Lexical resources for Accessing to Public Sector Information

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Abstract. In many countries, public institutions, as the main producers and distributors of legal source of information, have promoted projects aimed at improving the availability and the free access to information via the web as a significant component of the process of transparency in citizen/institution interaction. This paper describes the state of the art in terms of European projects created by public institutions for facilitating access to regulatory information and it focuses the necessity of integrating structural documentary standards with semantic ones for the description of content. The Italian JurWordNet project is a source of semantic metadata aimed at supporting the semantic interoperability between sectors of Public Administration; the creation of a multilingual lexicon that extends the Italian model to five European languages (the aim of the Lois Project that has recently been approved by the EU) is also described.

1 Introduction: the social and ecomomic value of Legal information

Legal information has both a social and economic dimension and is one of the most important components of Public sector information (PSI) provision. 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

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primary locus to which both citizens and businesses can come for access to online information. Clearly, public sector information has considerable economic potential[1].

Better conditions for the exploitation of public sector information would lead to both new opportunities for job creation and the production of value-added information content and services vital to citizens and business. As part of the Action Plan for the Information Society, 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[2].

In order to meet the Directive's goals and to expand the European market in this field the public sector should establish a legal and technical framework aimed at improving dissemination of PSI and services to citizens and business. This should be achieved by adopting a series of measures and strategies that include: a general right to re-use PSI; effective co-operation between the public and private sector; a transparent pricing structure; the adoption of standard licenses that prevent the granting of exclusive rights; the provision of easy access to data; the adoption of the digital format as the primary mode of information distribution; improving administrative procedures and adopting common procedures, standards and metadata.

The importance of standards and metadata is stressed by the universal awareness that the most important challenge that faces the Information Technology Society is the capacity of handling the exponential growth of the Internet and the crucial problems that this poses in generating, searching, extracting and updating information.

The same problems affect the specific field of legal information where practical/technical solutions for accessing information are also given a particular 'social' perspective by the need to enable citizens to access in an 'understandable' way legal, mainly regulatory, information.

In many countries, public institutions, as the main producers and distributors of this source of information, have promoted projects aimed at improving the availability and the free access to information via the web [5] as a significant component of the process of transparency in citizen/institution interaction. One of the main goals in this

[1] 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.

[2] 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*

area is the achievement of a high level of *semantic interoperability* between sectors in order to:

- improve communication between areas and services of the Public Administration
- make it possible for the user to access information and to make that information available for further use by other sections of the Public Administration;
- easy-to-access tools in order to incorporate and organize the data that the users themselves are asked to supply.

This paper is structured in the following way: the state of the art in terms of European projects created by public institutions for facilitating access to regulatory information is outlined (section 1); their analysis then leads to the emergence of the necessity of integrating structural documentary standards with semantic ones for the description of content (section 2); the Italian JurWordNet project as a source of semantic metadata is described (section 3); the creation of a multilingual lexicon that extends the Italian model to five European languages (the aim of the Lois Project that has recently been approved by the EU) is also described (section 4).

2 Standard for Legal Documents: State of the art

At a national level many initiatives exist that are specifically concerned with the development of common standards across websites holding information on legal matters. In the UK, the Legal and Advice Sectors Metadata Scheme (LAMS)[3] was developed by the Lord Chancellor's Department as part of the Community Legal Service (CLS) launched in April 2000. It is a central part of the British Government's programme of legal reform, which is designed to increase ordinary people's access to justice. The UK Metadata Framework (UKMF) describes all the resources within each government sector so that policy-makers have access to the resources on a particular policy issue regardless of the department to which those resources belong.

As part of its e-government Plan, the Italian government has invested 12 million Euro in projects aimed at making legal information more readily available: one of these is the *Norme-in-rete* Project[4] (NIR) in which all of Italy's major Institutions in this area participate (the Chamber of Deputies, the Senate, the Department of Justice). The project envisages the XML codification of all standards adopted in normative texts, including metadata descriptions.

In the Netherlands, the METALEX project[5] is an open XML standard for the mark up of legal sources. In France, an *Action Spécifique on Legal Ontologies du*

[3] www.lcd.gov.uk/consult/meta/metafr.htm)
[4] http://www.normeinrete.it)
[5] www.metalex.nl

Droit et langage juridique has recently been set up by Governmental Institutions with the aim of improving the LegiFrance public legal information system.

In Denmark, a similar Project (DAMIALex) has recently got under way. In other EU countries the LEXML initiative[6] is a coordinating point for Germany, Sweden, Austria, and Netherlands in the development of standardised structures, vocabularies and data exchange tools. The US Association on legal XML is LegalXML[7].

3 Accessing legal contents

On the development of the NIR, the need of a semantic standard as a tool for describing content alongside structural standardisation has emerged.

