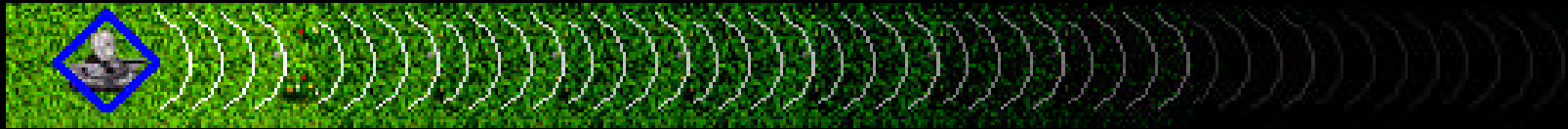


Long-Term Learning in Soar



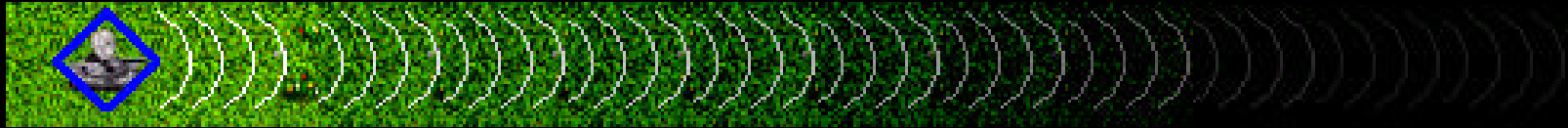
Bill Kennedy

George Mason University

22st Soar Workshop

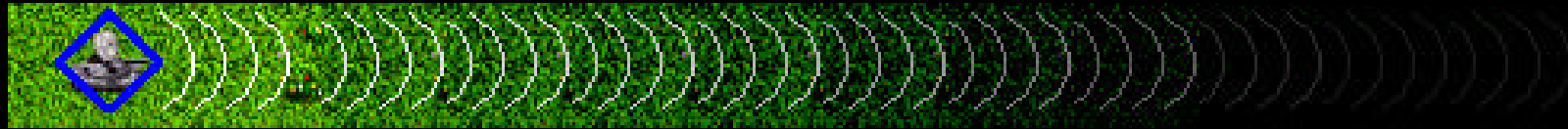
Sunday, June 2, 2002

Long-Term Learning Fundamental Questions



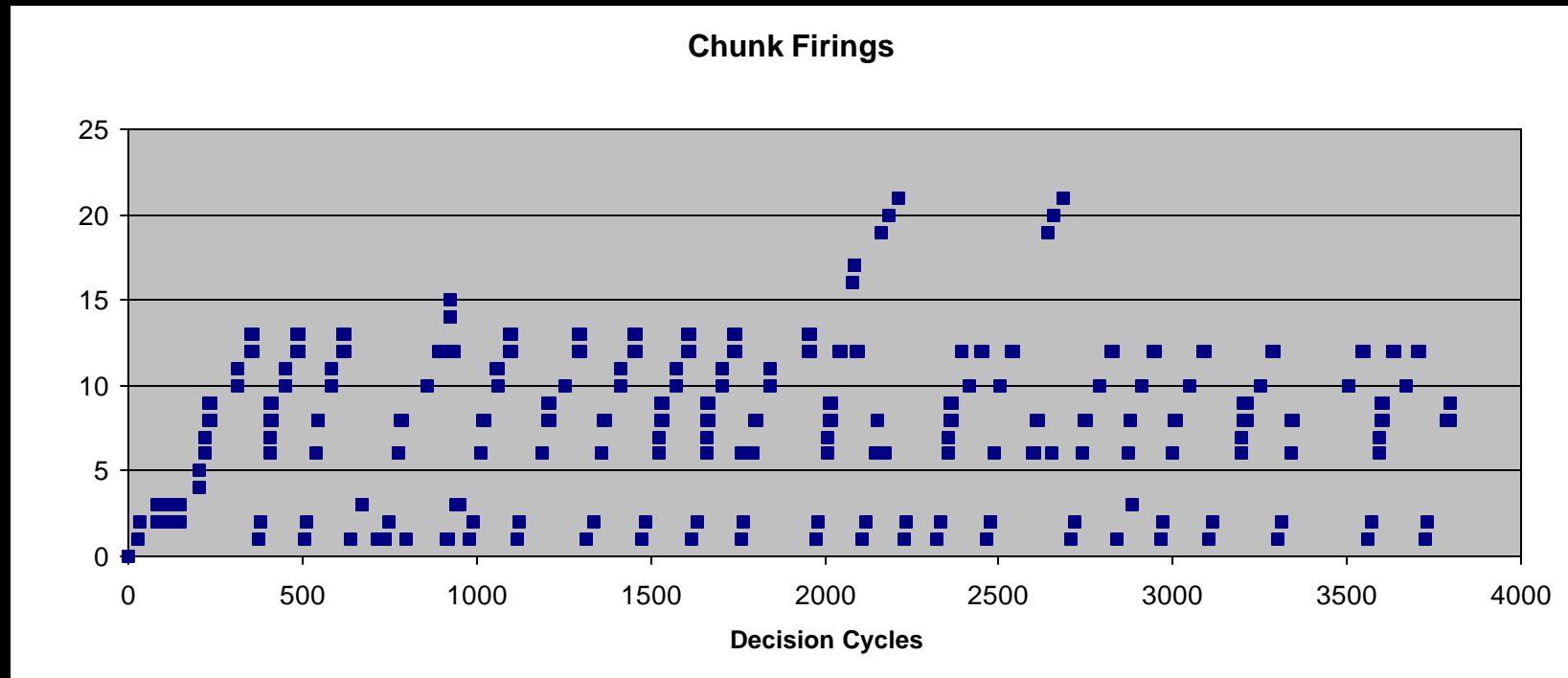
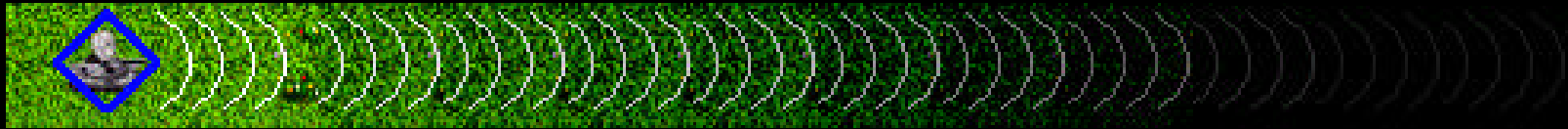
- Will learning go on forever?
- How much of learned knowledge is ever used?
- Can we use understanding of chunk use to improve performance?

Experiments with “simple-learner” alone

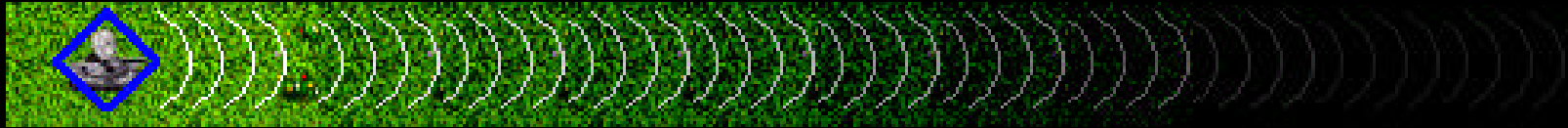


- At least 7 occasions for chunking
- More depending on starting position
- Initial circuit is 140 dc
- After chunking, 132 dc
- Chunking ends & all chunks on circuit are used each cycle

