Smart Manufacturing & IIoT
Division

Setting the Standard for Automation™

Newsletter
March 2020

In this Issue

2020 Events

| 19-21 October | ISA IIoT Conference \| Galveston, Texas |
| 23-26 October | Annual Leadership Conference \| San Juan, Puerto Rico |

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Welcome to our Division

I am very happy to bring this first Newsletter of **Smart Manufacturing & IIoT Division** to our members and other connections. In the short span of 3 months, we already have around 300 members and many of them new ISA members! I would like to believe that for some of them the motivation was the division!

Industrial Internet of Things (IIoT) is connected with Industrial Automation on many levels and hence critical for ISA. Smart Manufacturing is touted as the 4th industrial revolution and is powered by IIoT, cloud, big data, machine learning, etc. The division will provide a platform to keep abreast of the latest developments in smart manufacturing & IIoT, connect with experts and collaborate amongst members.

Division activities
I am glad to tell you that we already have a great team in the Division and we are planning several activities:

- Creation and collation of technical resources relevant to the division and publish on the division website
- Publish a quarterly newsletter – this is the first one
- Conduct webinars
- Technical support to the annual conference

- Create various opportunities for Division members to collaborate and network
- Liaison with other organizations working in IIoT and Smart Manufacturing

I am happy that this newsletter has one article and a case study contributed by division members.

I hope you will engage with the Division activities and help us grow.

Take care and Stay SAFE & Stay HEALTHY!

Sujata Tilak
Division Director

Division Website
https://www.isa.org/iiot-and-smart-manufacturing-division/.

Join our LinkedIn Group!
https://www.linkedin.com/groups/12175409/

How to become a Division Member?
Do you know a fellow member who is interested in IIoT? They should contact info@isa.org to have this division added to their ISA Membership at no additional charge.

IIoT Conference Rescheduled

ISA was organizing the first IIoT & Smart Manufacturing Conference in April in Galveston, TX. The conference will now take place in October 2020.

As COVID-19 (Coronavirus) diagnoses continue to increase worldwide, ISA is committed to providing a safe and healthy environment for our members and customers. The World Health Organization (WHO), the US Centers for Disease Control (CDC), and other global health organizations have universally recommended the cancellation or postponement of gatherings, including conferences, to slow the spread of the virus. We are complying with those recommendations. As a result, the IIoT & Smart Manufacturing Conference, has been rescheduled to 19-21 October 2020, in Galveston, Texas, USA.

www.isa.org/iiot

Industrial Internet of Things (IIoT) has emerged as a major technology with a big impact on industrial automation systems and on the automation professionals involved with the design and maintenance of such systems. One of the biggest challenges for the adoption of IIoT technologies is cybersecurity.

ISA recently established the IIoT & Smart Manufacturing Division to create a forum for the automation community to discuss the adoption and challenges of applying these technologies in industries globally. With its multitude of members, volunteers, and subject matter experts, ISA contributes a vast amount of expertise in IIoT and industrial cybersecurity. This IIoT conference will be an important vehicle for content sharing on such critical topics.

Conference Topics:
- Navigating the IIoT Landscape
- System Design & Architecture
- Cybersecurity & Safety
- Implementation & Management
- Smart Manufacturing
- Digital Transformation
- AI/Edge Computing
- Industrial Communications
- Network Technologies

Register for the conference at www.isa.org/iiot.

Why do we need a Smart Manufacturing & IIoT Division?

The Smart Manufacturing and IIoT Division (also known as SMIIoT) is the newest and fastest-growing division of ISA aimed at helping our members grow professionally and technically. The primary goals of SMIIoT are to provide clarity around these ever-evolving spaces, develop useful technical content, develop standardized approaches to solve critical problems and provide a forum for networking and collaboration.

ISA's understanding and focus of Smart Manufacturing and IIoT will continually evolve to adapt due to the high level of activity and interest throughout the worldwide community. The constant development of new technologies, new applications, and new concepts from most of the major hardware manufactures, solutions providers, businesses, research institutions, and even governmental agencies.

Join us if you want to learn, contribute, network, and help build out the Division to create a better world through automation.

What is IIoT?

The Industrial Internet of Things (IIoT) is a subset of a much larger concept known as the Internet of Things (IoT). At a high level, IoT is a network of interrelated intelligence devices, computers, machines, and objects that are capable of transferring data without requiring human-to-human or human-to-computer interaction. The application of IoT to 'Industrial' use cases refers more specifically to interconnected control systems, sensors, instruments, industrial assets, computers, and people. IIoT enables intelligent industrial operations using advanced data analytics resulting in transformational business outcomes. The scale and span of IIoT can be massive, easily resulting in deployments reaching into the thousands, if not tens of thousands of individual endpoints. When properly utilized and optimized, it can be one of the largest enablers for smart manufacturing.

What is Smart Manufacturing?

National Institute of Standards and Technology (NIST) defines Smart Manufacturing systems as "fully-integrated, collaborative manufacturing systems that respond in real-time to meet changing demands and conditions in the factory, in the supply network, and customer needs." Thus, smart manufacturing is an ecosystem that enables factories, warehouses, supply-chains, etc. to be fully integrated and agile to fulfill customer demand for product or service delivery. Although arguments can be made to differentiate between other big buzzwords like "Industry 4.0" and "Digital Transformation", they are often used interchangeably.

