitoring."

By Sherry Lin with images provided by Advantech
Interviewed with Allan Tsay, Vice President of Advantech Industrial IoT Group
Jonney Chang, Associate Vice President of Advantech Industrial IoT Group

The ROI Industry 4.0 Awards have been hosted in Germany since 2013 to honor Industry 4.0 solutions in the manufacturing industry. For the first time, in 2017, ROI and Ringier Events hosted the awards in China. This year, 30 companies were eligible for the awards and five winners were finally chosen to receive the prestigious ROI Industry 4.0 Award China. Timo Schneemann, Vice-General Manager of ROI Management Consulting, stated, "What Advantech has achieved is an outstanding example of what can be done in terms of quality and utilization by providing real-time production insights. While today, other companies have key machines connected to a central system, Advantech stands out because they have not only connected sophisticated equipment like SMT lines, but have also upgraded and connected conventional machines such as stamping machines to get a full picture of what is happening in production—from start to finish. Whilst connecting machines is one thing, the crucial step other companies are missing is making this data easily accessible to the people who need it, and here is where Advantech scores high again with their data consolidation and visualization framework."

Industry 4.0 Situation Room Enables Real-time Management

From many years, Advantech has consistently

optimized its production line in manufacturing centers to improve efficiency. "The Industry 4.0 situation room is Advantech's most important upgrade to Industry 4.0. The situation room is the factory's nerve center where data is collected, analyzed, and visualized for real-time management and data-driven decision-making. This award has demonstrated that we are on the right track with our Industry 4.0 blueprint," said Allan Tsay, Vice President, Advantech Industrial IoT Group.

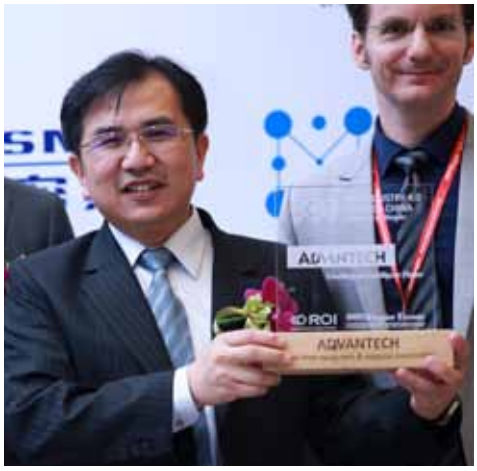
Advantech's WISE-PaaS platform is at the core of Industry 4.0 solutions that help system integrators and manufacturers rapidly deploy smart, networked equipment systems. WebAccess software facilitates machine connection without needing to replace existing equipment, allowing for the collection of equipment, production, and environmental data. Process visualization enables data integration with manufacturing execution systems via the situation room dashboard for improving production efficiency and reducing production costs. The WebAccess app provides push notifications of unexpected downtimes, allowing for immediate action to be taken. Advantech's Industry 4.0 journey begins with equipment connectivity and process visualization solutions, and continues with optimization processes. Data is the key to improving efficiency in Advantech's smart factory.

"Advantech is not only an end user, but a provider of Industry 4.0 solutions. Advantech has primarily used its own products and solutions in the planning and implementation of the smart factory. Advantech's smart factory is evidence of how iFactory SRPs (Solution Ready Platforms) and products can be used to implement Industry 4.0 in practice. Advantech's iFactory SRPs are quick-start tools that enable a step-wise approach to achieving Industry 4.0," said Jonney Chang, Associate Vice President, Advantech Industrial IoT Group.

