



Useful Things to Know About Soar and the Java Debugger

Bob Marinier

University of Michigan



Introduction

- Many people don't know about some of features of Soar and the Java Debugger
- Both new and old stuff
- First commands
- Then debugger



Command: help

- Details on all of the stuff here can be found using the help command
 - Can't use aliases or abbreviations
 - Good: “help preferences”
 - Bad: “help pref”
- May have to use “set-library-location” to tell Soar where the help files are



Command: run

- “run” command allows you to run by many different step sizes
 - Decision cycle, phase, elaboration
- “step” is just an alias for “run -d”

Command: set-stop-phase

- Determines where a decision cycle ends
 - Affects the run command
- Helps debugging
- Example: set-stop-phase --before --apply
 - “step” will stop between decision and apply phases
- Debugger has graphical widget for this



Command: preferences

- preferences
 - Shows operator preferences for bottom state
- preferences <id>
 - Shows support for all WMEs with that id as value
- preferences <id> --object
 - Shows support for all WMEs with that id as id
- preferences <id> <attribute>
 - Shows support types for all WMEs with that id and attribute
- preferences <id> --names
 - Also shows which rules created each wme
 - Can use <attribute> or --object here as well

Command: print

- **--depth** now prints WMEs at minimum depth
 - Prevents unnecessary deep indenting
 - Output is the same for all depths past the minimum depth to deepest WME
 - Try this on Eaters or TankSoar input-link
- **--tree** option prints in a tree format
 - One WME per line
 - Can be much easier to read or parse, but takes more vertical space
 - Not documented yet



Command: watch and GDS

- `watch --wmes` prints GDS info
 - Wrong state id is often used when states are retracted, but message is still very helpful

Command: load-library

- Can load a dll/so that contains custom event handlers or RHS functions (or anything, really)
 - Useful for extending an existing environment without resorting to a remote client (which is very slow)
 - Written almost exactly the same as a remote client
 - can easily write code to run as remote client or load as a library
 - But code must be written in C++?
- See “help load-library” for details
- See TestExternalLibraryLib for example



Other useful commands

- matches
- memories and multi-attributes
- command-to-file
- rete-net

Debugger: logging

- Can log the contents of any window to a file
 - Right-click window -> Log this window...
- For more complex logging needs, look at `LoggerJava` and `LoggerWinC` examples for how to write your own logging client
 - Don't run your logging client remotely! Use `load-library` command instead for much better performance.



Debugger: Customizing

- Can add/remove/move widgets in the debugger
- Can save/load various layouts
- Note: When upgrading to a new version of Soar, existing layout will be used if possible
 - Won't see any new widgets unless you load the (new) default layout



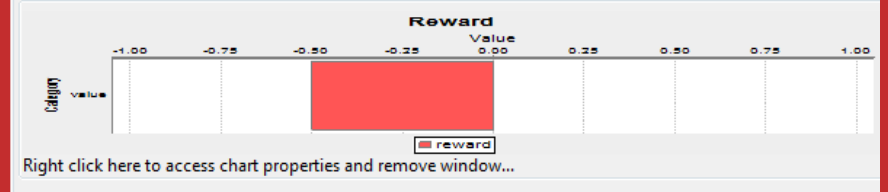
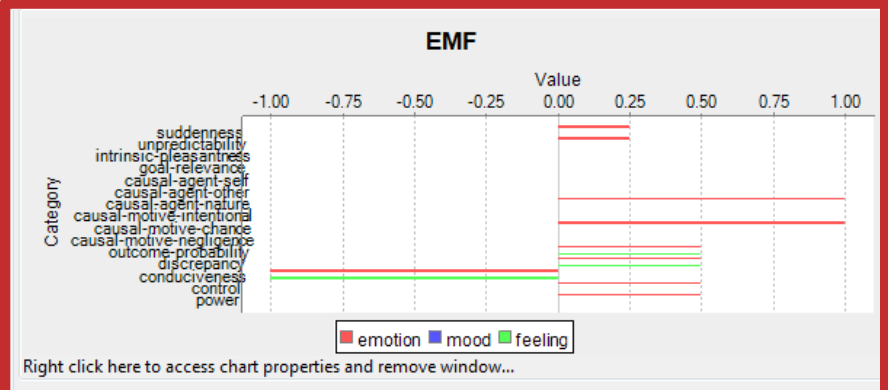
Debugger: New widgets

