

Conclusion

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Outline

- 1 Conclusion
- 2 Topics not covered
- 3 Perspectives

Conclusion

	Notions
Epistemic logic	Syntax, Semantics, Succinctness, Model checking, Satisfiability
Knowledge and seeing	Abstraction
Knowledge and time	Interaction
Dynamic epistemic logic	Automatic structures VS Turing-complete, no knowledge about the strategies of others
Knowledge-based programs	Common knowledge of the strategies of others

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Other topics not covered

- Belief revision, plausibility models
[Baltag et al. Chap. 7 of Handbook of epistemic logic]
- Probabilistic dynamic epistemic logic
- Distributed systems and interpreted systems. Modeling protocols.
- Proof theory. Soundness and completeness of axiomatization.
- Finite model property. Bisimulation. Bisimulation contraction.

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Perspectives

- Provide efficient algorithms for epistemic planning
- Synthesis Knowledge-based programs (mix of Reinforcement Learning and tracking the emergence of epistemic reasoning?)
- Face the logical omniscience problem

Limited belief

Issue when interacting with humans: logical omniscience

Because knowledge computation not modeled in the semantics



I know you know
the perfect move at
Chess.



Limited belief

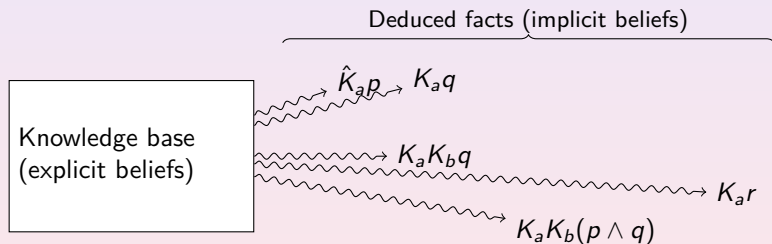


Limited belief

Solution

Model the knowledge computation via *proof systems*!

[Levesque, 1984], [Lakemeyer, 1994], [Kaplan and Schubert, 2000]



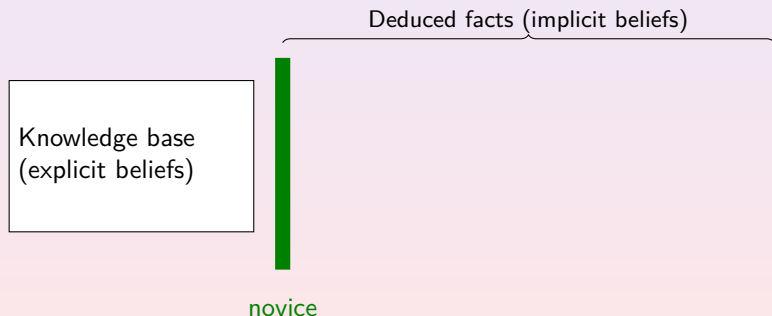
[Liu et al., 2004], [Schwering, 2017], [Chen, Saffidine, Schwering, 2018]

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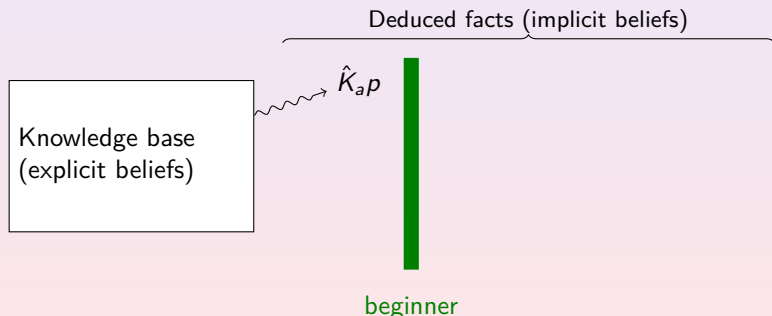
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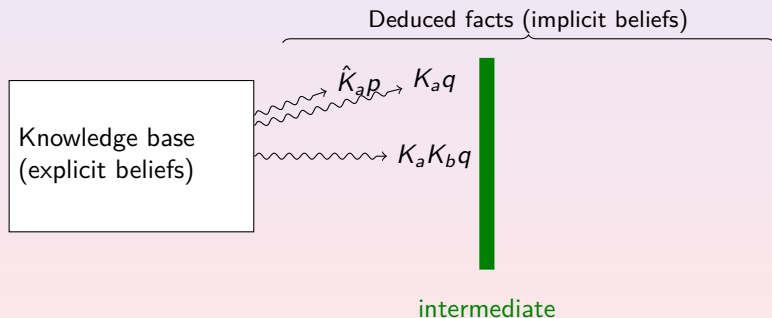
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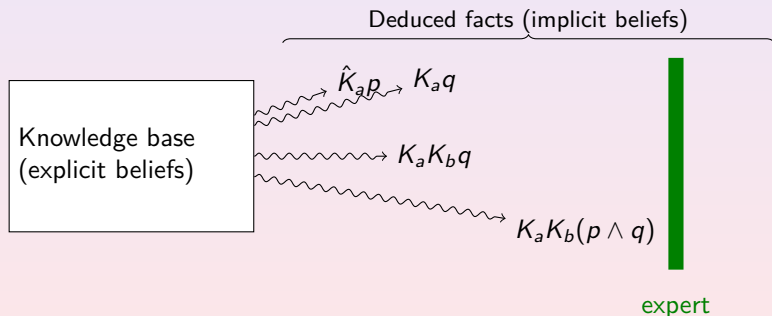
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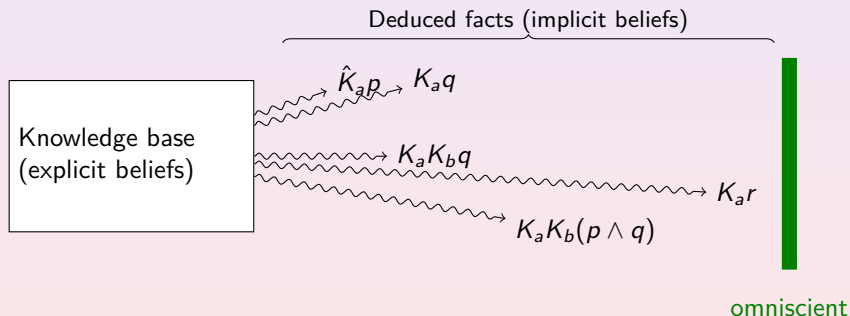
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Limited belief

Theorem

With one agent, theorem proving is:

- *NP-complete,*
- *but PSPACE-complete when the belief level is part of the input*

[Chen, Saffidine, Schwering, 2018]

Question

- *Extension to the multi-agent case?*
- *Extension to DEL actions?*
- *Provide approximate solutions?*

Hintikka's World

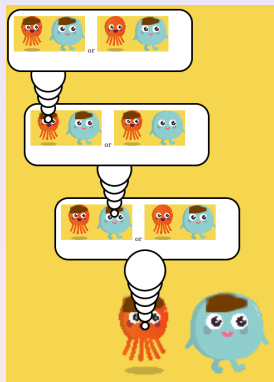
Implement many different models

- belief revision, plausibility models
- probabilistic models
- interpreted systems
- explicit VS implicit beliefs
- verification/synthesize of knowledge-based programs

A tool for advertising AI techniques

Planning SAT Sampling (cf. Kuldeep's talk)

Trugarez bras. Merci. Thank you.



Feel free to use it!

<http://hintikkasworld.irisa.fr/>