

# Finding Cliques in Ant Networks (or Twitter)

Isolating Behavioral Clusters Through an Unsupervised Two Stage Network Segmentation

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Ants have had incredible ecological success in part due to their efficient organization of work, a feat achieved by having flexible task allocation networks. These decentralized networks rely on individual workers making crucial decisions without complete knowledge of the colony overall. Research has been done on the idea that task participation can be one way that workers share information locally to organize themselves for the colony, i.e. what task an ant is doing may change its behavior in ways that increase/decrease the amount of communication other tasks. This model relies on an assumption that the finest layer of this in/out group dynamic is indeed task participation. We hypothesize that this may be too much of an a priori distinction and present a novel manner in which to discern proper behavioral clusters of ecological networks based on a "friends of friends" approach. In our two stage network segmentation, we cluster on communication links between a population of nodes and their mutual connections and then perform a feature selection on each cluster to find the most representative members, those who are most similar to every member of their group. To illustrate our algorithm, we utilize Twitter as a data-rich surrogate for an ecological setting and perform a network segmentation on a single user. In this setting, we use followership in place of communication links and "friends of friends" of the account to establish the network. Thus, with the feature selection, we are able to parse out distinct groups with unique behavioral patterns.