E-D10-1

Spring or Summer School III.1

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Abstract
This document consists of two chapters.

Chapter 1 reports on "Reasoning Web 2006", the second REWERSE Summer School.

Chapter 2 describes in detail the programme of "Reasoning Web 2007", the third REWERSE Summer School.

Keyword List
semantic web, reasoning, education and training, summer school

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Spring or Summer School III.1

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28 February 2007

Abstract
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Contents

Chapter 1

Reasoning Web 2006

The Summer School “Reasoning Web 2006” took place at the New University of Lisbon from Monday 4th September 2006 to Friday 8th September 2006 (see `http://reasoningweb.org/2006`).

1.1 Programme

A detailed description of the programme of Reasoning Web 2006 was given in deliverable E-D8-2 [Eisinger and Małuszyński, 2006b] and is not repeated here. An overview of the programme can be found at `http://reasoningweb.org/2006` and in the table of contents of the summer school proceedings [Barahona et al., 2006].

1.2 Proceedings and Teaching Material

As described in deliverable E-D8-2 [Eisinger and Małuszyński, 2006b], each course was accompanied by a full paper in the summer school proceedings [Barahona et al., 2006] published in the “Lecture Notes in Computer Science” series by Springer-Verlag. Publisher information about this volume can be found at `http://www.springeronline.com/3-540-38409-X`, an online version is available at `http://www.springerlink.com/content/978-3-540-38409-0`.

The lecturers of Reasoning Web 2006 uploaded their slides and similar material used in giving the courses to REASE (`http://rease.semanticweb.org`). REASE is the “Repository of EASE”, a joint KnowledgeWeb and REWERSE educational infrastructure. The Reasoning Web 2006 courses were classified according to the Semantic Web topic hierarchy proposed in deliverable E-D7 [Małuszyński et al., 2006]). This hierarchy was initiated by REWERSE and developed jointly with Knowledge Web and is meanwhile sufficiently established in the Semantic Web community that even conferences use it for naming their sessions. It is also accessible under `http://wiki.ontoworld.org/index.php/Semantic_Web_Topic_Hierarchy`.

1.3 Participants

The selection process used for participants of “Reasoning Web 2005” (described in deliverable E-D8-1 [Eisinger and Małuszyński, 2006a]) was also used in 2006.

The number of persons who applied for participation was 89. The selection committee admitted 48 of the applicants, 4 of whom presented their PhD work at the Summer School.

Among the applicants, about 20 percent were related to REWERSE and 80 percent were not. Among the summer school participants, 30 percent were REWERSE related and 70 percent were not. This is significantly different from last year, when about half of the applicants and even more of the particpants were from REWERSE.

This is interesting in two respects: First, there is no danger that Reasoning Web might be perceived too narrowly as "the REWERSE Summer School for insiders". And second, Reasoning Web seems to attract sufficient interest outside of REWERSE to enable its durability beyond the end of REWERSE. After all, this time it attracted four times as many non-REWERSE applicants as REWERSE applicants, and the ratio REWERSE to non-REWERSE participants was roughly the opposite of last year's.

1.4 Evaluation

The participants were given two opportunities to provide feedback: in a panel discussion during the Summer School and via a questionnaire distributed after the Summer School.

1.4.1 Feedback from the Panel Discussion

At the end of the last session during the Summer School a 30 minutes discussion with the audience resulted in the following conclusions:

- The programme was perceived as neither too full nor too light (in 2005 it was perceived as too full).
- The "school" aspect could be emphasised more strongly by devoting the first day to introducing basics such as RDF, OWL, description logics, automated reasoning.
- Application oriented talks can be kept shorter. They should outline the lessons learned from the applications.
- A common wiki for all Summer Schools was suggested.
- The local organisation was not even mentioned, indicating that it met the expectations. This is confirmed by the answers to the questionnaire (see below).

Several other comments concerned time table organisation, such as a get-to-know session, distribution of breaks, time for questions, exercise sessions.

