

# Software Makes Decision Analysis Easy

Ron Friedmann

David Post

Published in *Legal Technology Newsletter*, December 1990

## Introduction

What is Decision Analysis?

When and Why Decision Trees are Useful for Lawyers

The Mechanics of Decision Trees

## Introduction

A character in a Moliere play learns that, to his surprise, all language not poetry is prose. Thereupon he goes about bragging that he "speaks prose." Many lawyers find themselves in a similar situation. Decision analysis, sometimes called risk analysis, is a tool many lawyers use intuitively, even though they do not know it by name. Unlike Moliere's Bourgeois Gentleman, however, lawyers can gain more than bragging rights -- namely, greater ability to represent their clients effectively -- by better understanding and implementing this technique.

## What is Decision Analysis?

Decision analysis is a technique to manage the complexity and uncertainty inherent in decision-making. Complexity is reduced by breaking down a problem into a sequence of smaller, related problems or "key events." Uncertainty is managed by explicitly estimating the probability of key events.

A decision tree depicts a complicated problem in a diagram showing key events and possible final outcomes. Evidence may be admissible or not; a witness may be available or not; a defense may be allowed or not. The final outcomes produced by differing combinations of these events -- typically verdicts expressed in dollar amounts -- can be valued. By estimating a probability that each key event will occur, and a dollar amount for each possible outcome, decision analysis allows you to compute the "expected value" of a case. The expected value is a probability weighted average of all possible outcomes and is the best single measure of the value of the case. (See Figure One for an example of a simple decision tree.)

Decision analysis is not a substitute for your judgment. It is merely a way to capture and quantify your expert opinion. The key inputs to a decision tree -- estimates of probabilities of the key events and of the dollar values of final outcomes -- reflect the experience and judgment of the lawyer making the estimate.

## When and Why Decision Trees are Useful for Lawyers

Decision analysis is perhaps most useful in analyzing settlement options. Whether you are initiating or responding to a settlement offer, you must have an estimate of the value of your case.

In personal injury cases, for example, some lawyers rely on services that estimate the likely verdict, by jurisdiction, in cases involving different injuries. But this is not the settlement value. You must still estimate the likelihood that the judge or jury will find the defendant liable. The finding on liability may turn, in part, on whether you can establish an important fact at trial. Most matters, even simple ones, have several key events that determine the final outcome.

Application of decision analysis allows you to see how differing assumptions about key events affect the case value. For example, in one case, our firm used a decision tree in settlement discussions with the other side. They accepted our decision tree structure -- although not our estimates of probabilities and verdicts! -- as an accurate analysis of the case. We encouraged them to choose their own values for certain probabilities and values. We then demonstrated that even under their most optimistic scenario, the expected value was much higher than their initial settlement offer. Use of the decision tree provided structure for what could otherwise have been an unproductive discussion, and allowed us to reach a favorable and cost-effective outcome for our client.

Decision trees are also useful for clarifying your own judgments about a case and communicating those judgments to your clients or others involved in a case. We have had experiences where our litigation team believed it was in agreement on a number of key factors in the case. Yet judgements about the likely final outcome differed substantially. Decision trees helped us analyze why. The team members agreed on such statements as "the judge will *probably* find that ... ". But when we diagrammed the case and had to put down probability estimates, it turned out that "probably" meant 90% likely to some, but only 50% to others. By forcing a team to estimate probabilities and dollar amounts, decision trees help clarify where judgments differ and can therefore lead to better joint estimates.

### **The Mechanics of Decision Trees**

Given the power and value of decision analysis, it is an under-utilized tool. To be sure, learning the technique may require a day or two of effort.<sup>1</sup> But the training hurdle is less imposing a barrier than the psychological one of having to put pen to paper (or hands to keyboard) to estimate specific probabilities and values.

Once you have familiarity with the basic technique, various software packages can assist with decision analysis mechanics. One program, the Computer Aided Case Evaluation system (CACE), removes the burden of designing your own decision tree. CACE contains a pre-formulated decision tree tailored to defendants in personal injury suits. Moreover, it guides the user through the entire process of case assessment. Substantial help, oriented to the needs of

---

<sup>1</sup> A good way to learn the technique is to attend a seminar. Marc Victor, of [Litigation Risk Analysis, Inc.](#), regularly teaches seminars around the country. He offers both one- and two-day seminars. Litigation Risk Analysis can be reached at (415) 854-1104.

defense counsel, is available (both online and in print). CACE can thus be profitably used by even novice decision analysts.

CACE prints a complete set of reports that can be used to communicate with clients or co-counsel, or that can be kept in your files for future reference. The software allows you to store each matter as a separate file so that you can easily save your analysis and return to it later. CACE, for IBM and compatibles, is produced jointly by Wilmer, Cutler & Pickering and Litigation Risk Analysis. Although our firm does not do a great deal of personal injury work, CACE evolved out of work for a large manufacturer facing product liability suits around the country. The manufacturer needed a means by which it could estimate its total exposure. It also wanted a tool that would help local counsel rigorously analyze a case for the settlement possibilities.

Other programs have less built-in structure, and therefore require greater knowledge of decision analysis techniques -- but also allow greater freedom of analysis. Arborist is a Texas Instruments program for IBM and IBM-compatible personal computers. Data by [TreeAge Software](#) is a program for Apple Macintosh computers. Both programs draw any decision tree imaginable, perform all the necessary calculations, and produce graphical displays of the decision tree. As is generally true for Mac based products, once you understand the Mac interface, learning new programs is not difficult. Data takes good advantage of the Mac and is fairly intuitive. We first used Arborist around 1985; to the best of our knowledge, the program has not been updated since then. Like many programs of this vintage, the user friendliness leaves something to be desired. Both programs offer a variety of functions to enrich the analysis, including "sensitivity analysis," which allows the user to vary key input variables and observe their effect on the overall value of the case.

You can also perform decision analysis using any spreadsheet program. This approach requires a degree of experience and confidence that is uncommon. Entering the formulas for a decision tree that is well defined is not too difficult for those who understand both decision analysis and a spreadsheet program. You can even space the formulas in a way that mimics the shape of your decision tree. But even experienced users are likely to find that adding or deleting branches using the spreadsheet approach is quite difficult.

All three programs and spreadsheets have been used in our practice at Wilmer, Cutler & Pickering. CACE is now available over the firm's Local Area Network, where it can be accessed by any of the firm's lawyers. Both Arborist and Data have been used outside of the personal injury context, or in situations requiring a more complex analytical tool. In general, we have found that the effort required to perform final decision analysis pays back in better results for our clients.