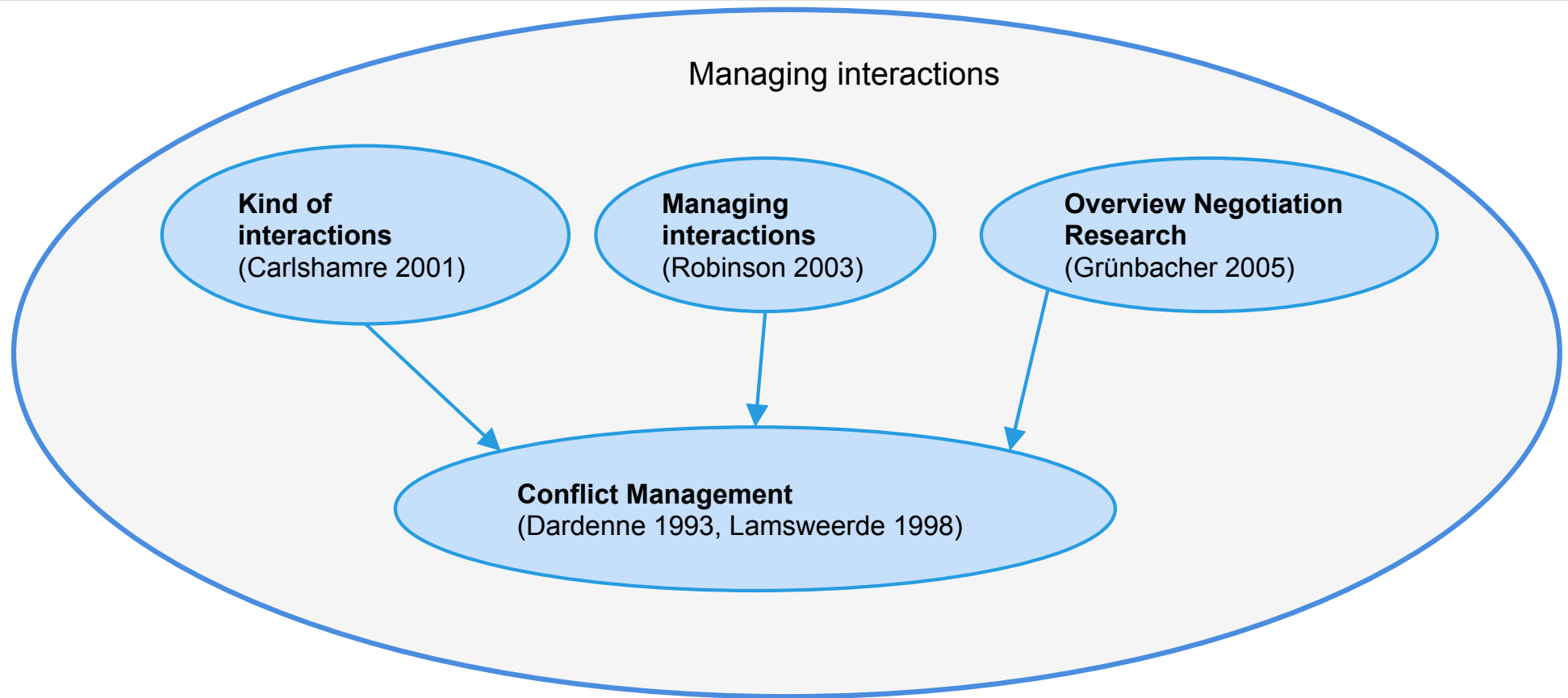


Conflict Management with Goal Oriented RE

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Context



Group Papers

- Goal-directed requirements acquisition
 - Dardenne 1993
- Managing Conflicts in Goal-Driven Requirements Engineering
 - Lamsweerde 1998

Goal Oriented RE

- **why** and **how** instead of **what**
- Synonyms [1]
 - goal-driven (Lamsweerde 1998)
 - goal-based
 - goal-directed (Dardenne 1993)
- Other views
 - view-directed
 - scenario-directed

[1] <http://lams.epfl.ch/reference/goal/>

Goal

Dardenne	Lamsweerde
Justification and explanation the presence of requirements components, which are not comprehensible	Drive elaboration of requirements
Assign respective responsibilities ○ which agents should perform which actions	Completeness criterion for requirements specification
Provide basic information for detecting and resolving conflicts ○ conflicts arising from multiple viewpoints among human agents	

Goal-directed requirements acquisition (Dardenne 1993)

- Portion of KAOS meta-model
 - illustrated by excerpt of university library system
- Approach to requirements acquisition
 - driven by higher-level concepts
 - goals to be achieved
 - agents to be assigned
 - alternatives to be negotiated

KAOS

- **K**nowledge **A**cquisition in aut**O**mated **S**pecification
- Components
 - Conceptual model with acquisition language
 - Set of strategies
 - Automated assistant
- Driving forces
 - reuse of domain knowledge
 - machine learning technology
- Learning strategies
 - learning-by-instruction



KAOS



Fig. 2. A portion of the KAOS conceptual meta-model.

