Graph-based Editor for SWRL Rule Bases

RuleML 2013 Challenge

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Outline

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Motivation

- Ontologies and rules are too complex to handle by an ordinary user
- Rules written in declarative code are hard to read/write
- Decision tables and trees have different representation of facts and rules
- Graphs are easy-to-understand by an untrained user
- Integration of an ontology, rules and data in one graph-based form is convenient and understandable
- We want to provide an easy-to-use and easy-to-understand tool, where ontologies, rules and graphs can support user's work

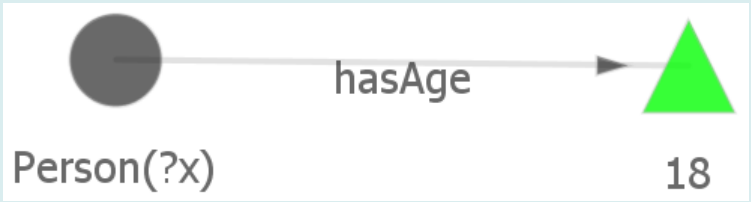
Graph-based Editor (1)

- **Represents ontology, rules and data as directed graphs**
- **Supports OWL and SWRL (Semantic Web Rule Language)**
- **Performs reasoning by the Pellet engine**
- **Presents results of the reasoning process on a graph**

Graph-based Editor (2)

- Each graph consists of nodes (classes/objects/values) and edges (relations)
- Each type of node is represented in different colour and shape
- Two kinds of ontology visualization: trees (taxonomies of classes and properties) and graphs
- Rules can be created visually and executed
- Reasoning process modifies all graphs and trees (if applicable)
- Graph structure can be manipulated by using specialized layouts or by manual rearrangement

Graph-based Editor (3)

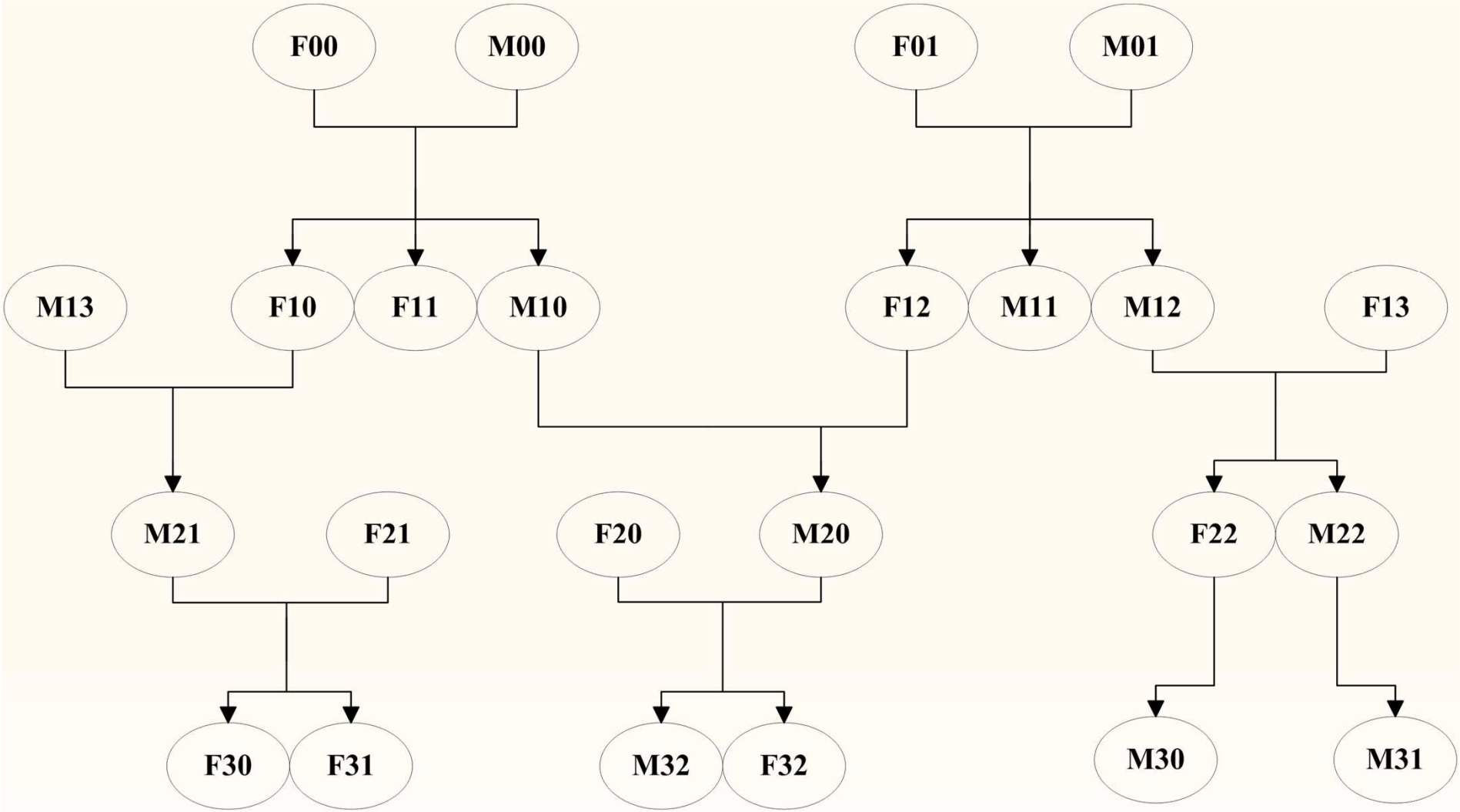
Element	Graph-based representation
OWL Class	
OWL Class instance	
Object property between two OWL instances	
Datatype property between an object and a value	

Demo Time!

Family Relationships Ontology

- We **modified** an ontology developed by Christine Golbreich
- The ontology contains the usual **classes** (***Person, Man, Woman*** etc.) and **relationships** within a family (***hasConsort, hasChild, hasParent,*** etc.)
- Moreover, it contains also a number of **SWRL rules**
- We **added** some classes, relations and rules
- We introduced a set of **instances**

Family Relationships Ontology - Instances



Family Relationships Ontology - Rules

Person(?x), Person(?y), Person(?w), Person(?z), hasParent(?w,?z), hasParent(?x,?y), hasSibling(?y,?z)

→

hasCousin (?x,?w)

Person(?x), Person(?y), Person(?w), hasGrandparent(?x,?y), hasFather(?y,?w)

→

hasGreatGrandfather (?x,?w), GreatGrandfather(?w)

Conclusions and Future Work

- Our tool integrates ontology, rules, and data in a graph-based representation and supports reasoning by the Pellet engine
- All elements are represented on a directed graph
- Creation of SWRL rules is simpler than usual
- Graph-based representation is very intuitive, easy-to-understand and easy-to-use
- We will extend our tool to support:
  - Queries execution with graphical answers,
  - Database interface,
  - OWL 2 RL and QL Profiles
  - Ontology creation and modification

THE END

Thank you for your attention!

Demo presentation and download at

http://draco.kari.put.poznan.pl/ruleml2013_SWRLEditor