SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

1 March – 27 March 2020

TOPICAL REPORT

ADVANCED MANUFACTURING

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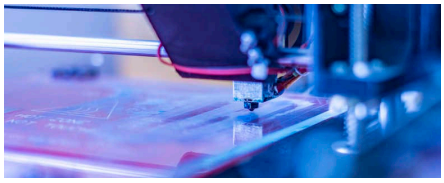
news

MANUFACTURING



How smart technology is transforming the industrial world

"When it comes to the world of manufacturing, Industry 4.0, the Industrial Internet of Things and Smart manufacturing are all terms we hear thrown around a lot. Whilst these terms can all be used in isolation; they share one very important commonality – they are all impacted by digital transformation. "
Source: Global Manufacturing

Industry 4.0 and the future of manufacturing

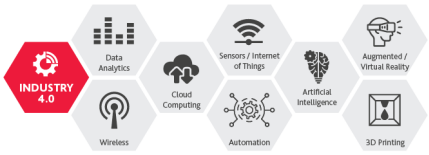
"Manufacturers around the world are engaging with Industry 4.0 to improve performance and accelerate growth, yet Canadian companies have been less adventurous when it comes to advanced manufacturing."
Source: Plant.ca

Coronavirus fallout: When will manufacturing and logistics bounce back?

"Investors in the manufacturing and logistics sectors will be keen to assess how long it will take both industries to recover from the coronavirus outbreak. It typically takes three to six months for these sectors to bounce back after containment measures – based on the experience of the 2003 SARS epidemic – however a "fast V-shaped recovery is becoming less likely by the day", management

academic

INDUSTRY 4.0



A Review Content Analysis Between Industry 4.0 and Sustainable Manufacturing

"the first topic suggests the need to explore and comprehend the interaction between the areas. The second topic brings the importance to analyse and understand requirements needed to successfully implement. The last topic shows the different ways to implement and assess the sustainable manufacturing in the context of Industry 4.0."
Source: International Joint conference on Industrial Engineering and Operations Management

"Industry 4.0" Digital Strategy, and the Challenges for Adoption the Technologies Led by Cyber-Physical Systems

"The aim of this article is to present an international literature review about the challenges of Industry 4.0 on manufacturing sector. The literature does not present yet a broad study for identifying the challenges in this sector. As result, was discovered that there is a gap in the literature in the identification of systems solutions, simulated and or applied in the real context, which meet the requirements of CPSs, due to the low level of maturity of this technology. Developing algorithms of CPS and the related technologies of Industry 4.0, beside meet the new production

reports

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2020 Advanced Manufacturing Report

"Learn how Canadian Manufacturers are responding to Industry 4.0"
Source: Plant.ca

SMART FACTORY

2019 Deloitte and MAPI Smart Factory Study

"Factories are not new to absorbing technologies. Since at least 1913, when Henry Ford's assembly line first started rolling,1 factories have ingested the latest technologies to manufacture products faster, better, and more cost-efficiently."
Source: Deloitte

Cybersecurity for smart factories

"The rise of digital technologies brings a new level of cyber complexity to factories. Does the manufacturing industry have adequate cybersecurity programs in place to prepare for these expanded risks?"
Source: Deloitte

consultants Bain & Company has warned."
Source: Leadersleague

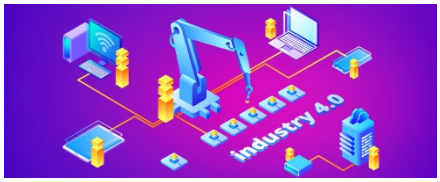
On-Demand Manufacturing Meets Pandemic Manufacturing Demand

"Headlines have been filled with news of the spread of a new strain of coronavirus throughout 2020. The strain, SARS-CoV-2, causes COVID-19, a vaccine for which will not be available for many months. With attention high and cases rising, coronavirus is top-of-mind for many, impacting not only personal safety measures but also business operations. The additive manufacturing (3-D printing) industry is among the sectors responding to the rising needs unique to life in the time of pandemic."
Source: Forbes

Four Types of Industrial Robots for Advanced Manufacturing

"When you hear the word "industrial robot" thrown around, you might think of robot arms welding cars as they travel down an assembly line, or a robotic cell quickly arranging computer chips. There are, of course, a wide variety of robot configurations to suit various manufacturing needs. While it would be impossible to discuss all of them in this article, here are a few robots that you may encounter in manufacturing, or perhaps implement to solve a problem yourself."
Source: Embedded Computing

INDUSTRIAL IOT



Conventional IIoT Making Way For IIoT 2.0

"Industry 4.0 or IIoT has attained magnanimous proportions in business considerations, particularly in the context of the industrial and manufacturing sectors. Coined almost a decade ago to mark the emergence of the fourth industrial revolution, Industry 4.0 is the combination of technologies and innovative trends that lays out the path to remodel the future. It is a framework that affects a transformation from isolated manufacturing activities to fully integrated product and data flows within global value chains."
Source: AIM

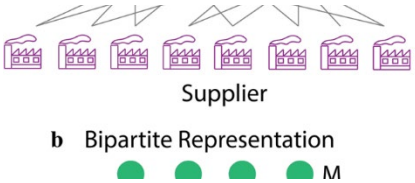
INDUSTRY 4.0

demand is the fundamental challenge in the search for a digital and efficient industry."
Source: International Journal of Performability Engineering