One of the typical obstacles the citizen is faced with when accessing legal resources is "Legal jargon". The non-expert user has no precise idea of what he is looking for and will often use common language rather than specific legal terminology. Indeed several legal concepts may have different names in normal as opposed to legal language. For instance, in Italian the common term "*affitto*" (*rental*), which any interested party will use to retrieve relevant legal documentation, is referred to in legal jargon as "*locazione di immobili*" (*lease*). Even professionals in the legal field might encounter difficulties in retrieving some kinds of legal document by using inappropriate keywords. This is a particularly pressing problem in the area of case law (judicial decisions) where the discursive style of argumentation is often affected by the semantic ambiguity of natural language. Identical legal concepts are often designated by different terms, which are, however, synonyms from the legal point of view. Thus, there is a clear need to be semantically explicit so that searches are driven by a meta-description which holds to univocal references in the text.

Even more importantly, corporate users, citizens, but especially professional organizations will benefit from cross language linkages in order to retrieve legal documents from different European countries. The possibility of doing this is becoming more and more vital as social and economic activities, which require legal documentation, are acquiring an ever-increasing European dimension. In the future we envisage that even non-specialized legal practises will need to consult legal documentation from countries other than their own. (See section 4)

[6] www.lexml.de
[7] www.LegalXML.org.

4 JurWordNet

JurWordNet is a formal ontology-based extension to the legal area of the Italian part of the *EuroWordNet* initiative[8] [10] [14]. As is the case for other WordNets[9] this is relevant to the class of computational lexicons that aim at making word content machine-understandable via the highly structured semantic representation of concepts [7], [8], [2]. 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.

4.1 The methodology

Consistent with all WordNet projects, the developing methodology favours the use and harmonization of already existing lexical resources. [12] Relevant concepts have been spotted *bottom-up from* the queries of legal information systems. In particular the lists of the Italgiure/Find system, the largest Italian law information system, developed by the Court of Cassation, produced:

- the Semi database, 11,00 conceptually connected key words and headings;

[8] 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.)

[9] 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). This is the main reason. Why successively great efforts have been made to make WordNet related technologies as stable as possible. For instance just in terms of programmatic interfaces the community can rely on 21 access libraries in all major modern computer languages. Also Multilingual WordNet can be considered mature in every respect. The European commission recognized the importance of having linked WordNet for all European languages as early as 1996 by funding the EuroWordnet project (LE-2 4003 & LE-4 8328). The results and the methodologies developed within this project proved to be so sound that in September 2001 a new project was launched, namely Balkanet, with the goal of extending EuroWordNet to Balkan languages.

- the list of terms that common users includes in AND, from which derives the *list of syntagms*, a group of about 13,000 two-word expressions.
- The list of words that common users include in OR, the so-called *analogical chain*. Analogical chains are made up of synonyms, or terms that, at least in a certain amount of searches were declared to be interchangeable by the majority of users.

From syntagms, a taxonomy was automatically created with the main term, as were the top levels of the trees derived from it, using, in a partially automatic mode, the dictionary glossaries. A consolidated corpus of about 2000 synsets will be automatically increased through the link with thesauri and key words for legal databases. We will also map the resource with the MultiWordNet database, which contains 1800 synsets marked as 'legal'[10].

4.2. Connection between legal and generic WordNet.

JurWordNet is a domain lexicon; as in all technical fields, it is impossible to trace a borderline between common language and terminology: consequently, the legal lexicon should not be considered as a sub-class separated from the generic base. Overlapping occurs, both when the technical sense is stored in the Italian lexicon (ItalWordNet), and when the term is stored only in its common meaning. The connection between the two resources is made manually, adopting pragmatic criteria relevant to the application task. The first simplification was to limit the connection to nouns, as nouns make up almost the totality of this specific resource. A limited amount of adjectives is included, as these are polysemies compared to the nominalised use (private, public…); verbs appear rarely in syntagms and are connected to the noun that acts as the subject/object. There are two kinds of *Plug-in* functions between legal and generic resources:

- specific meaning that overlaps the generic meaning *(eq-lug-in)* occurs when the sense defined in common language matches with terminology. However, the definition (gloss) drawn from dictionaries or legal handbooks is more precise. In this case, through simultaneous access, all the lower branches of the trees are the specific ones, whereas the upper are in common Italian.
- a specification of the legal meaning as opposed to the generic one *(hypo-plug-in)*, which entails that the entire lower legal branch becomes a specific branch making up that of common Italian.

