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Merging Appeal to Ignorance, Composition, and Division Argument Schemes with Bayesian Networks

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Abstract : The argument scheme approach to argumentation has two components. One is to identify the recurrent patterns of inferences used in everyday discourse. The second is to devise critical questions to evaluate the inferences in these patterns. Although this approach is intuitive and contains many insightful ideas, it has been noted to be not free of problems. One is that due to its disavowing the probability calculus, it cannot give the exact strength of an inference. In order to tackle this problem, thereby paving the way to a more complete normative account of argument strength, it has been proposed, the most promising way is to combine the scheme-based approach with Bayesian networks (BNs). This paper pursues this line of thought, attempting to combine three common schemes, Appeal to Ignorance, Composition, and Division, with BNs. In the first part, it is argued that most (if not all) formulations of the critical questions corresponding to these schemes in the current argumentation literature are incomplete and not very informative. To remedy these flaws, more thorough and precise formulations of these questions are provided. In the second part, how to use graphical idioms (e.g. measurement and synthesis idioms) to translate the schemes as well as their corresponding critical questions to graphical structure of BNs, and how to define probability tables of the nodes using functions of various sorts are shown. In the final part, it is argued that many misuses of these schemes, traditionally called fallacies with the same names as the schemes, can indeed be adequately accounted for by the BN models proposed in this paper.

Keywords : appeal to ignorance, argument schemes, Bayesian networks, composition, division
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