Ontology-based models of legal knowledge

Maria-Teresa SAGRI, Daniela TISCORNIA*

Contents

Abstract

In this paper we describe an application of the lexical resource JurWordNet and of the Core Legal Ontology as a *descriptive vocabulary* for modeling legal domains. It can be viewed as the semantic component of a global standardisation framework for digital governments. A content description model provides a repository of structured knowledge aimed at supporting the semantic interoperability between sectors of Public Administration and the communication processes towards citizen. Specific conceptual models built from this base will act as a *cognitive interface* able to cope with specific digital government issues and to improve the interaction between citizen and Public Bodies. As a Case study, the representation of the click-on licences for re-using Public Sector Information is presented.

* ITTIG (Institute for Theory and Techniques for Legal Information)
Of the Italian Research Council, Florence, Italy
Sagri@Ittig.cnr.it
Tiscornia@Ittig.cnr.it

I. Introduction

The use of ontology-based methodologies has greatly expanded in recent years, and, as a consequence, the term 'ontology' has taken on a wide range of meanings. One of the distinctions that are most commonly accepted is that between *Semantic lexicons* (so called lightweight ontologies, Hirst G. 2003) and *Formal ontologies*. On the strength of our own experience, we have developed a legal semantic lexicon (JurWordNet) [Miller 1995, Sagri 2003] that is structured according to taxonomy and semantic relationships based on linguistic rules; the high level concepts of JurWordNet have been framed and organised via a *Core Legal Ontology* (CLO) in order to remove terminological and conceptual ambiguities [Gangemi, Sagri and Tiscornia 2003]. At this second, more complex, level, *formal foundational ontologies* provide a powerful and logically sound base, because Core Ontology requires that cognitive assumptions underlying the meaning of concepts are made explicit and formally defined.

In this paper we describe an application of the lexical resource JurWordNet and of CLO as a *descriptive vocabulary* for modeling legal domains specific to the-Government issues. In the domain of the AI & LAW applications the two main streams of interest in the civil law countries are legal *advice and norm comparison* [Boer, Van Engers and Winkels R 2003, Breuker and, Winkels 2003]. We have elsewhere [Gangemi, Prisco et alii 2003] examined the use of ontology-based models in the light of norm comparison, and of normative conflicts handling. Here we will consider a third perspective, that is the creation of a *cognitive interface* [Borges et alii, 2001] for the description of legal knowledge, able to improve interaction between citizen and Public Bodies.

The experiences acquired in the 1980s in the field of legal knowledge formalisation were mainly (especially in continental civil-law countries) to do with the choice of the best paradigm of representation (declarative versus deductive approach, rule-based, logic-based), while in the 90s most of the AI&Law community turned its attention to legal reasoning and the dialectic dimension of law (deontic modalities, defeasible reasoning, argument construction). Investigation on the type of entities of legal knowledge, though, has been slight. As a consequence, legal expert systems never came out of the level of prototypical applications, since they lacked a solid methodology for knowledge modeling: formalising legislative knowledge was a subjective process, time- (and cost-) consuming, relatively unreliable from the user's perspective, and not easily re-usable by different applications.

Arguably, the logic and the ontology-

based approaches deal with different aspects of legal words: the logic-based approach mirrors the inferential/syllogistic structure of law closer than the ontological approach, and faces, at epistemological level, the dependency relations between different kinds of legal knowledge [Valente1995]. Otherwise, in the ontological approach legal entities are represented as conceptual units and their intended meaning is made explicit.

Unlike traditional theoretical approaches[1], formal ontologies are based on the assumption that non physical (social) entities can be described in the same terms as physical objects, considering them as pertaining to the same universe of discourse [Searle 1995]. Therefore, non-physical objects are "first order entities that can change or that can be manipulated similarly to physical entities···. They can be represented both as theories/models and as concepts with explicit reification rules" [Masolo et alii, 2003]. In formal ontologies both concepts and relations of the domain discourse are defined through universal properties and metaproperties that are explicitly expressed, and axiomatized [Baader F, et al 2003].

The paper is structured as follows:

Sect. 1 introduces the basic theoretical framework underlying the ontology-based methodology and the components of this model. Some of the main structural aspects of the methodology will be described:

- on lexical level, the JurWordNet resource is a bridge between technical and common language and it allows multilingual access; moreover, at conceptual level, it lexicalizes the ontological entities;
- on ontological level, the Legal World interpretation according to the basic assumptions of the DOLCE+ foundational Ontology and the main classes of concepts in the Core Legal Ontology are described.

Sect. 2 describes an application of the ontology-based model for the building up of knowledge-based systems. In this context, the representation of licences for public sector information handling is sketched.