- Numeric accumulator
- Waterfall numeric accumulator
- Custom printing of objects and operators
- Bar charts
- Uses RHS functions
 - Can be slow since all that info goes across a remote connection
- Still needs a little work
 - Currently only works for one agent (this will be fixed)

```

***CountMe motor-command
***CountMe motor-command
***Reward 0.
157: ==>S: S30 (operator no-change)
***Reward 0.
158: ==>S: S31 (state no-change)
***Reward 0.
159: O: O185 (wait)
***Reward 0.
160: O: O186 (wait)
***Reward 0.
161: O: O187 (wait)
***Reward 0.
162: O: O188 (wait)
***Reward 0.
163: O: O189 (wait)
***Reward 0.
164: O: O190 (wait)
***Reward 0.
165: O: O191 (wait)
***Reward 0.
166: O: O192 (wait)
***Reward 0.
167: O: O193 (wait)
***Reward 0.
168: O: O194 (wait)
***Reward 0.
169: O: O195 (wait)
***Reward 0.
170: O: O196 (wait)
***Reward 0.
171: O: O197 (wait)
***Reward 0.
172: O: O198 (wait)
***Reward 0.
173: O: O199 (wait)
***Reward 0.
174: O: O200 (wait)
***Reward 0.
175: O: O202 (stop-turn)
***CountMe motor-command
***Reward 0.
176: O: O203 (update-dists)
***Reward 0.
177: O: O204 (attend)
***CountMe attend
***CountMe attend-retrieve-supergoal
***CountMe motor-command
Reset: discrepancy
*** Attending retrieve-supergoal G8 passable=true, off=true
***CountMe motor-command
***Reward -0.5
178: O: O207 (verify)
***CountMe difference-detected
discrepancy=0.5
***Reward -0.5
179: O: O208 (intend)
    
```

<Type commands here> Expand Filters

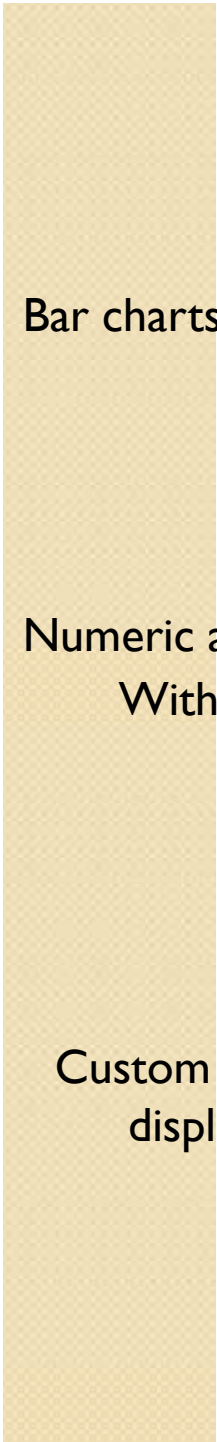


Goal id: S21 type: goto-area goal-object: O2	Total Reward -2.125	Operators O208 (0.0) name: intend O209 (0.0) name: ignore-event	Events E15 type: create-subgoal name: goto-area goal-object: 73 path: unknown progress: true in-subgoal: false distance: 2 E16 type: retrieve-supergoal goal-object: G8 path: off progress: false in-subgoal: true
Intention	Total Reward Interval goto-area-93: -2.875 clean-house-13: -0.375 goto-area-73: -1.875 clean-house-13: 3.0		
Prediction id: P14 status: difference-det			

