The drones are attracted, the visual vision that completes 3 dimensions

Akira Tsuda

Japan Drone Association

Drone performances and functions, holding various training sessions to correctly understand aviation law, establishing a skill certification system to fly safely, technical guidance, etc. based on a unified standard, drone users can do basic without anxiety We will develop an environment where opportunities to master skills and knowledge can be obtained.

In addition, we will support drone spreading activities in collaboration with the development of new technology using drone, social contribution project including entrepreneurial support and education, environment for drone safe operation, administrative and related organizations.

I would like to focus on the development of the drone industry in Japan, with everyone who has the same intention regardless of individuals or companies.

Development of Valmet Industrial Internet

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Valmet K.K.
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Valmet Automation Inc.

The Industrial Internet has enabled the unlocking of the value of vast data resources in a modern pulp and paper complex. The unlocking of this value is today being done by experts in pulping, papermaking and energy processes who analyze this secure data in supplier performance centers. Their analyses, discoveries and recommendations are now being used to optimize the performance of mill sub-processes and the whole mill, and to improve reliability.　Supplier and pulp and paper producers collaboratively implement and sustain performance

improvement and reliability improvement programs based on various optimization and analytics methods. Specific case studies are presented where productivity has been increased, raw material and energy costs lowered, quality optimized and process uptime improved.

Fuji Electric's IoT solutions to create new value

Yasuo Inamura

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Fuji Electric has been providing the state-of-the-art control technologies for use in various areas, including social infrastructure such as electric power and transportation, equipment for industrial use such as iron and steel, chemicals, automobiles and electric and electronic devices and consumer products such as buildings, retail stores, vending machines and in-vehicle devices.

And recently, the Internet of Things (IoT) has been attracting a great deal of attention and the control technologies in the industrial world are entering a phase of major change.

This paper describes Fuji Electric's approach to the IoT with the following examples.

1) The energy center for improving energy management operational efficiency

2) Boiler combustion solution for reducing boiler fuel cost

3) Vibration diagnosis system of rotating machine with wireless sensor

Industrial Internet for the Power Industry

Yasutaka Muta

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The power industry faces lots of challenges like power-market deregulation, the rise of renewables, unstable fuel price, and changing consumer behavior. Power companies need to understand the impacts of these challenges and by embracing digitalization, companies can apply unprecedented insights, new capabilities and innovative business models to these challenges.

To change challenges to enormous opportunities, GE provides industrial internet platform, PREDIX, and industry-centric digital solutions, Asset Performance Management (APM), Operations Optimization (OO), and Business Optimization

(BO). APM is a solution to capture, integrate, and visualize data from physical assets in power plants and run analytics to improve reliability and availability of these assets. Predictive analytics is the key feature of APM that enables operator to anticipate or identify failure of an asset with longer lead time by modeling the asset's expected versus observed states. OO is designed to help power companies to tackle operational issues, meet business demand, and reach "true" plant capacity while still reducing cost. OO has two key components, cloud-based visualization and recommendation solution and closed-loop edge control solution that enables real-time operational optimization. BO is a cloud-based solution designed to help power companies to take full advantage of predictive analytics to make improved decisions around power trading, fuel purchases and portfolio management. These solutions are powered by PREDIX, the industrial internet platform. Advanced analytics technologies including Digital Twin is a key advantage of PREDIX. Data security is also built into the PREDIX environment that enables power companies to fully embrace this platform.

Predicting equipment failure using IoT and AI

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　The internet of things (IoT) has been finally in spread period. Moving objects, such as smartphones or automobiles have been leading the market, and the rapid growth of IIoT (Industrial IoT), IoT for industrial area, has been highly expected. However, there have been difficulties in spreading IoT, because the utilization of IoT and its　effects are not perfectly understood and shared. Even after introducing IoT-driven remote false detection, largely accumulated data from sensors are not perfectly utilized in the most cases.

We have provided the IoT platform service by in-house development since 2006, when the word, IoT or M2M, was not existed, with utilizing the mobile telephone network. Also, we have started the false predicting service in 2016 as bigdata utilization of accumulated sensor data by IoT platform service, after some actual proofs of failure detection for facilities by AI (machine learning).

