The Markov Random Geometric Graph: A growth model for temporal dynamic networks

Quentin Duchemin[*1] and Yohann De Castro[2]

[1]Université Gustave Eiffel – Ministère de l'Enseignement Supérieur et de la Recherche Scientifique – France
[2]École Centrale de Lyon – Ministère de l'Enseignement Supérieur et de la Recherche Scientifique – France

Résumé

We introduce Markov Random Geometric Graphs (MRGGs), a growth model for temporal dynamic networks. It is based on a Markovian latent space dynamic: consecutive latent points are sampled on the Euclidean Sphere using an unknown Markov kernel; and two nodes are connected with a probability depending on a unknown function of their latent geodesic distance. We provide theoretical guarantees for the non-parametric estimation of the Markov kernel and the connection function. Proofs encompass concentration inequalities for random matrices and a recent concentration inequality for U-statistics of order 2 in a dependent framework. As a by product, we propose heuristics to solve link prediction tasks.

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[*]Intervenant