Node embedding based on the inherent modular structure of hyperbolic networks

Talk by Sámuel Balogh

Consistently, a foundational goal of network theory has always been the exploration of models that adeptly capture the inherent characteristics of real-world networks. The success of hyperbolic network models, such as the PSO (popularity-similarity optimization) model, can be attributed to their ability to simultaneously and naturally capture many universal features of real-world networks, including e.g. sparsity, scale-free property or high-clustering coefficient.

Recent numerical studies have also revealed that hyperbolic network models generate highly modular structures, which is somewhat surprising given the lack of explicit community formation steps in their model definitions. The present talk introduces analytical results highlighting the extremely modular nature of PSO networks, with a particular focus on their modularity. Additionally, I will introduce and thoroughly discuss a novel hyperbolic node embedding algorithm. This algorithm leverages the interplay between community structure and embeddings, utilizing advanced methods from computer science.