

Dimension reduction techniques for embedding networks into the hyperbolic

Talk by Bianka Kovács

Arranging the nodes of a network in the hyperbolic space has become a common practice to obtain expressive low-dimensional representations of the network structure. Hyperbolic embeddings reflect small topological distances and high connection probabilities as small hyperbolic distances between the nodes, and are also able to grasp the community structure of a network through the angular arrangement of the nodes. A natural idea for finding an optimal hyperbolic arrangement of a network is to optimize the likelihood of the embedding according to a given hyperbolic network generation model. However, another possibility is given by the application of dimension reduction techniques to matrices that represent the network topology e.g. based on the shortest path lengths measured along the links. This talk will present some of such model-independent hyperbolic embedding methods, in which the number of dimensions of the embedding space is a freely tunable parameter, which can be crucial e.g. from the viewpoint of community detection, as it will be demonstrated through a new, iterative embedding process. The applicability of the considered embedding algorithms for networks having directed links will be also discussed.