



## Truth and Consequences

**A**re you a seeker of the truth? I don't mean religious or philosophical truth. I mean truth with a small "t," as in where did your daughter really go on Saturday night or are you truly a better-than-average driver as 80 percent of people claim to be? If the technology were available to identify these "truths" to a high degree of certainty, would you want to know?

For instance, technology currently exists to electronically monitor how fast vehicles are moving and automatically issue tickets to speedy drivers. Would you prefer such a system of traffic regulation to one with random enforcement and a bit more ambiguity (for example, one that ignores violations for speeds less than 7 mph above the posted limit or for any speed if the car in the next lane is going faster)?

Well, consider that "the United Arab Emirates is investing \$125 million in a system that will make it possible to determine the speed of any of the Gulf state's two million vehicles, no matter where they are." (*The Economist*, Sept. 17, 2005) Big brother may soon be watching you, too.

And what about "actuarial truth," i.e., a conclusion that's highly likely given available information, though not certain?

Statistical methodologies such as data mining and predictive modeling are able to find relationships among variables where none were thought to exist before. The use of credit scores in personal automobile pricing has generated a great deal of debate, but this is just one example of where "statistical truth" and its consequences can become highly controversial.

When the federal government decided to analyze patterns in telephone records to identify communication among terrorists, alarm bells sounded widely. Many of us apparently value shoe removal at airport checkpoints as a more tolerable security measure than data mining tools applied to vast amounts of data.

Here are a few more examples:

You might know your credit score, but do you know how you rate as a terror suspect? According to the *Philadelphia Inquirer* (Dec. 1, 2006), "the federal government has assigned millions of international travelers, including Americans, computer-generated scores rating the risk they pose as terrorists.... Scores are assigned to people based on where they are from, how they paid for their tickets, their motor vehicle records, their previous one-way travel, their seating preference and what kind of meal they or-

dered." The Homeland Security Department calls it "one of the most advanced targeting systems in the world."

As the next presidential election draws near, many of us will be the subjects of "microtargeting," which, as explained by *Philadelphia Inquirer* staff writer Thomas Fitzgerald (Oct. 29, 2006), "is a practice whereby campaigns build databases that correlate consumer preferences, hobbies, and other lifestyle tidbits with voter rolls ... allowing them to pinpoint likely supporters and swing-voter blocks and tailor a message to each audience." As these systems advance in sophistication, they may come to know us better than we know ourselves.

Predictive models also show promise in helping to decide how to treat medically incapacitated patients who have not completed an advance directive. (For example, should a comatose patient be given dialysis?) Such decisions are often left to surrogates, but authors Shalowitz, Garrett-Meyer, and Wendler (see their article in *Public Library of Science Medicine*, March 2007) show that computer models based on the preferences of those with similar personal characteristics (such as age, nationality, educational level, employment, etc.) can do a better job of predicting what the patient would actually want to happen.

And then there's the issue of war. According to *The Economist* (Sept. 17, 2005), a commercially available product, called the Tactical Numerical Deterministic Model, significantly outperformed the Pentagon in predicting the outcome of Operation Desert Storm, including the duration of the conflict and the number of casualties.

This model, designed by "a collaboration between computer programmers, mathematicians, weapons experts, military historians, retired generals, and combat veterans, draws from the largest historical combat database in the world." It uses inputs such as the influence of rainfall on the rate of rifle breakdowns and the vulnerability of supply lines to predict the outcome of specific armed conflicts.

Perhaps someday these emerging statistical methodologies will become so universally accepted that countries will be willing to settle their conflicts through computer simulations alone. Now, that's a consequence we could all live with.

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