1.4.2 Feedback from the Questionnaire

A short time after the event a questionnaire was sent to all participants asking them to rate several aspects of the summer school. 34 participants replied. Their ratings are summarised in the following table.

		avg (diff)	dev (diff)
1.	Summer School Programme		
1.1	lecture subjects:	2.3 (+0.4)	1.1 (+0.6)
1.2	number of lectures:	2.2	1.4 (+0.3)
1.3	PhD presentations:	2.8 (+0.4)	0.9
1.4	feedback to PhD presentations:	2.6	0.9 (-0.3)
2.	Lectures		
2.1	level of details:	2.2	0.8
2.2	examples:	2.4	0.6
2.3	application aspects:	2.8	0.9
2.4	theoretical aspects:	2.0	1.2
3.	Lecture Notes		
3.1	size:	2.1 (+0.5)	1.8 (+0.9)
3.2	text quality:	2.0 (+0.4)	1.6 (+1.1)
3.3	relationship between lectures and lecture notes:	2.2	1.2 (-0.4)
4.	Local Arrangements		
4.1	technical facilities (lecture hall, computers):	2.0	1.7 (+0.4)
4.2	catering facilities (lunches, coffee break):	1.9 (-0.6)	1.2 (+0.3)
4.3	bus transfer:	1.7	1.1 (+0.5)
4.4	social programme (excursion and banquet):	1.7 (-0.3)	1.7 (+0.9)
4.5	recommended hotels:	2.1 (-0.8)	1.8 (+0.6)
	Total average:	2.2	

Scale:	1 = very good, ..., 3 = acceptable, ..., 5 = very bad
avg, dev:	average and standard deviation taken over all participants
diff:	changes compared to 2005 (negative values mean better than in 2005). Changes between -0.3 and +0.3 are not shown.

Characteristics of these ratings:

- The total average is very close to “good” and equal to last year’s total average.
- For every single question the average rating is better than “acceptable”.
- The worst average ratings (of 2.6 to 2.8) were given for:
  2.3 application aspects, 1.3 PhD presentations, 1.4 feedback to PhD presentations
- The best average ratings (of 1.7 to 1.9) were given for:
  4.3 bus transfer, 4.4 social programme, 4.2 catering facilities
- Changes with respect to last year:

1. Summer School Programme:	worse ratings, but also high deviation
2. Lectures:	almost no change
3. Lecture Notes:	worse ratings, but also high deviation
4. Local Arrangements:	much better ratings, also high deviation

The questionnaire also asked for free text comments. Recurring themes were:

- The background expected of the participants seems to have been not sufficiently clear. Some participants found the level too demanding and the Summer School too conference-like.
- Several participants noted that there were too many application subjects or that they were presented with too much detail. In 2005 "application aspects" had exactly the same average rating, which was also the worst. In reaction to that the 2006 programme included more application subjects. Apparently this reaction did not meet the participant's expectation.
- The quality of PhD presentations and of feedback to them was mentioned a few times, but not strongly emphasised.

1.4.3 Conclusions from the Evaluation

The feedback with respect to organisation was forwarded to the organisers of the next Summer School. A common wiki for all Summer Schools proposed in the panel discussion was set up (`http://reasoningweb/wiki/`), but so far none of the 2006 participants contributed.

Concerning the feedback with respect to content, it is obviously difficult to match the expectations of all attendants of the Summer School. But future Summer Schools should:

- Make clear what the participants should expect, in particular:
  - introductions to demanding topics;
  - several compact courses grouped over a short period of time;
  - detailed proceedings, the reading of which is necessarily a time-consuming activity to be pursued after the Summer School.
- Make clear that the "Reasoning Web" is a vision, which, to a large extent, is not yet realized. Therefore "application lectures" may seem to the audience to be more abstract than in older Computer Science fields.
- Encourage a better quality of PhD presentations and feedback to them.

Chapter 2

Reasoning Web 2007

The location and date of Reasoning Web 2007 will be Dresden, 3rd to 7th September 2007 (see `http://reasoningweb.org/2007`).

