Autonomous Multiagent Systems

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Week 9, Thursday (10/24)

Any Questions?

Your Proposals

- Subjective comments from both of us
- The mechanics were generally good
- But there's more to good writing than that
- Grade based mostly on organization, readability
- Most common problems:
  - *Difficult* to read
  - Poor opening
  - Not enough detail
- First a few words about content …

Content

- In general, quite good (and varied)
- Some are going to be *quite challenging*
  - Especially machine learning ones
  - Be prepared to scale back
- Some had not enough detail for me to evaluate
  - Flesh things out ASAP
  - Ask if you want more feedback
  - Be more explicit in progress report

Structure

> A whole is that which has a beginning
> a middle and an end. *Aristotle*

Beginning: Pose the problem

- At least "why?" and a bit of "what?"
- Maybe foreshadow "how?" too

Middle: Make the argument

- Details of what and how - all the mechanics
- Say both what you *have* defined, and what is *yet to be done* in as much detail as possible.

End: Summarize

- Remind succinctly
- Final details

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Beginning

- What's my topic?
- What's my thesis?
- What do I need to tell my reader right away?

This essay will look at Amazon.com

vs.

Jeff Bezos became a billionaire after founding Amazon.com in 1995, but his company has yet to make a penny of profit. How did Amazon get so big so fast? Can it sustain its remarkable growth? And will Amazon and scores of other high-profile dot-coms ever become profitable-or are they built on a flawed business model?

Eschew Excess Verbiage

- Be succinct.
- But also make sure that it's *easy to read.*
- Readers of scientific papers need to be drawn in and led along or they will go on to something else.
  – (unless, of course, it's a class assignment)

The Middle

- Hypothesis & Aims
  - Be clear.
  - What would you consider a success?
  - What would be a failure?
- Significance
  - Make sure the reader cares if you succeed.
- Preliminary Studies
  - Make the reader believe that you can do it.
- Design and Methods
  - Details!
  - Representation, methodology, etc.
  - What remains to be defined?

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The Ending

- Similar to the beginning
- Succinct

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Progress Reports

- Revised proposals
- Consider our suggestions
- In some cases, complete rewrites
- Add a previous work section
- More related to the readings!
- Will be graded with a higher standard

Readings Overview

- OASIS for airtraffic control
- RL for elevator control
- Electric elves for office support

Question

- Are we ready for free flight and automatic proxy agents?

Last year's applications

- OASIS
- Archon — an early MAS
- Trafficopter — highway traffic planning
- AntNet — network routing using ant metaphor
- Competitive results

Archon — Cockburn and Jennings ’96

- Large, industrialized systems (e.g. electricity distribution)
- A general system (methodology)
  – many applications
- Clearly distinguish between:
  – **social know-how** (AL)
  – **domain-level problem solving** (IS)
- Built to combine **legacy systems**

Trafficopter — Moukas et al. ’98

- Intelligent highways without the infrastructure
- Oncoming cars report upstream traffic
- Cars equipped with PDAs, GPS, wireless transceivers
  - Cheap equipment
  - Cars easily equipped
  - Not needed on all cars

Data Transfer

- Cars query about specific map locations
- Messages propagated by other cars
- Some controls to keep data fresh:
  - Half-time decay function of traffic data
  - Requests die after number of hops, amount of time
  - Farther messages propagates first (hop minimizer)
  - Only 3 propagations per message

Results

- Feasability studies in simulation
- Studied percentage of queries answered as a function of number of cars equipped
- Also studied effect of data cache and hop minimizer

AntNet

- Network routing example
- Randomized algorithm (packets sent probabilistically)
- Travel to destination and back, leaving time-to-dest data at nodes
- Follow the “pheromones” probabilistically

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Next Week's Readings – Distributed Rational Decision Making

- Chapter 6 or a web article
- Don't be confused with week 11
- Start early on week 11