RAWE: An Editor for Rule Markup of Legal Texts

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Outline

- Scenario
- Goal of the project
- Requirements of RAWE
- Functionalities
- Akoma Ntoso and LegalRuleML
- LegalRuleML and RDF
- Demo of the rule editor
- Demo of the RuleViewer
Scenario

- RAWE is a component of a project called “Fill the gap” funded by University of Bologna for extending the outcomes of several projects: EU-project *Estrella* (2007-2009) and UN project Akoma Ntoso

- In the legal domain we find different sources:
  - **norms**: abstract mandatory commands concerning rights or duties
  - **legal concepts**: abstract category of concepts (e.g. *good faith*) coming from the legal tradition
  - **textual provisions**: sequences of text expressing the norms and legal concepts
  - **rules**: interpretation of the text in logical rules and modelled with a formal representation
Scenario

- Legal rules are an interpretation of the legally binding (legal) text and they are based also on legal concepts.
- Legal rules need a logic formalization and it is a complex time consuming activity.
- Legal experts want to see a reasonable evidence of the rules in the legal text.
- Legal experts need to track changes over time in text and rules.

Minimize the effort  Trust  Changes over time
Goals of “Fill the Gap”

- Provide a set of integrated XML standards for modelling all the Semantic Web cake in legal domain: Akoma Ntoso and LegalRuleML

- Provide an integrated architecture able to take advantage from the integration of all the knowledge and fill the gap between text, ontologies, rules

- RAWE: Editors oriented to legal expert for modelling in integrated way legal text and legal rules in order to foster the information, coordinate them over time, minimize the effort, create trust
Legal Document, Legal Rules, Legal Open Data

Legal document in XML

Combine rules with other dataset
Interoperability and interchange
Retrieve rules and documents

Legal Ontology

linked Open Data

Logic Rules
Legal domain Requirements

- **Isomorphism**: connections between legal text and legal rules
- **Context of the rule**: Author, Jurisdiction, Authority, Temporal properties, etc.
- **Rule semantics**: connection with legal ontology
- **Defeasibility**: hierarchy of rules
- **Deontic operators**: obligations, rights, permissions (strong and weak), etc.
- **Reparation and Penalty**
- **Meta-Rules**: rules on rules (e.g. abrogation of a rule, violation of a rule, interpretation of rules, etc.)
Some problems in the state of the art

- AI&Law literature developed in the last 20 years good academic rule systems, but not usable by legal end-users [Cabaret, Hypo, Cato, Carneades, etc.]
- Other commercial systems don’t take too much care of the special needs of the legal domain (e.g. defeasibility, legal metadata)
- Legal document modelling and Rule modelling communities are not so much connected, the same with the Semantic Web
Some problems from usability

- Rule modelling is a time consuming and high skill activity, complex and often the model needs to be optimized for the legal reasoning
- Existing editors on the market are not able to connect the original text with legal rules
- Problem of traceability over time of the changes
- Problem of usability of the tools (HCI)
RAWE

- Web based WYSIWIG
- Multilingual, user profiling, legal tradition customization
- Based on the Akoma Ntoso and LegalRulemL standards
- Contextual interface based on the XML-schemas
- Based on XML native repository
Functionalities

- **Contextual Composition of the Rule.**
  - In LegalRuleML we have four groups of rules:
  - Prescriptive, Constitutive, Penalty, Reparation.
  - Each group permits some particular modeling following the XML-schema

- **Reparation** is a relationship between a penalty and a prescriptive rule or violation. Interface tool for creating this relationship

- **Metadata in Context.** RAWE permits to import the metadata by Akoma Ntoso according with the text fragment

- **Extra isomorphism rules.** Sometimes we need to include extra rules not directly linked to the legal text. RAWE permits to model this particular situation
Open issues

- **Usability.** Some problems with complex rules in term of interface (drug and drop, cut and past, etc.)

