

# About The Exposition of Brazilian Jurisprudences

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**Abstract.** In this paper, we address an issue concerning the application of an ontological layer over some federal jurisprudences repositories. After a brief state of art, we designed a domain ontology performing a substantial modification of an existing one, adding some federal features through experts interview. This approach seems to open promising ways towards a semantic exposition of Brazilian jurisprudences and some worldwide legal vocabularies alignments.

## 1. Introduction

Open data is well known as the movement advocating the exposition of digital data coming from public sources. Despite their free access, these data are unfortunately largely produced and disseminated in a semi structured or unstructured manner. Indeed, most of time, these data can be reused to support new reasonings making necessary the presence of an upstream semantic layer (see [Bizer et al. 2009]). The sector of Justice illustrates perfectly these needs, the arbitrations are there continuously produced by performing cognitive reasoning (argumentation, similarity and case-based reasoning) to achieve the decisional processes. Thus, legal ontologies (see [van Engers et al. 2008] for a large view) now play an important role in the digital support of legal expert productions. Recent researches proves that using semantic web technologies can improve the research of legal documents for legal users (see [Saravanan et al. 2009]). In this article we are interested to support a particular kind of judicial reasoning in Brazil, the construction of jurisprudences. A jurisprudence is a set of repeated decisions performed by courts that provides the basis for new trials. Thus, jurisprudences are used to support and argue the judgments at all levels of the justice. On the web, there are various repositories for Brazilian jurisprudences, each of them providing interface to access to specific (see [STF ]) or unified (see [JU ]) jurisprudences. Moreover, Brazil participated in an international initiative establishing an open standards for the interchange of legislative and court information called LexML. Nevertheless, all of these repositories do not dispose of a semantical layer giving the status of legal data warehouse (see for example [Casellas et al. 2012]) inside which query could be performed through some endpoints. The issue of this paper is then to investigate if some similar domain ontologies were already proposed and to capture a set of competency questions in order to redesign a possible controlled vocabulary and a set of axioms to cover the repositories. The subsequent parts of the article is as follows: Section 2 describes our application case, Section 3 presents a brief but exhaustive state of art, Section 4 details the competency questions, Section 5 depicts our domain ontology and Section 6 opens some research perspectives.

## 2. Judicial Process

In Brazil there are different kinds of justice layers (e.g. state, federal, regional electoral, labour and military) and different kinds of rights (e.g. civil, penal, etc). Our application case is restricted to the criminal right of the federal court. As depicted in the Figure 1, a criminal case begins with a denunciation and can finish in different ways: with an outright rejection, with a summary absolution, with a sentence without appeal (*sentença transitada em julgado*) given by a judge of a *Seção Judiciária* (SJ, 1st instance) of a federal region, with a decision (*acórdão*) of the *Tribunal Regional Federal* (TRF) without appeal or with a decision (*acórdão*) of the *Supremo Tribunal Federal* (STF) or the *Superior Tribunal de Justiça* (STJ). In the first instance, after the end of the criminal procedure, instructed by an *Audiência de Instrução e Julgamento* (AIJ), comes the sentence that can suffer a resource. So, the process will transit through the second instance, i.e. one TRF in our application case, specifically towards a groups of recourses, which are usually composed by three relators (that can be composed by *desembargadores*, *juízes* or *ministros*). The process is assigned to one relator who will start with an argumented position (*voto*). Another relator called reviewer may give his/her own argumented position that will support an agreement or a discordance. A session of judgment is planned, and all the relators of each group of recourses will sit to vote using the *pros or cons* for all the recourses. If the position of the first relator wins then he/she will construct the decision (*acórdão*), else it's the reviewer (or the third relator) who will have to construct the decision. Thus, the judgments that are supported by a second study (in a TRF) or third study (in STF or STJ) of the case will constitute the future jurisprudence.

