

Modeling Driver Performance With In-Vehicle Information Systems

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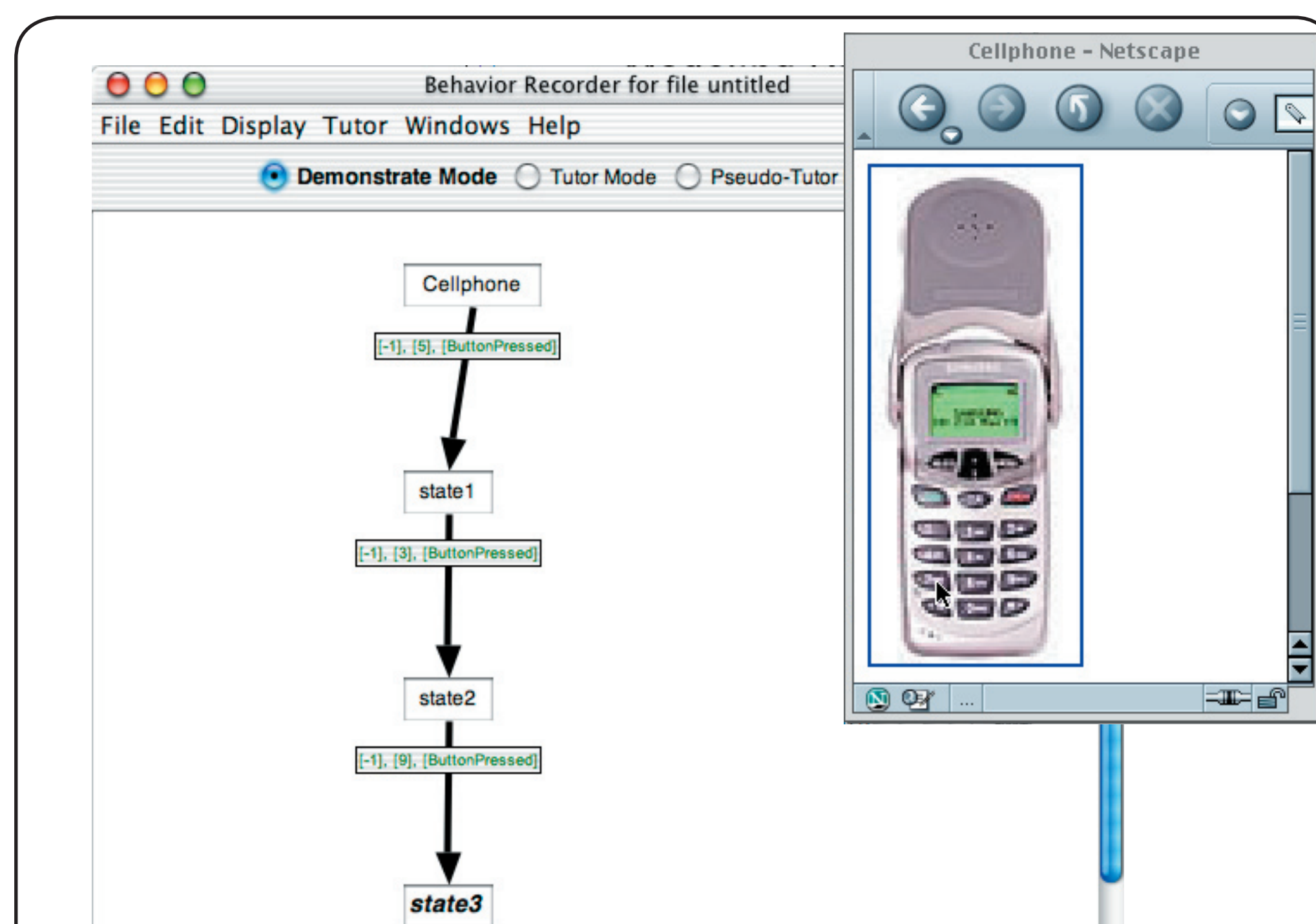
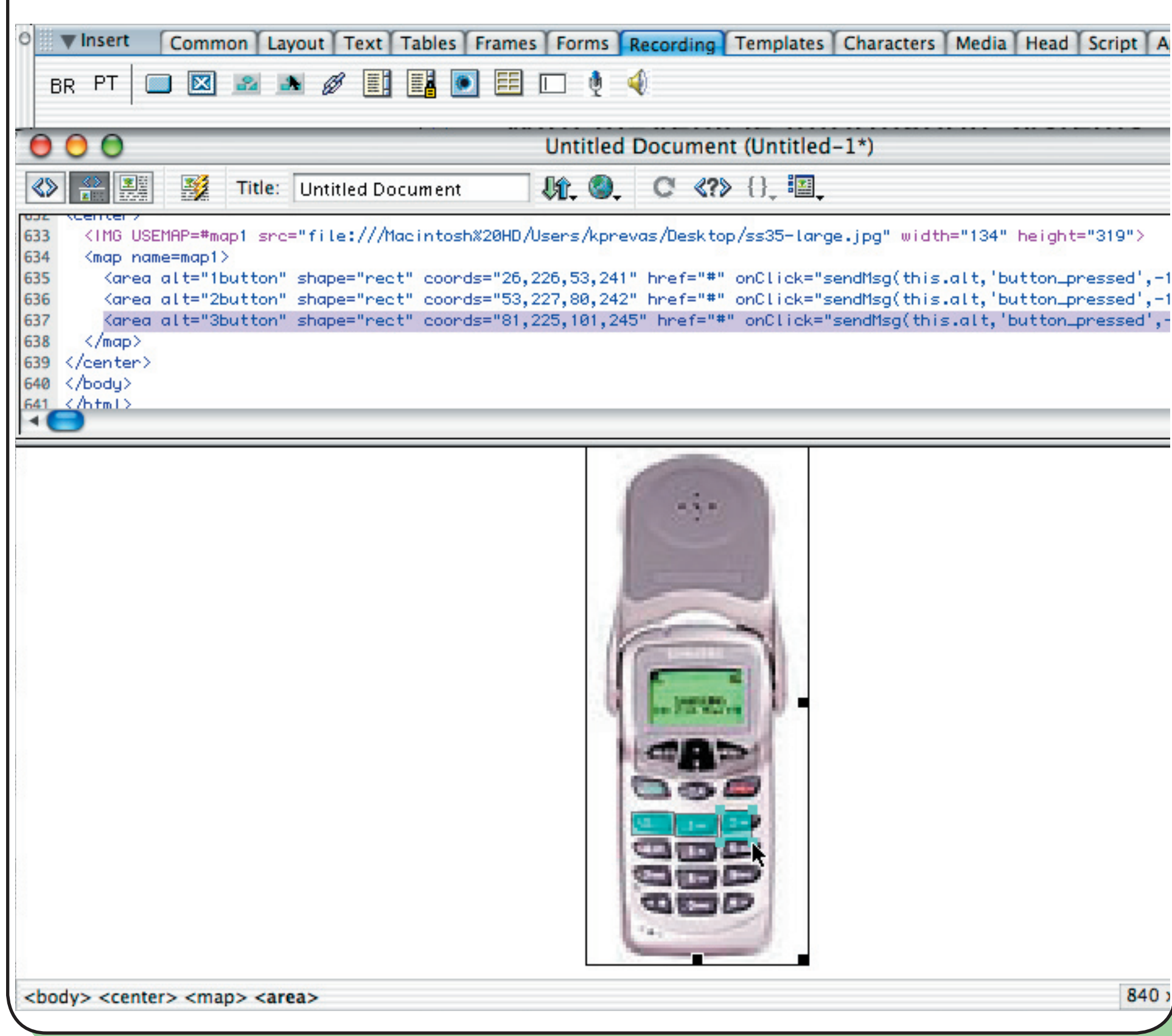
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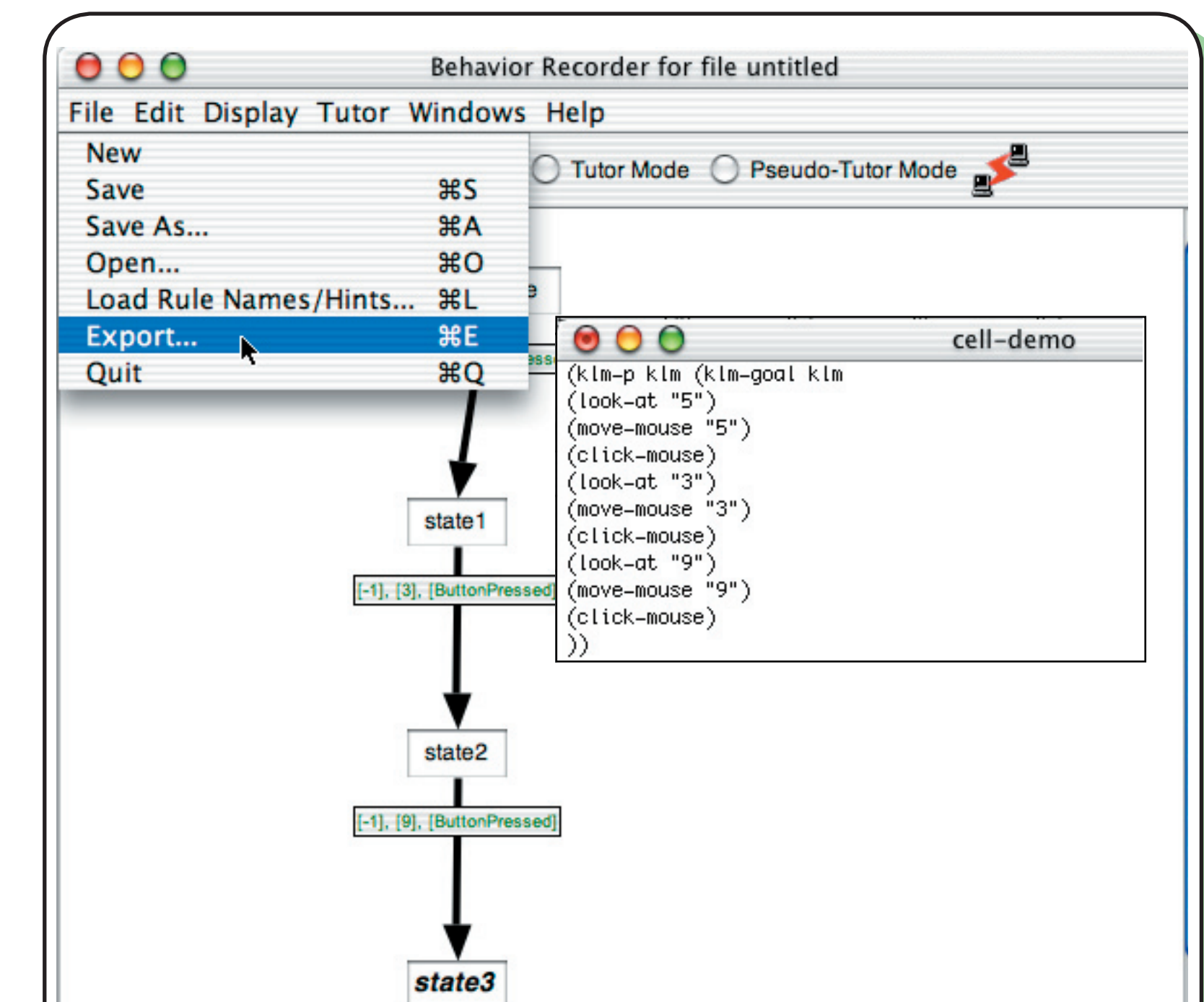
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Human behavior modeling allows device designers to quickly evaluate design ideas, producing estimates of performance such as task time, errors, and attention switching. Our system allows designers to easily mock up devices, demonstrate tasks, and construct models automatically from those demonstrations. These device models are then integrated with a model of driving to produce predictions relevant to the design of in-vehicle systems.

