

ELRUNA: Elimination Rule-based Network Alignment

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Abstract: One of the most essential graph mining tasks is to align two or more networks to infer the similarities between cross-network vertices and discover potential node-level correspondence. In this presentation, we introduce the novel network alignment algorithm: ELRUNA (Elimination rule-based network alignment). Under the guidance of the elimination rules that we defined, ELRUNA computes the similarity between a pair of cross-network vertices iteratively by accumulating the similarities between their selected neighbors. The resulting cross-network similarity matrix is then used to infer a permutation matrix that encodes the final alignment of cross-network vertices. In addition to ELRUNA, we also present a novel selection method RAWSEM (Random walk based selection method) that improves the performance of local search, a commonly used post-processing step for solving the network alignment problem. Through extensive numerical experiments on real networks, we demonstrate that ELRUNA significantly outperforms the state-of-the-art alignment methods in terms of alignment accuracy under lower or comparable running time. Moreover, ELRUNA is robust to network perturbations such that it can maintain a close to optimal objective value under a high level of noise added to the original networks. Finally, the proposed RAWSEM can further improve the alignment quality with a less number of iterations compared with the naive local search method.

Talk will take place from 1:00PM - 2:00PM through Zoom (invitation will be emailed to everyone soon).