Experiments with “simple-learner” with “simple” tank

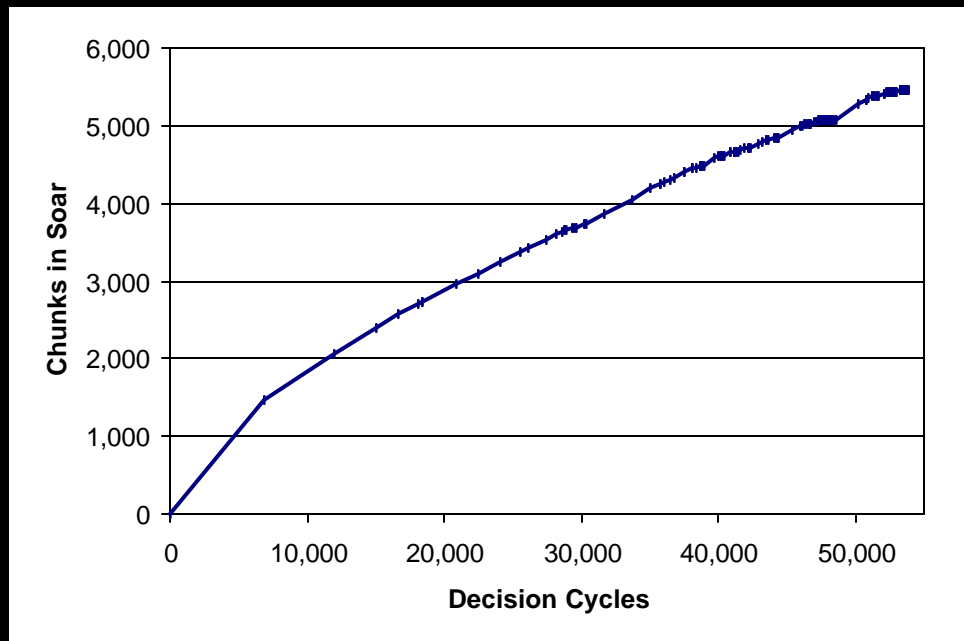
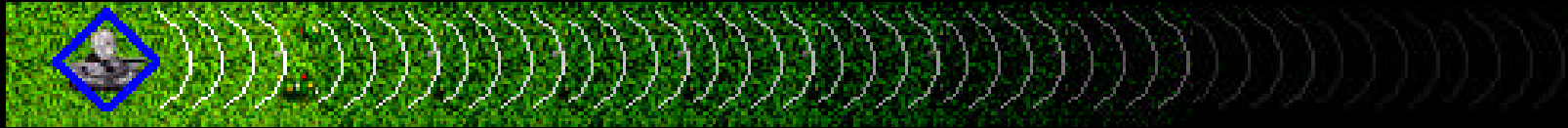


Experimenting with John Laird's Planning Bot



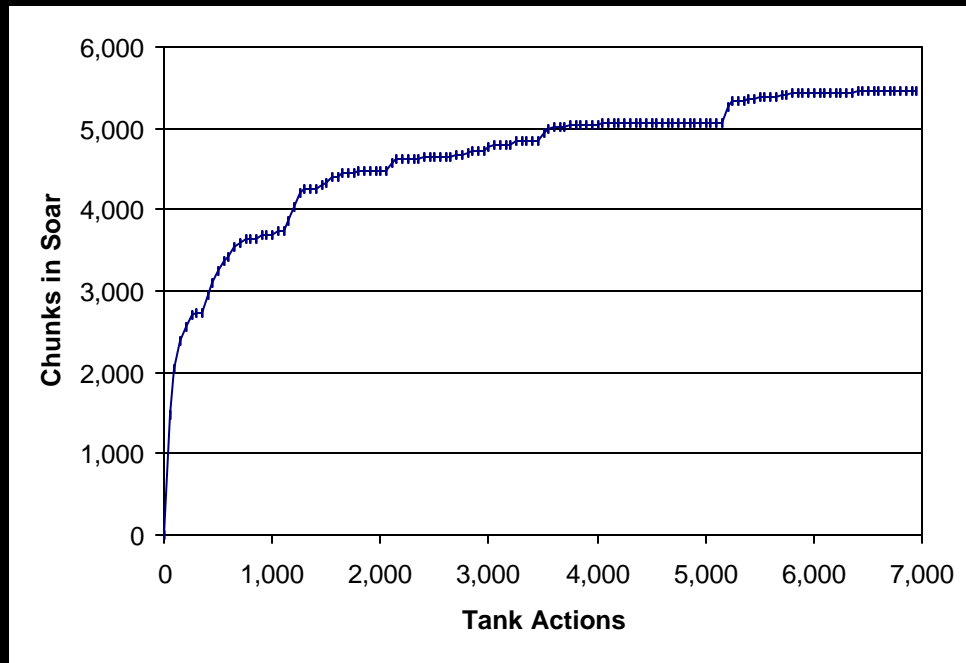
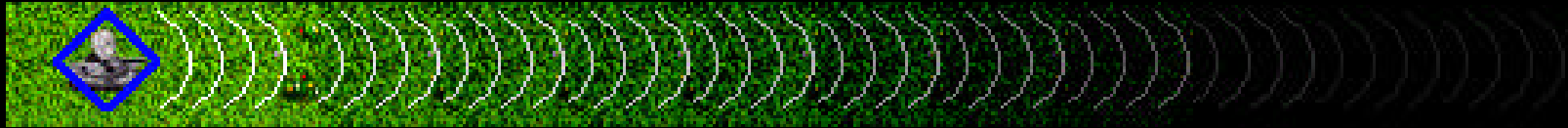
- Experimental design:
 - John's Bot alone, run for twice the default period
 - Excise chunks based on the gap between use
 - Monitor performance . . .