- **Ontology.** Some elements of rule modeling need to be enriched with definitions from an external vocabulary or ontology

- **Meta-Rules.** In the future LegalRuleML will be also be able to manage meta-rules (rules about other rules), and we 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 by different authors

- **Granularity.** For now the granularity of the isomorphism is on the rule level. In the future we will be able to also manage the same functionality on the body, head, and atom
<lrml:LegalRuleML>
   <lrml:References>
      <Reference> ...
   </lrml:References>

   <lrml:Context key="ruleInfo1-v2">
      <lrml:Association>
         <lrml:appliesSource keyref="#sec2.1-list1-itm31-par1-v2"/>
         <lrml:toTarget keyref="#rulebase1-v2"/>
      </lrml:Association>
   </lrml:Context>

   <lrml:hasStatements key="rulebase-v2">
      <lrml:ConstitutiveStatement key="rule1a-v2">
         <ruleml:if> ...
         <ruleml:then> ...
      </lrml:ConstitutiveStatement>
   </lrml:hasStatements>

</lrml:LegalRuleML>
AKOMA NTOSO

- An open XML standard for all legal documents used in Parliamentary processes and judgments
- Started in 2004-2005 within the project “Strengthening Parliaments’ Information Systems in Africa”, promoted by the UNITED NATIONS Department for Economics and Social Affairs (UNDESA)
- Akoma Ntoso means “Linked Hearts” and it is a symbol used by the Akan people of West Africa to represent understanding and agreement
Successful case histories

- LexML Brazil – customization in Portuguese
- European Parliament – Amendments of Bills
- Uruguay Parliament – Lifecycle of Bills
- California State Law – conversion to Akoma Ntoso
- Kenya Law Report – Legacy Database exported to Akoma Ntoso
- South Africa Parliament – early implementation phase
- Senate of Italy – as bill open data standard
- Federal Chancellery of Switzerland – for the official journal publication
Akoma Ntoso: fostering metadata

<akomantoso
  xmlns="http://www.akomantoso.org/1.0">
  <act>
    <meta>
      Permanent URI
      Metadata annotation by editors
      Legal and document
      Ontology classes
      Ontology annotation by editors
      Temporal lifecycle
      of the events
      Lifecycle metadata by systems
      Qualification of the
      textual provisions
      Analysis metadata by scholars
    </meta>
  </act>
</akomantoso>
Temporal metadata exported

(b) Actual Damages and Profits

- The copyright owner is entitled to recover the actual damages suffered by him or her as a result of the infringement, and any profits of the infringer that are attributable to the infringement and are not taken into account in computing the actual damages. In establishing the infringer’s profits, the copyright owner is required to present proof only of the infringer’s gross revenue, and the infringer is required to prove his or her deductible expenses and the elements of profit attributable to factors other than the copyrighted work.

Intervals definition in Akoma Ntoso in the metadata block

```xml
<temporalData source="#palmirani">
  <temporalGroup id="t5">
    <timeInterval refersTo="#inforce" start="e6"/>
    <timeInterval refersTo="#efficacy" start="e6"/>
  </temporalGroup>
</temporalData>
```

Intervals definition in LegalRuleML

```xml
<lrml:TemporalCharacteristics key="tblock1">
  <lrml:TemporalCharacteristic key="e2-e">
    <lrml:forRuleStatus iri="&lrmlv;#Efficacious"/>
    <lrml:hasStatusDevelopment iri="&lrmlv;#Ends"/>
    <lrml:atTimeInstant keyref="#t6"/>
  </lrml:TemporalCharacteristic>
</lrml:TemporalCharacteristics>
```
Basic Functionalities

- Multilingual interface and parser
- Parser of the text
  - Structure
  - Normative references
  - Dates
- Contextual interface based on the legal tradition
Multiple export formats of the documents and rules
Copyright law: copyright infringement

- US “Digital Millenium Act” and modifications
- goal: in \( t \), calculate the proper *statutory damage* in case of violation of the copyright taking in consideration all the exceptions and the modifications respect an fact.