Ⅱ. JurWordNet

JurWordNet is a formal ontology-based

1) Comanducci 1999, pp.6-7: " Both Kelsen and Searle seem to be constructivists. But what kind of constructivists are they?... Constructivism has to do with one's ontology and epistemology. The differences between Searle's and Kelsen's constructivisms, in my view, lay more at the epistemological level than at the ontological one... Both share, in the sense of 'ontology' as the study of the essence of things,the idea that, among what exists, there are ontologically objective things and ontologically subjective things.....On the other hand, Searle's epistemology looks different from Kelsen's, still influenced, in the second edition of *Reine Rechtslehre*, by neo-kantianism. Searle, I guess, would not accept, for example, the kelsenian use of *a priori* categories as conditions of intelligibility of legal facts *qua legal* facts, as in the case of "basic norm".....Kelsen, therefore, puts together, from an epistemological point of view, natural sciences and empirical social sciences. And he carefully distinguishes both of them from legal science....Searle's dualism, on the contrary, is the dualism between natural sciences (the language of physics and chemistry) and social sciences, or, perhaps, philosophy of society."

extension to the legal area of the Italian part of the *EuroWordNet* initiative[2]. As is the case for other WordNets[3] this is relev ant to the class of computational lexicons that aim at making word content machine-understandable via the highly structured semantic representation of concepts. These are represented by *synsets*, a set of all the terms expressing the same conceptual area (*house, home, dwelling domicile*···) linked by a semantic relation of meaning equivalence. Semantic equivalences are limited (variants) in many terminology lexicons such as the legal one, which has a plethora of technical terms and where synonyms are rare. Conversely, it is important to create equivalence relations with normal language in order to make up for the imprecision of non-experts when searching for legal information, and to use common language terms instead of legal ones. Apart from having taxonomic vertical relations, the synsets of the law lexicon also have 17 associative horizontal relations based on the notions of meronymy, synonymy, and role.

One of the most interesting functions of the wordnet methodology is the distinction of meanings in polysemic terms, both within the domain and in relation with common language. Often, sense distinctions do not just concern language but also the differences in reality perception: for instance there is a need to separate within a concept the role played as opposed to the existence of a tangible physical entity. The entry *President of the Republic* indicates the physical person (referring to space and dimension), the constitutional body, and the holder of the state function. Another example, very common in law, is the distinction between the normative content and physical entity: the entry *contract* may be catalogued as a legal relation, as the physical entity of the paper, and as information content.

The criteria followed to organise the concepts require, therefore, assumptions that are external to the language. These assumptions must be explicit so that the user is aware of the perspective according to which concepts are differentiated. This is the role of ontology. This process also allows mapping terms between different languages. This is particularly effective in the legal field where corresponding terms are often absent in different languages but are present in concepts and legal systems. In the legislative domain it is more appropriate to speak about multi-language versions of law texts rather than translations. Shifting emphasis from the linguistic expression to content allows

2) Currently, the Italian language coverage offered by IWN amounts to 50,000 terms (www.ilc.cnr.it); specialised sectors dealing with specific areas, e.g. EcoWordNet for economic/financial language; Euroterm is an extension of Eurowordnet with Public Sector Terminology funded by EC in the E-content Program. (www.ceid.upatras.gr/en/index.htm.)

3) Since its initial release by Princeton University, WordNet has always been regarded as one of the most important resources in the NLP community (about 400 papers have been published on the subject).

comparing concepts through properties and metaproperties, and to assess not only whether the concept itself occurs in different contexts, but also how the concept is processed in different regulatory structures. The project LOIS, funded by the European e-Content program[4], will extend the Italian legal network to five European languages (English, German, Portuguese, Czech, and Italian, linked by English).

The localisation methodology [5] is based on the automatic junction between already existing lexicons. The basic premise is that semantic connections between the concepts of a language can be mapped through the relationship between equivalent concepts in another language. This procedure serves to test what is covered by the lexicon with respect to the domain and provides an initial base of conceptual equivalents. From the first results of this intersection with the lexicon of EU laws (via the Eurodicautom[6] database) it was evident that out of the 2000 synsets of the Italian law lexicon 800 could be found in the German, 470 in the Dutch, 490 in the Portuguese and 580 in the English. The intersection with the Princeton WordNet showed 600 JurWordNet synsets in the English lexicon, and these were classified as legal terms.