Please refer to deliverable E-D8-2 [Eisinger and Małuszyński, 2006b] for details about the programme committee and local organisers and about co-operation aspects.

2.1 Teaching Material

Each course or talk will again be accompanied by a full paper in the summer school proceedings. Negotiations about publishing the proceedings are in progress at the time of writing this report.

Also, like in the previous year, slides and other teaching material will be uploaded to REASE (`http://rease.semanticweb.org`).

2.2 Programme

The courses selected by the programme committee can be grouped into three categories (numbered according to the Semantic Web topic hierarchy proposed in [Małuszyński et al., 2006]):

1.1 Foundations of Knowledge Representation and Reasoning

2.4.1 Rules and Rule Languages

2.7 Applications of Semantic Web Reasoning

In addition there will be an introduction to Reasoning on the Semantic Web. The following list is ordered by these categories. It does not include PhD presentations.

P 0 Introduction

P 0.1 Introduction to Reasoning on the Semantic Web and to the Summer School

Authors/Lecturers:
Nicola Henze.
Contributing REWERSE participants:
Hannover
Teaching Time:
2 hours
Abstract:
This chapter gives an introduction to the vision of a next generation World Wide Web, a Web in which machines process semantics of Web data in order to improve the support and satisfaction of human users. After a short overview on methods and techniques so far developed, the role of reasoning and rules for realizing this new Web will be discussed.

P 1 Foundations of Knowledge Representation and Reasoning

P 1.1 Reasoning in Description Logics: Basics, Extensions, Tools, and Usage

Authors/Lecturers:
Ulrike Sattler.
Non-REWERSE contributors:
University of Manchester (United Kingdom)
Teaching Time:
4 hours
Abstract:
We will introduce description logics (DLs), their syntax, semantics, and reasoning services, and we will do this for basic and expressive DLs as well as for their extensions with rules. Next, we will discuss tools that have been developed for reasoning over DL knowledge bases, i.e., DL reasoners, and for ontology engineering. Finally, we discuss the usage of these tools and future directions of research.

P 1.2 Foundations of Rule-Based Query Answering

Authors/Lecturers:
François Bry, Norbert Eisinger, Thomas Eiter, Tim Furche, Georg Gottlob, Benedikt Linse, Reinhard Pichler, Fang Wei.
Contributing REWERSE participants:
Munich, Vienna
Non-REWERSE contributors:
Oxford University (United Kingdom)
Teaching Time:
6 hours
Abstract:
The lecture aims at introducing into the essential concepts and methods underlying rule-based query languages. It consists of eight sections covering four complementary areas: Declarative semantics, operational semantics, complexity and expressive power, and optimisation. The main focus of the lecture is to survey essential results of over four decades of research in the logic programming and database community on the combination of query languages and rules. These results form the foundation for conceiving, improving, and implementing several Web and Semantic Web technologies, in particular conjunctive queries against relational, XML and RDF data with XQuery, SPARQL, and rule languages like the "Rule Interchange Format" currently being developed in a working group of the W3C. The lecture focuses on foundations and is deliberately limited to declarative languages in a classical setting: issues such as query answering in FLogic or in description logics, and the relation of query answering to reactive

rules and events are not addressed. The lecture closes with a brief outlook on current research issues in the field.

Contents:

1. Introduction
2. Preliminaries
   (a) Syntax, types of rules and rule sets (positive, definite, disjunctive rules and rule sets, rules and rule sets with (nonmonotonic) negation, rules and rule sets with function symbols, recursive rule sets, rules and rule sets with aggregation)
   (b) Herbrand base of a rule set
   (c) Closed World Assumption
   (d) Unification
3. Declarative Semantics
   (a) Minimal model semantics of positive rule sets
   (b) Fixpoint semantics of positive and definite rule sets
   (c) Declarative semantics of rule sets with negation: stable, well-founded, inflationary semantics
   (d) Declarative semantics definite rule sets with aggregation: stratifiable and stable semantics
4. Operational Semantics: Positive rule sets
   (a) Forward chaining on definite rule sets: naive and incremental
   (b) Basic backward chaining: SLD Resolution and SL Resolution
   (c) Backward chaining with Memoization: OLDT resolution and the Alexander and Magic Set Methods
   (d) Tableau-Method for forward chaining on disjunctive rule sets
5. Operational Semantics: Rule sets with nonmonotonic negation
   (a) Forward and backward chaining on stratifiable rule sets
   (b) Forward chaining on disjunctive rule sets under the Stable Model semantics
   (c) Forward chaining on definite rule sets under the Well-Founded semantics
6. Complexity and Expressive Power
   (a) Complexity Classes and Reductions
   (b) Conjunctive Queries
   (c) First-order Queries
   (d) Unification
   (e) Positive definite rule sets (Datalog+)
   (f) Stratifiable definite rule sets (stratifiable Datalog)
   (g) Positive disjunctive rule sets
   (h) Definite rule sets with negation under the Well-Founded and inflationary semantics
   (i) Expressive Power of rule sets with function symbols

7. Query Optimisation: Query Containment, Query Rewriting, and Query Algebras
   (a) Containment of Conjunctive Queries
   (b) View Materialisation and Rewriting using Views
   (c) Nested Views vs. Nested Queries
   (d) Query Algebras or How to evaluate conjunctive and first-order queries efficiently (Recall: Relational and Physical Algebras in (traditional) RDBMS, Monad Algebra for Complex Values, XML algebras: outlook and issues, RDF algebras: outlook and issues)
8. Current research and perspectives

P 2 Rules and Rule Languages

P 2.1 Reactive Rules on the Web

Authors/Lecturers:
Bruno Berstel, Philippe Bonnard, François Bry, Michael Eckert, Paula-Lavinia Pătrânjan.
Contributing REWERSE participants:
Munich
Non-REWERSE contributors:
ILOG, Paris (France)
Teaching Time:
4 hours
Abstract:
Reactivity on the Web, the ability to detect events and respond to them automatically in a timely manner, is needed for bridging the gap between the existing, passive Web, where data sources can only be accessed to obtain information, and the dynamic Web, where data sources are enriched with reactive behavior. Reactivity is a broad notion that spans Web applications such as e-commerce platforms that react to user input (e.g., putting an item into the shopping basket), Web Services that react to notifications or service requests (e.g., SOAP messages), and distributed Web information systems that react to updates in other systems elsewhere on the Web (e.g., update propagation among biological Web databases).

The issue of enriching (relational or object-oriented) database systems with reactive features has been largely discussed in the literature and software solutions (called active database systems) have been employed for some years by now. Differences between (generally centralized) active databases and the Web, where a central clock, a central management are missing and new data formats (such as XML and RDF) are used, give reasons for developing new approaches. Moreover, approaches that cope with existing and upcoming Semantic Web technologies (by gradually evolving together with these technologies) are more likely to leverage the Semantic Web endeavour. Along this line, of crucial importance for the Web is the usability of (Semantic) Web technologies that should be approachable also by users with little programming experience.

The rule-based approach to realizing reactivity on the Web is discussed in this lecture as an example of an easy to use (Semantic) Web technology. Compared with general purpose programming languages and frameworks, rule-based programming brings in declarativity, fine-grain modularity, and higher abstraction. Moreover, modern rule-based frameworks add natural-language-like syntax and support for the life cycle of rules. All these features make it easier to write, understand, and maintain rule-based applications, including for non-technical users.

The Event-Condition-Action (ECA) rules and production rules fall into the category of reactive rules, which are used for programming rule-based, reactive systems. In addition to the inherent benefits of rule-based programming mentioned above, the interest of reactive rules and rule-based technology for the Web is underlined by the current activity within W3C working groups on these subjects.

Due to the emphasis they put on events, ECA rules have traditionally been used in reactive systems such as telecommunication network management. As such, they are well-suited for the reactive, event-based aspect of (distributed) Web applications. Production rules originate from non monotonous expert systems, where they were used to encode the behavior of a system based on domain-specific knowledge. This makes them relevant to address the stateful, expertise-based aspect of (higher-end) Web applications.

