Legal Rules Modelling Meets the Web

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Introduction

This abstract presents RAWE, a Web editor for helping the legal knowledge engineer marking up legal document's using the Akoma Ntoso [2][13] XML standard, and also to model legal rules using a logic formalism and convert them into LegalRuleML [1][11]. The main goal of the RAWE Web editor is to provide a tool capable of managing in an integrated way the legal source text and the legal rules. It offers the advantages of the Akoma Ntoso and of LegalRuleML, applying the isomorphism principle [3][6][10] to connect, as far as possible, legally binding textual provisions with the logic formalism expressed using rules. AI&Law tools [8] usually are too focused on the task of applying a logic formalism to achieve isomorphism (e.g. often they use plain text, paraphrase techniques or simplified English text—ACE [1]), but the legal experts (judges, lawyers, and administrators) are interested in verifying the results of the legal reasoning engine and in finding evidence in the legally binding text that more and more, nowadays, is available on the web in digital format[2].

Secondly, a legal text changes over time, and so the rules need to be updated accordingly. If the isomorphism principle is not applied properly, it is quite difficult to determine whether those rules need to be updated [12]. The RAWE editor helps the legal knowledge engineers to maintain text and rules aligned and to minimize manual mark-up activity during the lifecycle of the legal documentation.

Thirdly, the aim of the RAWE is also to meet the Semantic Web techniques, for so it converts all the legal knowledge embedded in Akoma Ntoso and in LegalRuleML in RDF serialization to favour Linked Open Data interoperability with other legal open resources available in the cloud (e.g. geoNames [3], organizations [4], crowd-sourcing annotation, journalism, etc.).

1. RAWE Functionality

RAWE[5] is the web editor that permits the abovementioned mechanism and it provides the following functionalities: i) Authentication of the end-user and customization of the environment according with the personal profile (e.g., legal system, legal tradition, legal guidelines); ii) Multilanguage interface and environment; iii) Customized interface and buttons on the basis of the user profile and of JSON configuration files; iv) Mark-up of a legal text with Akoma Ntoso standard using parsers to automatically detect the normative references, dates, metadata, and structure of legal documents; v) Record of the XML files in the eXist repository [9]; vi) Tree of the marked-up elements; vii) On-the-fly view in Akoma Ntoso and in LegalRuleML; viii) Conversion and export in PDF, XML, ePub, or RDF format; ix) Web editor environment with WYSIWIG interface; x) Contextual functionalities based on the XML tree and XML-schemas; xi) Mouse-over for detecting the metadata of a portion of legal text and reuse for modelling legal

[1] ACE—Attempto Controlled English: http://attempto.ifi.uzh.ch/site/

[2] Euro-Lex from July 1st provides on the web the legal binding electronic publication of the Official Journal of the European Union: http://new.eur-lex.europa.eu/legal-content/EN/TXT/?qid=1374823435988&uri=CELEX:32013R0216

[3] http://www.geonames.org/

[4] http://www.w3.org/TR/vocab-org/

[5] http://sinatra.cirsfid.unibo.it/rawe/

rules; xii) Toolbar for marking up the document's structure; xiii) Toolbar for marking up legal rules.

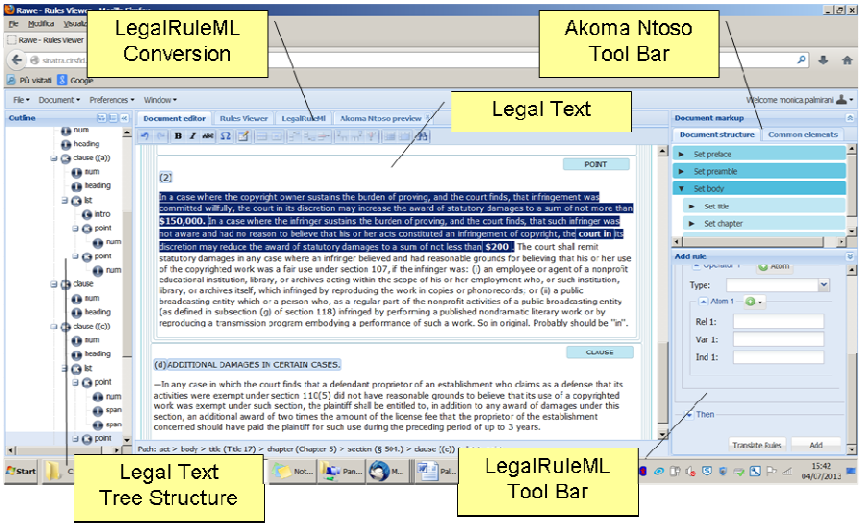

Figure 1. *RAWE* Web editor for marking up legal texts and normative rules.