**17 USC Sec. 504**
Remedies for infringement: Damages and profits

<table>
<thead>
<tr>
<th>Enter in force of the norm</th>
<th>Interval of efficacy of the norm</th>
<th>Statutory Damages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct. 31, 1988</td>
<td>[March 1, 1989, Dec. 9, 1999 [</td>
<td>$500 &lt;= statutoryDamages &lt;= $20,000</td>
</tr>
<tr>
<td>Dec. 9, 1999</td>
<td>[Dec. 9, 1999, ∞</td>
<td>$750 &lt;= statutoryDamages &lt;= $30,000</td>
</tr>
</tbody>
</table>

three versions
(c) **Statutory Damages.**

(1) Except as provided by clause (2) of this subsection, the **copyright owner** may elect, at any time before final judgment is rendered, to recover, instead of actual damages and profits, an award of **statutory damages** for all infringements involved in the action, with respect to any one work, for which any **one infringer** is liable individually, or for which any two or more infringers are liable jointly and severally, in a **sum of not less than $250 or more than $10,000** as the court considers just. For the purposes of this subsection, all the parts of a compilation or derivative work constitute one work.

(2) In a case where the **copyright owner sustains the burden of proving**, and the court finds, that **infringement was committed willfully**, the court in its discretion may **increase** the award of statutory damages to a sum of not more than **$50,000**. In a case where the **infringer sustains the burden of proving**, and the court finds, that such infringer was not aware and had no reason to believe that his or her acts constituted an infringement of copyright, the court in its discretion may **reduce** the **award of statutory damages to a sum of not less than $100**.

http://www.law.cornell.edu/uscode/text/17/504
(c) **Statutory Damages.** -

The copyright owner may elect an award of statutory damages for infringements in a sum of not less than $250 or more than $10,000 as the court considers just.

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(c) **Statutory Damages.** -

The copyright owner may elect an award of statutory damages for infringements in a sum of not less than $750 or more than $30,000 as the court considers just.
Rules

- **R1:** if (X is a copyright owner and Y is a copyright infringer and X claims the statutory damages) then (Y pay a statutory damages - fee)
  - Penalty1(min $250 - max $10,000)

- **R2:** if (X copyright owner sustains the burden of proving and Y infringes copyright **willfully**) than (Y pay a statutory damages)
  - Penalty2(Y pay a min $250 - max $50,000)

- **R3:** if (Y copyright infringement sustains the burden of proving and Y infringes copyright **NOT willfully**) than (Y pay a statutory damages)
  - Penalty3(Y pay a min $100 – max $10,000)

- **Reparation1:** R1, Penalty1
- **Reparation2:** R2, Penalty2
- **Reparation3:** R3, Penalty3

- **Defeasability:** R3>R2>R1

- Fact (t_k; burden of proving [null,0,1]; willfully [null, 0, 1]; idwork; Y)
Editor and RuleViewer

- **Editor**  [http://sinatra.cirsfid.unibo.it/rawe/](http://sinatra.cirsfid.unibo.it/rawe/)
- **RuleViewer**  [http://sinatra.cirsfid.unibo.it/ruleviewer/](http://sinatra.cirsfid.unibo.it/ruleviewer/)
Creation of a rule

Panel of rules
- Type of statement
- Type of deontic op.
- Type of strength
- Operators: and/or/not
- Atom: Rel, Var, Ind
Type of statements

Panel of rules
Reparation composition

Composition of a reparation as association of prescriptive rules and penalty
LegalRuleML conversion
RDF conversion
Conclusions

- We have demonstrated the possibility to integrate text, rule in the next step we want to integrate also ontologies
- Several issues need to be extended:
  - Granularity
  - Meta-rules
  - Extra-isomorphism rules
  - Ontology link and extra-metadata
  - Multiple interpretation by different authors
  - Validity of XML and RDF
  - Error-checking panel
  - Mark-up of the rules from txt sources
- Future works:
  - Translation of LegalRules in Drools Language, Carneades, SPINdle
Thank you for your attention!

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http://lime.cirsfid.unibo.it/
http://sinatra.cirsfid.unibo.it/rawe/
http://sinatra.cirsfid.unibo.it/ruleviewer/

https://tools.oasis-open.org/version-control/browse/wsvn/legalruleml/trunk/?rev=76&sc=1