

Inductive Logic Programming for Collaborative Problem Solving

Agent Lab Ph.D Symposium
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Outline

- 1 Thesis
 - Title
 - Research problems
 - The plan
 - Progress

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Thesis Title (tentative)

- Title: Inductive Logic Programming for Collaborative Problem Solving
- Elements:
 - learning in multi-agent system;
 - inductive logic programming (ILP);
 - learning involving interaction;
 - epistemic reasoning;

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Collaborative ILP

Inductive Logic Programming (ILP):

- B : background knowledge
- E : training examples
- H : hypothesis
- ILP: construct H such that $B \wedge H \models E$



Collaborative ILP

Collaborative ILP:

- $\mathbb{B} = \bigcup_{i \in \mathbb{A}} B_i$: total background knowledge
- \mathbb{E} : total training examples
- H : hypothesis
- CILP: construct H such that $\mathbb{B} \wedge H \models \mathbb{E}$



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Plan

- Conceptualize and illustrate the type of distributed problems that can be effectively solved by collaborative learning.
- Define precisely the collaborative inductive logic programming problem.
- Develop a framework which integrates inductive logic programming with epistemic reasoning.
- Evaluate the proposed approach when applied in reducing communication costs and enhancing privacy.

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Conference Papers

- 1 J. Huang and A. R. Pearce, "**Distributed Interactive Learning in Multi-agent Systems**", in Proceedings of the Twenty-First National Conference on Artificial Intelligence. AAAI Press, 2006, pp. 666-671.
- 2 J. Huang and A. R. Pearce, "**Toward Inductive Logic Programming for Collaborative Problem Solving**", IEEE/WIC/ACM International Conference on Intelligent Agent Technology (IAT'06), to appear.
- 3 J. Huang and A. R. Pearce, "**Collaborative Inductive Logic Programming for Path Planning**", in Proceedings of the Twentieth International Joint Conference on Artificial Intelligence, to appear.