Rethinking legal probabilism

Rafał Urbaniak

Contents

1 Scientific goal

define lega probabilism talk about piecemeal evaluation vs incorpo tion?

say sth abo replicabil- ity crisis in forensic sciences at some point

As many miscarriages of justice indicate, scientific evidence is easily misinterpreted in court. This happens partially due to miscommunication between the parties involved, but also because incorporating scientific evidence in the context of a whole case can be really hard.

While probabilistic tools for piecemeal evaluation of scientific evidence in legal contexts are quite well developed,the construction of a more general probabilistic model of incorporating such evidence in a wider context of a whole case, and probabilistic explication of legal decision standards, remain a challenge. Methods are needed to support proper assessment of evidence in such contexts. This project intends to contribute to further developments on such methods in a philosophically motivated manner.

The assessment of evidence in the court of law can be viewed from at least three perspectives: as an interplay of arguments, as an assessment of probabilities involved, or as an interaction of competing narrations. Each perspective presents an account of legal reasoning (Di Bello & Verheij, 2018; van Eemeren & Verheij, 2017). Individually, each of these strains has been investigated. The probablistic approach is the most developed one, but a probabilistic approach to the incorporation of scientific evidence in the context of a whole case is still underdeveloped. This is partially so in light of various lines of criticism developed by the representatives of the other strains, as such challenges have not been satisfactorily adressed by the proponents of legal probablism.

The **goal of this project** is to contribute to the **development of legal probabilism** by formulating its variant that accomodates important **insights provided by its critics**. A crucial point of criticism is that the fact-finding process should be conceptualized as **a competition of narrations**. I plan to develop methods that allow the probabilist to take this perspective, and explain how such methods allow the legal probabilist to address various other objections present in the literature. The key idea is that once **narrations are represented as bayesian networks, various criteria on, features of and operations on narrations can be explicated in terms of corresponding properties of and operations on bayesian networks**. The conceptual developments are accompanied by technical accounts. **R** code capturing to the technical features developed is made available to the reader. Thus, the output will be a **unifying extended probabilistic model embracing key aspects of the narrative and argumentative approaches, susceptible to AI implementation.** The methods employed include: Bayesian statistical methods (including Bayesian approach to higher-order probability), imprecise probabilities and Bayesian networks.

2 Significance

(state of the art, justification for tackling a specific scientific problem, justification for the pioneering nature of the project, the impact of the project results on the development of the research field and scientific discipline);

2.1 State of the art

From among the three perspectives mentioned in the beginning, I focus on the probablistic approach and take it as my point of departure, for various reasons:

- The project is to be informed by and reflect on the actual practice of legal evidence evaluation, and much of scientific evidence in such contexts has probabilistic form.
- Probabilistic tools are fairly well-developed both for applications and within formal epistemology, reaching a state of fruition which I think should inspire deeper reflection.
- Statistical computing tools for such methods are avaialable, which makes programming development and preliminary evaluation of the ideas to be defended a viable enterprise.

One important difficulty is that there are various thought experiments in which the probability of guilt is very high and yet conviciton or finding of liability is intuitively unjustified—these are known as proof paradoxes (Cohen, 1977; Redmayne, 2008).

Add an example

At least *prima facie*, then, it seems that some conditions other than high posterior probability of liability have to be satisfied for the decision to penalize (or find liable) to be justified. Accordingly, various informal notions have been claimed to be essential for a proper explication of judiciary decision standards (Haack, 2014; Wells, 1992). For instance, evidence is claimed to be insufficient for conviction if it is not *sensitive* to the issue at hand: if it remained the same even if the accused was innocent (Enoch & Fisher, 2015). Or, to look at another approach, evidence is claimed to be insufficient for conviction if it doesn't *normically support* it: if—given the same evidence—no explanation would be needed even if the accused was innocent (Smith, 2017). A legal probabilist needs either to show that these notions are unnecessary or inadequate for the purpose at hand, or to indicate how they can be explicated in probabilistic terms.