2. Our description model: Types of entities in the Legal World in DOLCE e D&S

The categories that bring together the top level of JurWordNet' s taxonomical trees are the basic legal entities, which are held to be common to all the legal systems. We can give them a minimum set of properties shared by all the specific meanings of each system and/or language. They make up a *Core Ontology for law (CLO).* CLO is a specialisation of DOLCE (Descriptive Ontology for Linguistic and Cognitive Engineering) foundational Ontology [Gangemi et alii, 2002]. The four basic categories of DOLCE are *endurant* (including object- or substance-like entities, either physical or non-physical), *perdurant* (including state- or process-like entities), *quality* and *region* (including dimensional spaces of attributes such as time, geographical space, colour, etc.). DOLCE includes several primitive relations, such as *part, connection, constituency, and inherence* of qualities in entities, *participation* of endurants in perdurants, etc We refer to DOLCE documentation for a

4) The project started on the 1st of March 2004
5) Amongst others, see the MultiWordNet project http://tcc.itc.it/projects/multiwordnet/multiwordnet.php
6) Eurodicautom is an aid for translators created by the European Commission http://europa.eu.int/eurodicautom/Controller

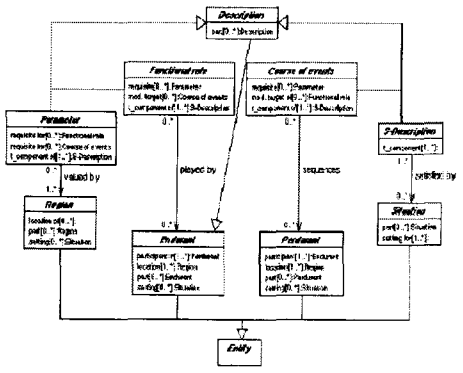
full description of DOLCE top categories.

In DOLCE extended to D&S a new top-category *situation* has been added. The Description and Situation Ontology is an extension of DOLCE aimed at providing a theory that supports a first order manipulation of theories and models. The basic assumption in D&S is that the cognitive structure emerging in cognitive processes refers to high level descriptive structures: any State of Affairs becomes a Situation according to a possible Description of it "A Description is disjoint from situation. A description may be satisfied by a State of Affair. The satisfaction relation is reified in D&S as a first-order *referenced-by* relation. A description satisfied by a SOA is an s-description. A SOA satisfying a description is a situation". [Guarino and Mika, 2003]

According to this approach, the legal world is conceived as a representation, or a description of reality, an ideal view of the behaviour of a social group, according to a system of rules that is generally accepted and acknowledged. In the DOLCE+ D&S distinction, *descriptions* (in this domain legal descriptions, or conceptualisations) encompass laws, norms, regulations, crime types, etc., and *situations* (legal facts or cases) encompass legal states of affairs, non-legal states of affairs that are relevant to the right, and purely juridical states of affairs.

A norm is a legal *description* composed of *legal roles*, *legal courses* of events, and *legal parameters* on entities that result to be bound to *the setting* created by *a legal case*. The *satisfaction* relation holding between *legal descriptions* and *cases* is the reified counterpart of the semantic satisfiability relation: a legal description (the content of a norm, a regulation, a decision, etc.) is assumed to be the reification D_T of a (potentially formalized) theory T, while a legal case C_S is assumed to be the reification of a state of affairs S that can satisfy T.

Fig. 1. Implementing the ontology of Description in Dolce.[7]



7) Exstracted from *Ontology Infrastructure for the Semantic Web*, IST Project 2001-33052 Wonder Web. http://wonderweb.semanticweb.org/deliverables/documents/D18.pdf

Norms may even be *satisfied by* purely juridical Situations, as for norms that describe others norms: (e.g. amendments, law making norms, validity norms.). This enables us to use this distinction to represent meta-juridical conceptualisations (meta-norms) as well, and to provide a unity criterion.

In a social dimension, Law includes social and ethical rules, practices, and conventions. It is a complex, autonomous entity, which includes its self-recognition rules, [Hart, 1961] therefore it cannot be considered as a mere sum of norms. In a strict (positivistic) sense, legal norm is a sub-class of norm, *expressed by* a Normative Text that is *physically represented by* a Document. Legal norms are *constitutive* or *regulative;* constitutive norms create all Law's entities including laws themselves. Thus, in Dolce, a legal norm *functionally depends on* Constitutive Norms and on Collective Acceptance [Searle 1995].

According to the class they pertain to, norms may have *parts* and *components* that are the representation of:

- Legal functional roles (constitutive norms)
- Institutional agents (constitutive norms)
- Institutional powers (power-conferring norms)
- Behaviours (regulative norms)
- Incrimination acts as *legal courses*(incriminating norms)
- Cognitive states (presumptions).

Legal Roles are a sub-set of social roles, played by either physical or non-physical objects. Social Roles [Masolo et alii, 2004] have a relational nature, are anti-rigid[8] and are linked to *contexts* (in legal term, a *constitutive norm*, a *Description* created by intentional agents). Among legal roles, *legal subjects* and *legal assets* constitute the basic entities of the legal world. Legal-subject is an *agentive* legal role, while legal asset is *non-agentive.*

Institutional Agents, or Legally-constructed-Institutions pertain to Social Individuals; like Social Concepts, are defined by Descriptions, but, unlike roles, are rigid and agentive and can be classes (e.g. organisations, public bodies.) or instances; in many cases the same description defines both a class of Individuals (e.g. Ministry) and a Role (Minister) as a *representative* of the individual.

