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Bayesian Inference for Rapid Social Networking Analysis.

One approach to social network analysis models the network as a weighted graph, $G=(V,E)$ with weights on either the vertices, the edges, or both. In a terrorist network there are levels of trust and complex relationships involving family ties, shared history, and natural abilities of the members that cannot be reduced to a single number. E.g., a cell leader may trust one member to carry packages but not information, another may be trusted with money; some may be allowed more information than others because of kinship ties; or assigned specific tasks because of abilities. All of these data are gathered as evidence with some uncertainty since any evidence is potentially false. Synthesizing data into useful details about how each relationship works is a complex task. In this talk we show how Bayesian networks are applied to making knowledge inferences about uncertain data. We show how they can infer the answers to a variety of questions about what is true about each node or relationship and to give a confidence score for the answer automatically. This versatility is essential to understand how relationships work at a fundamental level. (Received September 22, 2010)