DC4: Learning assisted control for haptic systems over 6G networks

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

Project description

"Immersive experience" and "Robots and autonomous systems" are pillars for the future 6G networks, and involve the transmission of high-quality video, and the combination of actual and virtual elements for the collaboration between robots and humans. Haptic controllers are essential in this context, and the 6G network should enable the transmission of the corresponding data, while the controlled system should be able to readapt to the network capabilities. Hence the motivation behind this PhD topic, on the interface between telecommunications and control domains.

The PhD will start by studying the impact of the network imperfections on the performance and optimizing the 6G network for haptic tasks. There are in general 3 data streams in haptics use cases: a) a video flow, carried in 5G/6G by the eMBB service, b) haptic data from sensors and c) the control input, both carried by the URLLC service. Quantifying the performance of the system and optimizing the radio resource allocation among the data flows will be the first direction of this PhD.

On the controller side, the task itself may have to be dynamically readapted for considering the imperfections on the wireless channel. An Artificial Intelligence will be developed, where the control actions are learned from data, while being fed by mathematical models to ensure their convergence and effectiveness.

Eligibility Conditions

- The candidate must hold a Master degree in telecommunications or control.
- The candidates are eligible if they have not resided in France for more than 12 months within the past 36 months.

Required Skills

- Strong mathematical background
- A previous experience in network controlled systems is a plus.
- Strong programming skills.
- Fluency in English, excellent communication skills.

How to apply

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Funded by the European Union

The TOAST project is funded by the European Union's Horizon Europe research and innovation programme (HORIZON-MSCA-2022-DN-01) under the Marie Skłodowska-Curie grant agreement No. 101073465.