A Pedagogical Framework for Modeling and Simulating Intelligent Agents and Control Systems

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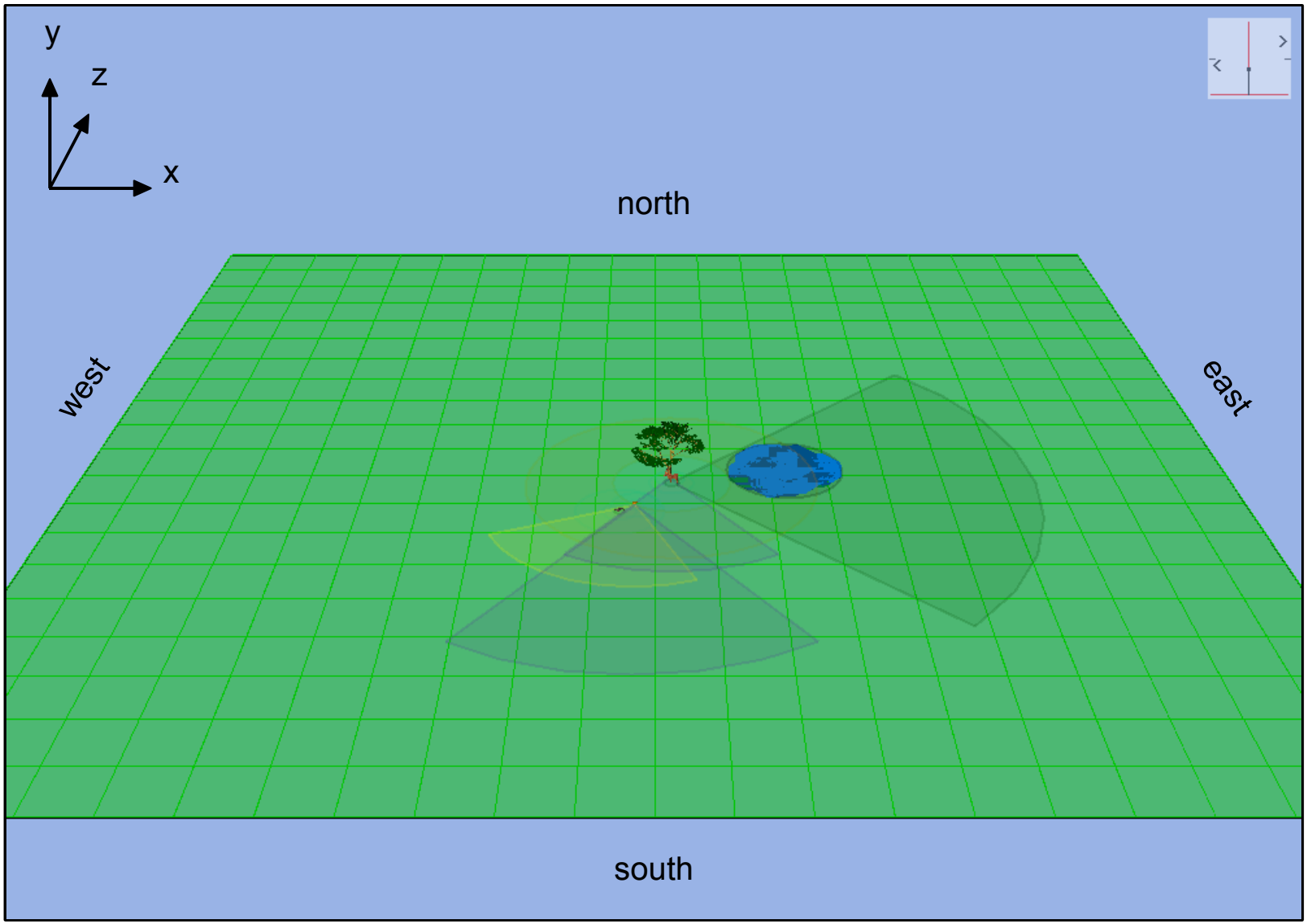
Motivation

- Student programming assignments
  - too much troublesome administrative overhead
  - effort directed toward programming, not AI
  - non-reusable hacks
- Student-friendly AI modeling and simulation framework
  - manages components, agents, graphics, logging, etc.
  - facilitates controlled experiments
  - promotes meaningful analysis