Accelerating Industry 4.0 - Advantech in the Fast Lane

2017 has been an important year for Advantech to continue driving Industry 4.0 growth. Advantech upgraded its manufacturing centers to real Industry 4.0 demonstration sites and has opened them to external visitors in an attempt to accelerate digital transformation and inspire the development of other smart factories. Additionally, Advantech hosted several Industry 4.0 forums in China, Taiwan, Malaysia, Singapore, Korea, Thailand, Japan, Vietnam, Brazil, Turkey and Dubai to share the latest iFactory applications with representatives from industry, government, and academia; collaborating closely to establish a local Industry 4.0 ecosystem. This July, Chaney Ho, the Cofounder, Executive Director, and Acting General Manager of Advantech Europe, received a special award for, "Industry Leader of the Year" from Asian Manufacturing Awards 2017 for his considerable effort in pushing Industry 4.0 in the Asian region. Advantech has not only realized the intelligent factory from a practical perspective, but also encourages customers to embrace Industry 4.0.

"Industry 4.0 is a dynamic process that has no downtime and is constantly advancing and changing," said Jonney Chang. With the advent of Industry 4.0, a profound digital transformation is now underway. As Industry 4.0 continues to evolve, Advantech will continue developing its smart factory and Industry 4.0 solutions with the aim of providing a brand-new in-depth experience for end users in 2018. ■



Esther Owens

Sales Operations Associate Director
Advantech Irvine

Hello everyone!

My name is Esther Owens. I am based in the AENC office in Irvine, California. I joined Advantech 14 years ago as a sales coordinator covering the Midwest region. I have since held several positions, progressing from sales coordinator supervisor to manager and finally to my current role as sales operations associate director. I remember the early days of Advantech, when we worked out of a small office that resembled a warehouse and comprised only roughly 30 employees. Fast-forward 14 years to the present day, and I continue to be a proud employee of AENC. Advantech has since expanded and now boasts over 140 employees, with annual sales figures approaching US$300 million.

My favorite aspect of our team is that we have a family-orientated work environment and we work diligently together to realize our common goals and vision.

In my personal time, I enjoy spending time with my family and friends. I have three children—one in high school, one in middle school, and one in elementary school—so, as you can imagine, they keep me busy. I'd like to think they keep me young, too! We enjoy going on family vacations, hiking, and to the beach.

I believe we need to design our day—what the day is going to be about and what we want to achieve.! "Live with intent" is my motto!

Hello everyone. My name is Joon Park, and I am the finance director for Advantech Korea (AKR).

I joined AKR in July 2009 after having worked for 10 years as a finance manager in the portable devices industry. Incidentally, 2009 was also the year that AKR was firmly established as a Global Advantech subsidiary. To achieve that, all AKR staff and related HQ support teams, such as the finance and accounting, IT, and supply chain management (SCM) departments, collaborated to integrate Advantech's various systems and operational processes. That experience impressed me significantly.

During my employment with Advantech, I have had the opportunity to meet many wonderful colleagues from all over the world. Additionally, I have learned a great deal about how to cooperatively face challenges and identify solutions.

I enjoy challenges and devising solutions to overcome problems. For the last 9 years, I have also taken on additional management roles for the HR and SCM teams. My current position is acting SCM manager. With the great support of my fellow Advantech staff, I believe that I can overcome the various barriers to RBU growth.

I truly appreciate the efforts of the people I have worked with at Advantech to integrate and synchronize our collective goals and targets. In the future, I would like to meet, talk to, work with, and share experiences with more of the worldwide Advantech family.

Joon Park

Finance Director
Advantech Korea

Advantech Wzzard LRPv Series

Immediate Access to Your Remote Assets

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Advantech's Wzzard LRPv solution

Wzzard LRPv solution, a highly integrated LoRa sensing platform for applications ranging from I/O sensor data management to network protocol conversion, can be utilized to form a private sensor network, paying immediate dividends by cutting maintenance costs while increasing overall productivity.

SmartSwarm 243 LoRa Gateway.