ECA rules have the structure 'ON Event IF Condition DO Action' and specify to execute the Action automatically when the Event happens, provided the Condition holds. Production rules are of the form WHEN Condition DO Action and specify to execute the Action if an update to the (local) data base makes the Conditon true. This shows that the similarities in the structure of these two kinds of rules come with similarities, but also some differences, in the semantics of the two rule paradigms.

Since Web applications have both an event-based and an expertise-based aspect, and because the two paradigms are semantically close to each other, Web applications can choose one paradigm or the other, depending on where they put the emphasis. They can also leverage the advantages of both, by choosing to implement a part of their logic using ECA rules, and another part using production rules.

This lecture provides an introduction to programming Web systems with reactive rules, by discussing concrete reactive languages of both kinds, thus trying to reveal differences and similarities between the two paradigms. For exemplifying the two approaches to realizing reactive behavior, the ECA rules language XChange and the ILOG Rule Language (IRL) have been chosen. XChange is an ongoing reasearch project at the University of Munich and part of the REWERSE (Reasoning on the Web with Rules and Semantics) work. IRL is a production rule language marketed by ILOG as part of their production rules system ILOG JRules.

Contents:

1. Introduction
2. Reactive Behavior on the Web
   (a) General Problem
   (b) Application Examples
3. Event-Condition-Action Rules
   (a) General Ideas
   (b) XChange as an Example of an ECA-Language
   (c) ECA-Language Design Issues
      - rule execution semantics (conflicts, priorities, transactions)
      - enabling and disabling of rules
      - rules (variables, rule registration, etc.)
      - events (available events, support for composite events)
      - conditions (test condition before/after event, etc.)
      - actions (available actions, combinations of actions)

   (d) Implementation of ECA-Systems
      - architecture, algorithms
      - composite event detection algorithms

   (e) An Overview of Existing ECA-Languages and Systems

4. Production Rules
   (a) General ideas
      - Why production rules?
      - The lifecycle of a production-rules-based software application
   (b) Description of a Production Rules System
      - The Working Memory and the underlying data model
      - Relation with RDF concepts
      - The rule language: pattern matching, procedural actions
      - Operational semantics of a production rules program: stateful semantics for correlation and inference, stateless semantics for filtering
   (c) ILOG JRules as an Example of a Production Rules System
      - Architecture of the ILOG JRules product
      - IRL: the ILOG rule language
   (d) Implementation of a Production Rule Engine
      - Focus on the Rete algorithms
      - Overview of Leaps and Fastpath
   (e) Overview of Existing Production Rules Languages and Systems
5. ECA and Production Rules: Commonalities and Differences
   - Comparison of the approaches
   - When to use/prefer which type of rules?
6. Conclusion

P 2.2 Rule Interchange on the Web

Authors/Lecturers:
Paula-Lavinia Pătrânjan, Axel Polleres.

Both authors are members of the W3C Rule Interchange Format (RIF) Working Group (`http://www.w3.org/2005/rules/`). Paula-Lavinia Pătrânjan is one of the editors of the Second Public Working Draft of "RIF Use Cases and Requirements". Both authors have been involved in the development of the RIFRAF framework; Axel Polleres has also developed the RIFRAF questionnaire for populating the RIFRAF framework with concrete rule languages and systems.

Contributing REWERSE participants:
Munich

Non-REWERSE contributors:
Universidad Rey Juan Carlos, Madrid (Spain). W3C RIF WG.

Teaching Time:
2 hours

Abstract:
The issue of interchanging rules on the Web has received considerable attention during the last couple of years and, thus, entailed the newly established standardization activity of the

World Wide Web Consortium (W3C) Rule Interchange Format Working Group (RIF WG). The W3C RIF WG is chartered to develop a format for rules that should enable rules to be translated between different rule languages and systems. This is to be achieved through two phases corresponding to the development of a core interchange format and a set of extensions (standard dialects).