describe w the proba- bilistic mo is before w get deeper

Another point of criticism of the wider proabilist model, legal proceedings are back-and-forth between opposing parties in which cross-examination is of crucial importance, reasoning goes not only evidence-to-hypothesis, but also hypotheses-to-evidence [Wells (1992); allen2007problematic] in a way that seems analogous to inference to the best explanation (Dant, 1988), which notoriously is claimed to not be susceptible to probabilistic analysis (Lipton, 2004). An informal philosophical account inspired by such considerations—The **No Plausible Alternative Story (NPAS)** theory (Allen, 2010)—is that the courtroom is a confrontation of competing narrations (Ho, 2008; Wagenaar, Van Koppen, & Crombag, 1993) offered by the sides, and the narrative to be selected should be the most plausible one. The view is conceptually plausible (Di Bello, 2013), and finds support in psychological evidence (Pennington & Hastie, 1991, 1992).

It would be a great advantage of legal probabilism if it could to model phenomena captured by the narrative approach, but how is the legal probabilist to make sense of them? From her perspective, the key disadvantage of NPAS is that it abandons the rich toolbox of probabilistic methods and takes the key notion of plausibility to be a primitive notion which should be understood only intuitively.

Initial philosophical analysis of the approach has been performed, (Di Bello, 2013) pioneering a probabilistic understanding of narrations.

add more about Mar- cello

2.2 Choice of problem

2.3 Pioneering nature & impact

3 Concept and work plan

(general work plan, specific research goals, results of preliminary research, risk analysis);

4 Research methodology

(underlying scientific methodology, methods, techniques and research tools, methods of results analysis, equipment and devices to be used in research);

References

Allen, R. J. (2010). No plausible alternative to a plausible story of guilt as the rule of decision in criminal cases. In J. Cruz & L. Laudan (Eds.), *Prueba y esandares de prueba en el derecho*. Instituto de Investigaciones Filosoficas-UNAM.

Cohen, J. (1977). *The probable and the provable*. Oxford University Press.

Dant, M. (1988). Gambling on the truth: The use of purely statistical evidence as a basis for civil liability. *Columbia Journal of Law and Social Problems*, *22*, 31–70. HeinOnline.

Di Bello, M. (2013). *Statistics and probability in criminal trials* (PhD thesis). University of Stanford.

Di Bello, M., & Verheij, B. (2018). Evidential reasoning. In *Handbook of legal reasoning and argumentation* (pp. 447–493). Springer.

Enoch, D., & Fisher, T. (2015). Sense and sensitivity: Epistemic and instrumental approaches to statistical evidence. *Stan. L. Rev.*, *67*, 557–611. HeinOnline.

Haack, S. (2014). Legal probabilism: An epistemological dissent. In *Haack2014-HAAEMS* (pp. 47–77).

Ho, H. L. (2008). *A philosophy of evidence law: Justice in the search for truth*. Oxford University Press.

Lipton, P. (2004). *Inference to the best explanation*. Routledge/Taylor; Francis Group.

Pennington, N., & Hastie, R. (1991). A cognitive theory of juror decision making: The story model. *Cardozo Law Review*, *13*, 519–557. HeinOnline.

Pennington, N., & Hastie, R. (1992). Explaining the evidence: Tests of the story model for juror decision making. *Journal of personality and social psychology*, *62*(2), 189–204. American Psychological Association.

Redmayne, M. (2008). Exploring the proof paradoxes. *Legal Theory*, *14*(4), 281–309. Cambridge University Press.

Smith, M. (2017). When does evidence suffice for conviction? *Mind*.

van Eemeren, F., & Verheij, B. (2017). Argumentation theory in formal and computational perspective. *IFCoLog Journal of Logics and Their Applications*, *4*(8), 2099–2181.

Wagenaar, W., Van Koppen, P., & Crombag, H. (1993). *Anchored narratives: The psychology of criminal evidence.* St Martin's Press.

Wells, G. (1992). Naked statistical evidence of liability: Is subjective probability enough? *Journal of Personality and Social Psychology*, *62*(5), 739–752. American Psychological Association.