- IP66-rated
- AA battery and external
- power input (3.7 ~ 12 V)
- Wide operating temperature -40 ~ 75 °C

Wzzard LRPv Node

- Software customization
- Low power consumption
- Supports IoT protocols
- Wide operating temperature -40 ~ 75 °C

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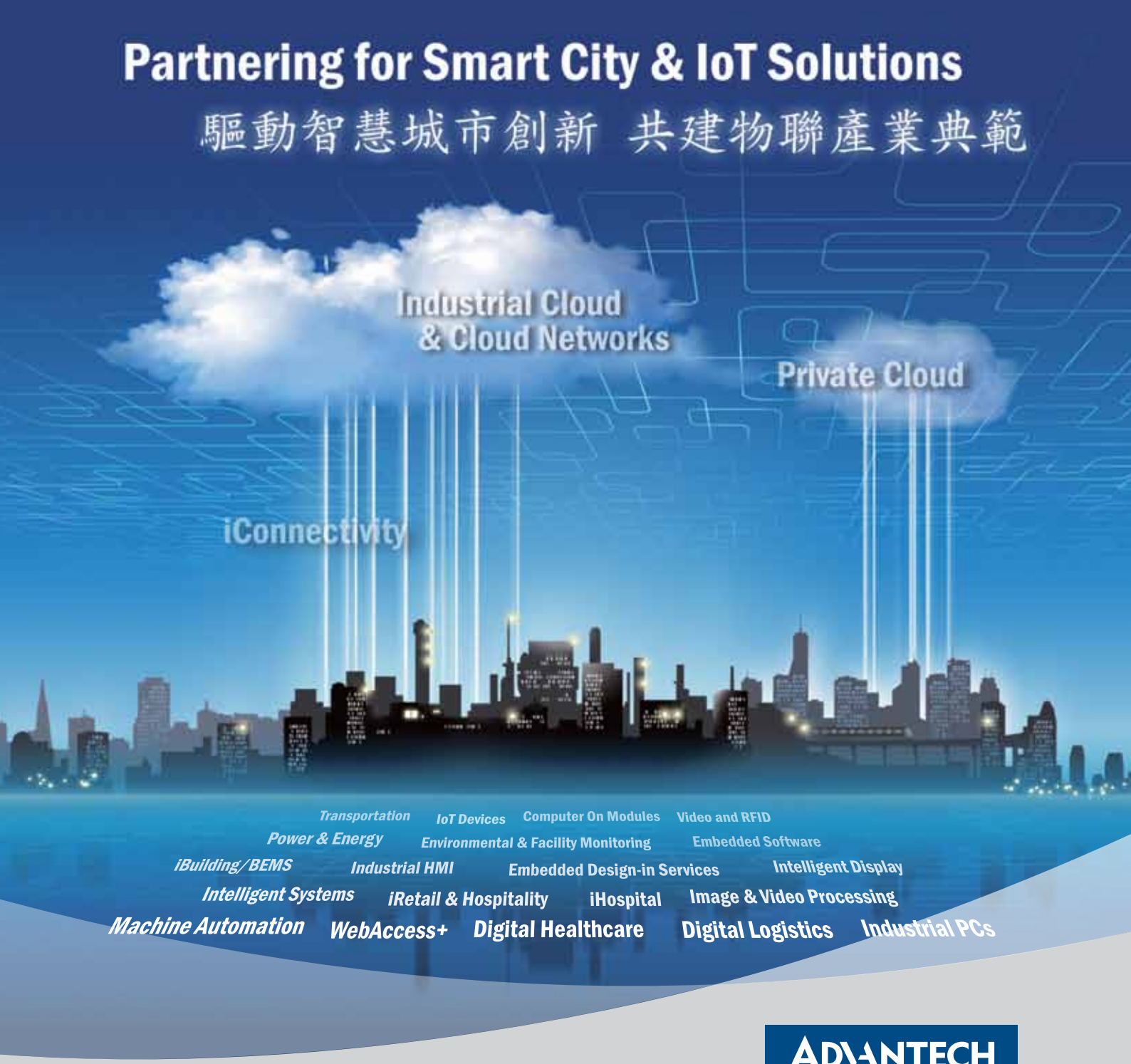

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Partnering for Smart City and IoT Solutions

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。

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