PhD subject : Interference mitigation in Massive IoT context

Laboratory : Cnam/CEDRIC/Laetitia

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Subject :

One of the major challenges of the fifth generation of mobile telephony will be its ability to connect tens of billions of objects and to integrate increased traffic on radio access networks in the future. There are currently excellent solutions that are very well suited for relatively low-throughput communications and for not-too-high connected object densities. In this regard we can cite the LTE-M, NB-IoT and LoRA standards. However, if we imagine more massive deployments of the Internet of Things (Massive IoT) with densities higher than one million high throughput connected objects per km², then the current solutions could reach their limits and we should see problems appear related to a sharp increase in radio interference levels. The typical case will be connected 4K cameras that will sporadically generate a high transmission rate. The proposed PhD subject is therefore to develop blind algorithms for cancelling interference in Massive IoT contexts and then to develop performance bounds in order to be able to determine the limit cases beyond which transmissions will no longer be possible. The work will include theoretical developments and numerical simulations (Matlab).

Key Words

Interference mitigation, cancellation and alignment solutions
Non-Orthogonal Multiple Access (NOMA, PD-NOMA, SC-NOMA)
Waveforms for Massive IoT
LTE-M, NBIoT,LoRA,Sigfox

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