- System Goal
 - satisfaction goals
 - information goals
 - robustness goals
 - consistency goals
 - safety goals
 - privacy goals
- Private Goal

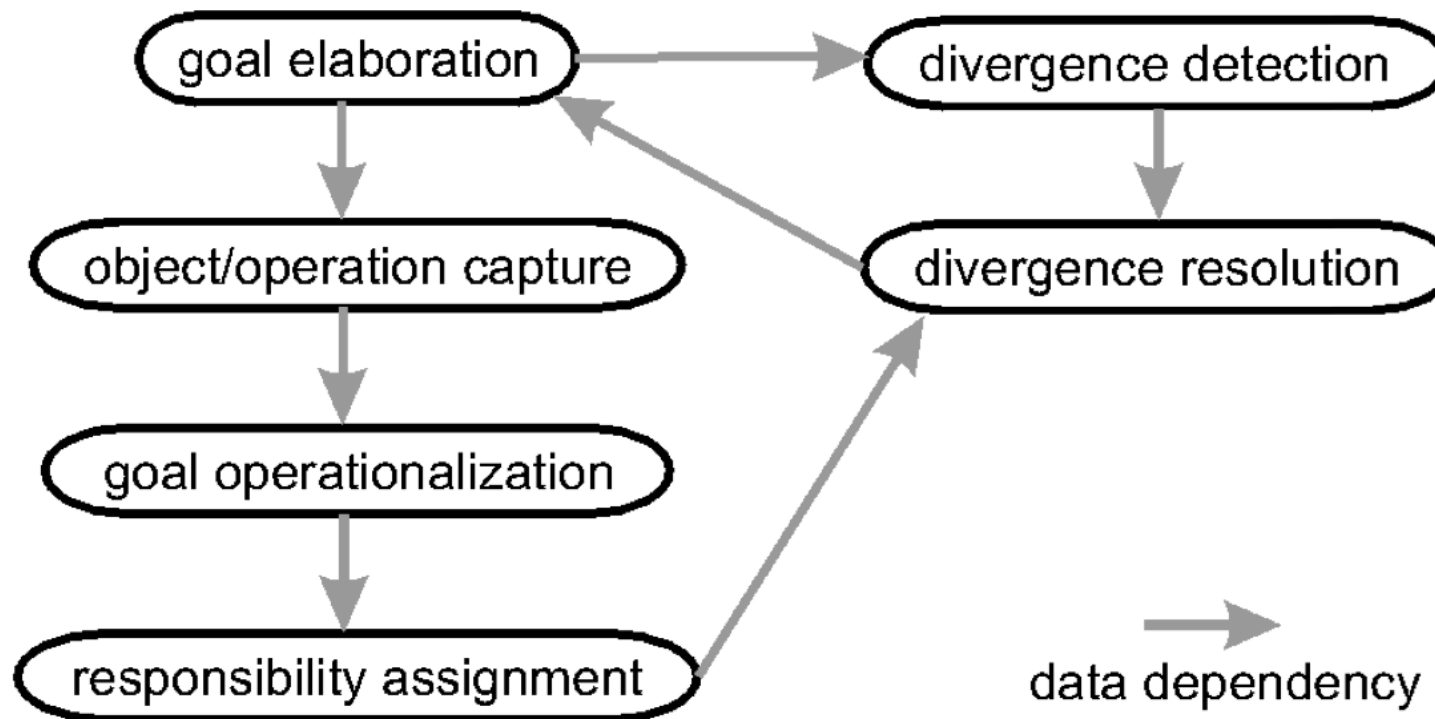
Managing Conflicts in Goal-Driven RE (Lamsweerde 1998)

- Integration of conflict management
- Background on KAOS
- Inconsistency management techniques
- Detecting & resolving divergences
- Key principle
 - manage conflicts at goal level

Inconsistence

- No way to satisfy descriptions
- Origin
 - multiple stakeholders, viewpoints and independent documents
- Kinds
 - Process-Level Deviation
 - Instance-Level Deviation
 - Terminology Clash
 - Designation Clash
 - Structure Clash
 - **Conflict**
 - **Divergence** (weaker kind of conflict)

Conflict Management



Conflict management in goal-driven RE (Lamsweerde 1998)

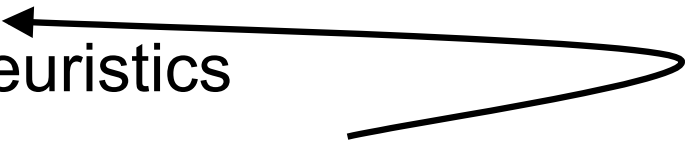
Detecting Divergences

Formal techniques

- Regressing Negated Assertions

Initial step: take $B := \neg A_i$

Inductive step: let $A \Rightarrow C$ be the rule selected,
with C matching some subformula L
in B ;
then $\mu := \text{mgu}(L, C)$;
 $B := B[L/A.\mu]$

- Using Divergence Detection
 - Divergence Identification Heuristics
- 

Resolving Divergences

Strategies

- Assertion Transformation
 - Avoiding Boundary Conditions
 - Goal Restoration
 - Conflict Anticipation
 - **Goal Weakening**
 - Alternative Goal Refinement
 - Divergence Resolution Heuristics
- Object Transformation
 - Object Refinement
 - Agent Refinement

Conclusion

How can models help in managing conflicts

- Formal models
 - Benefits
 - Reuse of patterns
 - Detect problems that are hard to detect
 - Fully automated Model checking
 - Weakness
 - Expensive
 - Not really applicable

Potential Conflicts - Case Study

- Potential conflict
 - Mayor municipality
 - Reuse of central electronic standardized register
 - Represent citizens will
 - → **Minimize[Costs]**
 - National Council
 - New central electronic standardized register
 - Educate citizens how to use digital signatures
 - → **Maximize[NumberOfPollTypes]**
 - **Achieve[TotallyNewVotingSystem]**

Acquisition Language

PrivateGoal Minimize[Costs]

InstanceOf SatisfactionGoal

Concerns Citizens

InformalDef ...

Discussion

- Can models help managing conflicts?
- Does anyone can think of the application of a formal model in practice?