EDEE: A New Environment for Soar

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Agenda

- Introduction to EDEE
- Soar Interface to EDEE
- Demo
- EDEE for Research
- Episodic Memory Experiment
- Nuggets and Coal

Problem

- Commonly used Soar research environments can be placed into three categories:

	Easy to Setup	Easy to Use	Complex	Configurable
Eaters, Tanksoar, etc	✖	✖		✖
FP shooter	✖		✖	
Custom			✖	✖

- Wanted: a complex, highly-configurable environment for research that is still easy to setup and use

Solution

www.killerbeesoftware.com/edee

Features of EDEE: Easy to Use

- Simple rules
  - cities create units
  - units can destroy other units or capture cities
  - unit movement is bound by terrain
- Relatively few commands
  - movement/attack
  - unit construction
- Turn-Based
  - unit actions are discrete
  - easy to debug and control

Features of EDEE: Complex

- 13 different types of terrain

- 35 different types of units

- supply management
  - supply chains
 - resource management
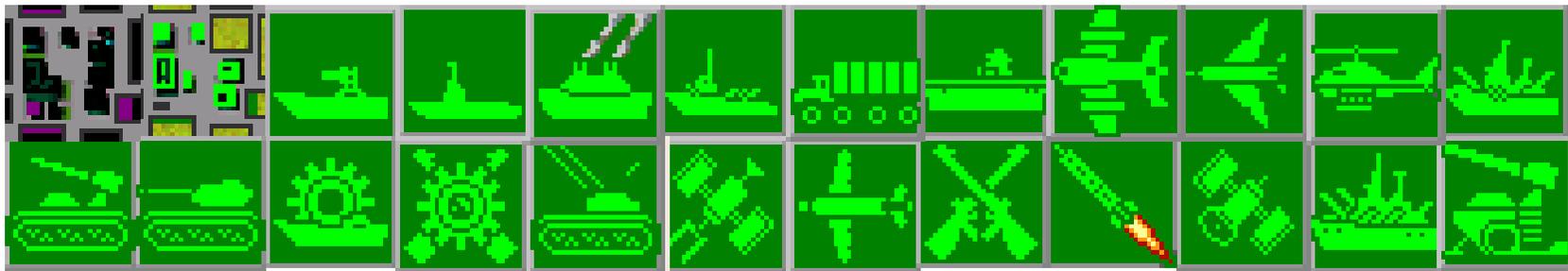
Features of EDEE: Complex (2)

- multiple simultaneous goals
  - winning battles
  - taking/defending territory
  - long term planning
- command multiple units not just one entity
- other effects
  - weather
  - fog of war

Features of EDEE: Configurable

- Random maps in any size

- Control ratio of different terrains

  – example: tropical, lots of islands

  – example: arctic, lots of land
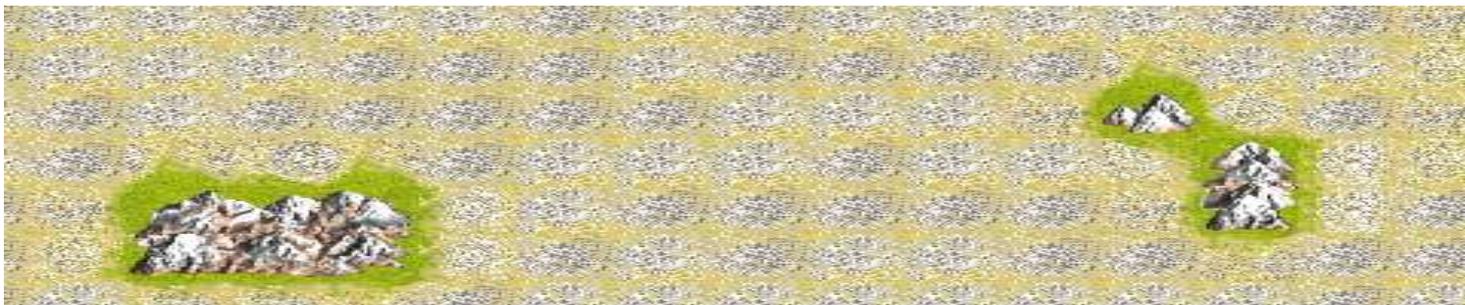
Features of EDEE: Configurable (2)
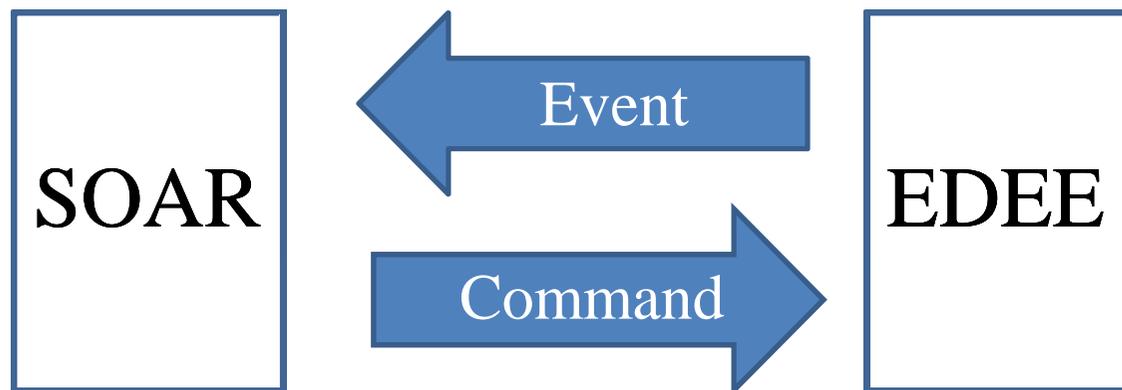
- Custom Maps