There are some special functionalities that we have faced in the RAWE implementation using HCI techniques for coping with the isomorphism mechanism.

Contextual Composition of the Rules. In LegalRuleML we have five groups of statements: PrescriptiveStatement, ConstitutiveStatement, PenaltyStatement ReprationStatement and FactStatements. Each group allows some particular modeling following the legal logic theory (e.g. Prescriptive rule is a sequence of deontic operators). For this reason RAWE is based on the LegalRuleML prescriptive grammar constraints and it lead the end user to compose the rules correctly.

Reparation is a binary relationship between a penalty and a prescriptive rule or violation. So we found a smart interface mechanism to select the two parts of the relationship and to connect them to each other using drag and drop function.

2. Future Work

A first pilot case was marked up with RAWE (section 504, title 17, US code, 7 versions over time). This pilot case, even if modest, has made evident some critical points:

Metadata in Context. If we need to refine or readjust the context of the rule and the related metadata, we need a new toolbar and panel.

Extra isomorphism rules. Sometimes we need to include extra rules not directly linked to the legal text.

Ontology. Some elements of the rule modeling need to be enriched with the definitions of an external vocabulary or ontology (e.g. LKIF [5] [7]).

Meta-Rules. Meta-rules (rules about other rules), need to find a mechanism for linking rules as antecedents and consequents.

Multiple interpretation. In this version of the editor is not possible to have multiple interpretations of the same legal textual document fragment [4]. It is a crucial feature for guarantee the multiple annotation.

Granularity. For now the granularity of the isomorphism is on the rule. In the future we will be able to also manage the same functionality on the body, head, and atom.

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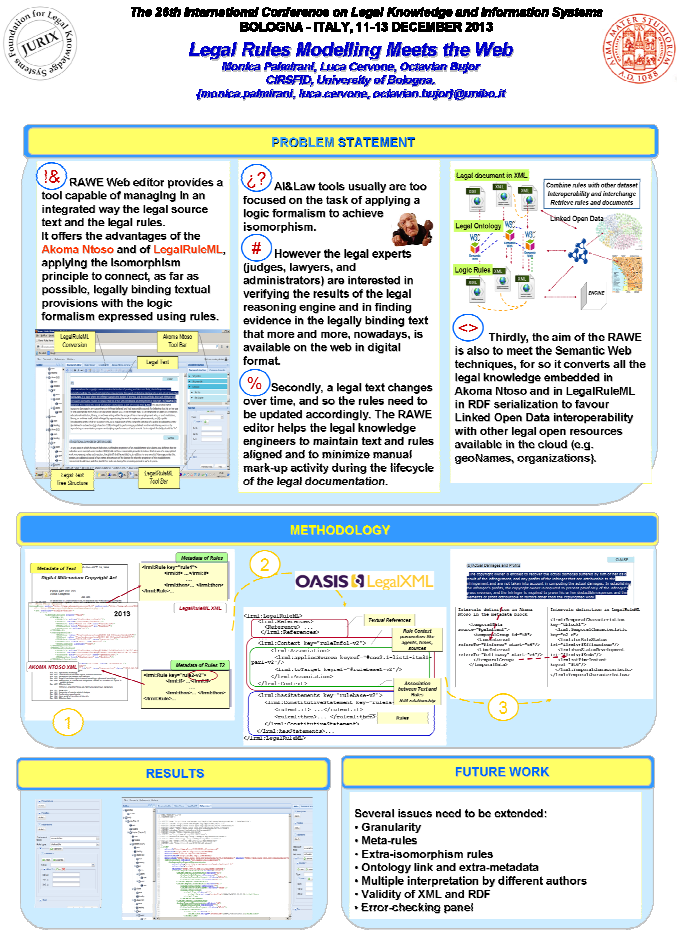

Figure 2. Poster.