Optimization Approaches for IoT-based Applications

Mots clés :
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- Unité de recherche: Laboratoire d'Informatique PAris DEscartes
- Ecole doctorale: École Doctorale Informatique, Télécommunications, Électronique de Paris
- Domaine scientifique principal: Sciences et technologies de l'information et de la communication

Résumé du projet de recherche (Langue 1)

The PhD candidate will investigate meaningful and promising IoT-based networking application scenarios, along with their interactions with the 5G technology and the Cloud, which are very tightly related to IoT. Therefore, the PhD student under the guidance of the supervisor will first identify a set of specific application scenarios and then she/he will design and evaluate paradigm-shifting mechanisms, developing a cross-layer (PHY, MAC and Networking layers) optimization framework that touches all the layers of the networking stack. Indeed, a thorough investigation of existing solutions and studies that have been conducted in the IoT area is required to make novel and relevant contributions. Among the main challenges that the student will face while exploring this research area are: ensuring efficient resource and spectrum management, guaranteeing a low interference between devices and low energy consumption, providing ubiquitous connectivity, low computation, efficient and secure storage, and communications, implementing intelligent routing solutions, to cite a few. The PhD student will use mathematical tools (i.e., Mixed Integer Linear Programming, Game and Auction Theory) as well as simulation tools and potentially a real testbed/platform (like the FIT IoT-Lab, https://www.iot-lab.info/) to develop new, energy-efficient, reliable, secure and lightweight models, protocols and architectures for IoT scenarios. At last, but not at least, the PhD student will evaluate the performance of the proposed models, protocols and architectures through extensive numerical simulations and real case studies.

Informations complémentaires (Langue 1)

Possible collaborations with the Advanced Network Technologies Laboratory (ANTLab) at Ecole Polytechnique de Milan, with the possibility of a joint supervision of the thesis, and the mobility of the doctoral student.