# Decision and Control

"I'm the kind of person who likes to know all the facts before I make a decision."
—*U.S. President George W. Bush, speaking on CNN on July 3, 2002 about the possibility of sending U.S. troops to Liberia*

"When you come to a fork in the road, take it."

—*Yogi Berra*

Each December, as the calendar year winds down and the weather up north gets cold, about 800 engineers, educators, and researchers come together to attend the IEEE Conference on Decision and Control (CDC). The CDC is just one of thousands of conferences held each year on specialized topics ranging from fiber optics to building ships in bottles (an actual conference I stumbled upon one day in Michigan). While control technology may seem rather specialized to the average person, making decisions is something that everyone must do. And sometimes decision making is not easy, facts or no facts.

Decision making gives us a sense of power. When I choose a flavor of ice cream, I feel decisive, but I can't help wondering about all those folks who choose flavors I've barely heard of. Does anyone really buy them, or does the store just stock them so consumers can feel decisive? Perhaps you've tried the following strategy to get kids to go to bed: "You can read a book or listen to music for 10 minutes." Although staying up for another hour is not an option, the choices offered provide a limited form of empowerment.

How permanent are the consequences of your decision? When I make a decision I assign a number between zero and one, which I call the "reversibility index." When I take my hand off the chess piece, it's a done deal, but when the loan officer in a bank says, "By law, you have 72 hours after you sign to void the contract," I have a way out. "Can I return this vacuum cleaner if I don't like it?" "Sure, you have 30 days. Just save your receipt," and the decision is easier to make.

So what are some ways to make a decision? Benjamin Franklin advocated the scientific approach. Trying to decide which job to take? Just make a list of the key attributes such as commute time, salary, and opportunities



for advancement, assign a weighting to each category (20% for commuting, 50% for salary, and 30% for advancement opportunities), and then rate each attribute on a scale of one to ten. The job that gets the highest weighted score pops right out as the winning decision.

At the other extreme of decision making is the intuitive approach, called coup d'oueil, where there isn't much time for analysis and you go with your gut instinct. In the heat of battle, with time of the essence, the commander draws on experience to make a coup d'oueil decision that can spell the difference between victory and defeat.

Beyond science and intuition, the coin-tossing method has certain merits. Every choice we make precludes other choices, and the options we choose can have as many hidden pluses and minuses as the options we reject. The "perils of benefactors and the blessings of parasites" lurk unseen, so randomness may have a positive side in decision making.

If the decision is of a moral nature, then "do the right thing" is often preached. When courage is needed, this strategy gives us the strength to make a decision that may be unpopular or detrimental in the short term.

So what is the best way to make a decision? The scientific method is comfortingly rational, but it's hard to avoid adjusting the weights to manipulate the outcome. Coup d'oueil relies on intuition, but intuition can be confused with impulse. Leaving decisions to chance is like gambling, but what is the risk? And moral dilemmas often have two sides, so that simple strategies may be too simplistic.

As the year winds down and the cold winds begin to blow (at least in Michigan), there is one decision that all of us aficionados of decision and control must make. We are fortunate to have the IEEE Control Systems Society (CSS) as a volunteer organization that promotes and supports our field of specialization. Each CSS membership strengthens the Society and our profession, benefitting all of us. It's hard to think of an easier decision, arrived at by any method.

See you at the 42nd CSS-fest in Maui!

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