

Comment on
Lowrance’s “Graphical manipulation of evidence in structured arguments”

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Lowrance’s use of template-based structured argumentation and a collaborative tool in which graphical depictions convey lines of reasoning from evidence to conclusions has real potential for supporting legal tasks such as complaint-drafting, especially if the tool were extended in various ways.

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John Lowrance’s paper, “Graphical manipulation of evidence in structured arguments”, is a thought-provoking demonstration of the potential for using template-based structured argumentation and the collaborative software tool, Structured Evidential Argumentation System (SEAS), in a legal context. According to Lowrance, “structured arguments are based on a hierarchy of questions (a tree) that is used to assess a situation. This hierarchy of questions is called the argument’s template (as opposed to the argument, which answers the questions posed by a template).”

Reading a pre-conference draft of the paper led me to consider how this kind of tool might help litigators prepare for trial. Perhaps the Conference’s location in lower Manhattan and the paper’s example of helping analysts assess threats of terror made me think of my earlier days as a litigation associate at White & Case, then located at 14 Wall Street, New York City. In those days, long before September 11, 2001, the only thoughts of terror on my mind were the queasy feelings in the pit of my stomach whenever I responded to a partner’s summons to come into his office because he had a new matter to discuss.

On one occasion, it concerned a new lawsuit the firm was planning to bring on behalf of a long-time client. The partner had already discussed the client’s contentions with its in-house counsel who had already collected a store of documents and electronic files concerning the commercial dispute. The problem involved allegedly defective machinery whose breakdown at sea caused economic loss of a vessel. My assignment was to prepare a complaint in consultation with the partner. He shared his views of the various potential claims at stake: breach of contract, product liability, negligence, even fraud. But there were also defenses, for example, a limited warranty whose terms would preclude recovering for loss of profits.

And thus, the partner launched me on my task of preparing a complaint. Naturally, I had all of the resources of a large law firm’s legal library and computerized research facilities at my disposal as I set out to address four important questions in preparing a complaint:

1. What legal claims were available, and what were the likely defenses and counterclaims?
2. What were the legal tests for deciding the available claims, the likely defenses and counterclaims?
3. What evidentiary conclusions (i.e., facts) were needed to support the client’s positions regarding those tests?
4. What documentary support was there or would there likely be for establishing the evidentiary conclusions?

In reflecting on this typical litigation task in light of the Lowrance paper, it was readily apparent that SEAS has tremendous potential in helping litigators organize the answers to these questions. Not only would it assist litigators’ own thinking but also organize the materials for the benefit of their collaborators both within and outside the firm. If anything, that potential is even more apparent in Figure 8, “A depiction of a claim and affirmative defenses from legal rules to evidence”, in the excellent new Section 6, “Relevance to legal reasoning” of the latest (post-conference) version of the paper. The figure demonstrates two structured arguments (i.e., “unidimensional templates”) concerning a claim of negligence and an affirmative defense of waiver. The nodes in the structured argument templates correspond to the legal rules defining the claim or defense in terms of various elements, the facts associated with each of the elements,

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and the multiple pieces of evidence that support or detract from showing each fact. The figure demonstrates color techniques for representing whether pieces of evidence support or detract from intermediate conclusions and fusion techniques for combining support and promulgating it up through the unidimensional template to show the extent to which the claim, affirmative defense, and other defenses such as contributory negligence are satisfied. It even brings the unidimensional templates together into a “multidimensional template” that “would capture” all of the rules of law that are (potentially) at play with respect to a given claim” and how they interact.

From the viewpoint of preparing a complaint, this depiction of template-based structured argumentation is appealing, especially given the complexities of the task that quickly become apparent in even a moderately complex matter. As one pursues answers to the four complaint-drafting questions listed above, new questions arise. In answering question 1, it often happens that one could plausibly pursue multiple claims and multiple theories of each claim. Each claim and theory may involve a different characterization of the evidence, a different “narrative” about how the actions of ones client were reasonable, and those of ones opponent unreasonable, in light of the purposes and policies of the law underlying the claim or theory. In addressing question 2, it may occur that there are multiple alternative versions of the legal tests for deciding the available claims and defenses; they may have somewhat different elements or logical connections among elements. The variations may reflect differences in the law of different jurisdictions, different majority and minority rules across jurisdictions, different formulations of the law in the applicable precedents, or unstated conditions that nevertheless bear upon the applicability of a given legal rule, for example, that the rule not be unconstitutional or preempted and that it not contradict fundamental legal principles. In evaluating the evidentiary conclusions needed to meet the requirements of these tests, the litigator soon perceives that there may be multiple relationships among pieces of evidence, tests, and claims, and that particular pieces of evidence may compete with or undercut each other, or strengthen a conclusion for one claim, test, or element while weakening another.