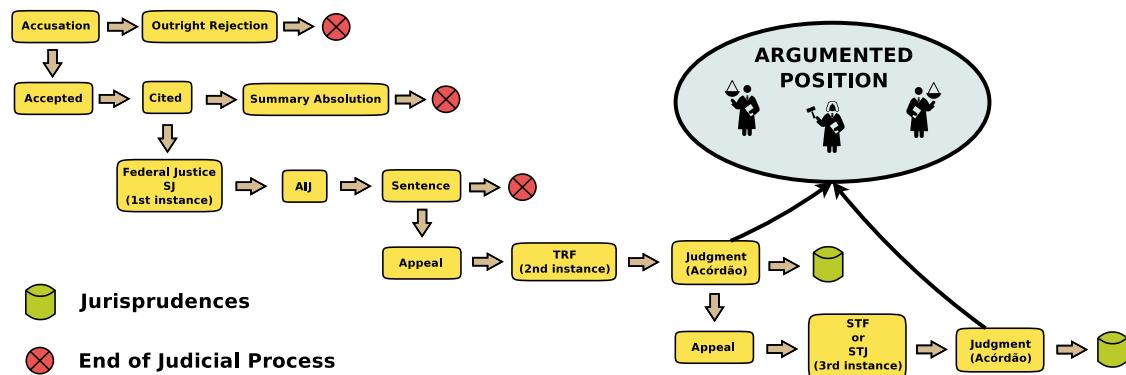


Figure 1. Process Criminal Justice

Then, a jurisprudence is a set of decisions and interpretations of laws made by the courts. They are used to support and argue the decisions and judgments at all levels of the (Brazilian) justice system. In summary, they are past judgments that provide a basis for new ones. Note that, a jurisprudence does not build decisions, they just guide and highlight the precedent (similar) cases. But, it exists very well established jurisprudence (built from repeated court decisions) that are considered as dominant on a particular legal issue, without nevertheless insuring that all the courts will decide in the same way (space and time).

### 3. Existing Approaches

Our approach is situated in the general scope of legal ontologies (see [van Engers et al. 2008] for a large view). A very complete review paper was performed by Griffó et al. in [Griffó et al. 2015] in which the selected papers were analyzed and categorized according to the scientific challenges tackled. We selected the contributions dealing with jurisprudences completing our selection by other bibliographical portal resources. Thus, we discovered that it exists some ontology-based methods or tools to support the jurisprudence researching particularly in Spain [Benjamins et al. 2004], in Thailand [Boonchom and Soonthornphisaj 2012], in Tunisia [Dhouib and Gargouri 2015] and in Lithuania [Kiskis and Rimantas-Alfonsas 2004]. Few attempts were realized in Brasil to provide a domain ontology for the interoperability of jurisprudence database (see [de Oliveira Lima 2010]). The first real proposition to design a pattern representing an ementa of a judgment or (acordão) was performed by Guimarães in [Guimarães 2004]. Another approach deals with some jurisprudences of the Tribunal of Goias in [Morais and Ambrósio 2008] but focusing the proposal on the domain NLP-categorization task (accident, divorce etc.). The closer approach is undeniably those of Molinari and Tacla in [Molinari 2011], where the authors proposed a state jurisprudence ontology (from Paraná) called JurisTJPR which is depicted in Figure 2.