Modal Descriptions are *proper parts* of regulative norms that contain some *modality target* relation between legal roles (legal agents involved in the norm) and legal courses of events (descriptions of actions to be executed according to the norm). The classification of Modal Descriptions is based on the Hofheld's *Theory of basic conception* and on the *Theory of normative positions*

8) Rigidity is a meta-property of particulars in Dolce [Guarino 2004].

[Lindhal, 1977][Kanger, 1972]. Recent revisions of legal philosophers and logicians [Pörn, 1977] [Jones &Sergot, 1996] [Jones, 2003] provide a formal framework and a computational transposition. Following Hofheld' s approach, the normative positions are mainly described throughout relations of opposition/correlation between them. In the DOLCE+ ontology, modalized descriptions reify the theories that a regulatory state of affairs must satisfy. Non-reified theories are usually expressed in some deontic or action logic, as in [Jones, 2003], but the reified counterpart allows one to talk of partial or incomplete theories, and allows reasoning on them at first-order. Among legal modal descriptions, Right and Power are the most important.

Legal Right is a *social advantage* (Bentham), a *free choice* (Hart), or a *protected interest* (MacCormick); it justifies the imposition of duties, the entitlement of claims and privileges, the transfer of powers. In this wide sense, it includes subjective rights. In the strict sense, it is, according to the Hofheldian definition, *correlative of* duty and better expressed by the term 'claim', which is, consequently, a sub-class of right.

Other normative positions are Duty, Privilege, (*correlative of* no-right), Immunity, (*correlative of* Disability). Disability is opposite to Abstract Power.

Abstract Power/Capacity is *dependent-on* constitutive rules. It represents the generic attitude of being entitled to rights/claims, or specific powers. In civil law systems, the Capacity to act is a sub-class of Legal capacity, as the role *legal subject* entails the legal capacity, but not the capacity to perform valid legal acts.

Legal Information Objects *depend on* agents' cognitive objects and on mental process and can by *represented by legal* descriptions. For example, Expression of Willingness may be not only a Linguistic Object (an Oral Expression), but this can also be manifested with behaviours; legal information objects *specifically-depend-on* Legal Documents in some cases in which a certain form is a requirement for the valid existence of a Legal Act (for instance: a will, a juridical text).

Legal Cognitive Objects are internal descriptions, (e.g. *agreement* and *mistake*), which *descriptively-depend-on* information objects, are *participant-in* mental processes or *constituent-of* cognitive states. Cognitive objects have a *one-sided- specific-dependence* on agentive physical objects (e.g. a natural person).

Among **cognitive states** (that are *perdurants*), intentionality is subsumed by will, which is subsumed by consciousness:

Legal Facts (*cases*) are situations satisfying norms (only facts relevant for legal systems are legal facts). Subclasses or atomic components of legal facts can also be defined in terms of perdurant entities, such as:

- *Natural facts* (e.g. death) which are independent of human actions pertains to phenomenon
- *Human facts, depending on* consciousness (but not on will), are accomplishment; Among these:
- *Legal acts* (in a strict sense) *depending on* will
- *Legal transactions, depending on* intentionality.
- *Institutional facts:* are the functional counterparts of brute facts, legally constituted by (*satisfying*) constitutive rules.

Among **qualities** *inherent to* Legal transactions are temporal qualities as duration (quality region are deferment, expiration, term, etc) and the *validity-assessment quality* (valid, void, voidable).

3. The regulative domain: European norms about the re-use and commercial exploitation of PSI

We choose as a case study a specific topic in the domain of copyright Management, dealing with the re-use of information produced by Pubic Bodies. The reason of this choice is because Public sector information (PSI) has both a social and economic dimension and is one of the most important components of public services. In carrying out its tasks the public sector collects, collates, creates, stores and disseminates huge quantities of information: financial and business information, legal and administrative information, geographical, traffic, tourist information etc.

PSI is crucial for democratic and civil life and user-friendly and readily available information enhances citizens' participation in the democratic process. Moreover a better use of public sector information is also useful to citizens by the provision of added-value information products that the public sector itself cannot provide. Therefore, the public sector can be considered the most important source of raw material for the creation of value-added information content and services and the primary locus to which both citizens and businesses can come for access to online information. Clearly, public sector information has considerable economic potential[9]. Better conditions for the exploitation of public sector information would lead to both new opportunities for job creation and the production of value-added

9) In order to estimate the extent of the economic value of public sector information, the European Commission's Directorate General for the Information Society commissioned a study from PIRA International on the *Commercial Exploitation of Europe's Public Sector Information* PIRA International (2000) Commercial Exploitation of Europe's Public Sector Information. Final Report for the European Commission, Directorate General for the Information Society. http://www.cordis.lu/econtent/studies/studies.htm.

information content and services vital to citizens and business. As part of the Action Plan for the Information Society, on the 24 October 2003 the European Commission has adopted a Directive on the exploitation of public sector information aimed at achieving a basic set of common rules in the European Community that at the same time do not or only minimally affect current public sector workloads and budgets[10].

