

CogTool: Predictive Human Performance Modeling by Demonstration

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1. CogTool

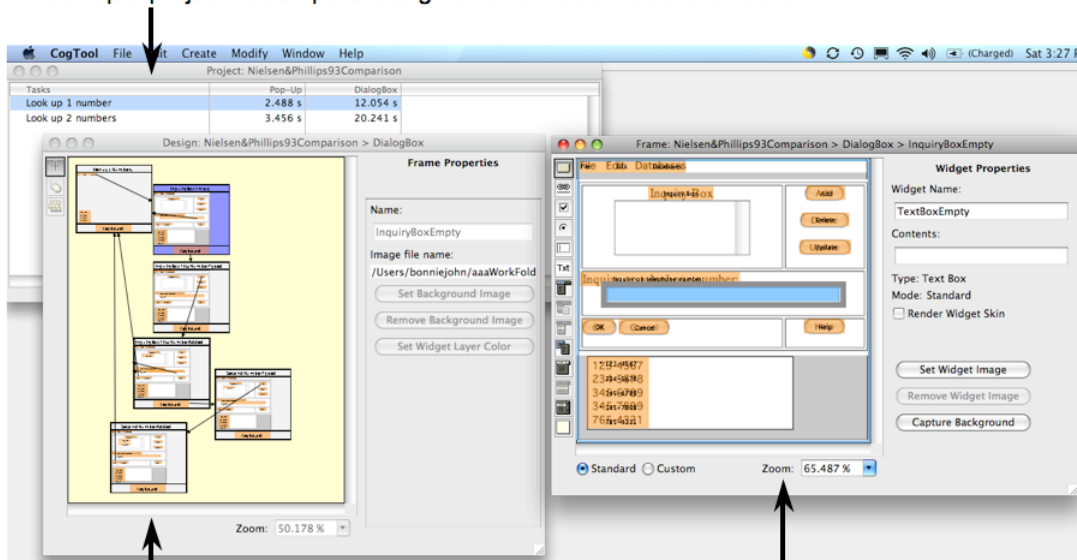
CogTool is a general purpose UI prototyping tool with a difference - it automatically evaluates a design using a predictive human performance model (a "cognitive crash dummy") (John, et. al, 2004)

To use Cogtool, simply create a storyboard of your design idea with sketches, images or on a canvas with CogTool's widgets, demonstrate tasks on that storyboard, then press a button to produce a valid cognitive model (implemented in ACT-R, Anderson,

et. al., 2004) predicting how long it will take a skilled user to complete those tasks (John, 2009). CogTool can be used today to baseline your current interface, or compare competitors' interfaces, and predict how much better your new designs will be.

Looking toward tomorrow, ongoing research is creating and validating new models to predict other metrics of interest to UI designers, for example, the exploration paths of new users (including the errors they are likely to make) (Teo & John, 2008).

1. Set up a project to compare design alternatives on a suite of tasks

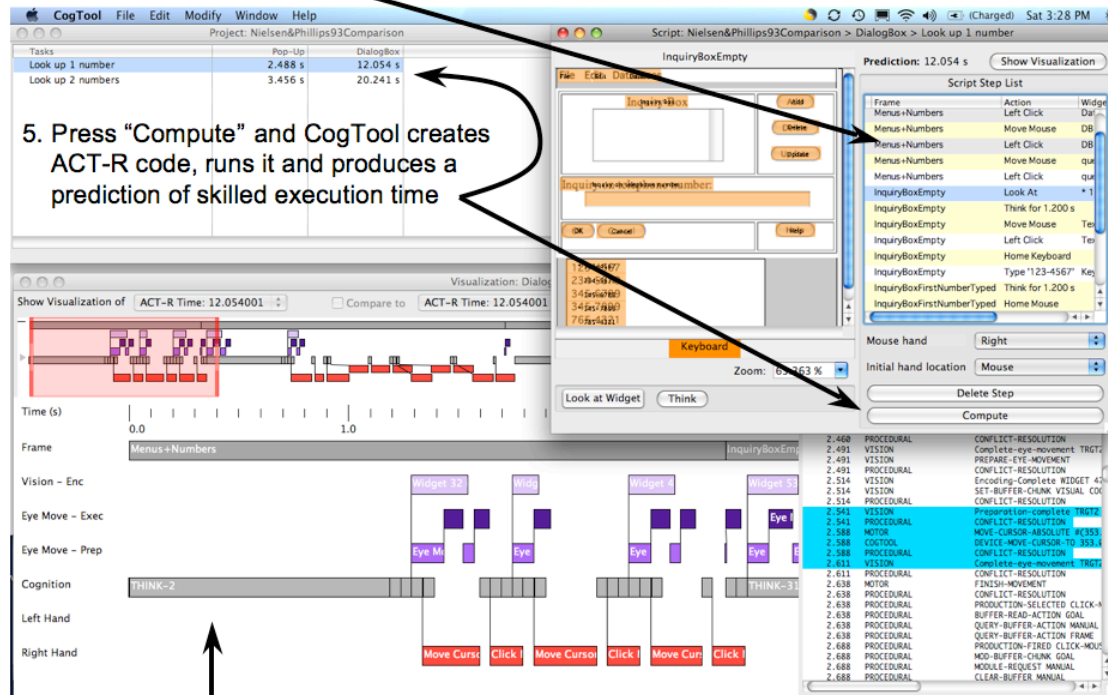


2. Lay out a storyboard of frames (what the user will see) and transitions between them (what the user will do)

3. Detail each frame with the interactive widgets available to the user

Figure 1. CogTool's Project window where projects are set up and results are tabulated (upper left), Design Window where a storyboard is displayed and transitions are defined (lower left), and Frame Window where widgets are placed to mock-up the display and controls presented to users (right).

4. Demonstrate the tasks, CogTool creates a valid cognitive model of a skilled user.



5. Press “Compute” and CogTool creates ACT-R code, runs it and produces a prediction of skilled execution time

6. Examine what the ACT-R model did to produce the prediction in an interactive timeline visualization.

Figure 2. CogTool’s Project window (upper left), Script Window where tasks are demonstrated and computation launched (upper right), and Visualization Window where timelines can be interactively inspected to see what ACT-R did to produce the predictions (bottom).

2. The Interactive Demonstration

The interactive demonstration will include CogTool analyses at different stages of completion, much like a cooking show, which will allow the demonstrator to focus on aspects of the tool requested by the audience. Depending on the size and engagement of the audience, this can be a linear presentation or it can move in many different directions, as varied as the audience’s interests. There will be examples from desktop applications, web-based services, parallel programming environments, cell phones, among others.

3. References

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Author Biographies

BONNIE E. JOHN (B. Eng. 1977, The Cooper Union; MS 1978, Stanford; PhD, 1988 Carnegie Mellon University), is a Professor, founding member of Carnegie Mellon University’s Human-Computer Interaction (HCI) Institute, and a member of the ACM SIGCHI Academy. She has been researching human behavior modeling and using it to guide HCI design since 1983. As the Director of the Masters program in HCI, Dr. John has researched and taught many HCI design and evaluation techniques. She has brought these experiences together, through human-centered design and automating substantial portions of the modeling process, to create modeling tools that are easier to use, one of which (CogTool) will be demonstrated at this session.