IEEE Transactions on Industrial Informatics

CALL FOR PAPERS

for Special Section on

Transfer Learning for 5G-Aided Industrial Internet of Things

Theme: Internet of Things (IoT) has become the new development trend as it supports concept of "anything, anyone, anytime, anyplace" connectivity and control. In the last decade, the Industrial standards and infrastructures have substantially evolved particularly due the amalgamation of IoT paradigm with the Industrial units and equipment, referred to as Industrial IoT (IIoT). Sometimes, IIoT is also known as the "internet of really important stuff, the objects and machines that power our lives"; thereby, causing industries to leverage its advantages to build their businesses. However, the potential for the wide scale acceptance of the IIoT is limited by lack of automation, real-time monitoring, and connectedness. Furthermore, the connected IIoT infrastructures generate humongous amount of data that require real-time analysis and evaluations with heterogeneous characteristics in terms of size, velocity, modes, and velocity. Recent reports also predict that almost 50 billion IIoT devices will be deployed by the year 2020; generating unfathomable amount of data, almost 600 zettabytes/year. Nonetheless, the current communication technologies, i.e., 3G and 4G, fall short to provide seamless data rate, high reliability, wider coverage, and reduced latency. However, the future communication trend towards 5G is expected to bring greater benefits to IIoT infrastructures in terms of high-speed transmission and ultra-low latency. Additionally, the coupling of these latest trends will connect greater number of devices to the internet, escalate the remote monitoring capacity, and promote network slicing to a much greater extent. Furthermore, with the emerging techniques such as millimeter-wave (mmWave), massive multiple-input multiple-output (MIMO), and machine-to-machine (M2M) communications, the coupling of IIoT and 5G will advance profoundly. Despite these advantages, 5G-envisioned IIoT ecosystems are expected to face other potential concerns such as trust, security, and privacy. Apart from this, the challenges related to data storage and processing, and computational complexities will also draw significant attention. In order to address the aforementioned challenges and target greater business advantages, it's important to analyze data in real-time. In this direction, the transfer learning (TL) can be revolutionary breakthrough. TL allows to democratize the machine learning models and res-use the previously developed models in different scenarios. Model retraining not only simplifies the model development process but also reduces the need to evaluate large datasets and invest in high computations. Furthermore, TL fosters greater explorations and experimentations, leading to innovations and greater productivity. Thus, it would be correct to say that the gradual advances in the field of transfer learning and 5G networks will immensely boost the growth of IIoT in the near future. As a result, this special issue aims to bring the latest research ideas, findings, and innovation of leveraging the potential of TL in 5G-driven IIoT ecosystems. Particular emphasis is placed on novel techniques, concepts, state of the art solutions, algorithms, modelling, implementation experiments, and applications, which are not just the evolution of Industry 4.0 but also act as key drivers for the next generations of industrial automation.

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

- Advanced TL algorithms and models for industrial automation
- TL-based architectures, technologies, and frameworks for secure communication
- Results from experiments, testbeds, and simulations
- Energy-aware solutions for TL-powered industrial automation
- TL-powered resource optimization for 5G-Aided Industrial Internet of Things
- Edge intelligence and blockchain based on TL
- Use cases/applications highlighting the potential of TL in industrial automation
- Big data and learning fusion using TL
- Advanced TL architectures for smart transportation system
- TL-aided complex and large scale cloud systems.
- Emerging TL-based solutions for latency-aware IIoT applications
- TL-enabled service mitigation and mobility management in IIoT
- Design and development of TL-based solutions for mobile edge computing in IIoT
- Novel concepts and applications related to TL in industrial automation

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 **Transfer Learning for 5G-Aided Industrial Internet of Things**

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 **July 30, 2020**
Expected publication date (tentative) December 2020

Guest Editors:

- Dr. Kuljeet Kaur, École de technologie supérieure, Canada, kuljeet.kaur@ieee.org
- Prof. Song Guo, The Hong Kong Polytechnic University, Hong Kong song.guo@polyu.edu.hk
- Prof. Min Chen, Huazhong University of Science and Technology, China minchen2012@hust.edu.cn
- Dr. Danda B. Rawat, Howard University, Washington DC, USA danda.rawat@howard.edu