Before turning the attention to the interchange of rules on the Web and the existing W3C proposal for a rule interchange format, this lecture discusses the notion of rules as an umbrella for different rule classes such as deductive rules and reactive rules. Furthermore, we try to determine the position of rules and rule interchange in the Semantic Web architecture and their role in realizing the Semantic Web vision.

This lecture is mainly based on the W3C RIF WG work and, more concretely, on the two Public Working Drafts on Use Cases and Requirements released by the Working Group and the current proposal on a core rule interchange format, the RIF Core. We present the current syntax and semantics of the RIF Core and exemplify the rule interchange through RIF Core on existing rule languages.

As means to recognize RIF Standard Dialects, a comprehensive classification system called RIF Rule Arrangement Framework (RIFRAF) has been developed and populated with existing rule languages and systems. The results of this study are analized and their impact on the possible extensions to RIF Core are also discussed in the lecture.

Contents:

1. Introduction

   Different kinds of rules and the issue of interchanging them is introduced in this section.

2. Rules in the Semantic Web architecture: Where do rules belong?

   It has become kind of obvious, that at least the Rule Interchange Format (RIF) is not the Rules layer for the Semantic Web at the moment. Even in this case, it is interesting of watching the other parts and how they fit: XML, RDF, OWL, SPARQL, etc.

3. Use cases outside the pure Semantic Web realm

   Production rules systems, Web Services, policies etc. are discussed in this section.

4. Current W3C use cases on rule interchange

   With this analysis in mind, we will go through currently identified W3C RIF WG use cases on rule interchange.

5. The Rule Interchange Format: Current Core and Possible Extensions

   Then we outline the current work of the W3C RIF WG on the RIF Core and the means for determing the RIF Standard Dialects that will extend the core interchange format. The current syntax and semantics of RIF Core are presented and accompanied by concrete examples.The discussion of concrete RIF Standard Dialects largely depends on the outcome of the W3C RIF WG work.

6. Conclusion and Outlook

P 2.3 Rule-Based Policy Representation and Reasoning for the Semantic Web

Authors/Lecturers:
Piero A. Bonatti, Daniel Olmedilla.
Contributing REWERSE participants:
Naples, Hannover
Teaching Time:
4 hours
Abstract:
The term policy is often overloaded. A general definition might be "a statement that defines the behaviour of a system". However, such a general definition encompasses different notions, including security policies, trust management policies, business rules and quality of service specifications, just to name a few. Researchers have mainly focussed on one or more of such notions separately but not on a comprehensive view. Policies are pervasive in Web applications and play crucial roles in enhancing security, privacy, and service usability as well. Interoperability and self-describing semantics become key requirements and here is where Semantic Web comes into play. There has been extensive research on policies, also in the Semantic Web community, but there still exist some issues that prevent policy frameworks from being widely adopted by users and real world applications.

This lecture aims at providing an overall view of the state of the art (requirements for a policy framework, existing policy frameworks/languages, policy negotiation, context awareness, etc.) as well as open research issues in the area (policy understanding in a broad sense, integration of trust management, increase in system cooperation, user awareness, etc.) required to develop a successful Semantic Policy Framework.

Contents:

1. Introduction to the lecture
2. Motivation: description of existing problems
3. Why policies? Policy definition and why policies represent a solution
4. Requirements for policy languages & frameworks (e.g. expressiveness issues, user awareness and control, rule support, etc...)
5. Brief overview of existing systems
6. Deployed Application Scenarios
    (a) REI, KAOS, PeerTrust, etc...
    (b) Protune – Protune demo
7. Challenges & Open Research Issues
8. Conclusions

P 3 Applications of Semantic Web Reasoning

P 3.1 Semantic Web Reasoning in Business Intelligence Applications

Authors/Lecturers:

Kalina Bontcheva, Paul Buitelaar, Thierry Declerck, Paolo Giudici, Martin Hepp, Monika Jungemann-Dorner, Hans-Ulrich Krieger, Paolo Lombardi, Horacio Saggion, Marcus Spies, Alessandro Tommasi, Franco Turini.