The goal of the EU is to provide enterprises with new job opportunities, taking into account, the considerable economic potential of PSI, as the new Information Society Technology makes it possible to combine data taken from different sources and create a vast range of added value products and services. The Directive aims at ensuring that in relation to the re-use of PSI the same basic conditions apply to all players in the European information market, that more transparency is achieved on the conditions for re-use and that unjustified market distortions are removed.

According to the Directive[11], "Public sector bodies should be encouraged to make available for re-use any documents held by them..... The Directive should apply to documents that are made accessible for re-use when public sector bodies license, sell, disseminate, exchange or give out information, that is produced and charged for exclusively on a commercial basis and in competition with others in the market"[12].

Art. 1, sub-sects 2, 3,4 constraint the exercise of re-use, stating that it shall not affect the Access right of citizen[13], the personal data Protection[14] and the Intellectual Property Right[15]

The Directive sets some rules for the re-use of PSI: "In some cases the re-use of documents will take place without a license being agreed. In other cases a license will be issued imposing conditions on the re-use by the licensee dealing with issues such as liability, the proper use of documents, guaranteeing non-alteration and the acknowledgement of source. If public sector bodies license documents for re-use, the

10) Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information, Official Journal L 345, 31/12/2003 P. 0090 ? 0096. http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_345/l_34520031231en00900096.pdf

11) Art. 3, General prevision of the Directive 2003/98/EC: "Member States shall ensure that, where the re-use of documents held by public sector bodies is allowed, these documents shall be re-usable for commercial or non-commercial purposes in accordance with the condition set out in Chapters III and IV".

12) Premises of the Directive.

13) Art.1, sub-sect.3.: "This Directive builds on and is without prejudice to the existing access regimes in the Member States.." .

14) Art., sub-sect.4.: "This Directive leaves intact and in no way affects the level of protection of individuals with regard to the processing of personal data)".

15) Art.1, sub-sect.2.: "This Directive does not apply to documents covered by industrial property rights, such as patents, registered designs and trademarks. The Directive does not affect the existence or ownership of intellectual property rights of public sector bodies, nor does it limit the exercise of these rights in any way beyond the boundaries set by this Directive. The obligations imposed by this Directive should apply only insofar as they are compatible with the provisions of international agreements on the protection of intellectual property rights".

license conditions should be fair and transparent. Standard licenses that are available online may also play an important role in this respect.[16]". As a condition for licensing, Public sector bodies should respect competition rules when establishing the principles for re-use of documents avoiding exclusive agreements as far as possible.

3.1. Modeling a license

The UK Government has already started the process of implementing the EU rules. During 2003 a Consultation on a Partial Regulatory Impact Assessment (RIA[17]) on the Proposal for a Directive was held, considering the ways in which ensure that the public sector complies with the measures set out in the Directive. Moreover, the Her Majesty' s Stationery Office (HMSO[18]), who is responsible of managing and licensing the re-use of Crown Copyright material, launched online Click - Use Licence. There are currently licences, which allow unrestricted use of core government information under licence. A new phase will extend the Click-Use approach to value added licences where fees are charged and collected online. Thus, we choose UK licences as a subject for testing the modeling framework[19].

Conceptualisations of IPR and of Digital Rights is a matter of great interest both from the ontological and the technical perspective [Dulong de Rosnay, 2003], [Delgado et alii, 2003]. Many international projects aim to define common models for the management of digital rights that involve both the substantial definition of normally accepted rules (I-Commons[20]) as well as the definition of languages and models for the digitalisation of the rules governing the use of digital information and web resources a (XrML[21], ODRL-Open Digital Rights Language[22]).

According to a common shared interpretation, a Licence is an Authorisation: it is a container of explicit permission to exercise rights. Rights set actions that an actor can exercise on a resource which can include constraints (limits), conditions (exceptions that expire permissions) and requirements (obligations that must be met before permissions can be exercised).

According to the D&S model, a licence is composed by a set of Descriptions stating permissions about use and re-use;

16) Art. 8: Licences sub-sect.1 "Public sector bodies may allow for re-use of documents without conditions or may impose conditions, where appropriate through a licence, dealing with relevant issues".
17) http://www.oqps.gov.uk/copyright/ria_consultation_03_archive.htm
18) http://www.hmso.gov.uk/copyright/licences/click-use-home.htm
19) Entities descriptions are based on the UK Metada Standard Framework.
20) http://creativecommons.org/projects/international/
21) http://www.xrml.org/
22) http://odrl.net/

constraints, conditions and requirements are expressed in term of S-Descriptions and M-Descriptions and are parts of Descriptions (Descriptions have only other descriptions as parts).