[10] http://tcc.itc.it/projects/multiwordnet/multiwordnet.php

4.3. Disambiguation of polysemies: linguistic and ontological levels.

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[11]. 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 the 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 organize 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: "It is possible that a lexicon with a semantic hierarchy might serve as the basis for a useful ontology, and an ontology may serve as a grounding for a lexicon. This may be so in technical domains, in which vocabulary and ontology are more closely tied than in more general domains" [6]. For this pourpose, we framed high-level concepts in basic legal categories, and we have inserted terms used in law handbooks, usually too generic for the search of the juridical data, which make up integrating categories suitable for the dominion. For example, terms used in the search, such as *foundation, association, committee,* and so on, are grouped in the class *institution*, which is a concept created by doctrine that does not appear among the lexical corpus.

Over and above the disambiguation of meaning within a linguistic and legal system things become even more complicated when, as in our case (see section. 4), the aim is to provide multicultural and multilingual communities with a shared knowledge for accessing legal material.

Thus, 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 series of properties shared by all the specific meanings of each system and/or language. They make up a *Core Ontology for law.* Having a nucleus of shared legal knowledge allows matching, integration, and comprehension

[11] For instance, the Italian juridical term *canone,* means both the payment in money or in kind, against a contract; or, in canon law, a universal juridical norm. The Italian term *mora* is meant both as "unjustified lateness in discharging an obligation" and as "the amount of money due as a fine against the delay". The Italian term *alimento* substantially changes it's meaning if considered in its singular form as "food", or plural form as "alimony". The entry *alienation* in a juridical context is a juridical act; whereas in common Italian is has several meanings, all unconnected to the technical meaning of the term. Making explicit the difference in meaning, the user is allowed to build more precise questions for information searching.

of elaborate legal concepts created by particular legal systems, and grants that the criteria used to organize the concept classes can be shared and are based on the law [4], [13].

Legal ontology is the subset of social object ontology[12], which, in turn, requires ontological assumptions with regard to the "real world" as well as the social and juridical. Both imply, and thus depend on, foundational ontology. The foundational ontology upon which our core ontology is based (*Core Legal Ontology CLO)* is DOLCE + (Extension of DOLCE, "Descriptive Ontology for Linguistic and Cognitive Engineering", version 2.1 of D17 Deliverable Wonderweb[13].). DOLCE was developed by the Laboratory for Applied Ontology of the Institute of Cognitive Sciences and Technology of the National Research Center in Rome. It collaborated with the ITTIG for the development of a legal ontology [3].

5 Cross-lingual information retrieval: the LOIS project

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 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 [1].

Translation problems are due to: a) language, b) difficult comparisons between different legal systems.

With regard to the first case, jurists maintain that, "*the translation of a word into another is possible and legitimate to the extent to which the two words express the same concept*" [11]. It is possible to encounter situations in which although literal

[12] According to the language philosopher John Searle, creating social or political ontology means describing the nature, properties, and role of social entities. The 'objects' represented by nations, social classes, communities, associations, governments, banks, universities, but also rights, obligations, powers, money, copyrights, patents, have no real existence or physical identity, but fill social life and are the object of any conversation on politics, social behaviours, and justice. Language created them, their existence is based on international, historical, and social agreements, and their meaning changes according to the various social contexts, historical ages, and discourse levels. The role of ontology is to describe such objects making explicit the meaning assumptions in terms of minimal (meta) properties that may be universally shared. On stricter, and more technical terms, ontology defines concept meaning negotiations facilitating, especially on the Internet, communication interchange, net interactivity, use of existing lexical resources, harmonization of contents, and so on.

[13] http://wonderweb.semanticweb.org

translations of terms can be made, the translated equivalent acquires within a different linguistic context a completely different meaning: for example the Italian term *diritto civile* translated into English as *Civil Law* has a very different meaning to the apparently equivalent term employed in the Italian context.

Other kinds of problem at the linguistic level arise from the need to compare linguistic systems that are very diverse in terms of structure and cultural pattern dimension. For example French is characterised by an abundance of polisemic words and the frequent use of insidious rhetorical forms that can only with great difficulty be compared to the terms and structures of the more practical and pragmatic English language. The difficulty in finding equivalent terms is all too apparent (e.g. *agent, estoppel, executor*).

The most common and most difficult problem, however, is due to a substantial divergence.

An example could be the term *negozio giuridico* which was introduced via German legal science and with great difficulty can be assigned an equivalent in French or English. It is a term that can be perfectly defined by both French and English jurists but which cannot be translated through the use of a specific term in these languages. This, of course, is a great limitation to the comparison and translation of texts. The Italian entry *capacità giuridica* has no equivalent in English, as there is no general theory on legal capacity within common law that may be compared to the body in Italian legislation.

In the last years the growing need to make comparisons with foreign documents has led research to tackle the issue of multilinguism by attempting to create tools to obviate the difficult problem of legal concept and data communication.

For example, the European Community, via *Eurodicautom,* predisposed a translation service of legal terminology taken from European laws, but because this tool is based on practical terminology it does not include terms used in legal science and it does not envisage a direct connection between the thesaurus developed by the Community.

