Post-Doc Offer

Strong coordination and strategic communication in the finite-length regime

Since the next generation of wireless networks comprehends a unified network of connected objects, it is vital to ensure the *cooperation* and *coordination* of the constituent devices. While communication networks have traditionally been designed with the purpose of reliably conveying information, the devices can be viewed as autonomous decision makers which exploit communication as a way to enforce a prescribed behavior. In this scenario, the information transmission is affected by at least two kind of constraints. First, the encoder and the decoder of a given signal may have nonaligned incentives, in which case the encoder might be unwilling to transmit truthful information. Second, communication between agents is often imperfect, the encoder signal is degraded by ambient noise.

By building on recent advances in Information Theory on strong coordination in [1], on finite-length regime [2], and in Game Theory on strategic communication in [3], we will develop a general framework for the strong coordination of the actions of strategic agents in the finite-lenght regime. New characterization of information-theoretic bounds are expected, by using the techniques employed in [4], where the fixed-length regime will be tackled following the approach of [5, 6].

This Post-Doc will take place at IRISA UMR 6074 in ERMINE team, Campus de Beaulieu, 263 Boulevard du Général Leclerc, 35000 Rennes, France, with regular scientific visits at IMT Nord-Europe, via Guglielmo Marconi, 59650 Villeneuve-d'Ascq (Lille), France, and with possibly scientific visits to Georgia Tech Atlanta and KTH Stockholm.

Applicants should have a strong background in mathematics, either in the theoretical aspects of telecommunications, or in game theory. Applicants must have a PhD degree. A good and working knowledge of the English Language is required.

How to apply:
Interested candidates have to send their detailed CV, academic records (from Bsc to PhD level), at least two academic referees and a short motivation letter via email to the contacts below.

References

[1] G. Cervia, L. Luzzi, M. Le Treust, and M. R. Bloch, "Strong coordination of signals and actions over noisy channels with two-sided state information," *IEEE Transactions on Information Theory*, vol. 66, no. 8, pp. 4681–4708, 2020.

[2] G. Cervia, T. Oechtering, and M. Skoglund, "(ϵ, n) fixed-length strong coordination capacity," in *Proc. of IEEE Information Theory Workshop (ITW)*, 2021.

[3] M. Le Treust and T. Tomala, "Persuasion with limited communication capacity," *Journal of Economic Theory*, vol. 184, p. 104940, 2019.

[4] M. H. Yassaee, M. R. Aref, and A. Gohari, "Achievability Proof via Output Statistics of Random Binning," *IEEE Trans. Inf. Theory*, vol. 60, no. 11, pp. 6760–6786, Nov. 2014.

[5] Y. Polyanskiy, H. V. Poor, and S. Verdú, "Channel coding rate in the finite blocklength regime," *IEEE Transactions on Information Theory*, vol. 56, no. 5, p. 2307, 2010.

[6] V. Kostina and S. Verdú, "Lossy joint source-channel coding in the finite blocklength regime," *IEEE Transactions on Information Theory*, vol. 59, no. 5, pp. 2545–2575, 2013.

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