Machine learning has a high affinity with IoT dealing with lots of sensors. A minimum required number of sensors used to be installed, considering the equipment mechanism, and failure prediction is judged by the specialized algorithm.

Recently, the lower price sensors have enable us to install lots of sensors at the same cost, however, a large quantity data have made us more difficult to get analyzed. To response to dealing with such a large quantity data, sensor data is learned by machine learning, which makes us to detect its tendency of failure quickly.

This study shows the sensing big data collected by IoT and AI utilization with our real use cases.

Strengthen factory network security applying SDN/OpenFlow technology

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With the evolution of Industrial IoT (IIoT) and Big Data, various types of factory systems are going to be connected to each other over and all form factors of devices will communicate with each other across the network. In the concept of IIoT, not only devices but mills, companies or any type of organizations would be connected and communicate each other in multi-dimensional ways.

As mill systems become more complicated, "Network traffic expansion, cybersecurity or securing human-resources with IT expertise" etc..., have been less considered for conventional mill network and there are newly emerging challenges that need to be addressed. Especially it is essential to establish method and plan to reinforce network security in a rapid and flexible manner without affecting running production activities.

To solve these problems we employed SDN (Software-Defined Networking) technology. The network integration by using SDN technology enabled monitoring of mill network security and integrity, and the network virtualization also enables potential network enhancement for the future without being constrained by physical restrictions.

Introduction of IoT device "e-Musen Junkai"

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Hokkaido Shiraoi Mill,　Nippoon Paper Industries Co., LTD.

Pulp and Paper Company is typical process industry and stable operation is enormously important to reach high efficiency production. In recent years, IoT (Internet of Things) and M2M (Machine to Machine) have been used manufacturing equipment etc. We have developed "e-Musen Junkai" which consists of wireless sensor network system and sensors. These sensors can measure acceleration and temperature of equipment with online. This system contribute to decrease the time of spent in watching equipment and make easier and faster to find breakdown.

This report presents the outline of developing process which we introduced into Hokkaido Shiraoi mill.

Replacement Project of PM2 QCS

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PM2 of Hokuetsu Kishu Paper Niigata Mill produces wood-free and wood-contain printing and writing paper. Quality Control System (QCS) installed in this paper machine was B/M7000XL, which was manufactured by Yokogawa Electric Corp., and had been operating for 18years since 1998.

Due to increasing of malfunction occorence and termination of a maintenance support, Hokuetsu Kishu Paper decided to replace with new QCS called as B/M9000VP in 2016.

With the renewal of this QCS, we planned not only a system update, but also an improvement of paper quality and a reduction of energy usages by incorporating requests from production department..

This paper introduces a background of QCS renewal and an improvement of performance of paper manufacturing process.

New Approach of Process Optimization by Analysis of Plant Big Data
-Cooperative Optimization Control of Stock Preparation and Paper Making-

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In recent years, as for manufacturing industry of Japan, especially in the process

manufacturing industries of the energy-intensive industry, energy consumption rate are increasing and upward trend due to trend shifts from mass production to small varieties and variant variable production etc.,. Therefore, the need for a smart factory energy management system (FEMS) that guarantees productivity is increasing.

Although optimization of individual facilities and individual processes are being carried out through our company's improvement activities at factory production sites, it has been found that optimization by the cooperation between the adjacent production processes and optimization by the cooperation between the production process and the power process have not been satisfactorily done yet.

We conducted a detailed survey through trial test at the target factory to determine the extent of energy saving potential through cooperative control between a production processes. In planning and realizing these remedial measures, it is necessary to efficiently collect and analyze so-called plant big data in production processes. At the same time, it is required to perform appropriate optimum control and pre-simulation. From these points of view, we confirmed the effectiveness of "the Cooperative optimization tool between processes".

Moreover, as an example of cooperative optimization between adjacent processes, we applied a new concept of feed forward control to color and ash control between stock preparation process and paper making process and confirmed the possibility of energy saving by 50% compared with conventional manual operations.