Experiments with Planning Bot over the long-term



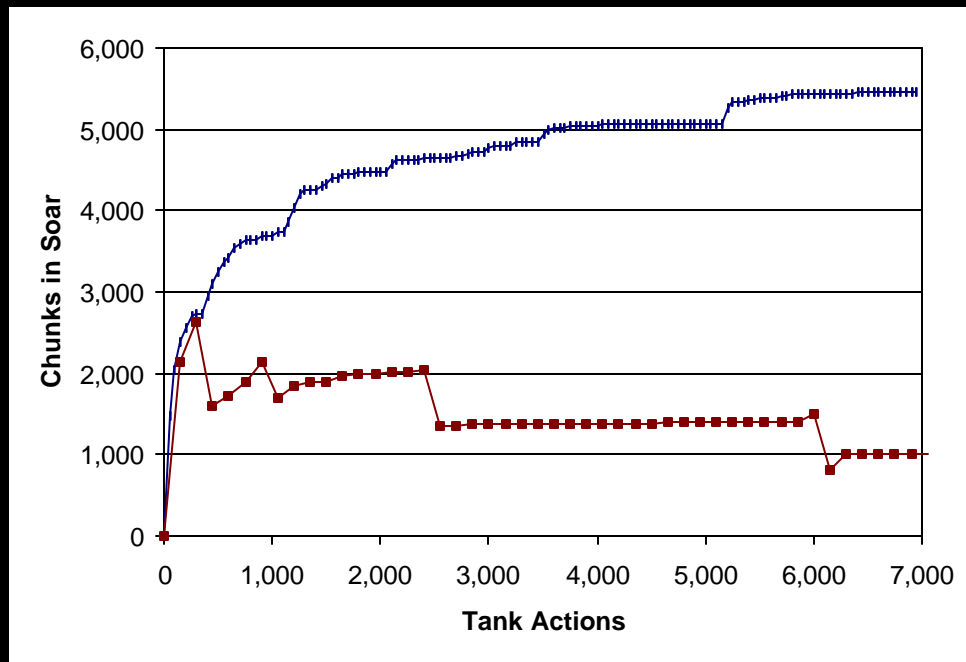
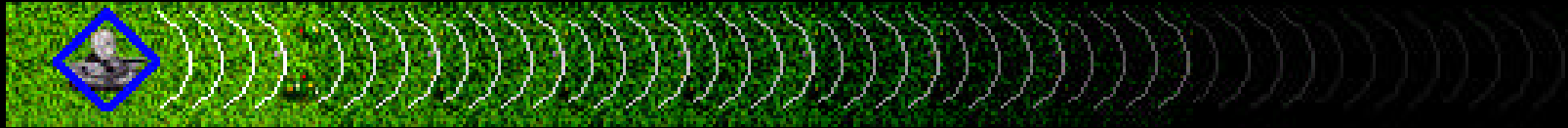
Learning continues,
but it's slowing. . .

