DC6: Optimized Delivery of Tactile IoT Complex Haptic Sensations over Next-Generation Wireless Networks

Application deadline: 28-02-2023 | Date of enrolment: 1-9-2023

Project description

Tactile IoT is a disruptive concept that will allow people to interact over long distances with higher levels of immersion than the current audio/visual-based Internet. The sense of touch (i.e., both kinaesthetic and haptic sensations) is the most sophisticated of the five senses due to the complexity of the nervous system, and therefore its communication is necessary to provide realistic teleoperation of objects and machines. Tactile communications are extremely challenging since humans can distinguish very short delays when perceiving tactile interaction.

This research project will focus on the operator and network domains of the Tactile IoT. The doctoral candidate will integrate beyond state-of-the-art tactile devices with next-generation wireless networks (i.e., 5G advanced and beyond) to characterize the requirements and KPIs (e.g., data traffic and latency) of Tactile IoT, analyzing the impact on the QoS of varying application-level and network-level parameters. The configuration and optimization of applications and networks will target the development of high-fidelity tactile feedback to enable human-to-human and human-to-machine (i.e., teleoperation of robots) tactile interactions.

Different access networks available for Tactile IoT (e.g., 5G-URLLC) will be compared and benchmarked via PHY/MAC layer simulations, laboratory tests and field measurements. The doctoral candidate will also utilize the 5G network slicing and other core network functionalities to study the coexistence of URLLC with other types of traffic, enabling the design of end-to-end models that not only optimize the transmission of tactile sensations from different objects and situations, but also the rest of heterogeneous flows that will compose the Tactile IoT.

Eligibility Conditions

- **Telecommunications Engineer** (or equivalent)
- The candidates are eligible if they have not resided in Spain for more than 12 months within the past 36 months.

Required Skills

- Knowledge and understanding of **5G** networks, relevant 3GPP releases, as well as **IoT** communications (NB-IoT/LTE-M, 5G-mMTC).
- Experience in lab and/or field trials to **measure KPIs** of wireless communication networks, using network analysis tools.
- Basic understanding of **haptic communications and devices**
- Good **programming skills**.
- Fluent in **English**. Knowledge of **Spanish** is highly recommended but not required.
- **Teamwork** and **interpersona**l skills. Good **writing, communication** and **presentation** skills.

How to apply

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