Papermaking. NextLevel
～ How Voith is making paper manufacturing better and more efficient through digitization～

Ryozo Shimizu
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Digitization has long since become a fundamental component of machine and plant engineering. And Voith is leading by example. Whether for existing or new paper machines, 'our digital platform concept stabilizes and optimizes processes, reduces costs and improves quality,' says Dr. Christian Naydowski, Vice President Integrated Solutions at Voith Digital Solutions.

Everyone is talking about "Industrie 4.0" or the Internet of Things. The machine and work environments are going digital. Fast and highly available internet

connections are the prerequisite for systematically integrating digital process tools into the supply chain. With its digital strategy, Voith is already a considerable step ahead. In recent years the machine and plant engineering company has consistently focused on developing a product system range for its core areas of business. This expertise is now being pooled across sectors in the new Corporate Division Voith Digital Solutions.

Papermaking. Next Level – The revolution in the paper industry

One of these core areas is paper manufacturing. Voith has been building paper machines for around 150 years and through numerous developments has revolutionized the manufacturing process for graphic papers, newsprint, packaging paper or specialty papers like banknotes or label holders. Naydowski calls Voith's next revolution for the paper industry " Papermaking. Next Level". 'We want nothing less than to integrate modern, dynamically developing information technologies with existing automation to create solutions for the paper industry.'The availability of fast internet and high, inexpensive processing power are helping the new automation tools from Voith to make the decisive breakthrough. 'Sensors, actuators and networked, data-based controls in Clouds are the basis of the new technology. What is essentially new is that we can make intelligent use of the cyber world with the physical world of plant construction and its machine components to obtain paper-specific indicators for managing the production process. In this context, speed and access to fast data processing play the decisive role.'

ANDRITZ Optimization of Process Performance（OPP）

Kazunori Ohmori
Andritz K.K.　Capital Systems Sales

The internet has fundamentally changed the way humans communicate. It has transformed knowledge sharing, interaction and the overall economy. Today we are facing the next revolution, the Industrial Internet of Things (IIoT). With the ability to see, hear, smell, taste and feel, countless machines and components can now communicate with each other and command and optimize themselves. With IIOT, the production of goods takes on an entirely new dimension. On the other hand, ANDRITZ is bundling its years of experience in the production of components and machinery as well as its in-depth pro¬cess know-how, and expanding them with smart digital solutions in Pulp & Paper industry. In past years, ANDRITZ has also

amassed extensive know-how in the optimization of processes and successfully imple¬mented it in numerous projects in its customers' key industries, primarily in the area of Pulp & Paper. This applies for new as well as for existing machines and equipment. Now, all in-house technology, knowledge and services are united with IIOT products under ANDRITZ's new technology brand, OPP.

IIoT Evolution to Direct Sensing of Solenoid Valve

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In order to support the safety operation of factory, the idea of IIoT system is starting to attract attention as well as the construction and improvement of safety instrumented systems. By detecting the opening and closing of the solenoid valve operation directly, it will be possible to predict deterioration of parts and prevent failure. This paper introduces the system in detail.

Extrusion molding of cellulosic fibers using cellulose derivative

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According to the Paris Agreement, it is getting important to develop 100% plant-based materials which could substitute oil-based plastics. Cellulosic fibers are abundant in the earth and have both durability and biodegradability. However, products from cellulosic fibers are typically limited to sheeted materials. In this study, we aimed at developing all-cellulose material which could be applicable to various forming methods like injection and especially extrusion. In order to extrude cellulosic fibers without using any oil-based plastics, hydroxypropylmethyl cellulose (HPMC), one of cellulose derivatives were blended to the fibers and kneaded with water to give clay-like material with plasticity. Effect of water on the extrudability

and shape retention was large. The best water content was chosen as 50% for paper powder used in this study. The material was successfully formed using hand-operated clay-extruder, dried at 60°C to give molded pieces. Addition of HPMC to paper powder increased extrudability of the material and the strength of the molded piece. The best blending ratio of paper powder and HPMC was estimated to be 7:3. The molded piece was disintegrated in stirred water and most of HPMC was recovered from the water as HPMC solution. We demonstrated an idea to realize 3D forming of cellulosic fibers with sufficient extrudability, strength and recyclability.