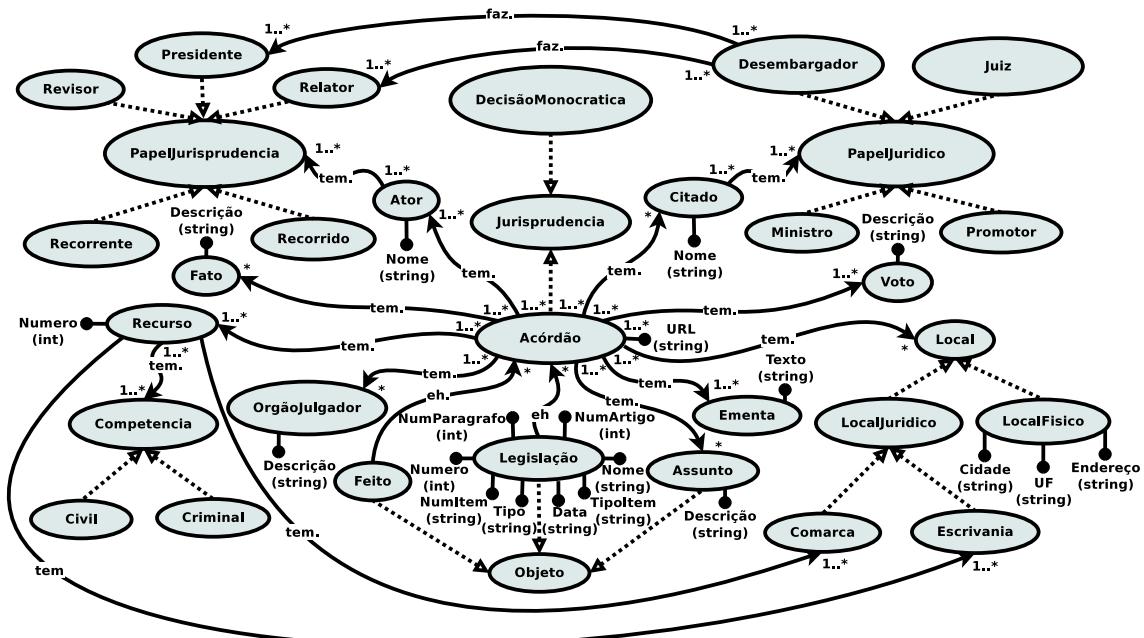


Figure 2. A graphical view of the Ontology JurisTJPR

The interpretation in OWL in the Figure 2 is summarized as follows: ellipses represent the concepts, dotted lines represent the inclusions between *concepts*, rounded edges represent *data properties*, curved oriented edges represent *object properties* (labeled by their names). The cardinalities represent the use of *universal restrictions* (\*), *universal* and *existential restrictions* (1..\*) or *universal* and general *cardinality restrictions* (n..\*, \*..m, n..m). The cardinalities of the *target concepts* are involved with their *object properties* in the *restrictions* of the *source concepts* while the cardinalities of the *source concepts* are involved with their *inverse object properties* in the *restrictions* of the *target concepts*.

## 4. Competency questions

We followed the methodology introduced in [Grüninger and Fox 1995] in order to gather some hints about entities that have to be captured by our ontology. In this paper, the authors claimed that designers should define with some experts of the concerned domain some competency questions that the ontology should support. Then, we collected competency questions from experts involved in the research of jurisprudences supporting real court decisions. After analyzing them, we identified 9 query patterns for which a jurisprudence portal should be able to answer for any conjunctions of any subset of these 9 patterns. The Table1 describes the different patterns. We illustrated each pattern through the example of a jurisprudence research concerning the crime of *a falsification of a driver's license by a foreign*.

PATTERN 1	Looking for judgments with certain keywords <i>Give me all the judgments about foreign and driver's license</i>	<b>ementa</b> tese, dispositivo
PATTERN 2	Looking for judgments given law fields <i>Give me all the judgments in criminal cases</i>	<b>Matéria</b> —
PATTERN 3	Looking for judgments by kinds of appeal <i>Give me all the judgments in appellate procedure</i>	<b>Recurso</b> —
PATTERN 4	Looking for judgments about an specific subject <i>Give me all the judgments concerning a falsification</i>	<b>Assunto</b> —
PATTERN 5	Looking for judgments by specific crimes <i>Give me all the judgments about an usage of a false document</i>	<b>Fato</b> —
PATTERN 6	Looking for judgments by law articles <i>Give me all the judgments using the article 304 CP</i>	<b>Legislação</b> uri
PATTERN 7	Looking for judgments of specific courts <i>Give me all the judgments in the TRF of the 2nd region</i>	<b>ÓrgãoJulgador</b> TF TSB TJ
PATTERN 8	Looking for judgments in specific time slots <i>Give me all the judgments since the year 2015</i>	<b>data</b> —
PATTERN 9	Looking for judgments by judges (2nd instance) <i>Give me all the judgments pronounced by João Perreira Costa</i>	<b>Desembargador</b> —