Features of EDEE: Configurable (3)

- Turn on/off various game elements
- Select available units
- Modify existing units and terrain
- Create custom units and terrain
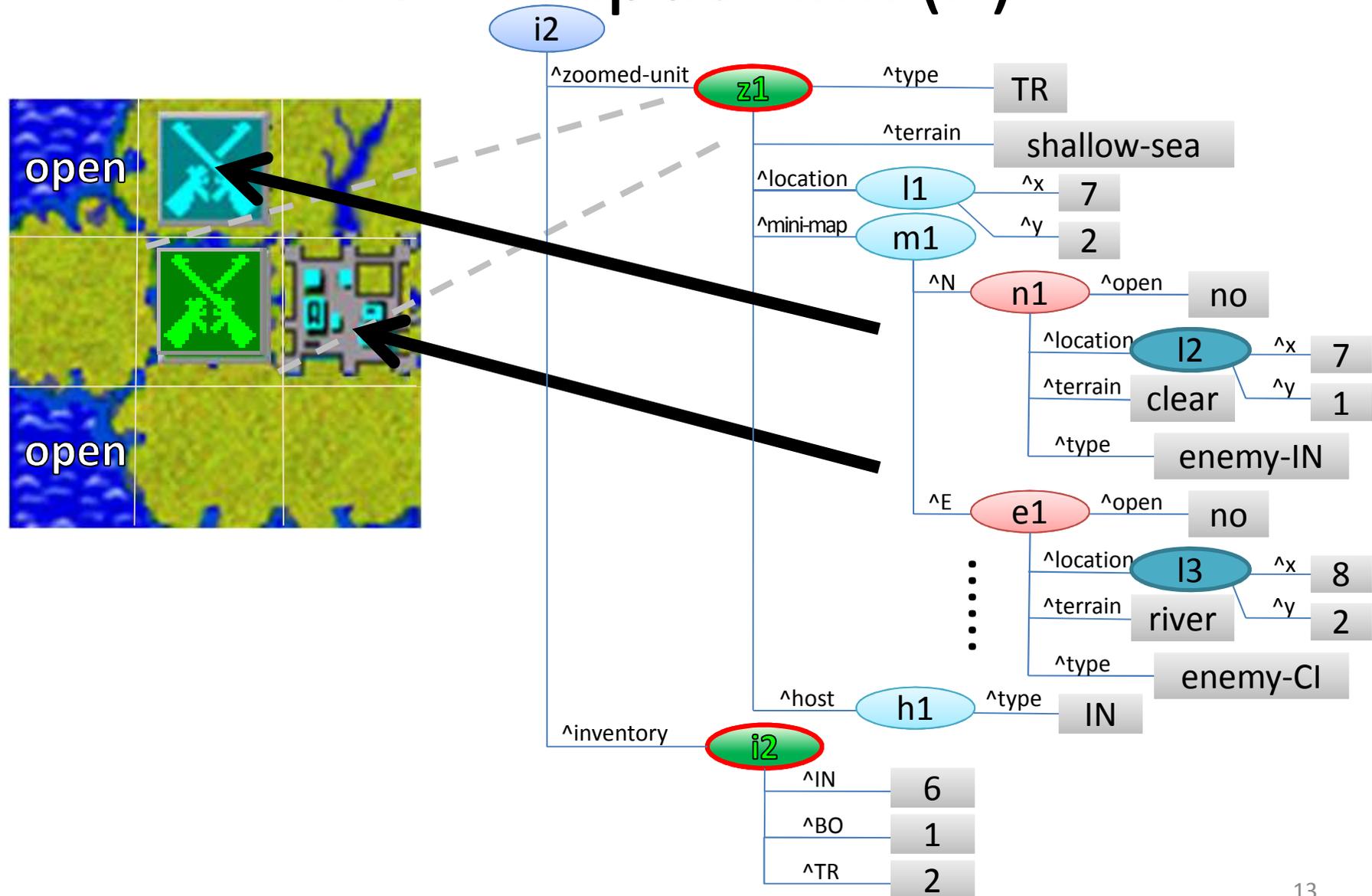
Soar Interface for EDEE