Descriptions are composed of:

- Endurant: activities set by the norms, as see, copy, re-use, redistribute, republish; such actions affect a non-physical entity (information) and are sequenced by a legal course of events (what is permitted or forbidden to do)
- Perdurant entities involved in actions are Individual, Group or Organisation:
- Agents play two categories of roles: rights holders and users. The role of Rights holder (who grants permissions) is played by Public Bodies as producers, by Custodian (who has the managing power over the resource, e.g. assignment and maintenance of access control markings.) and by Representative. Sub-classes of Users (who access electronic or digital versions of the Products) are End-users and Re-user.
- The role of Author is a requirement for[23] the role of Rights holder. Author is defined by a Description stating the existence of the right (Copyright Statement).
- Legal parameters (qualities) are requisites for roles and courses (e.g. type and format of data can be a requisite for its delivery). Specific parameters for digital right management are Accessibility (whether particular users will be able to access or use the resource) and Disclosability: as a general rule, users are allowed to access data disclosable only. Material that is covered by security classification, legal or policy restrictions is excluded. More specifically, Disclosability is concurrently constrained by DPA Data Protection Act, Freedom of Information Act (FOIA), and Environmental Information Regulations. Declaration of Disclosability is subject to review. Therefore, time of the disclosability review is a requisite for stating it as disclosable.
- Region entities in a case setting must be values for some legal parameter (e.g. quantity of data required, The date of the formal decision regarding the disclosability review).
- Legal roles have a modal target in a course of events (e.g. citizens are allowed to access legal information and are forbidden to access

23) Guarino et alii, 2004: "The requirement relation probably correspond to an often mentioned feature of reloes, coined as roles can play roles...this kind of double role-playng can be a consequence of the definition of one of the roles and therefore consitutes a case of requirement ".

undisclosable data).

The general rule states that re-use of disclosable information only is permitted. The requirement is expressed in our model, by a Modalized-Description where Endurant play roles of re-user, accessing/handling PSI is a course modalized as permitted and undisclosable is value for parameter Disclosability, as a requisite for accessing (fig.2):

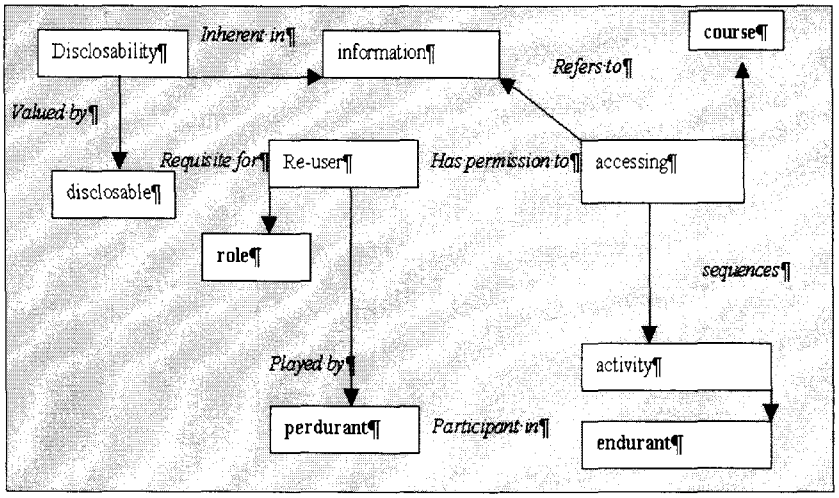
As specific cases, three situations occur:

CASE 1) this covers material where Crown copyright is asserted[24], but waived. Waiver material can be re-used free of charge without requiring a formal licence provided that it is:

- acknowledged
- not used in a misleading way
- reproduced accurately and kept up to date