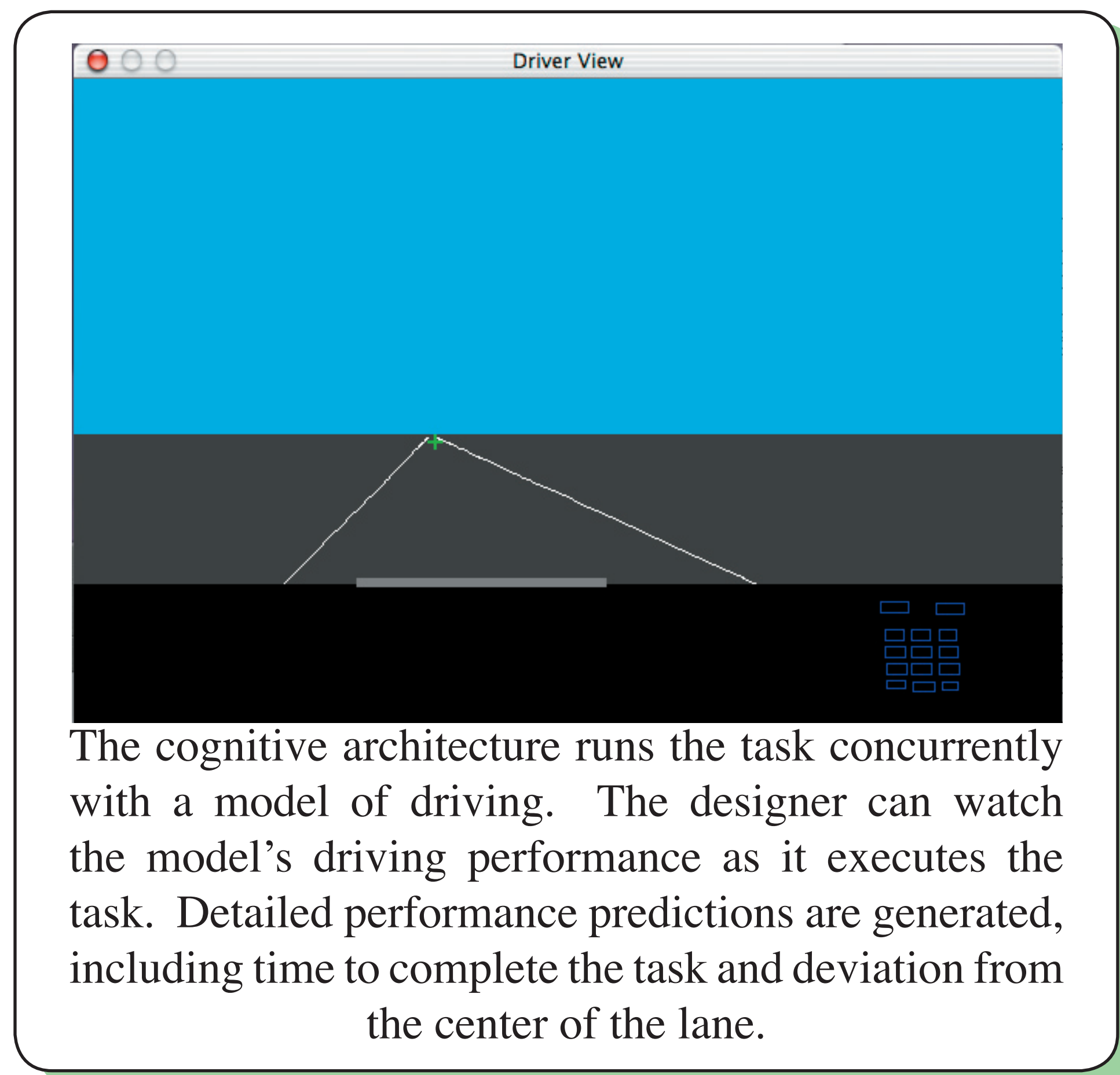
Using our special extension to Macromedia Dreamweaver, the designer mocks up the information system interface as an HTML storyboard. Alternatively, existing HTML storyboards can be instrumented with a single command.



