

List of Topics for Term Paper

Open Issues in AI:

1. **Architectures of Mind** - What does the whole mind look like? Network, Hierarchy or Society? Does I/O link to many brains or one? Who is in charge? Where am I? What is consciousness?
2. **Action Selection** - As a more specific example of the above. We know how to solve 1 problem. How does the creature deal with multiple problems at once?
3. **"Learning to Learn"** - How does the creature generate goals for itself in the first place? Machine learning algorithms all learn for a while and then converge (stop learning). Why do humans not converge?
4. **Symbol-grounding, Evolution of language.** - What is language? How do creatures processing numerical sensory data end up processing symbolic "words" with meanings? What does "chair" mean, internally? Is it a meaningless token #5099 being passed around, or is it a whole specialized sub-system, firing away? Do parts of the brain talk to each other? Do we have an internal language? Is it English, or is it something messier? Will sub-symbolic AI plug in neatly to symbolic AI?
5. **Robots or simulation?** - Robots are more real, may solve symbol-grounding. But experiments in simulation (the Web?) are more practical. Sims could never have evolved his 3-D robots in hardware. (Though a field of Evolutionary Hardware does exist.)

Open problems AI and E-Learning:

6. e-Learning design and methodologies
7. e-Learning portals
8. Instructional design methodologies
9. Audio and video technologies for e-Learning
10. Authoring tools
11. e-Learning technologies and tools
12. Social impact and cultural issues in e-Learning
13. Content management and development
14. Policy issues in e-Learning
15. On-demand e-Learning
16. e-Learning standards
17. Assessment methodologies
18. Knowledge management
19. Virtual learning environments
20. AI and e-Learning
21. On-line education (all levels: elementary, secondary, ...)
22. Open-source e-Learning platforms

23. Training and evaluation strategies
24. e-Universities
25. Case studies and emerging applications
26. Is learning with multimedia more effective?
27. How can we produce 'aha'-effects?
28. Are there simple and good models of evaluation?
29. How to integrate the authority of the instructor?
30. Design reusable content modules
31. Exploit the use of games
32. High level authoring tools for multimedia learning modules?
33. How to build intelligent navigation systems?
34. How to create adaptive learning environments?
35. Are there such things as 'learning-agents' ("things that teach")?

Open problems that Artificial Intelligence with requirements engineering

36. Disambiguating natural language requirements
37. Developing knowledge based systems and ontologies to manage the requirements and model problem domains
38. The use of computational intelligence to solve the problems of incompleteness and prioritization of requirements.

Open problems AI-XI

39. Old-evidence/updating problem and *ad-hoc hypotheses* [Gly80].
40. Limited environmental classes. The problem of defining and proving general value bounds becomes more feasible by considering, in a first step, restricted concept classes
41. Generalization of AIXI to general Bayes mixtures.
42. Intelligence Aspects of AIXI. Intelligence can have many faces.
43. Structure of AIXI.
44. General and specific performance measures in AI.
45. Practical performance measures in AI.
46. Experimental evaluation in AI.