Experiments with Planning Bot over the long-term



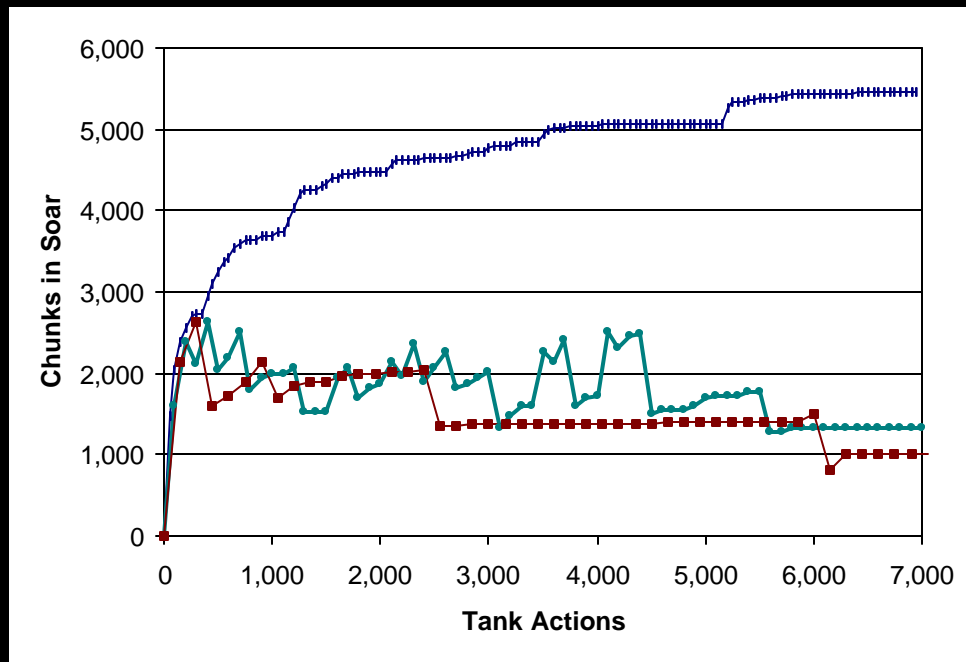
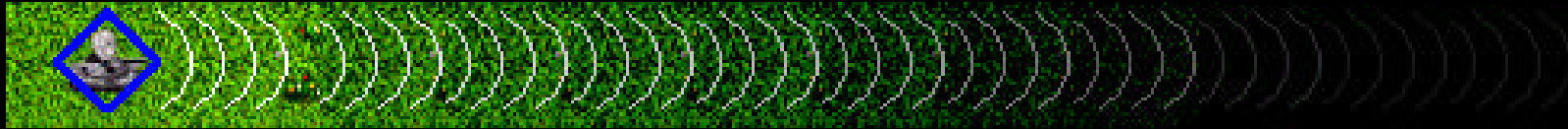
Learning continues,
but it's slowing. . .

Experiments with Planning Bot over the long-term



Chunks excised based on a
5,000DC gap between uses

Experiments with Planning Bot over the long-term

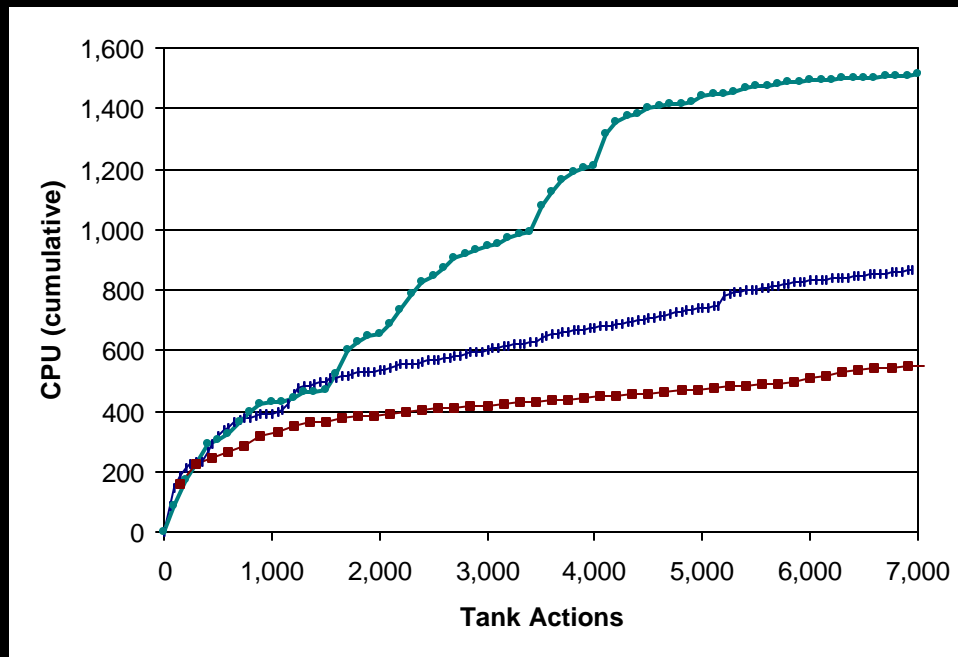
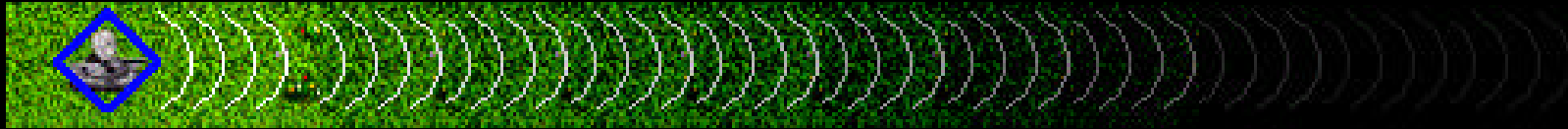