A General View of Industry 4.0 Revolution From Cybersecurity Perspective

"This paper aims to address which type of problems enterprises should handle against cyber-attacks and illustrate how governments take precaution and refer this issue at their policy documents in the era of industry 4.0. The digitalization of production has paved the way for an ever increasing existence of concepts such as Big Data, Cloud Computing, 3-D Printing, Augmented Reality, and Internet of Things in production."
Source: IJISAE

SMART FACTORIES

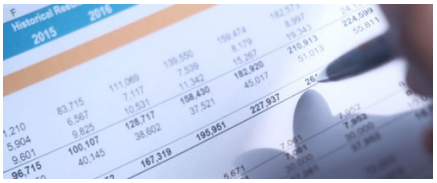


Applications of Artificial Intelligence Techniques to Enhance Sustainability of Industry 4.0: Design of an Artificial Neural Network Model as Dynamic Behavior Optimizer of Robotic Arms

"5G and network function virtualization (NFV) have the potential to make factory networks more flexible and scalable. For this purpose, we defined use cases in previous work and demonstrated them using emulation-based prototype deployments. In this paper, we extend our previous work and deploy our developed vertical-specific network services and cloud-native virtualized network functions (VNFs) in a physical NFV testbed that is located on the shop floor to analyze the potential of NFV in real-life environments. We use the 5GTANGO service platform to deploy them on Kubernetes. Both are running on top of OpenStack."
Source: IEEE

Putting NFV into Reality: Physical Smart Manufacturing Testbed

"This work has used 'Controllino mega' which is a controller to control the entire production as it has a cloud connectivity feature. It is an IoT Arduino compatible open source PLC device for industrial uses in automation and for controlling and monitoring. This will allow separate part of the production line to communicate to make the entire



Why data literacy is key to surviving Industry 4.0

"Data now informs all kinds of areas of the modern world, with the good use of it leading to better decision-making and more profitable businesses. Data literacy should therefore be treated as a crucial skill for pretty much everyone. That does not mean everyone needs to become a qualified data scientist. But for companies to successfully implement digital transformation initiatives, they must first focus on building a culture of data literacy within their company. Only by empowering data workers at all levels of the company, regardless of technical acumen, to become more data literate as well as improve their analytic knowledge, will companies succeed."
Source: Gigabit

Is Asia ready for 'Industry 4.0' revolution?

"Smart technologies such as artificial intelligence, it seems, are threatening to disrupt the longstanding "Asian growth model" that has fueled industrial development in digital technologies that may take away jobs - particularly routine tasks in the global production chain - as well as pump prime upgraded ones in the new era."
Source: China Daily

How The Internet Of Things Speeds Up Industry 4.0 Progress

"With the price of sensor technology dropping, manufacturers are designing and delivering more Internet of Things (IoT) enabled smart products and assets than ever before. As the technology moves its way further along the adoption curve, IoT hype is giving way to real-world IoT implementations. Today we are well past the proof of concept stage. The time for IoT is NOW."
Source: Forbes

manufacturing process easier to control and monitor in real time. In this work, a lot of new features and functionalities have been incorporated, which will change the way, a factory used to look and be."
Source: 2019 International Conference on Computational Intelligence and Knowledge Economy

Simulation of Factory 4.0: A Review

"This paper presents a systematic literature review of recent developments in modeling, simulation, and optimization of Smart Factories. It indicates the most frequent contexts, problems, methods, tools, related to simulation and optimization of smart factories. This paper fills this gap by identifying and analyzing research on simulation of smart factories."
Source: Global Joint Conference on Industrial Engineering and Its Application Areas

Indoor positioning-based mobile resource movement data management system for smart factory operations management

"The indoor positioning technologies enable to track the positions of physical objects in real time; however, they generate time series data for 3D coordinates of object position not suitable for practical use. Therefore, this article aims to integrate the indoor positioning technology with a specialized user application, which allows the users to define what kinds of data should be collected and how the raw data should be transformed."
Source: International Journal of Distributed Sensor Networks

Dynamic vs dedicated automation systems - a study in large structure assembly

"This paper compares the relative advantages of a dynamic, mobile robot-based system with traditional dedicated automation systems. The study uses simulations to evaluate several representative scenarios with different product supply bottlenecks, interference among mobile robots and mixes of products inspired by the aerospace industry. The results show that mobility enables higher resource utilisation and increased flexibility. This highlights the potential operational advantages mobile robot-based systems would offer and gives clear justification to continue the development of dynamic, self-organising production systems based on mobile robots."
Source: Production & Manufacturing Research

Internet of things technologies, digital servitization and business model innovation in BtoB manufacturing firms

"This paper – following a qualitative research method – aims at describing the service-oriented impact of IoT technologies on firms' business models, with a particular focus on opportunities and challenges for BtoB manufacturing firms."

Source: Industrial Marketing Management

MANUFACTURING

Operator 4.0 in manufacturing: trends, potential technologies and future perspectives

"While Industry 4.0 is characterized by greater automation, manual assembly systems continue to play an important role. A search was conducted in INSPEC and Compendex databases to uncover trends in research focused on human/worker in an Industry 4.0 context. In total 1469 relevant bibliographic references where obtained. The bibliographic dataset was analyzed using VOSviewer to create a map of terms. Results from this dataset show a significant change in the rate of scientific production in 2019 (23% Vs. 200%+). Three major communities of terms where identified and mean term occurrence calculated: technological infrastructure (148.7), worker performance (94.4), adoption and integration (72.8). Augmented reality and human-robot collaboration were the most studied technologies associated with workers in an Industry 4.0 context."

Source: Frühjahrskongress der Gesellschaft für Arbeitswissenschaft