

The State of Soar

v9.3.1

Nate Derbinsky

University of Michigan

Soar 9.3.1

Focuses

- Bug fixes
- Speed & stability (especially for long runs)
- Incremental functional improvements
 - RL, SMem, EpMem, WM-Activation/Forgetting

This Talk

- Important changes
 - (see release notes for comprehensive list)

Inequality Comparisons

Symbolic constant (i.e. string) and identifier comparisons are handled lexically

9.3.0

`(<s> ^attr apple < orange)`
`(<s> ^attr orange < apple)` } **False**

9.3.1

`(<s> ^attr apple < orange)` → **True**
`(<s> ^attr orange < apple)` → **False**

Example

```
sp {elab
  (state <s> ^superstate nil)
-->
  (<s> ^apple apple
    ^orange orange)}

sp {apple
  (state <s> ^apple <a>
    ^orange {< <a>} <o>)}
-->
  (<s> ^winner apple)}

sp {orange
  (state <s> ^apple {< <o>} <a>
    ^orange <o>)}
-->
  (<s> ^winner orange)}
```

Start Soar...

```
step
p -i s1
```

9.3.0

No winner

9.3.1

(16: S1 ^winner orange)

Faster Halting Behavior

The (`halt`) RHS function now takes effect at the end of the elaboration phase when fired (independent of run step size)

Implications

- Equivalent run length: `run -e | -p | -d`
- Episodic RL agents may require editing to ensure reward is asserted before or during elaboration phase of episode `halt`

64-bit Updates

To support long agent runs, the kernel and SML now use 64-bit integers for data like WME values, time tags, stats, counters, and rete data structures

Implications

- Potentially the need for small changes to SML applications in order to quell warnings
- Backward incompatibility over remote connections

SQLite Updates

To improve SMem and EpMem performance, the SQLite library was updated and database schemas were changed

Implications

- Database file backwards incompatibility
- New API allows for anytime disk backups of memory stores

Command Line Interface Rewrite

To simplify, improve, and better test/validate, the CLI code was rewritten

Implications

- Users must escape backslashes (i.e. “\\” vs. “\”) in commands (such as entering file paths in Windows)
- CLI errors tend to be more silent

Soar Manual Unification

The RL, SMem, and EpMem manuals have been integrated within the main Soar manual

Implications

- Single point of reference for Soar
- Better cross-references between related material
- Some inconsistencies and errors corrected
- Better searching (single PDF vs. multiple DOC files)

CLI Help Unification

All CLI documentation, including RL, SMem, and EpMem, is maintained on the Google Code wiki and converted to other forms as needed

Consumers

- Soar Manual
- Reinstatement of offline “help” command

Laundry List

Faster...

- Default callback registration
- WM Activation-based forgetting
- Memory allocation for STL containers

Better...

- SMem/EpMem/WMA debugging facilities
- SMem biases
- WM Activation-based forgetting

Evaluation

Nuggets

- Over 700 code commits
- 7 “old” bugs fixed
- Empirically better, faster, more stable over long runs

Coal

- Jon Voigt @ SoarTech -> infrequent Soar releases
- SVS not ready for prime-time
- Still lacking comprehensive correctness, stability, and performance tests