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Inference for Exponential-Family Random Graph Models based on Egocentrically-Sampled Data

Egocentric sampling comprises observation of a network of interest from the point of view of a set of sampled actors (egos), who provide information about themselves and their network relations (alters), but who often cannot disambiguate them. It is the only practical way to observe certain classes of networks, such as those of sexual partnerships. Although methods exist for recovering network features from such data, a unifying framework, such as exponential-family random graph (ERG) modelling, is lacking, and, so far, approaches to fitting ERGMs to such data have lacked a rigorous statistical foundation in general and measures of uncertainty in particular. In this work, we identify a subclass of ERGMs amenable to being estimated from such data, develop techniques for doing so, and introduce a technique for rigorously evaluating the uncertainty (i.e., standard errors) of these estimates. For ERGMs parametrised to be invariant to network size, we also describe a computationally tractable approach for fitting these networks. We demonstrate these techniques through a simulation study and apply them to the 1992 National Health and Social Life Survey (NHSLS) data.

Bio:

Pavel Krivitsky is a Lecturer in Statistics at the School of Mathematics and Applied Statistics (SMAS) and National Institute for Applied Statistics Research Australia (NIASRA) at the University of Wollongong. He received his Ph.D. in Statistics from University of Washington in 2009 and worked as a Visiting Research Scientist and a Research Associate at Carnegie Mellon University and Penn State University before moving to Wollongong in July of 2013.