Regardless of the semantics, these concept boils down to collecting and harnessing a tremendous amount of data to make better decisions; telling business leaders what to do and when to do it. The goal of most Smart Manufacturing initiatives, therefore, is to identify opportunities for automating operations and use data analytics to drive better agility, increase efficiency, improve quality, and reduce a company's time-to-market. What makes all this possible is the collective application of different cutting-edge technologies that make manufacturing more connected, more intelligent, and more dynamic.

Technical Committees
We're working to create the following Technical Committees:

- IIoT Technologies
- Cloud Technologies
- Additive Manufacturing
- Artificial Intelligence
- Digital Twin & Simulation
- Virtualization technologies (VR and AR)
- Big Data & Predictive Analytics
- Cyber-Physical Systems
- Advanced Robotics, AGVs, and Cobots
- Communication and Networking (Industrial Internet)

InTech Articles

Check out these great articles from ISA's InTech magazine:

Paying attention to IIoT solution providers
By Renee Bassett

Global scan of AI and 5G wireless networks
By Erik R. Peterson

Process Industry 4.0
Transforming the process industry with Industry 4.0 Process
By Stefan Zippel

Recommended Read

Industrial Ethernet on the Plant Floor: A Planning and Installation Guide

Industrial Ethernet on the Plant Floor: A Planning and Installation Guide
Author: Robert Lounsbury
Copyright 2008
Length: 150 pages

ISA Celebrates 75th years of Service

Our members, volunteers, and communities have supported ISA for 75 years. Their support, passion, and dedication ensure that ISA will spend the next 75 years advancing our vision – to create a better world through automation.
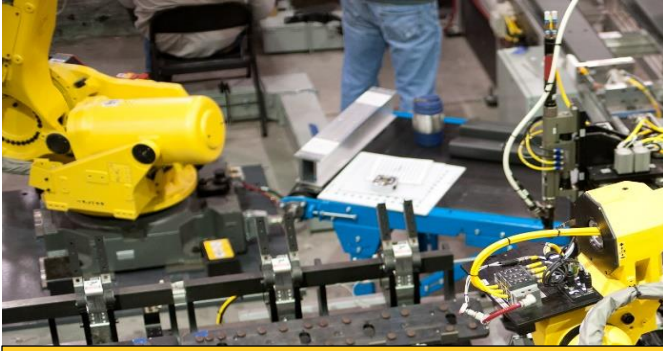
Division Website
https://www.isa.org/iiot-and-smart-manufacturing-division/.

Join our LinkedIn Group!
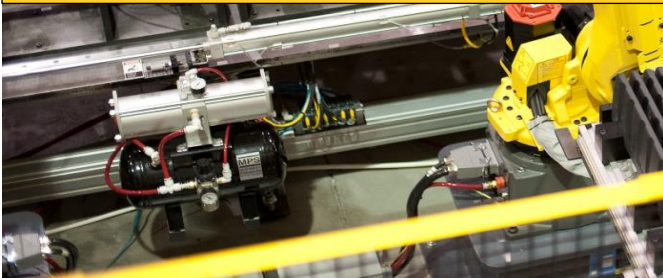https://www.linkedin.com/groups/12175409/

Case Study:
OEE Monitoring – Robotic Production Line

A major automotive and engineering MNC headquartered in USA with several plants in India. The project was executed in one of the plants in India

Challenges

- Non availability of OEE* data in real time resulting in lack of control on processes and productivity
- No visibility in production losses and their reasons
- Raising maintenance tickets in real-time from the shop floor

* OEE stands for Overall Equipment Effectiveness and is calculated as (OEE = Availability * Performance * Quality)

Solution

PlantConnect SFactory, an IIoT solution from Ascent Intellimation is deployed on the line.

SFactory Edge Gateways acquire real-time production data from all machines and robots in the line and send it to SFactory server application.

Key Parameters (captured/computed): Cycle time, loading and unloading time, alarms, production count, machine mode and status (on / off / idle)

Connectivity: Each cell has a Profibus network with the robot PLC acting as Master. A Profibus to Modbus converter is added in each cell and acts as a Profibus slave in the network. The mapping of required parameters is done in robot PLC and the converter. SFactory Edge Gateway connects to converter on Modbus TCP.

HMI: Siemens HMIs are provided in each cell for operator interactions. These HMIs also connect to Edge Gateway

Interlocking: Start signal of all machines on the line is controlled by SFactory. Thus, when a machine is down / idle beyond a certain threshold and this is not due to previous machines in the line, the system locks the start signal. It is released only when the operator submits downtime reason using the HMI. Thus, all availability losses are captured along with reasons

Key Features

- Real-time OEE of all machines
- Real-time OEE of line
- Loss analysis for availability, performance and quality losses
- Tool life monitoring
- The operator can raise maintenance tickets thru HMI, and they are pushed to CMMS
- Dashboards and reports

Outcomes

Immediate

- Real-time visibility of OEE and losses. This enables quick remedial actions and productivity improvements
- Improvement in maintenance response due to real-time alerts.
- Reduction in unrequired downtime due to accountability via interlocking

Medium and long term

- Downtime reasons analysis results in targeted improvements
- Recalibrating of processes to balance line performance
- Data availability with the historical context for analysis and continuous improvements