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Model Ontological Commitments Using ORM+ in T-Lex

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Summary

- Background and Motivation
- ORM$^+$
- ORM$^+$ Tool
- Conclusion and Future Work
- Questions

Background

- Why semantically grounded decision rules?
  - Decision support systems mainly contain *non-sharable* decision rules
    - Decision rules are rarely written in an agreed, formal way
  - Difficult to check the *redundanc*y and *similarity* in the decision rule set
    - E.g. `if` (weather is bad) `then` (stay at home)
      `else if`(weather is good) `then` (go for a walk).
    - `if not` (it's sunny) `then` (stay at home)
      `else if` (it's sunny) `then` (go for a walk).
- Use ontology to store the conceptual definition and decision items
  - E.g. "bad weather"
- Ontology
  - Explicit, sharable, formal, conceptual, stored in computers
  - DOGMA (Developing Ontology-Grounded Methods and Applications) Approach to ontology:
    - *Double articulation*: ontology = lexon base+ commitment (R. Meersman, 1999)

Background

- Lexon (conceptualization):
  - Lexon: plausible binary fact
  - E.g. <*γ, driver, has, is issued to, drivers license*>; < *γ, driving experience, is of, has, driver*>
- Commitment (axiomatization):
  - Describes particular application views of reality
    - the use of lexons
  - Provides multiple views on stored lexons
  - Needs to be expressed by commitment language
- ORM was adapted to model commitment
  - Definition of ontological commitment
  - ORM-ML
  - T-Lex

# ORM approach to commitment and its problems

- ORM
  - Object Role Modeling, Terry Halpin, 1990's
  - Intended for modeling and querying DB at a conceptual level
  - Why ORM?
    - Semantically rich modeling language to model and visualize commitments for non-technical domain experts
      - Expressive capabilities in its graphical notation
      - Verbalization possibilities
    - ORM-ML for machines
   - Store ORM graphs
   - Can be mapped to OWL
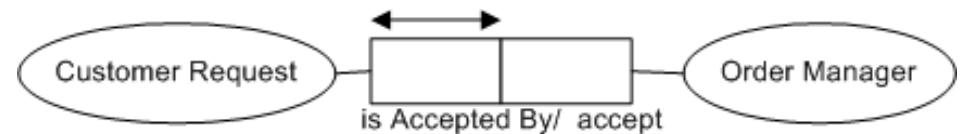
  - Problems
    - ORM still lacks several logical operators and connectors for the decision semantics, e.g. implication
    - Difficulties to specify some logical operators, e.g. negation
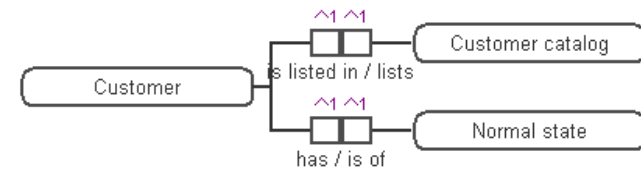
Negation in ORM and ORM +

- Transferring the negation connective is possible in ORM

- However, both positive and negative statuses of a type in the same schema.

- Extra analysis? Extra information?

- Negation in ORM+.
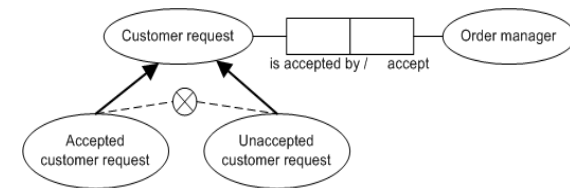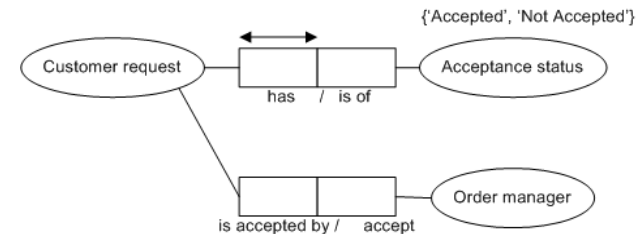
Conjunction in ORM+

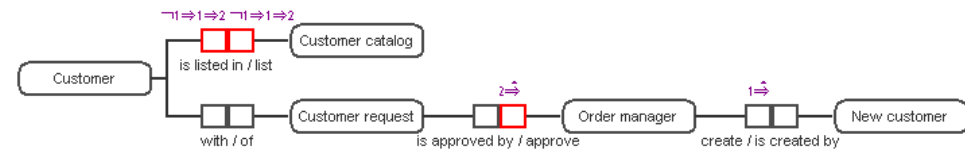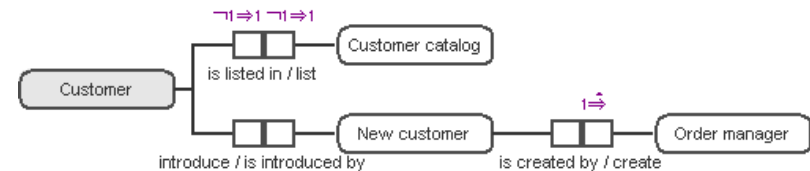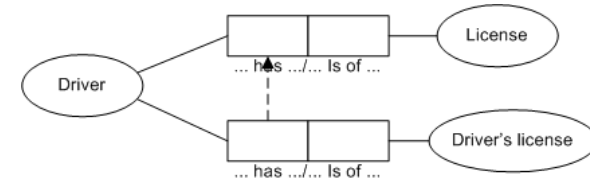- Not in ORM, only at the query/operational level

Implication in ORM and ORM+

- ## Problem
  - – Monotonic
  - – Only on one type
  - – Impossible to have parameters (conditional statement)
  - – Static

Sequence

- Example: "an order manager verifies a customer request *AFTER* the order manager receives the customer request"

- Application oriented.

- Related work:
  - business process modeling (Snoeck, 2003; OMG, 2006)
  - object modeling language (OMG, 2003)
  - software engineering (Taniguchi et al., 2005; van Hoeve et al., 2006)

- The core message: the issue of *order*
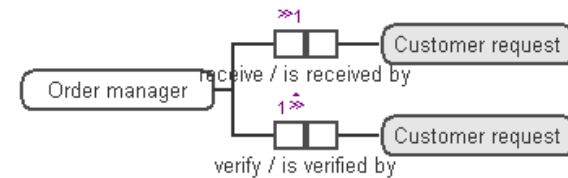
ORM⁺ Tool

- Tool demonstration

Conclusion and Future Work

- ## Conclusion
  - Graphical representation based on ORM for decision tables

- ## Future work:
  - Modal logic
  - More operational/functional dynamic rules
  - Note: ORM+ will be called Semantic Decision Rule Language (SDRule-L) in the future.
  - ORM+ ML -> SDRule-ML

Questions?

- Thank you!