- SML library linked to EDEE
- Empire is event-command based
  - sample events: new unit created, enemy sighted
  - sample commands: build unit, move unit

EDEE Input Link

EDEE Input Link (2)

Using EDEE for Research

- One agent controlling multiple units
  - multiple goals
  - different level goals
    - examples:
    - "take this city"
    - "explore the map"
    - "reinforcements needed in this area"
  - interleaved and sometimes conflicting goals

Using EDEE for Research (2)

- Simple Game, Massive State Space
  - requires state-space compression for traditional machine learning
  - difficult learning task

- A Good Environment for Transfer Learning
  - a single scenario can evolve to other scenarios of varying similarity

Specific Example:
Episodic Memory Navigation Task

- Situation: Unit can only see neighboring cells
- Goal: find the enemy city on the map
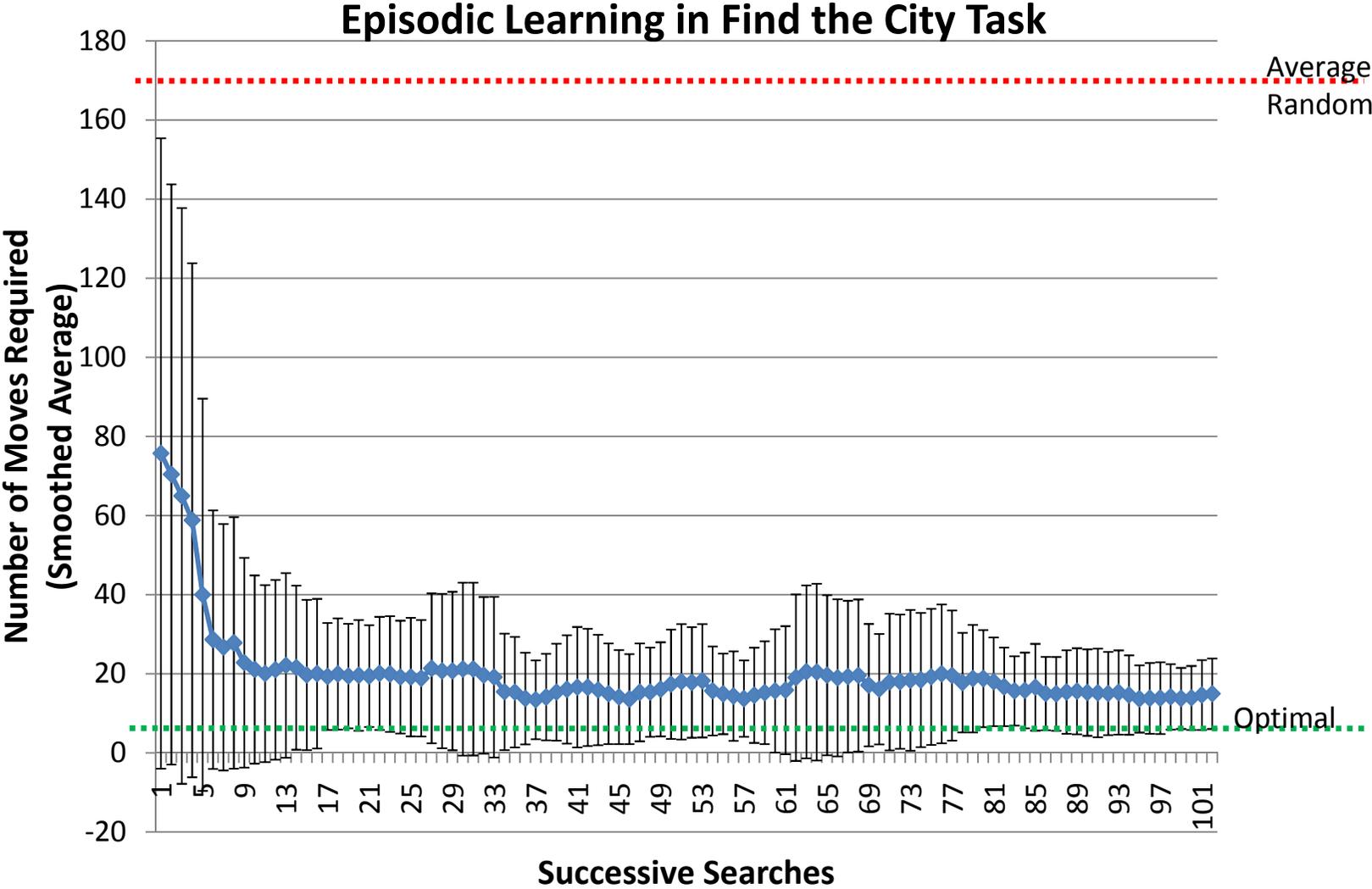
Find a memory with the same location

Traverse forward to a winning memory

Score a move according to how close to a win

Results

Episodic Learning in Find the City Task

Nuggets	Coal
Good environment for research	SML interface not complete • wanted: more units • wanted: more strategic information
Already supporting research	

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