Considering the complexities of the task of preparing a complaint leads to a list of seven criteria that a tool such as SEAS should satisfy if it is to be more helpful for litigators. The tool should:

1. Support multiple argument templates corresponding to claims and defenses, their associated tests and alternative versions of tests.
2. Support integrating case precedents into the argument templates.
3. Use argument templates that are more general graphs instead of trees.
4. Show positive and negative influences of pieces of evidence across and within claims. The influences should reflect both legal support and the effect on narrative plausibility.
5. Make inference and fusion methods more explicit.
6. Help attorneys pose and assess alternative hypotheses.
7. Support visualizing the effect of changes in plausibility of some theories and hypotheses over others.

From a closer inspection of Figure 8 in the Lowrance paper, the SEAS tool seems clearly to satisfy a number of these requirements. Consistently with no. 1, we see multiple argument templates corresponding to a negligence claim and affirmative defenses of waiver and contributory negligence. One could imagine that a set of facts that give rise to a negligence claim may also give rise to related claims, such as product liability, breach of contract or fraud, and their respective defenses. As one investigates the requirements of a claim or defense, one may discover alternative formulations. For instance, the defense of contributory negligence is treated differently in different jurisdictions, which may impose a rule of comparative negligence reducing liability for negligence rather than eliminating it.¹ Depending on the choice of law issues, the SEAS tool might have to support multiple versions of a claim until it can be determined which state’s laws will be applied.

¹ For an example of an expert system for estimating the settlement value of product liability claims that supports multiple versions of the contributory negligence rule and the definition of strict liability, see (D. A. Waterman and M. Peterson. Models of Legal Decisionmaking. Technical Report R-2717-1CJ. pp. v-xii, 30-34, Appendix A. Rand Corporation. Santa Monica, CA. 1981) and the diagrams presented there.

Thus, one might expect to see even more argument templates as additional claims and versions of claims are supported and filled out by users investigating the documents. Given its modular nature, SEAS could probably support showing where two versions of, say, a product liability claim diverge in different branches; requirements they share would be shown in a single portion of the template at the intersection of the versions.

That different precedent cases may employ different versions of claims and tests suggests that a SEAS tool for the legal domain should do more to support attorneys' need to annotate their arguments with cases that support or detract from their conclusions. Neither Figure 8 nor the accompanying text mentions precedents, nor is it entirely clear where case annotations should be incorporated into the structured arguments, but it seems important that they be incorporated somewhere. In researching the law to prepare a complaint, a litigator will discover precedents that justify the legal reasonableness of his formulations of the complaint as well as precedents inconsistent with those formulations. It is important that he communicate the existence of these cases to the partner and other collaborators; indeed, a focal point of their discussions will be the cases' implications for the success of the claims given the laws' underlying purposes, and how to analogize the favorable cases and distinguish the unfavorable ones.²

As associates connect evidentiary documents and facts to the trees, they may well discover that a document supports one claim or defense but not another, or that it even contradicts another claim or defense. It is particularly important that these potential conflicts be flagged so that when new staffers start using the templates they are made aware of this complexity in the overall argument. For this reason, the SEAS tools should support showing positive and negative influences of pieces of evidence and facts across and within claims. In order to better reflect this aspect of complaint-drafting for a complex scenario, the SEAS argument templates should probably use more general kinds of graphs rather than trees for which a node representing evidence or facts can have only one parent. Graphs can be used to represent that a particular piece of evidence can be relevant to more than one fact, or a fact can be relevant to more than one element (across templates or even in one template). In fact, Figure 8 does show some evidence nodes with multiple parents, although the text does not further explain their use, but it should support the possibility that facts may have multiple parents, as well.³

Another complexity of complaint-drafting involves the multiple ways in which evidence and facts can affect claims and elements. These positive and negative influences can be of at least two kinds: legal influences or "narrative" influences. By legal, I mean that they relate directly as a matter of substantive law to an element of a claim or defense. By narrative, I mean that, independently of their legal effect, they may relate more indirectly to the plausibility of a side's claim; they may contradict the narrative that a side is, in effect, telling with a claim or theory. For instance, one claim may focus on the extraordinary degree of care a side has taken with respect to the use of a defective product. Another claim may imply that the side should recover regardless of whether it took any care or not. The two claims may not be inconsistent with each other as a legal matter, and yet documents that relate to the latter may tell a story that is inconsistent with the former.