Jurovoc, the legal thesaurus of the Swiss Federal Tribunal is another type of tool developed in this area. It is made up mostly of legal terms in German, French and Italian that are connected amongst them selves in pairs. Compared to semantic lexicons thesauri, and therefore also Jurivoc, do not include term definitions and so do not resolve the problem of polysemes. It is difficult to grasp the meaning to which the translated term refers. Over and above this, the list of terms is connected at a taxonomic level (Bt, Nt) as well as to a generic reference to equivalent terms. The type of semantic connection made between terms is therefore not defined. For example, the term *mora dei creditori* is connected to *penalità della mora*. The distinction between the sanction with respect to and the legal effects that can result from this are missing. The WordNet methodology appears to offer solutions to the treatment of multilinguism that are able to go beyond the limitations of these approaches.

EuroWordNet has created an impressive quantity of documentation concerning *methods* for developing multilingual ontologies in the WordNet framework. All European local wordnets are linked to the ILI (*Inter-Lingual Index)* of English terms. ILI is an unstructured list of meanings, where each synset has a one-to-one reference (*equal- to*) to its source, without any language-specific relation [Vossen 1998]. Local synsets can be mapped from language to language according to the inter-link of ILI. This 'shallow' methodological choice was due to the difficulties encountered in the EuroWordnet project in harmonising different lexical resources and separate starting

points. The homogeneity requirement was dealt with by top-down identification of the Base Concepts and by the shared interpretation of semantic relations.

The European Commission[14], in response to the need for a means of allowing the access to cross-language legal information, has recently financed within the e-Content program[15], the LOIS project which will develop a multi-language database made up of law wordnets in five European languages (English, German, Portuguese, Czech, and Italian, linked by English).

The WordNets resulting from the *EuroWordNet* project cover standard language: *LOIS* will extend them to legal language by tracking the relations existing between common language and legal jargon synsets. In this way it will be possible to map queries expressed in a non-technical way onto effective queries to highly technical document bases. The Legal WordNet developed by the ITTIG will be used as a basis for all localization of legal lexicons.

The localisation methodology is a solution that has already been adopted by other projects[16]. It 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[17] 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.

These initial operations allow for the automatic locating of some of the correct semantic relationships that exist between terms in two different languages. For example, it has been possible to eliminate the ambiguity between the two meanings of

[14] Treaty on European Union (Consolidated version 1997), *Article 314 (ex Article 248):* "This Treaty, drawn up in a single original in the Dutch, French, German, and Italian languages, all four texts being equally authentic, shall be deposited in the archives of the Government of the Italian Republic, which shall transmit a certified copy to each of the Governments of the other signatory States. Pursuant to the Accession Treaties, the Danish, English, Finnish, Greek, Irish, Portuguese, Spanish and Swedish versions of this Treaty shall also be authentic".

[15] The project will start on the 1st of March 2004

[16] Amongst others, see the MultiWordNet project http://tcc.itc.it/projects/multiwordnet/multiwordnet.php

[17] Eurodicautom is an aid for translators created by the European Commission http://europa.eu.int/eurodicautom/Controller

the word "contratto" (sense 1, *document* and sense 2, *voluntary agreement*). In fact, using the hypernym "document", *contratto* 1) was linked to "*instrument: document that states some contractual relationship or grants some right*"; and contratto 2) "*contract: a binding agreement between two or more persons that is enforceable by law*".

A further example is the word Diritto which has two meanings in Italian, 1) *"faculty deriving from law or custom"* or 2) *set of legislative or customary norms that regulate social relationships*". In English sense 1 corresponds to *right*, and sense 2 to *Law*. Through the automatic comparison of Italian JurWN and legal terms in the Princeton WordNet it is possible to connect to the correct translation by using hypernym relationships. In fact *diritto pubblico* is correctly translated as *public law* and from this the correct hyperonym "law" is created.

6 Conclusion

At present E-Government projects focus on the creation of standards that public organizations can adopt universally; as a consequence the definition of semantic standards must necessarily be at the generic level. The creation of cognitive interfaces based on semantic lexicons allows for the overcoming of linguistic barriers in a dynamic way during the research phase; from another angle lexicons can become a marking source that can be used for the semantic tagging of legal documents with a high social interest.

The Jur-WordNet project will shortly attain the following objectives:

- to enable full *Legal coverage WordNet* localization for at least 6 languages of the EU members and candidate countries.
- Create links across several localized Legal Wordnets and across Legal Wordnets and Standard Wordnets (whenever base Wordnets are available).
- Configure an information retrieval system able to exploit the above resources in terms of more effective monolingual retrieval and cross lingual retrieval of legal document bases.

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