

## Bayesian Networks for the Analysis of Evidence

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### Abstract:

Bayesian networks are an alternative to Wigmore charts for the structuring and display of complex inter-relationships between items of evidence in a legal case. The two technologies have many similarities but also many differences, especially in the way in which the flow of information is represented.

An important consideration is the multi-layered nature of a complex case, which will typically involve direct evidence, ancillary evidence, evidence about ancillary evidence... all of a number of different kinds. If all these features are represented in one diagram, the result can be messy and hard to interpret. In addition there are recurrent features and patterns of evidence and evidential relations, e.g. credibility processes or match identification (DNA, eyewitness evidence,...) that may appear at many different places within the same network, or within several networks, and it is wasteful to model these all individually.

The recently introduced technology of "object-oriented Bayesian networks" provides a way of dealing with these problems. Any network can itself contain instances of other networks, the details of which can be hidden from view until information on their detailed structure is desired. Moreover, generic networks to represent recurrent patterns of evidence can be constructed once and for all, and copied or edited for re-use as needed.

The capabilities of OOBNs will be illustrated in the context of the celebrated Sacco and Vanzetti murder case.