The designer demonstrates tasks in a web browser. The Behavior Recorder software records the sequence of actions performed and creates a state graph to represent the task.

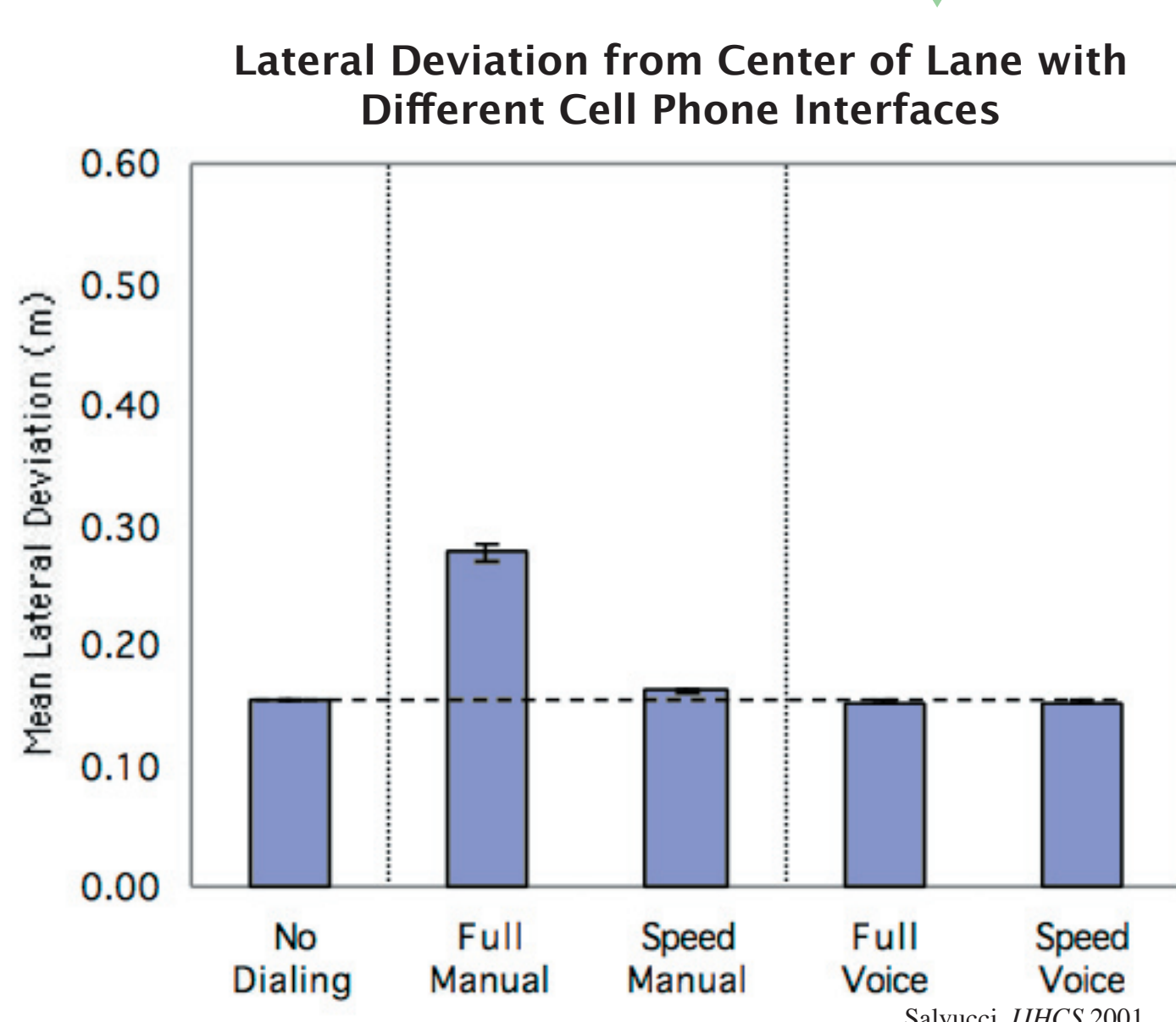


The Behavior Recorder exports the task description into a format that automatically compiles into a model in the ACT-R cognitive architecture.