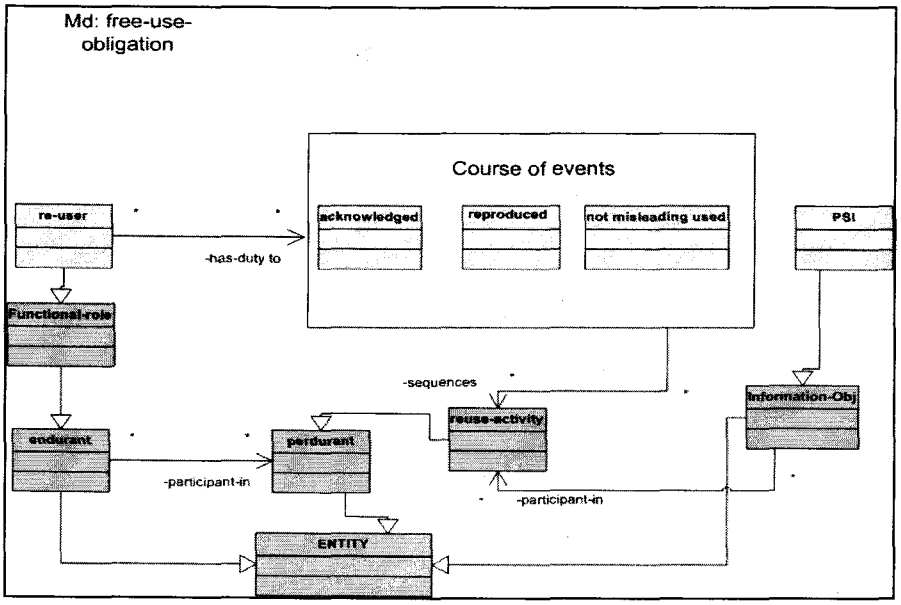
In M-Description free-use-obligation (fig. 3), re-user has-duty to acknowledge, reproduce accurately, up-date PSI (course)

Fig. 2. Access to public information: general rule



24) Public Sectore Information are subject in UK to Crown or Parlament Copyright .

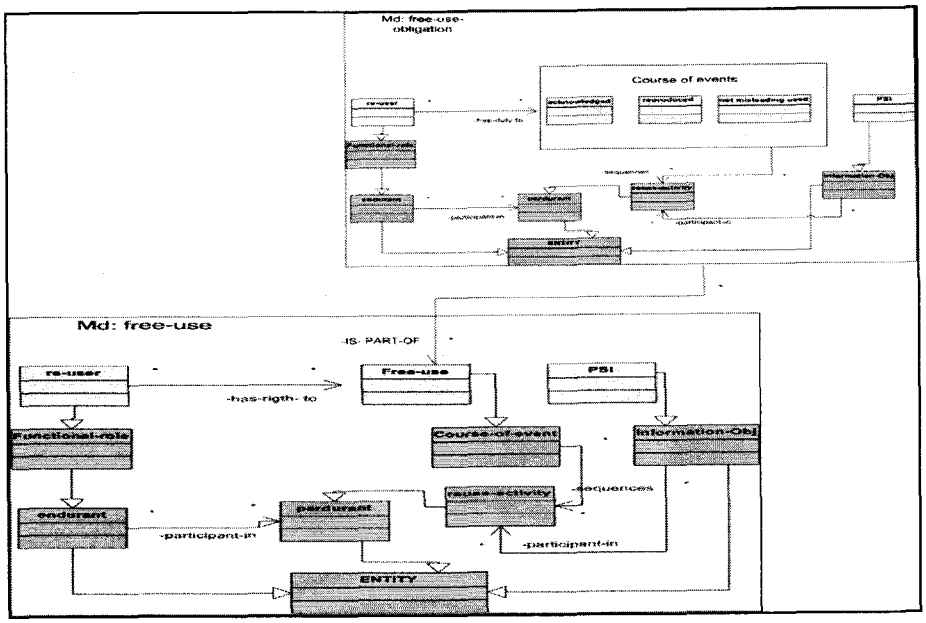
Fig. 3. Free-use-obligation



The condition is part-of M-Description

md: free-use (fig. 4):

Fig. 4. Free-use



CASE 2) A Core Licence covers core material, which is likely to satisfy the following conditions:

- It is essential to the business of government;
- It explains government policy;
- It is the only source of the information[25];

Among Obligations, re-user must:

- reproduce Material accurately from the current Official Source
- identify the source of the Material and feature the following copyright statement if you publish the Material;
- Not use the Material for the principal purpose of advertising or promoting a particular product or service, etc.

Requirements are expressed by parameters which affect the quality inherent to public information, for instance the quality exclusiveness must have positive value; Conditions are expressed by M-Description (Md: core-licence-condition) constraining the task of reusing activity. It is part-of a Md Core-licence.

CASE 3) Value added material will usually satisfy the following conditions:

- It will bring together information from a variety of sources, Value will often be added by means of commentary, analysis, indexing, search facilities or text retrieval software
- There may be similar competing commercial services and products in the marketplace;
- Its creation is not vital to the workings of government. There will often be alternative suppliers of such information. Etc....

Among obligations re-user ought:

- to identify the source of the Material···. ecc.

and, in Specific to Royalty licences :

- to keep full and accurate records of the sales of your Product; ecc.

Here a specific condition: fee or royalty payment holds as a course which sets the reuse-activity, component of a M-description Valued-added-condition; requisite is a parameter valued by kinds and quantity of sales.

