

# Task Analysis of Cognitive Model Interfaces

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# A gents are C ognitive M odels

- Intelligent agents in synthetic environments are a type of cognitive model
  
- Users and developers will want to
  - Understand them
  - Test them
  - Demo them
  
- But... the non-optimal design or the total absence of graphical displays that are needed to make the behaviour of the models visible, make the validation of the models problematic

## Goal of the Present Project

- To improve the usability of a graphical display that allows the inspection of the internal reasoning of cognitive models that populate a JSA F environment
- Create a task analysis to reuse these results
- Understand how to evaluate interfaces better

# There Have Been Several Soar Interfaces

- Unruh's graphical interface from Stanford
- Milne's Graphic interface
- Ward's Soar-mode
- Ritter/Hucka/Ritter/Hucka/Hucka Soar-mode
- Developmental Soar Interface
- The Tcl/Tk Soar Interface
- Soar lint
- Visual Soar
- Vista



Don't cumulate all that well

## C auses?

- Changes in software (Lisp to C)
- Changes in editor (Emacs to G K W)
- Changes in extension language (Tcl to Java)
- Lack of publishability of interfaces?
- A hard, little reusable set of problems

(all of these are coal)



## One Way Forward - Task Analysis

- Based on a study of experts of various kinds (see paper for details)
- Aggregated into a total of 35 unique problematic issues for the SA P display
- 16 issues have been or will be incorporated into the SA P
  - ▶ maybe \$3k/issue
  - ▶ This is not expensive, subjects cost at least \$1k minimum!
- Knowing what users need to do would be reusable, however

# Task Analysis

- Perception (Inputs) - What inputs does the model get?
- Actions (Outputs) - What actions has the model done?
- Physical environment features that affect the agent's body
- Mental environment -- Current Goals and Active Plans
- Social environment
- Mental models of other agents
- Military environment (task and hardware of own agent)

## Perception (Inputs) - What inputs does the model get?

- Inputs from instruments
- Radar and IFF values (if from display), and visual input
- Voice input/communication from other agents
- Other perceptual events
- Constants in perception, e.g., due north
- Self-perception, physical status of pilot: healthy, tired, bored
- Where is our agent's attention (for analyst) -- perhaps with a spotlight metaphor (this was used by Chong in the AMBR project to good reviews)



## Social environment

- Cultural/political/historical facts that influence behavior (declarative facts)
- Rules of engagement (perhaps available but not displayed if they don't change often)
- Other social context of team, broadly defined

## Physical environment features that affect the agent's body

- Weather
- Terrain, including base location, wet/dry, ground threats, places to land for RW A
- Unknown but suspected ground threats will be an interesting thing to display

## Conclusions

- **A task-analysis that** can be used for designing interfaces for other architectures
- Has some surprises in it
- Provides a nice checklist
- Is reusable