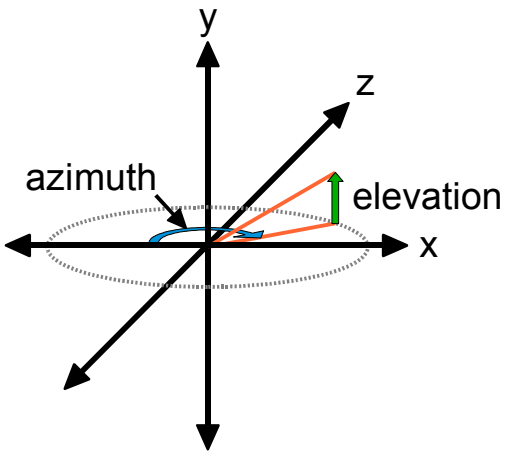
Environment

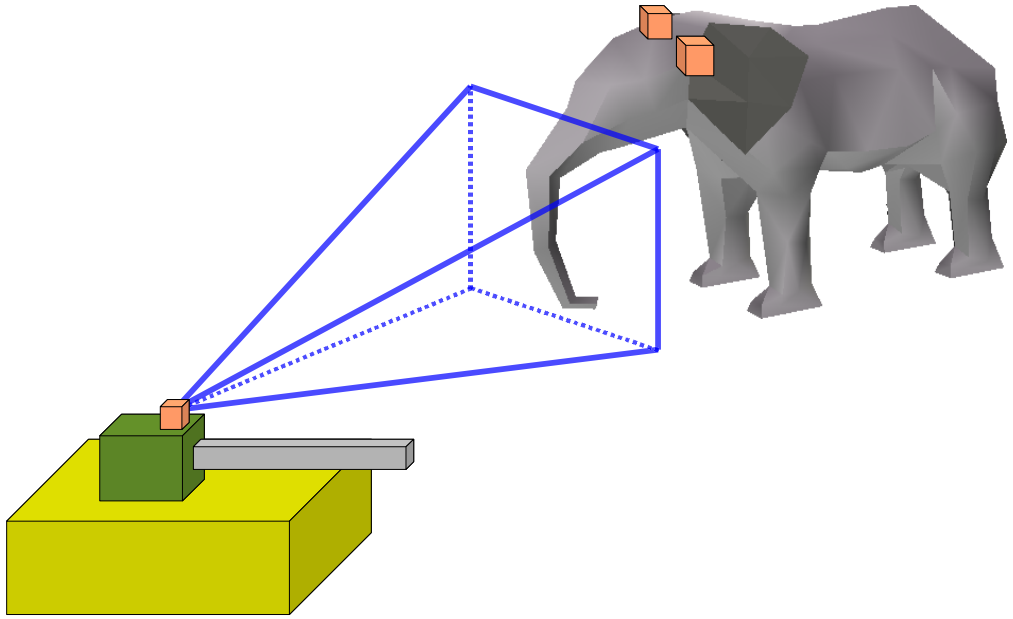
- 3D tabletop world of arbitrary scale

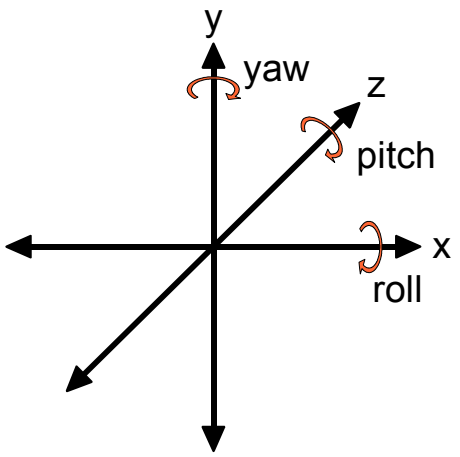


Components

- Hierarchical building blocks/infrastructure for agents
  - input/processing/output functionality
  - tedious, error-prone engineering aspects
    - mount points
    - degrees of freedom
    - speed, acceleration, timing
  - enforces students' rules and constraints

