CS 5317/4317 Human-Computer Interaction names _____
Professor Nigel Ward
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Assignment D

Modeling the Temporal Aspects of GUI Use

Interface designers often want to create interfaces that are efficient, in the sense that people can use them to accomplish things quickly. Although some techniques for this are well-known, it is often not obvious how to accomplish this, or even which of two alternative designs will be faster. While it is always possible (in theory) to implement two alternative designs and experiment to see which is faster, this can be very labor-intensive.

Thus we desire a model able to predict, from a description of an interface and the user's task, the time it will take to perform that task. Having such a model will enable us to evaluate alternative designs even before implementing them.

In this assignment you will first practice time-and-motion studies, and second develop the elements of a predictive model of task performance time.

0. Choose a partner to work with, find a computer, download the mouse-typing keyboards (mouseboards) at http://www.cs.utep.edu/nigel/hci/mouseboarding/, and try a couple. Which seems faster? Why do you think it is?

1. Find or borrow a stopwatch, and prepare to do some quantitative studies. For each step, one person will take the user role and one the observer role.

2a. First warm up. Open any editor and prepare to create a list of numbers. Go to google.com, type "log 1" into the search box and add the result to your list, correct to two decimal places. Do the same for "log 2".

2b. Now prepare to measure the time for this process, that is, the time required per input, from typing the "l" of "log" until the last digit of the result is complete and the user is again in the browser and ready to start typing the "l". Do this by taking the average over several repetitions. To make this task feel more realistic, tell your "user" that you need a list of log values for inputs 11 through 20, to two decimal places.

What was the average time? _____

2c. What were the constituent actions the user did to process each input? Be fairly detailed; there are probably 10-20 of them.

Show these to the instructor.

3a. Measure the average time to create a similar table of square roots, by typing "sqrt(n)" to google again, where "n" ranges from 0 to 4. _____

3b. How much longer did it take per item than for the logs? _____ Why?

3c. Now use your findings to predict how long it would take per value to create a similar table of weight conversions for 100 to 290 pounds, using the "100 lbs in kg" google query format. _____

3d. Write a general equation for predicting task-completion times from the component actions. Show the instructor.

4a. Now go to xe.com. First warm up by computing the yen equivalent of $100. Then create three conversion tables for dollars to yen, computing the average time for each:

4b. First do it using the mouse to click the “compute” button, for $66 to $70 dollars. ___

4c. Next, do the same for $11 to $15 dollars. ___

4d. Finally do it for $16 to $20 dollars, using the return key as a shortcut, instead of clicking the compute button. ___

4e. Write a general equation that accounts for these results. Show the instructor.

5a. Go to www.cs.utep.edu/nigel/hci/nump.html, play the game 10 times, and record the average time. ____

5b. Now go to oddp.html and similarly find the average time. _____

5c. Write a general equation able to predict the time of all of the operations above, and similar operations, as a function of the component actions involved.

6a. Find a calculator (either calculator.com, or a local calculator, for example in Windows via Start-Accessories; on Linux via Utilities-Desktop-Kcalc). Write down the steps required to multiply two 2-digit numbers. Don't forget the time it takes to verify that the digits you enter appear correctly, if necessary.

6b. From this list of steps, and your equations above, estimate the total time required to do this. _____

6c. Now actually try it, for example multiplying 99 by 99. How long did it actually take? ____

6g. How accurate was your estimate?

6h. List a few factors that may have limited the accuracy of the estimate.

Estimated time to complete: 40-100 minutes.

Hand in one sheet per team.