

AI-Driven Developments in 5G-Envisioned Industrial Automation: Big Data Perspective

Theme: With the recent advances in information and communication technologies, Industrial automation is expanding at a rapid pace. This transition is characterized by “Industry 4.0”, the fourth revolution in the field of manufacturing. Industry 4.0, also called as “IIoT” or “Smart Factories”, is a reflection of new industrial revolution that is not only interconnected, but also communicate, analyze, and use the information to create a more holistic and better connected ecosystem for the industries. Additionally, the automation induced by the coupling of IIoT with industries makes machines intelligent while rendering them capabilities to autonomously exchange information, trigger actions and operate remotely. However, in order to deliver a rich portfolio of services to the industrial sector, reliability and stability are needed for critical M2M communication, with short and stable latency times. As a result, industrial automation largely depends upon advanced mobile wireless connectivity to provide a more comprehensive, interlinked, and efficient approach to manufacturing. However, current cellular networks seem to fail in addressing the key requirements of industrial automation like augmented reality needs, process automation, monitoring and controlling a large density of IIoT devices, etc. Thus, the advent of 5G is expected to act as a global cornerstone for the demanding and diverse requirements of the “Factory of the future—Industry 4.0”. In order to deliver secure, dependable and seamless services to the automation pyramid like higher data rates, massive connectivity, ultra-low latency, high reliability, high mobility support, high-accuracy positioning, and most important availability, 5G supports three essential types of communication, i.e. URLLC, mMTC, and eMBB. As a result, ultra-low latency in combination with massive machine communications and intelligent analytics will enable the growth and transformation in smart factories while directly contributing to social and economic development. However, the involvement of a large number of sensors, mobile robots and autonomous machines is expediting the data that is captured and stored on dependable communication networks. This pervasive and exponentially increasing wireless data traffic is mainly characterized as “big data”. This information-intensive transformation is expected to leverage new possibilities in industries in order to revamp their operations and provide improved scalability, productivity, efficiency, and connectivity. However, achievement of these goals definitely require newer architecture designs and upgraded technologies that can make real-time decisions in an efficient manner. In order to cope with the increasing demands of next generation industrial automation and deliver some actionable insights, AI will likely perform a key enabling role in creating immense opportunities across industrial sectors. Integration of AI with IIoT would lead to the emergence of “connected intelligence” rather than mere “connected devices”. This amalgamation is expected to revolutionize smart business solutions including smart dust, smart drones, futuristic farming, smart aerospace, and smart energy networks. Thus, this special issue is intended to cordially invite researchers and practitioners to share their ideas, recent findings and research developments on consolidating AI for industrial informatics with a focus on 5G and big data. 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:

- New theories and applications of AI in industrial automation
- AI-powered algorithms, technologies, and architectures
- Results from experiments, testbeds, and simulations
- Advanced machine learning techniques and frameworks
- Design and development of autonomous systems
- Modelling and simulation of cyber-physical systems
- AI-enabled SDN architectures for IIoT
- Emerging cloud and edge based solutions
- Advanced data modelling methods for AI powered IIoT
- Mission-critical applications like smart grids, drones, autonomous vehicles, e-healthcare, futuristic farming, etc.
- Lightweight big data processing schemes
- Deep learning and federated learning
- Advanced security, privacy and authentication schemes
- Case studies with analysis and simulation
- Other concepts and services related to AI 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 **AI-Driven Developments in 5G-Envisioned Industrial Automation: Big Data Perspective**

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

May 31, 2019

Expected publication date (tentative)

October 2019

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