



Abstract for Presentation

Title:	Crime Scenarios in a Bayesian Network: Modeling Forensic Evidence with Narrative		
Authors: (underline presenting author)	<u>Charlotte S. Vlek</u> , Henry Prakken, Silja Renooij, Bart Verheij		
Affiliations:	Institute of Artificial Intelligence, Rijksuniversiteit Groningen (C.S. Vlek and B. Verheij) Department of Information and Computing Sciences, Utrecht University (H. Prakken and S. Renooij) Faculty of Law, University of Groningen (H. Prakken) CodeX, Stanford University (B. Verheij)		
Abstract: (300-400 words)	<p>When a criminal trial requires reasoning with a combination of evidence, Bayesian networks are considered a good tool to work with combined probabilities. However, a judge or jury is more inclined to think in terms of arguments or scenarios rather than probabilities. An approach that combines narrative and probability can form the basis for a better communication between a judge or jury and a forensic expert.</p> <p>In this talk we present a method for building Bayesian networks on the basis of narrative. We apply our method to the Dutch case of the Anjum murders, with a resulting model showing that an alternative scenario was perhaps more probable than the conclusion of the court case. Our method aims to combine the best of two worlds: while Bayesian networks enable a solid formalization of the details of the case, scenarios serve as a coherent account of what may have happened, thereby providing the context needed for finding relevant variables for the network.</p> <p>Inspired upon work by Fenton, Neil and Lagnado [Fenton et al., 2013], who developed legal idioms as building blocks for the construction of a legal Bayesian network, we propose four narrative idioms. These narrative idioms capture the narrative concepts of a scenario, a subscenario, small variations within a scenario and the combination of multiple scenarios in a case. For the construction of a Bayesian network we use these narrative idioms as building blocks, and employ the property of narrative that it can be told at various levels of detail. By slowly unfolding a scenario into more detail, a Bayesian network structure is built incrementally. This results in a modular structure in which the various scenarios and subscenarios are clearly visible and</p>		

	<p>in which the probabilities of scenarios can be compared.</p> <p>By modeling the Anjum case, we illustrate some strengths and weaknesses of our method. Finally, our model of the Anjum case allows us to draw the conclusion that an alternative scenario was perhaps more probable. Rather than the scenario that sounds most obvious and for which Marjan van der E. was convicted in court, an accomplice cooperating with the investigation to keep suspicion from himself is, in this model, the more probable explanation of the combination of all evidence.</p>
<p>References:</p>	<p>N. Fenton, M. Neil, and D. Lagnado, "A general structure for legal arguments using Bayesian networks," <i>Cognitive Science</i>, vol. 37, p. 61-102, 2013.</p>