IEEE Transactions on Industrial Informatics
CALL FOR PAPERS
for Special Section on
Digital Twinning: Integrating AI-ML and Big Data Analytics for Virtual Representation

Theme: Today we are in an era of integrating physic-based model and data driven model with AI/ML, and continuously update a real asset in operation of the existing model. Digital twin exactly does that, which is a virtual replica of physical product. It will be the innovation backbone of the future delivering virtual representation of real-world products, and systems. It is a physics-based representation of the product/system, capable of simulating its behavior and use in real-time. So the product/system can be tested in different environments and on the actual tasks that it's designed for. It allows us to understand how a product would perform before we have to build it. The digital twins can be inspected and modified when necessary, and stakeholders can get involved in the development process at an earlier stage. The rapid development iterations that the digital twin enables will results in fewer prototypes, reduced costs and faster lead-time. For example, digital twin of an electric car not only displays form, but also analyzes functions from the battery charge, to thermal condition in the motor and engine, to data from sensors and beyond. Digital twin continuously evolves throughout the life-cycle of the product/system with the flow data, user experience feedback and new input. This data also be used to develop the product further. This is greatly influencing development, production and operation in the era of industry 4.0 and beyond.

Today proliferation of IoT sensors, faster computing power, and capturing data locally has grown exponentially and is enabling the further development of integrated system model with the digitial Twin. The digital twin market is predicted to share over 90Billion dollars by 2025, this segmented based on application, manufacturing process planning, product design and both software/hardware. This technology shall be implemented in the developed countries where rapid adaptation of IoT enabled technology by medium and large-scale enterprises is already in place and by the advent of digital twin the operational performance will be improved. Being able to see it before we built it has been a long-time aspiration for the manufacturing industries. The technology of digital twin is now making this a reality. In development, a product's behavior can be simulated and tested long before a physical prototype has been built.

This special section solicits original research and practical contributions, which advance the digital twin computing architecture, technologies and applications. Surveys and state-of-the-art tutorials are also considered.

This special section will focus on (but not limited to) the following topics:

- Digital Twin Production/Manufacturing Process
- Digital Twin with Predictive Analytics
- Digital Twin – Health Care agent
- Digital Thread – Intelligent Transportation
- Digital-Twin-Assisted Deep Transfer Learning
- Digital Twin - Product Lifecycle Management.
- Digital Twin in Virtual Treatment/Surgery
- Digital Twin with AI/ML for Multimedia
- Digital Twin in Business and Educational Sector

Manuscript Preparation and Submission

Follow the guidelines in "Information for Authors" in the IEEE Transaction on Industrial Informatics http://www.ieee-ies.org/pubs/transactions-on-industrial-informatics . Please submit your manuscript in electronic form through Manuscript Central web site: https://mc.manuscriptcentral.com/tii . On the submitting page #1 in popup menu of manuscript type, select: SS on **Digital Twinning: Integrating AI-ML and Big Data Analytics for Virtual Representation**

Submissions to this Special Section must represent original material that has been neither submitted to, nor published in, any other journal. Regular manuscript length is 8 pages.

Note: The recommended papers for the section are subject to final approval by the Editor-in-Chief. Some papers may be published outside the special section, at the EIC discretion.

Timetable:

Deadline for manuscript submissions	**August 30, 2020**	
Expected publication date (tentative)	February 2021	

Guest Editors:

- Dr. Dr.Zhiwei Gao, Northumbria University, United Kingdom ZHIWEI.GAO@northumbria.ac.uk
- Dr. Dr.Anand Paul, Kyungpook National University, Korea, anand@knu.ac.kr
- Dr. Xiaokang Wang, St. Francis Xavier University, Canada xkwang@stfx.ca