**Table 1. Competency questions gathered from experts from a federal court**

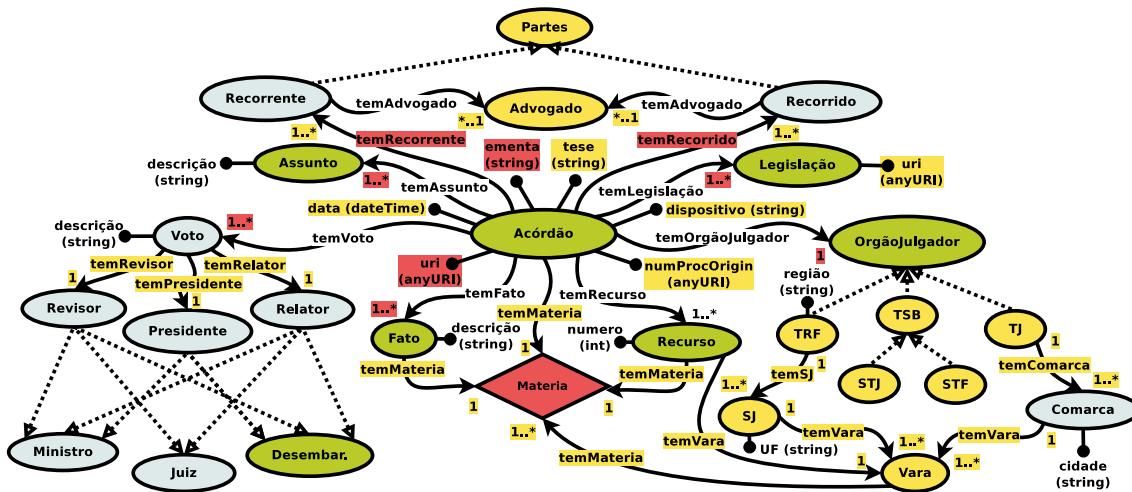
The query patterns obtained allow the identification of the entity types, their attributes and relations between them (labeled in portuguese in the Table1). The entities in a green cell were those identified by the competency questions already present in the state jurisprudence ontology, whilst the entities in a yellow cell were those also identified but not present in the ontology JurisTJPR. Entities in a red cell were those for which with respect to the expert interviews we changed the nature.

## 5. Ontology upgrade

Depicted in Figure 3 and following the same color code, we substantially upgraded JurisTJPR to integrate the federal entities inside an ontology called JurisJFES. The same color code is kept from the previous section to highlight the entities involved inside possible queries and the modifications performed. About this last point, we changed some natures of JurisTJPR entities.

We list here the crucial changes:

- Enumerations: the diamond Matéria represents an enumeration (constructor in  $\mathcal{SROTQ}$ ) of the law areas (e.g. penal, civil, administrative, military, etc.)
  - Object Properties: the two object properties temRecorrido and temRecorrente were created (instead of only temAitor) relaxing the “rigidity” of the object’s class.
  - Data Properties: the uris are introduced for a better designation of the pieces of law (Legislação) or the judgments (Acórdão) by LexML standard for example.
  - Subsumptions: a disjunction is used to express the superclass of Revisor, Relator and Presidente; TRF, TSB, TJ are a kind of OrgãoJulgador.
  - Restrictions: some existential and cardinality restrictions were modified.



**Figure 3. A graphical view of the Ontology JurisJFES**

Note that the ontology JurisJFES is available in <git://ontohub.org/jurisjfes.git>.

## 6. Perspectives

In this paper, we were introducing a very specific issue concerning about the semantic exposition of the Brazilian jurisprudences in the crossroad of two domains: the computational ontologies and the justice. After, describing the particular domain, we intended to tackle, we presented the results of our bibliographical investigations. Then, we were able to design a federal jurisprudence ontology by confronting an existing state jurisprudence ontology with a set of query patterns that we gathered from expert interviews. This ontology should be able to support interoperability between the federal regional tribunal in Brazil. Such practices would also open promising fallouts in terms of applications and researches. For example, when a judicial case is exceedingly singular (few if no Brazilian jurisprudence already available in the repositories), some professionals of law may have to investigate among the foreign jurisprudences. Performing alignments with other well established vocabularies such that Akoma Ntoso or EUR-lex would open the way for a real worldwide exposition of jurisprudences. Finally, two challenges can be considered: on the one hand, powering Brazilian jurisprudences repositories in the Linked Open Data cloud by providing endpoints and alignements, while on the other hand setting up an infrastructure performing some semantic similarities among the jurisprudences to take advantage of the new ontological layer.

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