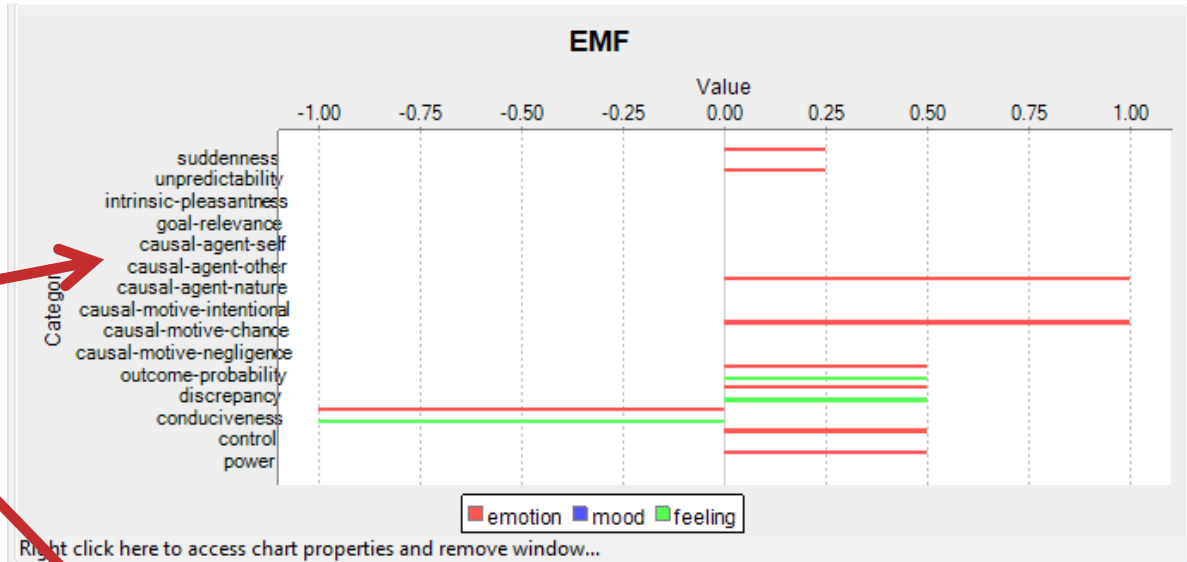
```

print <s>

(S1 ^appraisal-buffer A13 ^areas A15 ^blocks B1 ^carry false
 ^comprehend-buffer C36 ^control-buffer C35 ^count 178 ^counted false
 ^current-area A69 ^current-operator verify ^direction north
 ^directions S6 ^directions E6 ^directions W7 ^directions N1
 ^emf-values E1 ^emodebugger enabled ^encode-buffer E4 ^ep-mem E5
 ^feeling F202 ^feeling-code 0.3025369942188263 ^feeling-intensity 0.5
 ^feeling-label disp-disg ^feeling-valence -1. ^goal-buffer G7
 ^intend-buffer I7 ^io I1 ^last-area A14 ^last-operator attend
 ^mood-conduciveness 0. ^mood-intensity 0. ^mood-valence 0. ^name nafo
 ^operator O208 ^operator O209 + ^operator O208 + ^parameters P6
 ^reward-link R1 ^script nil ^superstate nil ^top-state S1 ^type state
 ^value -0.5 ^dynamic-ER-based-on| feeling)
    
```



Bar charts



Numeric accumulator
With waterfall



Custom operator displays

Custom object displays

Custom object displays

Goal
id: S21
type: goto-area
goal-object: 93
intend-start-dist: 3
completed: false

Total Reward
-2.125

Operators
O208 (0.0) name: intend
O209 (0.0) name: ignore-event

Events
E15
type: create-subgoal
name: goto-area
goal-object: 73
path: unknown
progress: true
in-subgoal: false
distance: 2
E16
type: retrieve-supergoal
goal-object: G8
path: off
progress: false
in-subgoal: true
distance: 2
E17
type: gateway
to: 13
id: 82

Total Reward Interval
goto-area-93: -2.875
clean-house-13: -0.375
goto-area-73: -1.875
clean-house-13: 3.0

Intention

Prediction
id: P14
status: difference-detected
path: on
outcome-probability: 0.5

For more info

- “help” command, manual, and tutorials
- Soar wiki:
<http://winter.eecs.umich.edu/soarwiki/>
- Soar-group mailing list:
soar-group@lists.sourceforge.net
- SML mailing list:
soar-sml-list@lists.sourceforge.net