As a practical matter, this means a SEAS tool may need to supply different kinds of links between, at least some, evidence, facts, and elements to distinguish the nature of the support or contradiction: legal or narrative. The special links may do no more than flag and annotate the narrative inconsistencies, but that could be a valuable warning of the potential interactions. Especially given the additional complexity of showing different types of support and contradiction, a SEAS tool may need to make the inference and fusion methods more explicit. A color scheme of green shading to red is eminently simple, but when evidence or facts may support or detract from claims and elements in different ways, it may be misleading.

² For example, the IBP program automatically generates and evaluates hypotheses predicting the outcome of trade secret problems based on comparing them to past cases, in the course of which it attempts to explain away inconsistent cases. [Ashley, K.D. and Brüninghaus, S. (2006) "Computer Models for Legal Prediction." *Jurimetrics Journal* Vol. 46, pp. 309-352.] The CATO program automatically generates arguments by analogy to past cases, distinguishing case counterexamples from the problem. [Ashley, K. D. (2000) "Designing Electronic Casebooks That Talk Back: The CATO Program". *Jurimetrics Journal* Vol. 40, No. 3, pp. 275-319].

³ For an example of the general idea, the Factor Hierarchy in the CATO program is a graph relating factors, stereotypical fact patterns that strengthen or weaken a side's claim, to the elements of the claim of trade secret law [Ashley, K. D. (2000) "Designing Electronic Casebooks That Talk Back: The CATO Program". *Jurimetrics Journal* Vol. 40, No. 3, pp. 275-319]. Factors can support some elements and weaken others; by pursuing alternative paths from a factor to its multiple parents, the program could make alternative arguments that a factor was or was not an important distinction between a case and problem.

A piece of evidence that is not red in the sense that it is legally consistent with a claim or element may mislead users into missing the problem that it may, nevertheless, undermine the narrative associated with another claim or element.

Finally, the SEAS tool could help users explore the ramifications of various design decisions they confront in preparing the complaint. Conceivably, the tool could support the ability of users to consider hypothetically the consequences of showing or failing to show particular facts and evidence or the consequences of different formulations of the tests for deciding the various claims and defenses. First, the tool could show litigators the hypothetical consequences of adopting different legal tests or different versions of legal tests. A user could try out alternate hypotheses of how the suit should be decided by modifying the elements of a test or their logical connections.⁴ Second, the SEAS tool could demonstrate the hypothetical consequences of assuming that a particular piece of evidence is or is not admitted. This may well be apparent from a structured argument like that in Figure 8, but it is a little less clear whether the current version supports visualizing the down and cross-stream effects of assumed changes in evidence on the plausibility of theories and hypotheses, promoting some over others. For instance, how does the system “flag” the changes that would be promulgated by, for the sake of argument, assuming that a piece of evidence is admitted or not, especially if one also considers the effects on claim narratives?

These critiques are meant only as suggestions for better adapting template-based structured argumentation and the SEAS tool to the legal context. As was pointed out by a questioner at the conference,⁵ attorneys employ ever more sophisticated on-line tools such as CaseMap to organize and integrate physical and electronic documents in large-scale litigation. It is a natural step to link these tools with something like SEAS to help litigators collaboratively construct their legal arguments and integrate the documents into them.

Independent research institutes, law firms, and private companies may be able to achieve this integration of case management and argumentation-support tools on their own, but the academic research community has much to offer. The goal of improving tools like SEAS and integrating them with document indexing tools raises issues that have long been central to the field of Artificial Intelligence and Law, such as representing legal arguments, modeling legal inferences, and improving legal information retrieval.⁶ Ideally, the further development of SEAS-like tools will be achieved by collaboration among independent research institutes, academic researchers, and litigators.

⁴ The HYPO program posed hypothetical variations of problem situations to show attorneys how changes in facts could strengthen the argument regarding a claim [Ashley, K.D. (1990) *Modeling Legal Argument: Reasoning with Cases and Hypotheticals*. The MIT Press / Bradford Books, Cambridge, MA.]. In the LARGO program, students draw graphs of U.S. Supreme Court oral arguments, focusing on points where Justices pose hypotheticals to assess an advocate’s proposed test for deciding a case, leading advocates sometimes to respond by modifying their proposed tests. [Ashley, K.D., Pinkwart, N., Lynch, C., and Aleven, V. (2007) “Learning by Graphically Representing US Supreme Court Oral Arguments”, short paper accepted for presentation at Eleventh International Conference on Artificial Intelligence and Law (ICAIL-07) Stanford University, June, 2007]

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⁶ See, e.g., the Eleventh International Conference on Artificial Intelligence and Law (ICAIL-07) workshop on ESID: Supporting Search and Sensemaking for Electronically Stored Information in Discovery Proceedings, Stanford University, June, 2007.