MULTI-AGENT EPISTEMIC PLANNING BASED ON HIGHER-ORDER BELIEF CHANGE

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In recent years, multi-agent epistemic planning has received attention from both dynamic logic and planning communities. Existing implementations of multi-agent epistemic planning are based on compilation into classical planning and suffer from various limitations. In this talk, I will introduce our recent work on multi-agent epistemic planning based on higher-order belief change, and our ongoing work on a model-theoretic definition of higher-order belief revision and its syntactic characterizations. We consider centralized multi-agent epistemic planning from the viewpoint of a third person who coordinates all the agents to achieve the goal. In our framework, the initial knowledge base (KB) and the goal, the preconditions and effects of actions can be arbitrary KD45n formulas, the solution is an action tree branching on sensing results, and the progression of KBs w.r.t. actions is achieved through the operation of belief revision or update on KD45n formulas, that is, higher-order belief revision or update. To support efficient reasoning and progression, we make use of a normal form for KD45n called alternating cover disjunctive formulas (ACDFs). To give a model-theoretic definition of higher-order belief revision, we propose a variant of Moss' canonical formulas which we call alternating canonical formulas, treat them as models and define distances between them.