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Scatter Dimension and FPT Approximation Algorithms for Clustering

In this talk, I will introduce you to a novel and intrinsic characteristic of metric spaces that we have dubbed 'scatter dimension'. This notion has applications in designing approximation algorithms for clustering problems that run in parameterized time, i.e., those algorithms that are allowed to run super-polynomially in certain parameters of the given problem, often referred to as FPT approximations. The talk will be based on our recent work [Abbasi et al., FOCS 2023], in which we provide tight FPT approximation algorithms for a general class of clustering problems, known as General Norm k -Clustering, for a wide range of metric spaces. We achieve this by i) linking the running time of the algorithm to the scatter dimension of the metric class, and ii) showing appropriate upper bounds on the scatter dimension of such metrics. At the end, I will also mention open problems and directions for future research.