FALSE-BELIEF AND LOGIC

MINI-WORKSHOP ON FORMAL MODELING

PRESENTED BY:
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WHERE IS THE CHOCOLATE?

➢ second-order false belief task

➢ differences between 1 and 2 order reasoning in dependence of age

➢ gradual progress, not an "on" and "off" ability

➢ theories: simulation theory, theory theory, hybrid theory

➢ ACT-R learning via utility adjustment (cf. van Lambalgen's preponent rule)

➢ assumptions of the model and epistemic logic axioms

➢ predictions: in terms of the usage of different strategies

➢ spikes in development vs continued development

➢ ACT-R accounting for brain development

DEL MODELING

➢how to make autonomous agents reason about false beliefs?

➢Would DEL predict a difference between smarties and sally-ann?

➢if a logic cannot distinguish between two models and a subject can that's not the right logic… or not a right subject (equivalence between two types)

➢agents are unable to build certain type of event models

➢agents might be unable of store certain types of event models

➢representing observability in DEL

➢goal representation (but epistemic planning is OK with that)

MODELING TOM

➤ neuro-science and ACT transfer of abilities (monotonicity of ability operators)

➤ transfer between false-belief abilities and marble drop game (analogy)

➤ production rules in grammars and PRIMS (abstract logical clustering rules)

➤ re-usage of rules (steps in proofs)?

➤ zero-to-one: shift in strategy

➤ higher-order depends on processing and memory strategies

➤ discrepancies in complexity (Szymanik) and experimental results in difficulty

➤ recursive nature of ToM vs. Limitations

➤ centipede game vs different branching types

HYBRID LOGIC

➢ interpreting information at point in time and at a person

➢ research in perspective shift

➢ hybrid logic and deduction rules

➢ common cognitive basis for different tasks

➢ proof theory vs model theory

➢ natural deduction

➢ comprehension vs production

+ VL & S

➤ false-belief task and executive deficits.

➤ logical computational model:

➤ inhibition clause: "and nothing funny happens"

➤ default reasoning

➤ closed world assumption

➤ sequence of conditional formulas that relate the mental precondition with a proper response. The mental precondition is enriched with an inhibitory clause (a propositional letter). This encodes the fact that the subject can refrain from reacting in a way prescribed by the conditional even if the mental precondition is satisfied, i.e., when the inhibitory clause is false

+ VD & L

➢ formalization in terms of inability to represent beliefs of others

➢ modal logic for modeling degrees of belief by partially ordered preference relations.

➢ type 1: agent believes that other agents do not distinguish among their beliefs

➢ type 2: agents believes that the beliefs of other agents are in part as their own

➢ type 3: agents believe that the beliefs of other agents are exactly as their own

➢ the multi-agent belief interaction is frame characterizable

➢ preservation under three common forms of belief revision
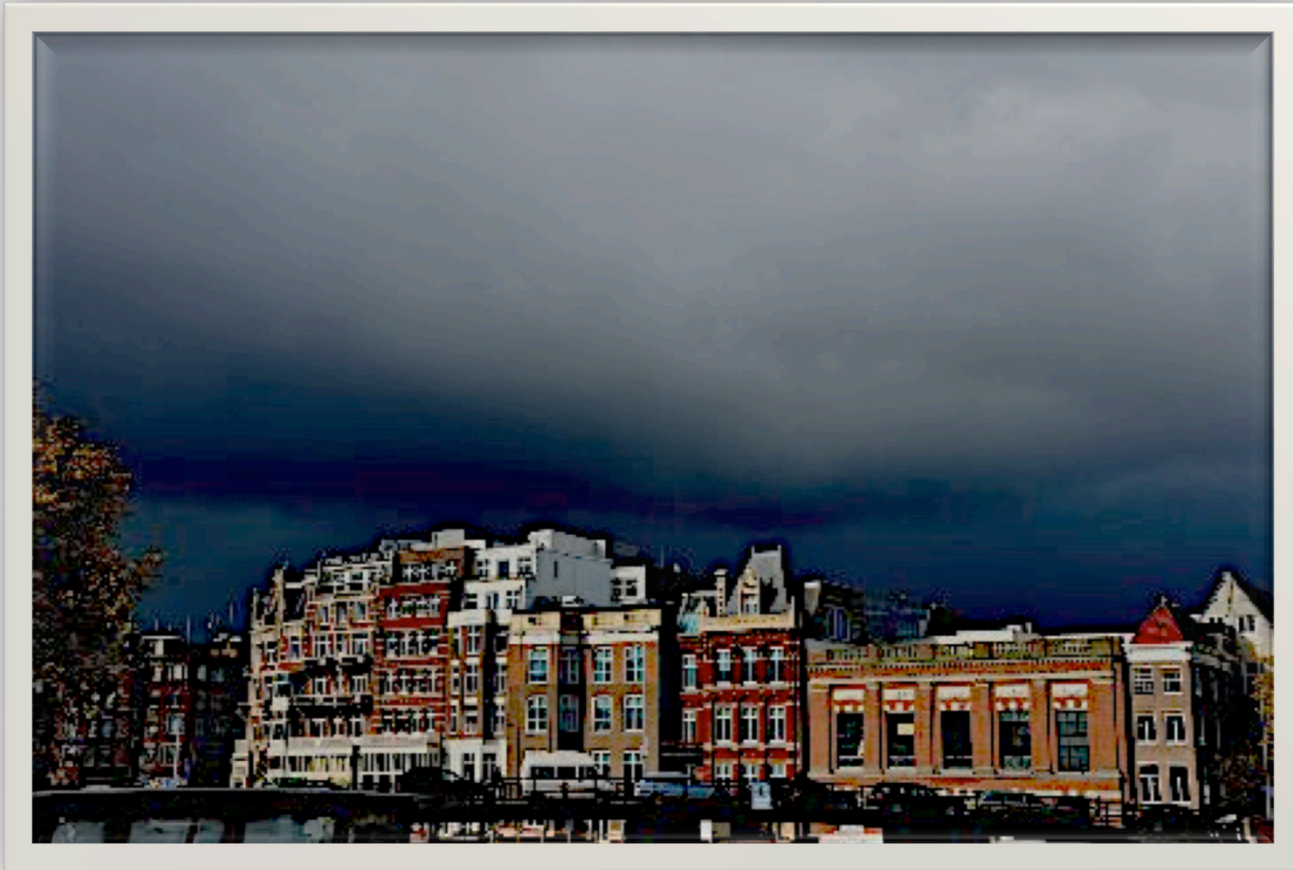
DISCUSSION

IT'S STORMY OUTSIDE ANYWAY