

CALL FOR PAPERS

Special Issue on Current Research Trend and Open Challenge for Industrial Internet-of-Things

The development of 5G communications has built a concrete foundation for industrial Internet-of-Things (IIoT). The ubiquitous connectivity, which includes a variety of industrial robots, sensors, and other facilities, potentially facilitates significant efficiency, productivity, and economic improvements for industry 4.0.

Traffics in IIoT can be typically classified into deterministic and non-deterministic manners. The non-deterministic traffic allows a small window of time jitter for operation completion, providing best-effort low latency communication for non-latency-critical missions, such as information involved in non-synchronized, non-critical ambient monitoring, software update, test report uploads, service charging and so on. On the other hand, the deterministic traffic (or termed as hard real-time) requires that the communication time taken is deterministic to an exact moment. In other words, the deterministic communication imposes low, consistent, and predictable latency requirement for data transmission between transceivers, under a strict jitter limit. The deterministic communication acts as a key enabler for providing time-sensitive and jitter-bounded applications, including but not limited to real-time operation monitoring, controller-to-actuator automation messages delivering, and haptic interaction in remote-control. These applications are deployed in use cases where failure to get data on time may lead to a total system failure.

Nevertheless, considering the massive-devices deployment, ubiquitous connectivity, heterogeneous traffics and quality-of-service requirements, complex and dynamic transmission environment in IIoT, there is a series open challenge to be addressed in IIoT. This special call aims to bring together world-renowned researchers to report their recent advances and portray future research directions, significantly prompting the research areas of IIoT communications. This special issue could have potential submission in the following topics:

- Information-theoretic foundation, algorithms, and systematic design of IIoT communications
- Integration of communication, sensing, positioning, computing, and control for IIoT
- Multidisciplinary designs among communications, automation control, computer vision, and industrial software
- Intelligent reflecting surfaces, antenna topologies and smart environments for IIoT

- Integration of IIoT communications with the state-of-the-art wireless technologies (e.g., short block-length, semantic communications, tactile control, grant-free access, and robot-to-robot communications)
- Machine learning aided IIoT communications
- Security, privacy, safety, and corresponding IIoT system design
- The interplay among time-deterministic design and other metrics, such as reliability, age-of-information, and scalability
- Experimental demonstrations and prototypes designs
- IIoT design with considerations of practical issues, such as power-hungry transceiver, and imperfect synchronization

Prospective authors should submit their manuscripts following the IEEE IoT-J guidelines at <https://iee-iotj.org/guidelines-for-authors/>. Authors should submit a PDF version of their complete manuscript through IEEE Manuscript Central, <http://mc.manuscriptcentral.com/iot>.

Important Dates

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