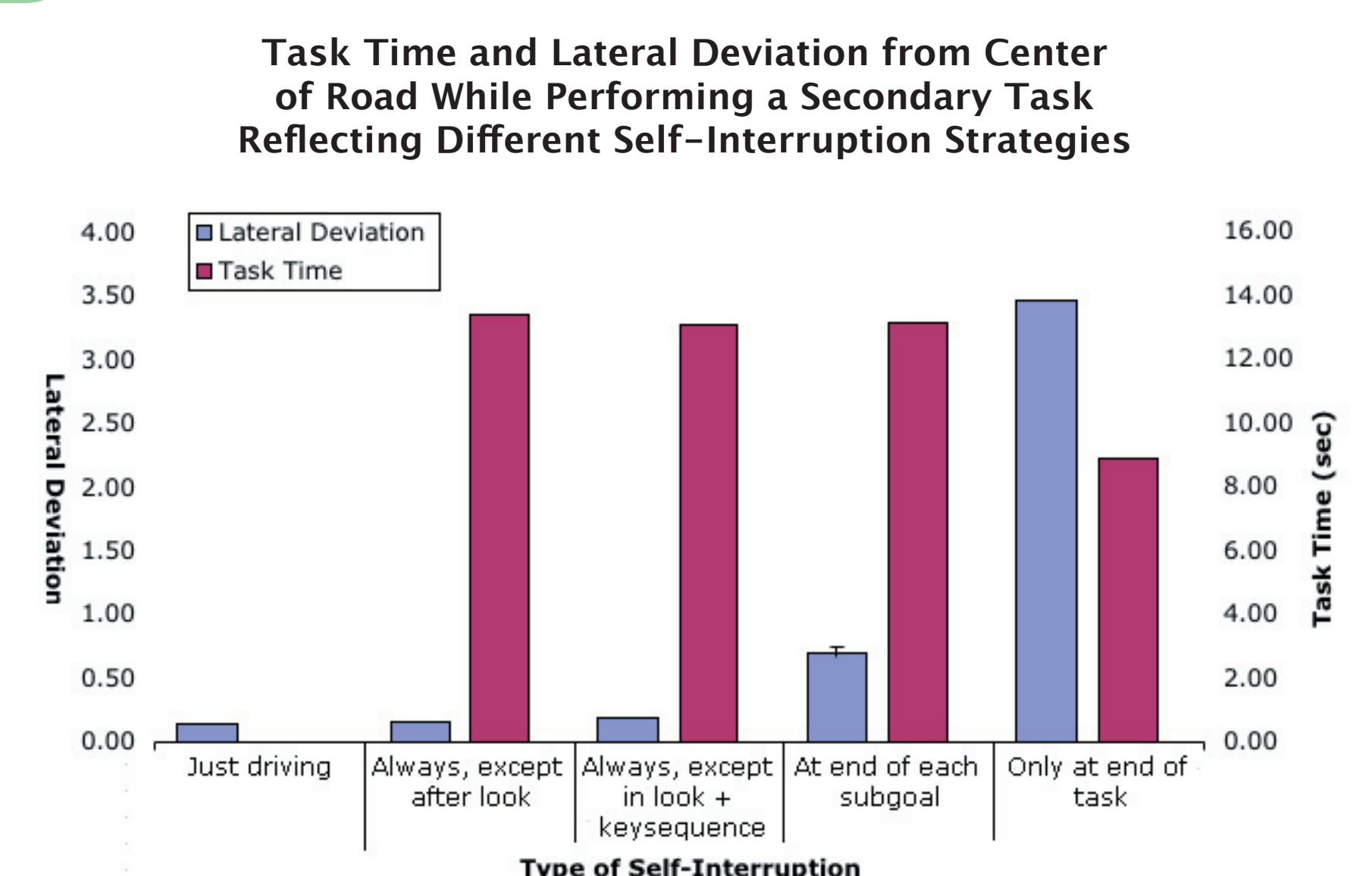


The cognitive architecture runs the task concurrently with a model of driving. The designer can watch the model's driving performance as it executes the task. Detailed performance predictions are generated, including time to complete the task and deviation from the center of the lane.

What if different interfaces are used to perform the same task?



What if people switch between driving and secondary tasks in different ways?



Future work will involve validating the models with data provided by the Virginia Tech Transportation Institute.