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Reasoning about Uncertainty

Epistemic logic is traditionally held up as a method for reasoning about a single person's knowledge (or beliefs), and this attitude towards epistemic reasoning was propagated when the focus shifted from single-agent epistemic logic to multi-agent epistemic logic. The agents in multi-agent epistemic logic are often idealized, having perfect recall, infinite memory and inferential capacities, and a burning desire to coordinate towards the truth with the other agents in the system. As a consequence, much work has been done concerning notions of group knowledge, common knowledge, how actions within a group can result in the increase of knowledge, how agents can reason about other agents' knowledge, etc. But just as a theory of truth must also account for falsity, every light side has its dark side, so too must epistemic logic account for reasoning when there is a 'lack' of knowledge. How do we reason when we are uncertain? What principles of knowledge hold for uncertainty (e.g., if we are uncertain about ϕ , does it follow that we are uncertain about whether we are uncertain about ϕ ?) How do uncertainty and action interact? How do single-agent and multi-agent settings differ?

In this talk, we will look at recent developments in reasoning about uncertainty – a field which from the modern perspective is quite nascent. However, we will also look at not-so-recent developments, ones which are for the most part not known to those working in the nascent field and which perhaps should be known to them: Developments in reasoning about uncertainty from the late 13th and early 14th centuries. Medieval logicians were quite interested in the logical puzzles that arise from uncertain contexts, and in some cases developed very sophisticated techniques to deal with these puzzles. By looking at the hitherto basically unknown medieval developments, we can gain interesting insights to guide contemporary research.