Decision Trees, Part 3

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Let's look at who the winners and losers have been in this story about the betting booths at the state fair. If you'd been smart and drawn decision trees and done your simulation models, chances are you're a winner. Certainly the gatekeeper is going to be a winner. But the one certain loser is Microsoft. Let's suppose that Bill Gates is looking at the returns for the week for Microsoft and notices the state fair in your particular area is costing him a lot of money. And suppose he says, "This is ridiculous. Let's close down that exhibit. Why waste all this money?"

Well, his public relations officer is probably going to say, imagine the headlines tomorrow morning: "Microsoft Unable To Pay for Exhibit at Such and Such State Fair." That really wouldn't be good public relations. Think what it's going to do to your stock. I've got a better idea. What we should do is put a positive spin on this. We're going to take out a big front-page ad in the local newspaper and we're going to say, "If you haven't yet come to the Microsoft exhibit, please come".   And then in the fine print at the bottom we will say, "Whereas previously we were giving 100 betting tickets to everybody who came, we have now changed to one betting ticket." So now the story's changed. When you go to the gate, the gatekeeper says to you, "Where do you want to bet, red booth or blue booth? And here's a ticket. One red ticket or one blue ticket."

Let's look at the odds again. You have one ticket. You go to the red booth. You either win $10 or lose a dollar. You go to the blue booth, you either win $100 or lose 20. What does the decision tree analysis tell us? It tells us that on average at the red booth you win $4.50. On average at the blue booth you win $40. But those averages are meaningless now. You're only going to bet once.

There is nothing you can do to massage the numbers here in order to come up with one number for the red booth and one number for the blue booth to make a comparison. You have to look at those four numbers and make a judgment, and the type of thinking that is probably going to go into making this judgment is going to be - goes something like this: How do I feel about losing a dollar versus losing $20? Or, how do I feel about winning $10 versus winning $100? And if you're being cautious, I think you would see that if you are going to bet once, you are going to

bet red because you minimize your risk. Whereas, if you are being incautious, you would bet blue because you maximize your profit.

So notice what's happened to this problem now. It's become almost purely a question of value, the value of money and the risks you're prepared to take, and there's no analysis to do. You can't massage the numbers. You just have to look at the numbers and apply your value system.

So in the three stages of this problem going from the original problem through to bribery through to the one-ticket problem we've gone from a situation where you can go all the way on analysis through to a situation where you have to consider both the analysis and your value system, through to a final situation where you have to only consider your value system to be able to come up with a strategy for reaching a decision.

Now, the question one might ask is: Which of those three problems is most like problems in resource management? And in particular, which of those three problems is most similar to the kinds of decisions one faces in conservation and conservation biology? And I think the answer is probably the third. And making the decision to go with the option where you have the minimum loss is probably equivalent - or is equivalent to the precautionary principle in conservation biology.

One of the reasons that I think so many of the decisions in resource management end up as conflicts, rather than decision analysis is because the values haven't been spelled out. And because different stakeholders have different value systems, and it is really the value systems that are conflicting rather than anything to do with the analysis.

So, decision analysis in resource management is only going to be functionally useful if one takes into account and has a clear statement of the value system up front along with the analysis of the facts.

There's a fantastic book by a Professor Keeney who is at the UCLA business school. He's written a lot about decision analysis. This particular book is called "Value Focused Thinking."

There's a lot of mathematics and theory in the book. But if you read the first and last chapters, you will get a lot out of it. The first chapters relate to major decisions where people didn't think through the valuations beforehand and that led to problems in the decision analysis. During the

rest of the book Professor Keeney develops his own theory of how to put values into some kind of number system.

And in the last chapter, he tells a fascinating story which goes something like this: He goes to the doctor and the doctor tells him he needs to have some surgery. He says, "Hang on a moment. I'm not going to have surgery until I've done some decision analysis." So he questions the doctor, and he gets some probabilities of outcomes, what is the likelihood that he will die during surgery, what is the likelihood that he will die if he doesn't have surgery? He asks about quality of life. He asks about pain. He then goes to his value system and thinks about how he feels about pain, how he feels about quality of life, how he feels about living and dying, and does an analysis, and at the conclusion of that analysis he decides he isn't going to have the surgery. As far as I know, he lived to write - well, he definitely lived to write the book. As far as I know he's still alive and probably doesn't regret that decision.

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