Avoiding Logical Omniscience by Default - An Investigation into Autoepistemic Logic (Levesque, 1990)

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Abstract: In cognitive science epistemic logic is often used to describe reasoning with knowledge. Standard systems of epistemic logic suffer from the fact that they presuppose perfect and flawless reasoning (i.e. logical omniscience). Deviation from this ideal (e.g. logical ignorance) cannot be described by standard epistemic systems adequately. The majority of approaches to this problem weakens the logical principles of standard epistemic logic. However, by doing this we lose the systems capacity to describe agents positive reasoning capacities. A new way out of this predicament is the use of default logic. Levesques (1990) All I Know Logic a non-standard default logic is specifically designed to model ignorance by agents. However, my discussion of defaults in this system shows: (1) Levesques system needs to be weakened to account for logical ignorance, or, alternatively, (2) we may avoid logical omniscience by describing the logical principles as defaults in a non-monotonic conditional logic.