Experimental Economics and Textbook Publishing

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Hal Varian has been using NeXT computers in several capacities. One project involves preparing the third edition of his graduate text on a NeXT computer using TEX. The TEX software (including TEXView), the UNIX editing and text processing tools (including Emacs), and the Display PostScript environment have proved very useful for this work. The integrated environment offered by NeXT makes the author's job much easier: All the tools necessary for producing professional technical publications using TEX come bundled with NeXT machines, and all the tools work very well together (see Figure 1).

Another of Varian's projects is in experimental economics. Economists have many theories about how people should behave in strategic interactions involving markets, bargaining, and negotiation. Experimental economics is an attempt to test these theories in a controlled environment. The typical procedure is to present human subjects with a set of strategic decisions and observe how they behave. It is generally convenient to do this using a network of computers.

Prisoner's Dilemma

Varian is studying subjects' behavior when they play a variation of the Prisoner's Dilemma (see Figure 2), a famous game involving principles of cooperation and defection. In this game both players do best if they cooperate; despite this, each individual is tempted to defect from the cooperative solution. One can vary the parameters of the game and study the incentives to cooperate or defect.

In Varian's implementation, each player has two playing cards, say a 6 and a 4. There is a pot of money in the middle of the table. If player one plays his 6, then player two will receive 6 chips from the pot. If player one plays his 4, he will receive 4 chips from the pot. The plays are made simultaneously, so neither player knows what decision the other player has made. Furthermore, each player plays against a different person each time.

The sum of the payoffs is maximized if both players cooperate and play their 6s. But if player one thinks that player two is going to play his 6, player one might as well play his 4 and get a total payoff of 10. But if both players do this, they each end up with 4.

The Prisoner's Dilemma can be used to model price wars, arms agreements, and a variety of other situations involving conflict. Varian is interested in examining what happens if players can negotiate—in a particular way—before they make their decision.

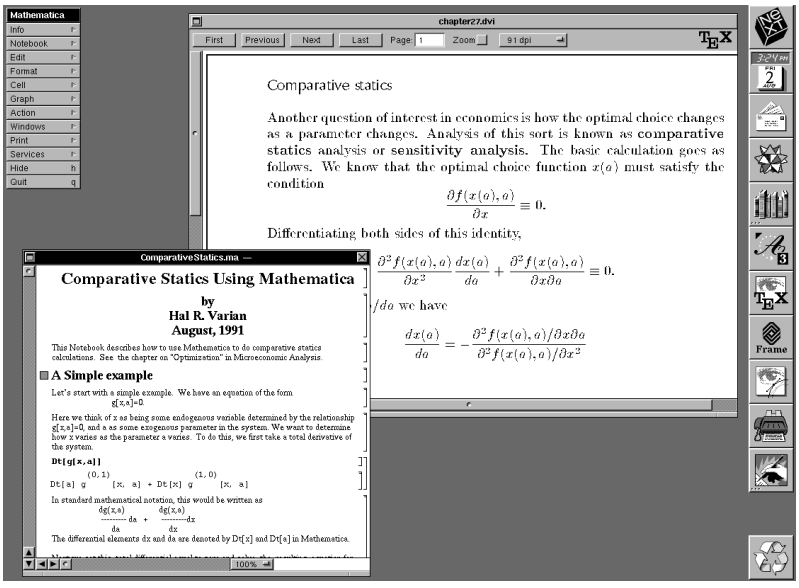

Figure 1 *TEXView and Mathematica provide an optimal environment for technical publishing.*

The Benefits of NeXT Technology for Economics

The major cost of developing applications for experimental economics is designing the user interface. After all, these programs are almost all interface: the actual computations are trivial.

It is important to have an intuitive interface since the student subjects have to learn to play the game in a short period of time. Furthermore, the interface should be fun to use. Students are encouraged to play to win, so they should have attractive visual simulation.

Developing such interfaces by conventional methods is costly and time-consuming. With Interface Builder, development time is substantially reduced. Furthermore, the object-oriented design of the NeXT encourages reusability. Each experiment is run only a few times, but each experiment has many features in common with other experiments. Having a toolkit of objects for such games and simulations have proved very useful in subsequent research projects.

Simulations of this sort are very useful in the classroom. Economic concepts become much more vivid when students can get hands-on experience, and the NeXT provides a very convenient platform for this type of experimentation. We plan to prepare other simulations of market games, auctions, and bargaining in the future that will be useful both for research and in the classroom.

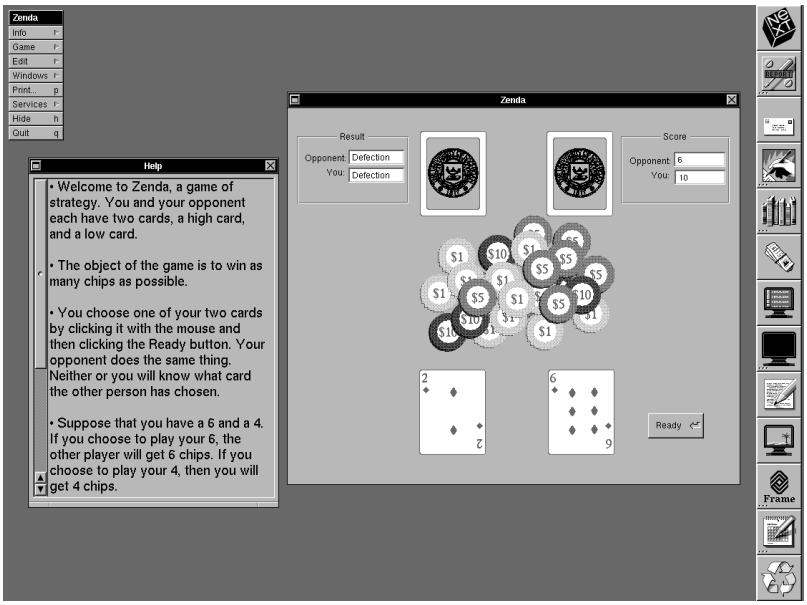

Figure 2 *Prisoner's Dilemma is a two-person game that can be played over a network to simulate how people behave in bargaining situations.*

For more information on technical publishing and experimental economics with NeXT computers, please contact:

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