← Learning without excising

← Excising with 500DC gap

← Excising with 5,000DC gap

Experiments with Planning Bot over the long-term

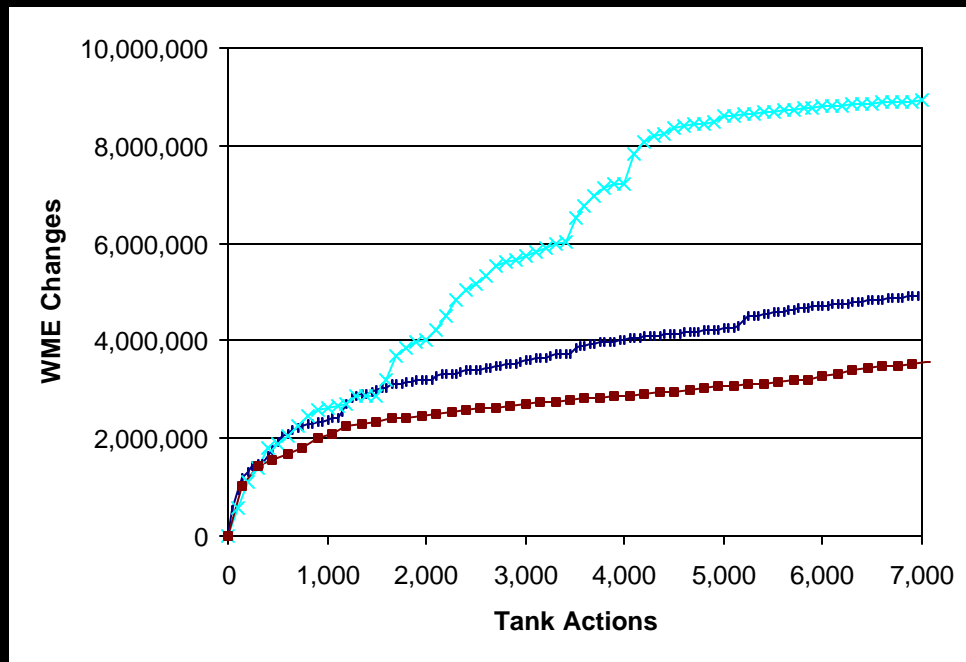
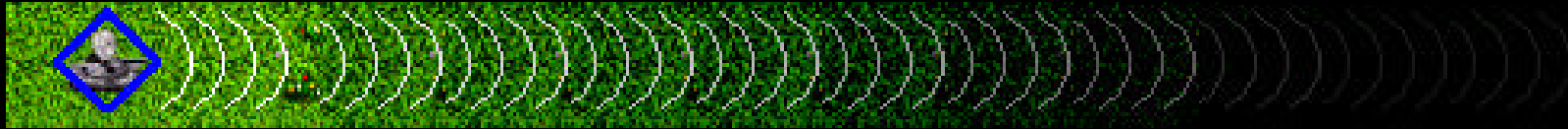


← Excising with 500DC gap

← Learning without excising

← Excising with 5,000DC gap

Experiments with Planning Bot over the long-term

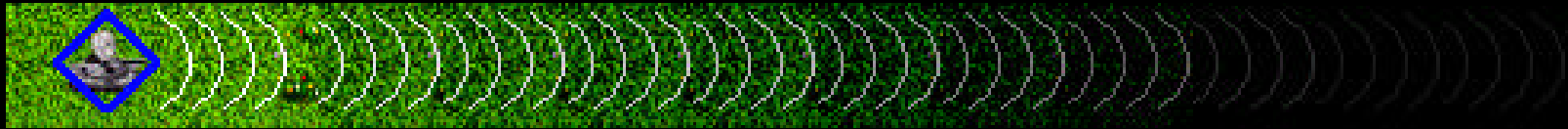


← Excising with 500DC gap

← Learning without excising

← Excising with 5,000DC gap

Implications for Soar and Soar as a “Computational Theory of Cognition”



- Consider allowing access to Soar’s internal performance to support excising. . . .
- Modify Allen Newell’s definition of intelligence to include performance considerations with long-term memory
- Implications for Cognitive Science
- Comments? WKennedy@gmu.edu