All authors are members of MUSING (see `http://musing.metaware.it/`), an Integrated Project in the Sixth Framework Programme of the European Commission.

Non-REWERSE contributors:

University of Sheffield (United Kingdom). DFKI, Saarbrücken (Germany). University of Pavia (Italy). DERI, University of Innsbruck (Austria). ComNetMedia AG, Dortmund (Germany). IPSC, Ispra, (Italy). University of Munich (Germany). University of Pisa (Italy).

Teaching Time:

4 hours

Abstract:

We report in this chapter/session on actual R&D work in the MUSING project (MUlti-Industry, Semantic-based Next Generation Business INtelliGence). MUSING is developing a new generation of Business Intelligence (BI) tools and modules founded on semantic-based knowledge and content systems. MUSING integrates Semantic Web and Human Language technologies and combine declarative rule-based methods and statistical approaches for enhancing the technological foundations of knowledge acquisition and reasoning in BI applications. The impact of MUSING on semantic-based BI is being measured in three strategic, vertical domains, on of those dealing with the financial domain, more especially with the development and validation of next generation (Basel II and beyond) semantic-based BI solutions, with particular reference to Credit Risk Management. The section of this chapter/lecture is being mainly written by the scientific partners of MUSING, describing the adaptation of their reasoning methods, algorithms and tools for the purpose of the goals of MUSING, also adressing the issue of the integration in a system to be deployed by financial institutions.

Contents:

1. Integration of Semantic Web and Human Language Technologies for enhancing the technological foundations of knowledge acquisition and reasoning in credit risk management applications
2. Ontology population, ontology-driven semantic annotations and ontology learning in the financial domain
3. Representation of time information and temporal reasoning in MUSING
4. Integration of Statistical Reasoning and Domain Ontologies for improving decision procedure in credit risk assessment applications
5. The MUSING platform

P 3.2 Semantic Web Reasoning in Semantic Wikis

Authors/Lecturers:

Sebastian Schaffert, Markus Krötzsch, Denny Vrandecic.

Non-REWERSE contributors:

Salzburg Research (Austria). AIFB, University of Karlsruhe (Germany).

Teaching Time:

4 hours

Abstract:

Semantic Wikis have been developed as an extension of normal wikis with the possibility to do semantic annotations. Such annotations serve several purposes: they help to structure information in the Wiki, they improve information access by intelligent search and navigation, they can be used for contextual adaptation, and much more. A particularly interesting feature is also the possibility to let several experts work together in ontology engineering tasks, making use of social software aspects in Semantic Web data creation. In this article, we focus on a particular aspect of Semantic Wikis, namely reasoning. Reasoning is only supported by few Semantic Wikis, but it can be used for astonishing, practical improvements of Wiki use by supporting the user in reading, browsing, and editing. At the same time, a Semantic Wiki in a sense represents the Semantic Web in a single system, demonstrating many requirements and to-date open challenges for reasoning in a single system. These challenges are discussed and demonstrated on practical examples in the second part of this article.

Contents:

1. Introduction
2. Semantic Wikis: The Potential of Social Software for the Semantic Web
3. Applications of Semantic Wikis
   (a) Knowledge Management
   (b) Ontology Engineering
4. Reasoning in Semantic Wikis: Context Adaptation
   (a) Alternative presentation of content
   (b) Editing support through customised templates
   (c) Annotation support by suggesting most suitable annotations
   (d) Adaptation to personal preferences and views
5. Requirements and Challenges for Reasoning in Semantic Wikis
   (a) Efficient, real-time reasoning
   (b) Truth maintainance
   (c) Dealing with uncertainty and missing information
   (d) Dealing with incorrect and conflicting information
   (e) Dealing with different levels of trust
   (f) Combined access to content (data) and meta-data
   (g) Make querying simple for users

(h) Rule-based in addition to OWL reasoning

6. Perspectives and Conclusion

Acknowledgement

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