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Emerging Technologies in Tactile Internet and Backhaul/Fronthaul Networks

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IEEE JSAC Special Issue on Emerging Technologies in Tactile Internet and Backhaul/Fronthaul Networks

Scope

Mobile communications networks of today have successfully connected the vast majority of the global population. With this technological advancement, the stage is set for the emergence of two trends: (a) the **Tactile Internet**, in which ultra-reliable and ultra-responsive network connectivity will enable the real-time control and tactile experiences to remote users, and (b) smart **backhaul/fronthaul** designs that are integrated and flexible to support the demands of next-generation applications.

The Tactile Internet will underpin the internet of skills, which, in turn, will provide a true paradigm shift from content delivery to remote skill-set delivery, thereby introducing a broad range of novel use cases. Due to the challenging requirements of Tactile Internet applications, many parts of today's mobile communication systems may have to be radically redesigned, from the silicon level up with new codec design for physical remote interaction through PHY and MAC layer re-design to the overall network architecture and cloud computing solutions.

Future networks will evolve from today's separate and incompatible fronthaul and backhaul into an integrated flexible cross-haul network. The development of smart **backhaul/fronthaul** solutions for economical and ubiquitous networks will enable ultra-low latency, high data-rates and high reliability. Such integrated backhaul and fronthaul networks will meet the global information and communication requirements of future smart and resilient cities and provide ubiquitous connectivity. One of the main considerations the operators are faced with today is how to migrate existing backhaul/fronthaul networks toward an integrated and flexible smart backhauling/fronthauling infrastructure.

The purpose of this issue is to provide a synthesized source of recent research results and to serve as a springboard for future work in this two emerging areas: Tactile Internet and

Backhaul/Fronthaul. The possible topics include, but are not limited to:

Tactile internet

- Ultra-responsive network and cloud design solutions for Tactile Internet (e.g. context-aware computing, real-time control feedback, cloud-based mobile architectures, proactive resource management, intelligent, wireless edge)
- Mobile and network edge cloud computing, personal clouds & cloudlets
- Low-latency and high-reliability physical and MAC layer communication solutions (e.g., wireless waveform design, haptic codec design, resource allocation, framing, feedback mechanisms)
- Role of emerging technologies in the tactile internet (e.g., massive MIMO, mmWave, reinforcement/machine learning)
- Spectrum considerations
- Silicon and hardware designs to support Tactile Internet requirements
- Tactile Internet applications

Backhaul/fronthaul

- Requirements and limitations for backhaul/fronthaul communications and networking (data rate, scalability, latency, cost effectiveness, etc.)
- Emerging 5G technologies for smart backhaul/fronthaul solutions
- Spectrum management for backhaul/fronthaul communications and networking
- Backhaul/fronthaul deployment and spectrum policy issues

Submission Guideline

Only papers submitted that are in accordance with the general submission rules specified in the "Information for Authors" section of the JSAC guidelines (http://www.comsoc.org/jsac/author-information) will be considered (submissions not satisfying the requirements will be rejected immediately without review).

We are also looking for one broad tutorial paper in each of the two subareas in addition to the focused research papers per area addressing specific challenges. Therefore, two types of papers can be submitted:

- Normal paper of at maximum 8 pages IEEE double column style
- Tutorial paper of at maximum 10 pages IEEE double column style

For each category, up to two pages can be added with over-length charges of $220 per over-length page. Upon request, a paper can be made open access for an additional fee of $1750. All papers must be submitted through EDAS.

Schedule

- **Full paper submission deadline**: **April 1, 2018**
- Author notification: August 1, 2017
- Camera-ready version due: September 15, 2018
- Expected publication: November 2018

Guest Editors

- Besma Smida, University of Illinois at Chicago
- Meryem Simsek, Technische Universität Dresden
- Joseph Kang, Nokia Bell Labs
- Muhammad Ali Imran, University of Surrey
- John Smee, Qualcomm Research
- Joachim Sachs, Ericsson

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