Conclusion and future work

In this paper we have presented a preliminary test of a methodology for modelling normative situations; we consider the work still in progress as further aspects need to be refined; among others:

- checking the completeness of the Core Legal Ontology;

25) only part of the actual requirements and conditions has been listed.

- specialising parthood or dependency relations between modalized descriptions;
- testing the modelling framework in close domains, as those of digital rights and privacy regulations;
- linking the conceptual interface to the lexical level of JurWordNet, in order to allow conceptual and multilingual access.

References

1. Alchourrón C. E. e Buligyn E. ,1971. Normative System, Vienna:Springer Verlag.
2. Baader F, et al., "The description logic handbook", Cambridge University Press, 2003.
3. Boer A., Van Engers T. and Winkels R., Using Ontologies for Comparing and Harmonizing Legislation, in Proceedings of the 9 th ICAIL Conference, Edinburgh, 2003.
4. Borges F., Bourcier D., Andreewsky E. and Borges R., Conception of cognitive Interfaces for legal knowledge, in Proceedings of ICAIL 2001, ACM Press.
5. Breuker J, and Winkels R, "Use and reuse of legal ontologies in knowledge engineering and information management", ICAIL03 Wks on Legal Ontologies and Web-based Information, Management, Edinburgh, Http://lri.jur.uva.nl/~winkels/legontICAIL2003.html, 2003.
6. Comanducci P. Kelsen vs. Searle: A Tale of Two Constructivists Analisi e diritto 1999.
7. Delgado J., Gallego I., Llorente S., Garcia R., IPROnto: An Ontology for Digital Rights Management, in Proceedings of Jurix 2003, IOS Press.
8. Dulong de Rosnay M., Cognitive Interface for Legal Expressions Description- Application to Copyrighted Works Online Sharing ,and Transactions, in Proceedings of Jurix 2003, IOS Press.
9. Gangemi A. Prisco A, Sagri M-T., Steve G., Tiscornia D.,Some ontological tools to support legal regulatory compliance, with a case study, Proceedings of the second International Workshop on Regulatory Ontologies WORM 2004 - Part of the International Federated Conferences (OTM '04), Springer LNCS
10. Gangemi A., Mika P. 2003, Understanding the Semantic Web through Descriptions and Situation, Meersman R, et al. (eds.), Proceedings of ODBASE03, Springer, Berlin, 2003.
11. Gangemi A., Sagri M.T., Tiscornia D.,

Metadata for Content Description in Legal Information, Workshop Legal Ontologies, ICAIL 2003, Edinburgh. In press for Journal of Artificial Intelligence and Law, Kluwer.

12. Gangemi A., Guarino N., Masolo C., Oltramari, A., Schneider L. 2002. Sweetening Ontologies with DOLCE. in Proceedings of EKAW 2002, Siguenza, Spain, pp 166-178.
13. Hart H.L.A. 1961, The Concept of Law, Oxford(UK):Clarendon Press.
14. Hirst G., " Ontology and the lexicon " In Staab, Steffen and Studer, Rudi (editors) Handbook on Ontologies in Information Systems, Berlin: Springer, 2003, p.14.
15. Jones A, A logical Framework, in J.Pitt (ed.), Open Agents Societies: Normative Specifications in Multi-Agent Systems, Wiley and S., 2003
16. Jones A and. Sergot M. A formal characterisation of institutional power, Journal of IGPL, 4 (3), 429-445, 1996.
17. Kanger S., Law and Logic, Theoria, 38, 105-132, 1972.
18. Lindhal L., Position and Change. A study in Law and Logic, Reidel, 1977.
19. Masolo C., Vieu L., Bottazzi E., Catenacci C., Ferrario R., Gangemi A., Guarino N., Social Roles and their Descriptions, in Proceedings of KR 2004
20. Masolo C., Borgo S., Gangemi A, Guarino N, Oltramari A, Schneider L, " The WonderWeb Library of Foundational Ontologies", IST Project 2001-33052 Wonder Web. http://wonderweb.semanticweb.org/deliverables/documents/D18.pdf, 2003
21. Miller G., WordNet: A lexical database for English, in Communications of the ACM 38(11), 1995, pp. 39-41.
22. Pörn, I., Action Theory and Social Science, Some Formal Models, Reidel, 1977.
23. Sagri M.T., 2003, Progetto per lo sviluppo di una rete lessicale giuridica on line attraverso la specializzazione di ItalWornet, in Informatica e Diritto, ESI, Napoli, 2003.
24. Searle J. R., The Construction of Social Reality, Free Press: N.Y., 1995 .
25. Valente A. 1995, Legal Knowledge Engineering, A modelling Approach, Amsterdam: IOS Press, 1995
26. Visser P., T. Bench Capon, 1999, Ontologies in the Design of Legal Knowledge Systems, towards a Library of Legal Domain Ontologies, in Proceedings of Jurix 99, Leuven, Belgique.