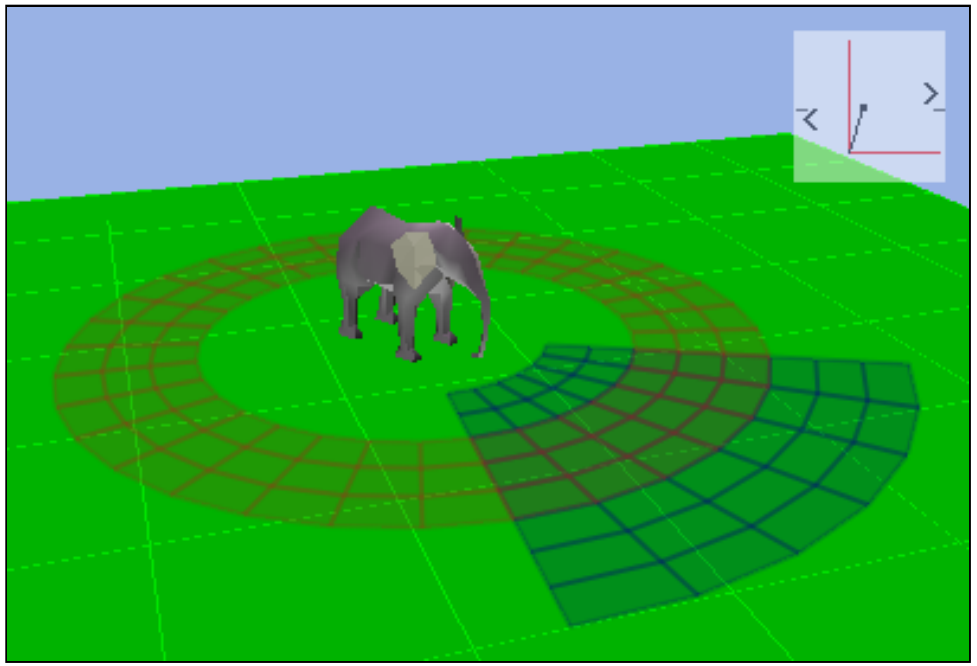


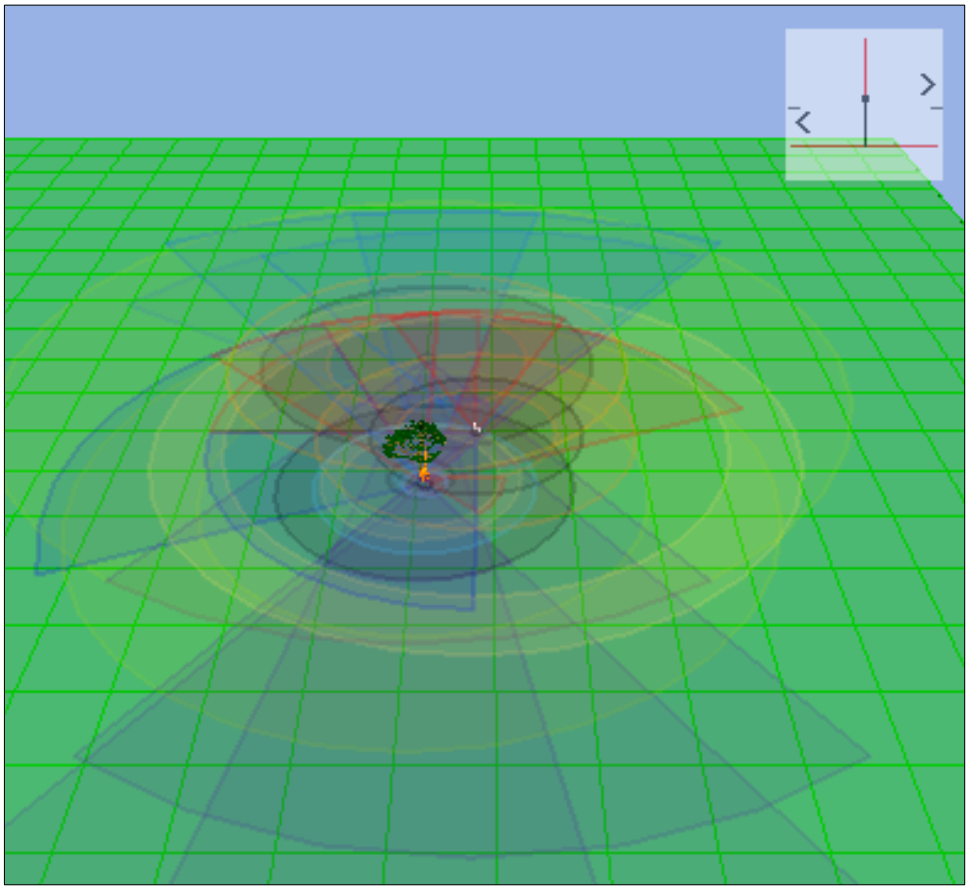




Agents

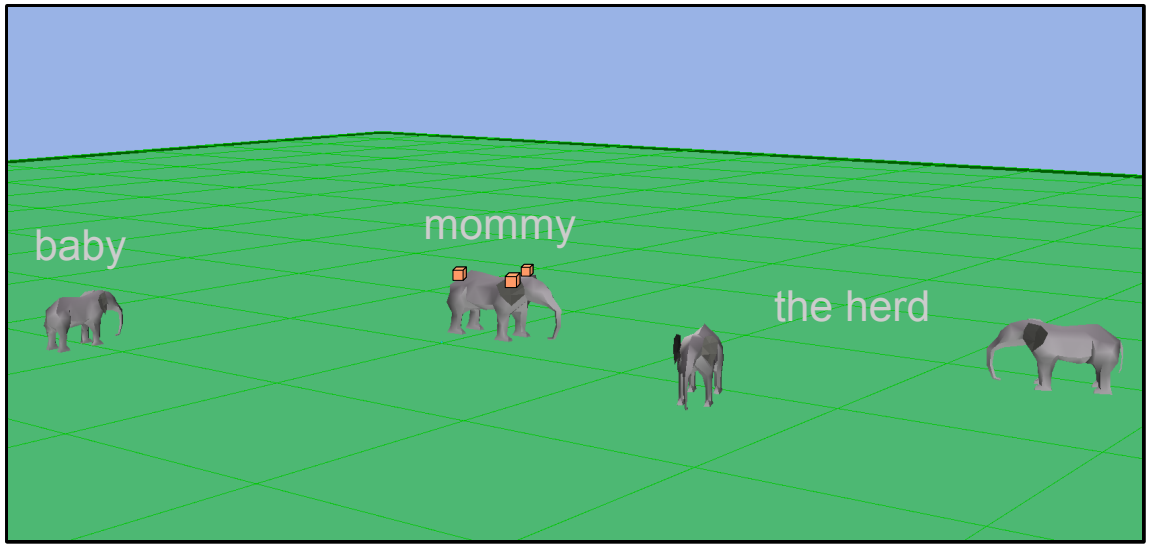
- Coordinated components in task environment
  - AI core
  - command and control
  - intercommunication

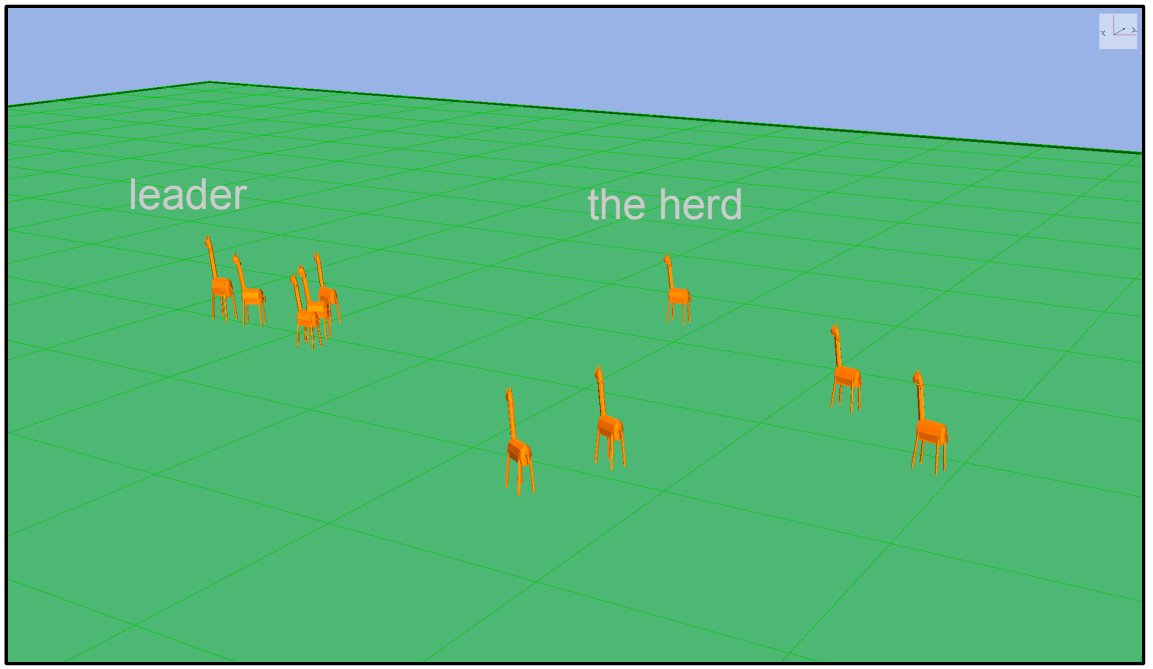




Simulation and Analysis

- Monte Carlo simulation
  - controlled experiments
  - automatic data collection
  - manual, external analysis
- Example scenarios
  - nature
    - herding
    - flocking
    - following
    - predator/prey
  - engineering
    - control systems
    - robotics
    - battle engagements





Questions?

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