Autonomous Multiagent Systems

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Week 8, Tuesday (10/15)

Any Questions?

Finish ML crash course

- Genetic algorithms/programming
- Neural networks
- **Reinforcement learning**

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Motivation from real insects

- Ant colonies exhibit remarkably complex behaviors
  - Food gathering
  - Burial
  - Nest building
  - Reproduction

- Individual ants aren't smart
  - They're easily fooled out of their element (Feinman)

$\boxed{\text{Model the ant, not the colony}}$

Overview of the Readings

Go to the Ant: A manifesto

Blazing a Trail: A robotic application

Pheromone Robotics: Another

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Student-led discussion

Claim: The behavior of ants is against the principle of evolution.

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What evolves?

- In nature, is it the individual, the colony, or the gene?
- How does "altruism" arise?
- What does this mean about agent-based systems?
  - Should we create self-interested ants?
  - Or do we need to give them a global objective function?

Exercises – Ant Based Applications

- Public transportation scheduling/driving
- Coal mining
- Satellite television
- Ship repair
- Area searches in dense terrain
- Truck convoy
- Seek and destroy agents

- Size-invariant image recognition
- Ethernet protocol
- Internet search
- Shortest path search

Next Week's Readings – Applications

- Air traffic control
- Elevator control
- Meeting scheduling

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